

A MATTER OF SURVIVAL

Report of the Global High-Level Panel
on Water and Peace



A MATTER OF SURVIVAL

**Report of the Global High-Level Panel
on Water and Peace**

The Report of the Global High-Level Panel on Water and Peace is part of the Blue Peace initiative.

Blue Peace



This Report would not have been possible without the support of the Co-Convening Countries of the Panel: Cambodia, Colombia, Costa Rica, Estonia, France, Ghana, Hungary, Jordan, Kazakhstan, Morocco, Oman, Senegal, Spain, Slovenia, and Switzerland. Special acknowledgment goes to Costa Rica, Jordan, Senegal and Switzerland who hosted meetings of the Panel.

With the support of:



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

**Swiss Agency for Development
and Cooperation SDC**



**UNIVERSITÉ
DE GENÈVE**

Contents

Abbreviations and Acronyms	2
Chairman's Foreword	3
Synopsis	6
Chapter 1: The Drama of Water	11
Chapter 2: Into the Abyss: Water in Armed Conflicts	21
Chapter 3: An Ounce of Prevention: International Water Law and Transboundary Water Cooperation	33
Chapter 4: Quantity and Quality: Strengthening of the Knowledge-Based and Data-Driven Decision Making and Cooperation for Security and Peace	43
Chapter 5: People's Diplomacy, Inter-Sectoral Water Management and Decision Making	53
Chapter 6: Financial Innovation for Water Cooperation	61
Chapter 7: In Pursuit of Agency: New Mechanisms of Water Diplomacy	69
Chapter 8: Water as an Asset for Peace: Conclusions and Recommendations	75
Annexes	81
References	90

Abbreviations and Accronyms

ADB	Asian Development Bank
AIIB	Asian Infrastructure Investment Bank
ASEAN	Association of Southeast Asian Nations
CESCR	Committee on Economic, Social and Cultural Rights
COP	Conference of the Parties
EBRD	European Bank for Reconstruction and Development
ESCWA	United Nations Economic and Social Commission for Western Asia
ESG	Environmental, Social and Governance Principles
ENMOD	Environmental Modification Convention
EU	European Union
FAO	Food and Agriculture Organization
IFC	International Finance Corporation
IW	International Waters Program of the Global Environment Facility
GEF	Global Environment Facility
GEMS	Global Environment Monitoring System
GHSF	Global Hydrometry Support Facility
GIF	Global Infrastructure Facility
GIS	Geographical Information Systems
GOWP	Global Observatory for Water and Peace
GWH	Geneva Water Hub
ICC	International Criminal Court
ICCPR	International Covenant on Civil and Political Rights
ICESCR	International Covenant on Economic Social and Cultural Rights
ICMM	International Council of Mining and Metals
ICRC	International Committee of the Red Cross
IHL	International Humanitarian Law
ILC	International Law Commission
iMOMO	Innovative Monitoring and Modelling
IOWater	International Office for Water
IWRM	Integrated Water Resources Management
LMCM	Lancang-Mekong Cooperation Mechanism
MDB	Multilateral Development Bank
MRC	Mekong River Commission
OIC	Organisation of Islamic Cooperation
OMVS	Senegal River Basin Development Organization (Organisation pour la mise en valeur du fleuve Senegal)
PBC	Peacebuilding Commission
PPP	Public-Private Partnership
SADC	Southern Africa Development Community
SCADA	Supervisory Control and Data Acquisitions
SDC	Swiss Agency for Development and Cooperation
SDGs	Sustainable Development Goals
SFG	Strategic Foresight Group
TWAP	Transboundary Water Assessment Programme
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNECE	United Nations Economic Commission for Europe
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNSC	United Nations Security Council
UNSGAB	UN Secretary-General's Advisory Board on Water and Sanitation
VCP	Voluntary Code of Practice
WASH	Water, Sanitation and Hygiene
WEF	World Economic Forum
WHO	World Health Organization
WINS	Water Information Network System
WMO	World Meteorological Organization
1992 UNECE Water Convention	Convention on the Protection and Use of Transboundary Watercourses and International Lakes
1997 UN Watercourses Convention	UN Convention on the Law of the Non-Navigational Uses of International Waters

Chairman's Foreword

Future historians may look back at the first decades of the 21st century as the time of dramatic global challenges and wavering global responses. Never in human history has the world been as interconnected and interdependent as it is today. Yet never in human history has the gap between the awareness of the global challenges and the actual level of global cooperation been as deep as it is now. Global peace in our era must be much more than the mere absence of a world war. Peace today requires strong and sophisticated mechanisms for the fostering of global security and all forms of global cooperation. Effective global cooperation is needed for the sustainability of the Earth's natural environment, for economic and social development worldwide, and for the protection of our common humanity and dignity.



Dr Danilo Türk, Chairman

One of the key areas of our common future is water, thus international water cooperation is an imperative. Its importance is generally recognized – as witnessed in the pronouncements of the UN Millennium Development Goals of 2000 and the more recent Sustainable Development Goals of 2015. However, the actual level of international water cooperation leaves much to be desired. In addition, water problems are becoming ever more central in the armed conflicts of our era, a tendency that serves as a dramatic reminder of the fundamental nexus between water, security and peace.

These considerations have led a group of fifteen UN Member States to initiate the creation of the Global High-Level Panel on Water and Peace. The Panel was launched at a ministerial meeting in Geneva on 16 November 2015. The fifteen Co-Convening Countries are: Cambodia, Colombia, Costa Rica, Estonia, France, Ghana, Hungary, Jordan, Kazakhstan, Morocco, Oman, Senegal, Slovenia, Spain, and Switzerland.

The Global High-Level Panel on Water and Peace was asked to study the nexus between water and peace, in light of the experiences of our era and to make recommendations for water as an instrument of peace. The Panel was composed of fifteen members acting in their individual capacities. We were tasked with preparing a report within two years and offering recommendations that would help policy makers in the future. The Panel was also asked to work in cooperation with the relevant stakeholders, notably the UN, and to hold consultations to get inputs from experts, policy makers and other relevant actors in different parts of the world.

The Panel met four times between November 2015 and May 2017 to discuss linkages between water and peace, to conduct its analysis and to formulate its recommendations. The first meeting was held in Geneva, Switzerland in November 2015. The second meeting was held in Dakar, Senegal in April 2016, while the third meeting was held in San Jose, Costa Rica in December 2016. The fourth and final meeting of the Panel was held in Amman, Jordan in May 2017. The Panel met with experts and policy makers, as well as with civil society organizations in the regions where the meetings were held. These consultations provided the Panel with the opportunity to learn about the diversity of problems and about the

common denominators in the search for solutions. The Panel is grateful to the Governments of Switzerland, Senegal, Costa Rica and Jordan, as well as to the University for Peace in San Jose and the Royal Scientific Society in Amman for their hospitality and substantive assistance to its work.

In addition to the core analytical work and the formulation of recommendations, the Panel members wished to emphasize the cultural dimensions of the understanding of water as an instrument of peace. Water has inspired artists from the early times of all the world's civilizations. The Panel wished to pay tribute to this artistic aspect of water and, at the same time, take advantage of the musical expression of the message of water as a factor of peace. This is why, at each of the four meetings, a composer from the region where the meeting was held, composed a movement of the Symphony for Water and Peace. This work was completed in parallel to the Panel's own activities. We are convinced that the Symphony will add a strong message of water as an instrument of peace, in addition to our report.

The Panel also took advantage of expert consultations, organized in addition to our own meetings. Eight think tank roundtable discussions were organized in Geneva. Individual consultations were held with over one hundred experts and policy makers from all parts of the world on diverse occasions during the last two years. Several Panel members also prepared working papers to elucidate various substantive issues discussed in Panel meetings.

On 22 November 2016 the UN Security Council conducted, at the initiative of its President at the time, Senegal, the first ever thematic debate on water, security and peace. I was asked to brief the Security Council about the Panel's work. The subsequent discussion, in which 69 UN Member States, including all fifteen members of the Security Council, participated, showed a growing sense of urgency on the issues of water and peace, and readiness to continue the discussion with a view to developing adequate responses. Several Council members expressed interest in a discussion of the report, once it is launched and presented to the UN.

This interaction with a wide variety of experts and policy makers, as well as representatives from civil society, and the business and scientific communities provided the Panel with an opportunity to learn about the variety of problems and the necessary directions for policy making in the future, and to prepare the current report in 2017. The text of the report proceeds from the facts of "the drama of water", that is a set of circumstances characterized by the growing scarcity of freshwater, deteriorating water quality, and the adverse effects of existing patterns of water use on the available water quantity and quality in many parts of the world. Moreover, the overwhelming proportion of the physical effects of climate change is transmitted through water, a factor likely to exacerbate the drama in the coming years. All of these phenomena are creating pressure around water and further weaken international security in many parts of the world.

These tendencies themselves call for stronger and more coherent global cooperation on water. In addition, the question of water resources and installations during armed conflicts is becoming increasingly serious. The Panel studied the problem of water in contemporary armed conflicts in which water resources and installations are increasingly targets of attack or used as weapons of war. The Panel recommends a number of measures relating to the protection of civilians in armed conflicts, to the support of humanitarian organizations and, above all, for a coherent policy on the protection of water resources and installations in the situations on the agenda of the UN Security Council.

The Panel is firmly of the view that international water cooperation should be developed into a major instrument used in strengthening international stability and peace, and conflict

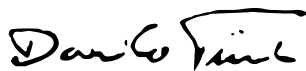
prevention. International Water Law – as developed in two UN conventions on international watercourses and lakes, and in a number of basin-specific agreements – offers a good platform for such a role. Other instruments have to be developed such as an integrated global system of water data collection, an improved set of practical measures to strengthen inter-sectoral cooperation in both the preparation of water projects and ongoing activities, and innovative financial instruments to strengthen transboundary water cooperation. The Panel proposes the creation of an international Blue Fund as an innovative instrument to advance international water cooperation.

Although current experience has reaffirmed the importance of transboundary water cooperation as a significant instrument of international stability and peace, it is not yet fully used in the water basins where its role is needed. This underlines the importance of the further evolution of water diplomacy and the development of the capacity to strengthen existing activities to leverage water for peace. Therefore, the Panel recommends the creation of a Global Observatory for Water and Peace as an instrument of water diplomacy dedicated to the strengthening of existing activities in knowledge management, coordination of activities and consultations available to states and other relevant actors capable and willing to develop international water cooperation to new levels.

The Panel hopes that people around the world will read this report and reflect on both the tasks ahead, as well as the urgency of these tasks. We also hope that decision makers at the UN Member States level, as well as leaders of regional organizations and the UN, will reflect upon our recommendations and will take the appropriate actions.

Now that the work of the Panel has come to its conclusion, I wish, on behalf of all the members, to thank the Geneva Water Hub for its support and assistance as the Secretariat. In the same spirit, I wish to thank the Strategic Foresight Group, a think tank from Mumbai, India, for the precious inputs in the preparation of this report, the large number of important substantive consultations with experts worldwide and organizational assistance in the preparation of the Panel sessions. We are grateful to the Governments of all fifteen Co-Convening Countries for their initiative and political support. Our special thanks go to the Government of Switzerland for the gracious hospitality provided in all the venues where the Panel conducted its meetings.

Ljubljana, 14 August 2017



Dr Danilo Türk
Chairman
Global High-Level Panel on Water and Peace

Synopsis

TOWARDS AN EFFECTIVE INTERNATIONAL COOPERATION FOR WATER AS A DRIVER OF PEACE

The Drama of Water

The world is facing the drama of water. Around two billion people lack access to safe drinking water. Most of them live in fragile, often violent regions of the world. In contemporary armed conflicts, water resources and installations are being increasingly attacked and used as weapons of war. Moreover, water scarcity is exacerbated in a world with a growing population facing human-induced climate change. Despite these problems, humanity will have to find ways to produce 50 percent more food and double its energy production by the middle of the century.

A fundamental rethinking of international water cooperation is essential, with the UN at the center of efforts for the necessary policy and institutional changes. The UN General Assembly should convene a full-fledged intergovernmental Global Conference on International Water Cooperation, with the aim of formulating a cooperation strategy and defining its specific priorities, and devising an action plan for the five-year period following the Global Conference.

Into the Abyss: Water in Armed Conflicts

The increasing tendency in a number of contemporary armed conflicts is to make water resources and infrastructure targets of attack or weapons of war, particularly in urban areas. These practices are flagrant violations of International Humanitarian Law and must be condemned. States have an obligation to respect and ensure respect for and compliance with International Humanitarian Law. The international community as a whole should assist humanitarian organizations since a permanent, long-term partnership between humanitarian organizations and local providers of services is of great importance for the effective protection or restoration of water infrastructure.

International efforts to maintain peace and security have to include effective policies for the protection of water infrastructure against all attacks, including terrorist attacks, while giving special priority to the humanitarian needs of affected civilian populations. The UN Security Council bears primary responsibility in this regard and should consider adopting, within its action for the protection of civilians in armed conflict, a resolution on the protection of water resources and installations in all the situations on the Council's agenda.

An Ounce of Prevention: International Water Law and Transboundary Water Cooperation

An ounce of prevention is worth a pound of cure. International Water Law has developed a number of principles, norms and institutions that provide the basis of international water cooperation and result in greater stability and conflict prevention. The UN Convention on the Law of the Non-navigational Uses of International Watercourses (1997 UN Watercourses Convention) and the UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992 UNECE Water Convention) are the essential international instruments in this regard. The principle of equitable and reasonable utilization of watercourses and the obligation not to cause significant harm constitute the core around which appropriate international regimes can be developed. The right to safe drinking water and sanitation is recognized as a moral imperative of our time and as a human right.

However, in many areas of the world much still remains to be done to expand transboundary and regional water cooperation to the desired level. This need applies to river basins, including some traditionally-sensitive river basins, as well as to internationally shared aquifers. The latter need is critical as the existing level of international cooperation is still far from satisfactory: out of approximately 400 internationally shared aquifers there are only 5 where international agreements exist. Transboundary water agreements and institutions, as well as the relevant "soft law" instruments represent valuable tools that should be utilized more fully.

Quantity and Quality: Strengthening of the Knowledge-Based and Data-Driven Decision Making and Cooperation for Security and Peace Building

Changes affecting water quantity such as droughts and floods – increasingly provoked by the effects of human-induced climate change – require intensified international cooperation and stronger institutions. At the same time, deteriorating water quality in many regions of the world, partly a result of the same causes, needs to be urgently addressed. Another problem exists in those internationally shared aquifers where the withdrawal of groundwater is greater than nature's ability to recharge the particular aquifer. Often the actual knowledge about the situations of aquifers is inadequate while the process of depletion continues. The technical, legal and policy instruments available to address these issues differ from region to region, and from country to country.

Therefore, monitoring and data sharing is an important task that should be prioritized at the global level. A strong, integrated global data and monitoring system needs to be developed on the basis of ongoing work by UNESCO, WMO, and UNEP. Another vital undertaking relates to the application and further development of international water quality standards, both regional and global. And finally, it will be necessary to overcome the existing fragmented institutional landscape related to water issues.

People's Diplomacy, Inter-Sectoral Water Management and Decision Making

Since water management and transboundary water cooperation affects people's health and well-being directly, and therefore carries an important ethical dimension, water governance in all its forms has to allow all relevant stakeholders to participate in decision making. Moreover, the trade-offs necessary between the various uses of water such as agriculture, energy generation, mining, human consumption, and others, have to be carefully considered, while respecting the needs of all those concerned. Although most of the decisions taken in these situations are made within states, good practices should be studied and lessons learned internalized. When decisions are taken at the transboundary water cooperation level, arrangements should be made to allow the participation of all stakeholders.

Transparency and data sharing are particularly important aspects of decision making relating to water, and governments are well advised to ensure the necessary multi-stakeholder dialogue platforms. For these to be operated effectively, it is necessary to invest systematically in water education at all levels, including the empowerment of women. Best practices should be studied and lessons learned should be applied by all governments and other stakeholders. The UN Global Compact, which involves tens of thousands of private companies around the world, would be instrumental in developing an appropriate voluntary code of practice on water management.

Financial Innovation for Water Cooperation

Since fostering transboundary water cooperation is an important priority in our era, it is necessary to develop sustainable financial mechanisms specifically aimed at promoting water as an instrument of peace. Transboundary water infrastructures such as dams and irrigation systems are currently financed by a variety of public and private sector investors, with funding available through existing financial facilities such as the International Waters (IW) Program of the Global Environment Facility (GEF), other climate finance mechanisms, and by bilateral and multilateral donors. The available conventional finance should also be used effectively to promote transboundary water cooperation projects.

Additional incentives are also necessary, and could include preferential and concessional finance for transboundary collaborative projects in water resources and infrastructure of a significant size. Incentives such as interest subsidies, financing of preparatory costs and insurance costs, as well as the provision of matching grants could also be provided. The Panel recommends the creation of a Blue Fund for these purposes. In addition, we believe that it is important to create a safe space, i.e. an opportunity for pre-negotiation consultations and other activities occurring at an early project development stage. This would help stakeholders address the major implementation problems well in advance, prepare projects proactively, increase confidence among all stakeholders, and would significantly help the process of financial decision making.

In Pursuit of Agency: New Mechanisms of Water Diplomacy

A variety of international institutions are working on water issues, ranging from research and knowledge management organizations, river basin organizations or transboundary water management systems, to regional organizations and a variety of UN actors. While all of these institutions are doing important work and contributing to international water cooperation, what is needed now is an institutional setting that connects these key actors, and reinforces and complements the existing frameworks, initiatives and expertise. In other words, there is a need to leverage water as an instrument of cooperation and peace. We need a new mechanism to pursue “agency” as an increased capacity to act together, and not as another institution.

The Panel thus proposes the Global Observatory for Water and Peace (GOWP) to facilitate assistance to governments in using water as an instrument of cooperation, in avoiding tension and conflicts, and to build peace. The GOWP would work closely with existing organizations at the global and regional level, which specialize in water cooperation and harnessing the potential of water in building peace. The new mechanism would focus on hydro-diplomacy beyond joint management, and would also engage in consultative activities necessary for the creation of “safe spaces” for financing transboundary water cooperation projects.

Water as an Asset for Peace: Conclusions and Recommendations

The Report of the High-Level Panel on Water and Peace consists of seven chapters covering the main areas of our analysis. Each chapter is concluded by a set of specific recommendations outlining further action. The Panel offers general conclusions and summarizes all of its recommendations in the final chapter, thus allowing the reader to see the whole picture of suggested further activities. The Panel hopes that its conclusions and recommendations will help decision makers develop a coherent vision of necessary future activities and assist in practical policy making.



CHAPTER 1

The Drama of Water

Water is life. It is a fundamental condition of human survival and dignity, and is the basis for the resilience of societies and of the natural environment. Unlike other natural resources, water has no substitute: the only substitute for water is water.

Scarcity

Water is scarce: about two billion people still lack access to safe drinking water. Most of them live in fragile, often violent regions of the world where water is a matter of life and death. The growing imbalance in global water supply and demand leads to tensions and conflicts, and could potentially evolve into a widespread threat to international peace and security. Water deprivation is increasingly seen as a fundamentally political and security problem, and no longer simply as a problem of human development and environmental sustainability.

Water and water scarcity are becoming serious security threats to a world with a growing population, facing human-induced climate change. By mid-century, close to four billion people – about 40 percent of the world's population – will live in water-stressed basins. This number will probably grow when the projected effects of climate change lead to diminished crop yields, while triggering droughts, floods and other weather extremes. At the same time, 40 percent of the world's population lives in shared river basins and aquifers that are areas of potential conflict.

Water plays a key role in the climate systems. An overwhelming proportion of the physical impact of climate change is transmitted through water. In other words, water is the primary medium through which climate change influences the Earth's ecosystems and biological processes, and thus the livelihood and well-being of societies. Higher temperatures and extreme weather conditions affect the temporal and spatial patterns of rainfall, snowmelt, river flows and groundwater, and further deteriorate water quality. While the effects of climate change are felt all over the world, their greatest impact is on the food security and displacement of vulnerable groups in developing countries. The resulting rise in migration and uncontrolled urbanization will further increase pressure on already limited water resources.

Yet in the face of all these problems, humankind has to find ways to produce 50 percent more food in the next 25 years, as well as to double energy production. These activities require massive water resources – both in order to meet the needs of the growing population and to maintain environmental conditions critical for the functioning of life support systems.

Water scarcity adds enormous pressure to the existing competition among the uses of water, including human consumption, food production and irrigation, mining and manufacturing, energy production, and environmental services. This inevitably leads to tensions. These competing needs,

coupled with dramatically growing demands, are therefore likely to exacerbate security problems related to future water use.

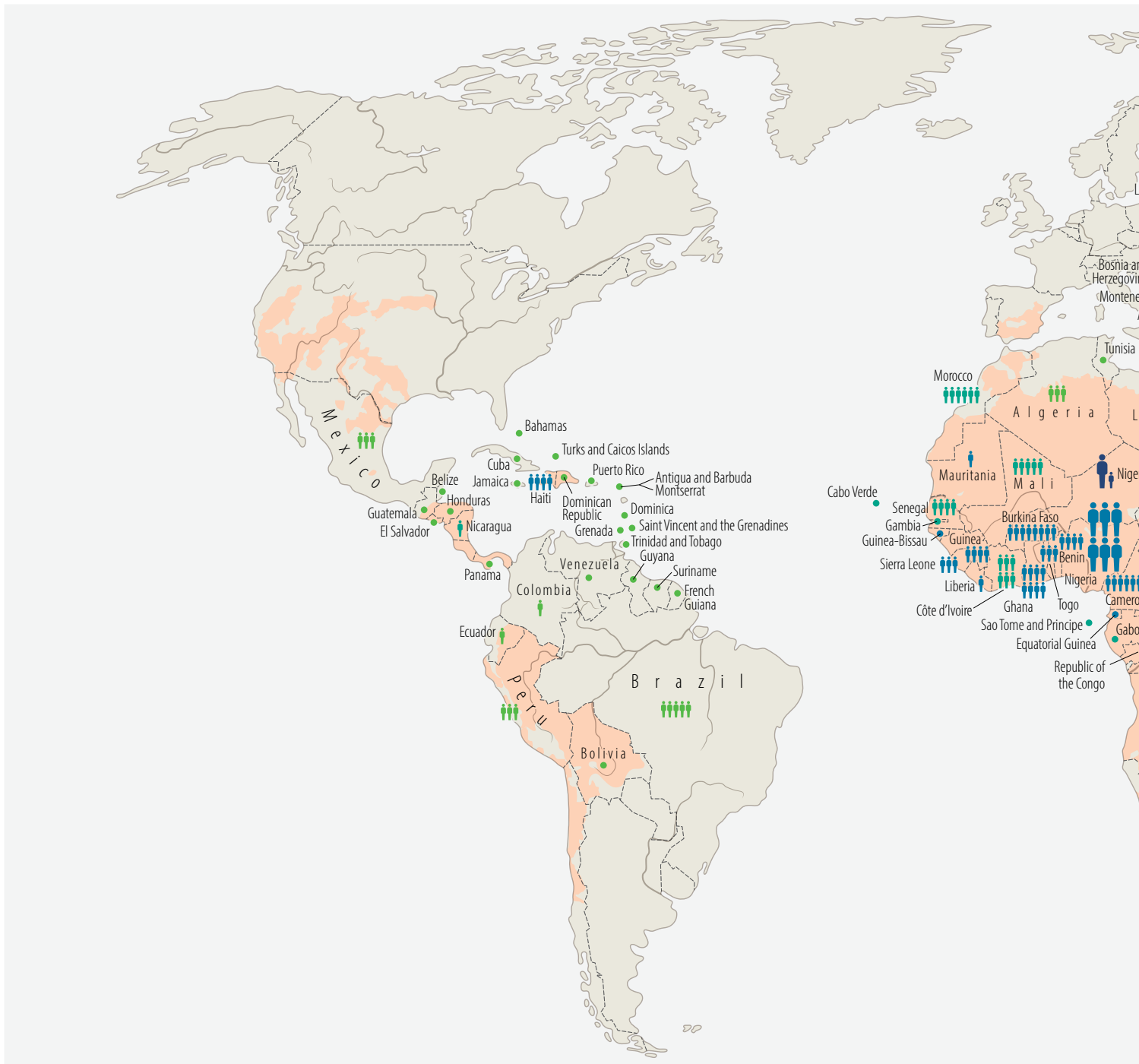
These alarming global realities can only be fully understood in light of the limited quantity of water, the finite nature of water resources and the expected imbalances between different regions of the world, as well as the rapidly sinking water tables in many of the world's aquifers.

Freshwater represents only 2.53 percent of the total water of the world. Over two-thirds of this water (68.7 percent) is frozen in polar caps, continental ice sheets, permafrost and mountain glaciers. Liquid freshwater is primarily found underground (more than 90 percent). Surface water in rivers and lakes (0.26 percent) and atmospheric water (0.04 percent) represent only a small volume of total freshwater.

These figures need to be compared with the basic trends in water consumption. The global availability of freshwater is approximately 5500 cubic meters per person per year. This represents a decrease of 37 percent since 1970 and the number is shrinking further. While the size of the world's population has tripled in the past century, water withdrawal has increased by a factor of six. Attempts to increase availability of water resources through reconstitution processes, such as recharging groundwater storages, have not kept pace with the rate of discharge and exploitation.

Freshwater is also unevenly distributed around the world. Nine countries – Brazil, Russia, the United States, Canada, China, Indonesia, India, Colombia and Peru – share 60 percent of the world's water reserves. This is only one aspect of the uneven distribution of water. Asia accounts for 61 percent of the world's population, but has only 36 percent of available water resources, while Latin America, with 6 percent of the world population, has 26 percent. The Middle East and North Africa are the most exposed to the dangers resulting from the scarcity of water and severe water shortages. An additional problem arises when water resources are unevenly distributed within countries.

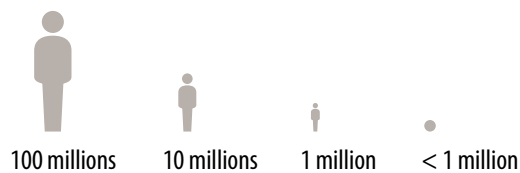
It is widely accepted that water crises may be among the most dangerous developments in the future. In 2015, the World Economic Forum (WEF) concluded that global water crises would be the biggest threat facing the planet in the next decade. In the WEF's subsequent global risk reports, water crises have consistently figured among the highest risks for the coming fifteen years.



Drinking water access

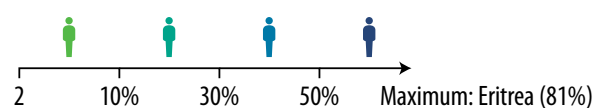
Number of people without basic access to drinking water

Absolute



Maximum: India (163 millions)

Relative (in percent of population per country)

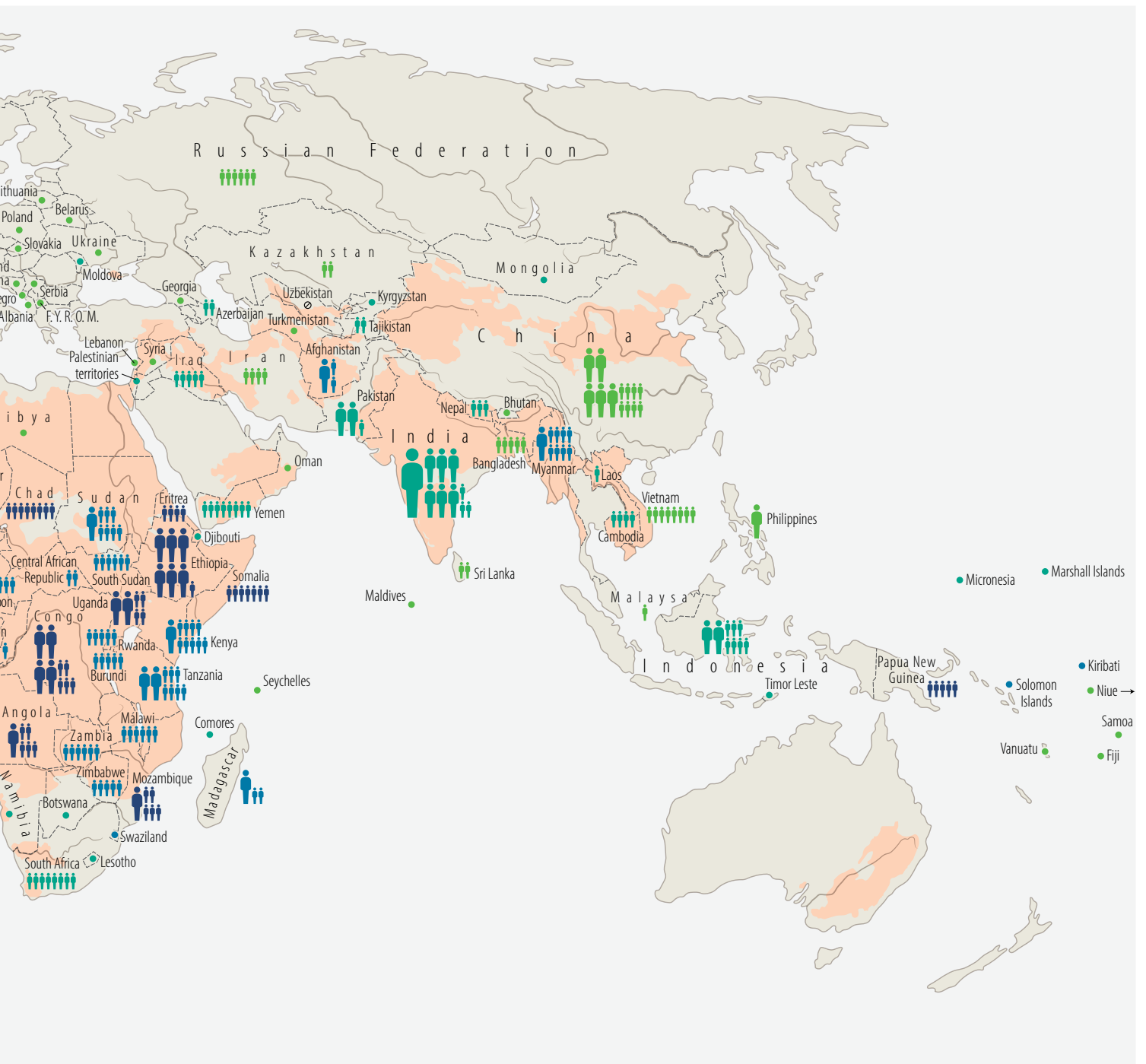


High water scarcity

∅ No data

Source: World Wildlife Fund (<http://waterriskfilter.panda.org/en/Maps>); WHO / UNICEF - Joint Monitoring Programme for Water Supply and Sanitation (JMP) (→ <https://washdata.org>)

Map produced by Zoi Environment Network, August 2017



Armed Conflicts

Water shortages produce a variety of negative influences on international peace and security. Most of these are readily identified, and range from direct confrontation over water and use of water resources as instruments of intimidation to more indirect consequences. Droughts in one part of the world, for instance, can lead to rising food prices and the deterioration of socio-economic conditions in other parts of the world, thus exacerbating tensions and triggering conflicts.

There is a clear link between water shortage and violence; water shortage has been an essential factor leading to armed conflicts in many cases. In Syria, a protracted period of drought and a sinking water table in the eastern part of the country caused a substantial displacement of the population to urban areas in the western regions. This migration provoked social turmoil that led to the outbreak of hostilities. In Yemen both the crisis and the armed conflict were fueled by a severe and life-disrupting water shortage. In Darfur water has been one of the main causes of the armed conflict.

Many transboundary water basins are located in areas marked by interstate tensions and, in some places, armed conflicts, both among, and within states. Although water, historically, has rarely been the direct cause of armed conflicts, the future may not resemble the past since the population continues to grow. Water shortages and tensions over water quality can spiral into armed conflict and war. In recent years, water has been increasingly used as a weapon of war by non-state actors, such as in Darfur, Somalia, Iraq and Syria.

Dire warnings have been expressed in the past decades by Secretaries-General of the UN. On the occasion of World Water Day in 2002, Kofi Annan warned that “fierce national competition over water resources has prompted fears that water issues contain the seeds of violent conflict.” He went on to say: “If the entire world’s peoples work together, a secure and sustainable water future can be ours.”

His successor, Ban Ki-moon, addressing the UN General Assembly, said on 6 February 2008: “Many of today’s conflicts around the world are being fueled or exacerbated by water shortages and climate change is only making the situation worse.” He also pointed out that “water is a classic common property resource. No one really owns the problem. Therefore, no one really owns the solution.”

Collective efforts are clearly needed, as the UN Secretaries-General have emphasized. In situations where water has been among the major drivers of armed conflict, it will be necessary to include a solution to the water issues in peace strategies. Durable and sustainable peace is not likely to last without an effective solution to the water problem. For centuries, water cooperation has been an important component of peace treaties. Water cooperation has been a part of numerous peace treaties in Europe: the Rhine and the Danube water cooperation systems that exist today are the results of peace agreements in Vienna (1815) and in Paris (1856), respectively. They initially

focused on navigation, but later evolved into more complex and systematic regulations of water economics and ecology. In our era, the Framework Agreement on the Sava River Basin (2002) established the first multilateral framework for the countries of the former Yugoslavia, following the war in the region. Water served as a driver of peace.

A Driver of Peace

Established water cooperation systems in shared river basins are an important feature of international cooperation and of the pursuit for solutions to water problems. Some of them, like the European examples mentioned above, were the result of armed conflicts. Others, such as the Shared River Basins Agreement between Portugal and Spain (Albufeira Agreement of 1998) came into being through political foresight and sound decision making.

Some transboundary water cooperation systems have proven to be very effective. The Senegal River Basin Development Organization (OMVS - *Organisation pour la mise en valeur du fleuve Sénégal*), involving Senegal, Guinea, Mali and Mauritania, was established in 1972, following both a long history of cooperation through navigation, irrigation and power production on the river, as well as occasional political tension and experience with natural disasters. OMVS is currently an example of a comprehensive, institutionally-developed management system of an international watercourse, which has proved an effective instrument of cooperation among neighboring states. Several cooperation arrangements between countries in North and South America and parts of Asia also serve as good examples.

Water cooperation can be an important factor in strengthening political stability and peace. In a 2015 publication titled “Water Cooperation Quotient,” the Strategic Foresight Group (SFG), a think tank based in Mumbai, India, suggests the following water and war equation: “Any two countries engaged in active water cooperation do not go to war for any reason.” A water cooperation quotient is a way to measure the intensity of transboundary water cooperation and its correlation with maintaining peace and stability between cooperating countries.

Although experience with existing systems of transboundary water cooperation allows us to be optimistic regarding the future of such cooperation, the number of these systems is still relatively small. There are 286 transboundary river (and lake) basins in the world, involving 148 states. Only 84 of these basins have joint water management bodies, and many of these are not considered effective. The number of shared aquifers without joint management bodies – more than 400 – is significantly higher. There is a clear need to strengthen cooperation among riparian countries in these shared water basins and aquifers, both to foster development and to strengthen peace and stability. Transboundary water cooperation systems are important assets of preventive diplomacy, and instruments for effective global support should be devised to strengthen this cooperation. Political commitment and support is necessary and appropriate financial mechanisms need to be put in place.

Although transboundary water cooperation is an important element in the efforts to address the global problem of water and peace effectively, it can only tackle a small part of it. Other water problems that can potentially threaten national, regional and international security and peace must also be identified. The international community is aware of the serious disruptions caused by climate change and of their impact on states, regions and populations, such as mass migration and rapid, uncontrolled urbanization, and the ways to cope with these challenges. These are the early ways to adapt to climate change, and are all strongly linked to water. Adaptation represents a key pillar of the requirement to build climate-resilient societies.

Water issues are a global development problem and need to be approached in a comprehensive manner. Water was seen as an economic development issue in the past, with the environmental dimension added later. In 2010, the UN recognized the human rights dimension of water (A/RES/64/292), with the security aspect being acknowledged most recently. The thematic debate on water, security and peace held by the UN Security Council on 22 November 2016 (S/PV.7818) was a clear example of the recognition of the security aspect of the water problem.

An important phase in this evolution was the adoption of the Sustainable Development Goals by the UN General Assembly in 2015 (A/RES/70/1). Of the 17 major goals, water issues are contained in goal 6 with several other goals also referring to water. Water issues are considered an important priority and are addressed in a manner cognizant of the nexus between water and peace. Goal 6.5 calls for implementation by 2030, of Integrated Water Resources Management at all levels, including through transboundary cooperation, as appropriate. Goal 16

called for the promotion “of peaceful and inclusive societies for sustainable development, and to provide access to justice for all and build effective, accountable and inclusive institutions at all levels.”

The drama of water is a problem of governance.

It is not difficult to establish connections between policies inspired by Goals 6.5 and 16 in a comprehensive implementation process of the Sustainable Development Goals. The concept of water security is of key importance in this context. In a 2013 analytical brief “Water Security & the Global Water Agenda,” UN Water defined water security as “the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems *in a climate of peace and political stability.*” (Italics added)

Water security highlights the centrality of water in achieving a larger sense of security and sustainability of societies. Many factors outside the water realm contribute to water security, ranging from biophysical, infrastructural to institutional, political, social and financial. Water security lies at the center of many security areas, each of which is intricately linked to water.

As the High-Level Expert Group of the Inter-Action Council emphasized in its report in 2016, water is at the center of the nexus of energy, health, agriculture and biodiversity. The crises the planet faces are overlapping and intersecting, and we cannot afford to address them one by one in isolation. But by following



the center of it – water – we can make progress in all other areas of the nexus. Conversely, ignoring the role water plays will make it impossible to achieve the other SDGs.

Achieving water security thus requires interdisciplinary collaboration across sectors, communities and political borders. International cooperation is vitally important in this context.

Faced with new, human-induced patterns of climate change, we have to be aware not only of the consequences of climate change, such as massive displacement and the potential for conflicts within and among regions and nations, but also of the fact that water cooperation can be – and should be – a critical mechanism for the adaptation to climate change. Dialogue, planning and common responses between states represent the potential for the articulation of effective strategies in the management of transboundary waters, both surface waters and – even more critical for the future – shared aquifers. These preventive measures are very cost effective, but they need to be implemented as soon as possible.

Strategies of Peace

The world has to face the drama of water in its many manifestations through a set of carefully devised and sophisticated strategies. These should involve individual states and governments, regional organizations, including transboundary water management systems and global organizations, including the United Nations system and global financial institutions, especially the World Bank. Water issues are not new challenges or tasks for any of these actors. UNESCO and WMO, for example, have been in the vanguard of international action on water issues for decades. UNEP and UNDP have developed significant water programs within their respective terms of reference, while UNECE and ESCWA have important water programs. Coordination mechanisms like UN-Water within the UN system and global stakeholders such as the World Water Forum also have important experience. Activities related to climate change have produced important lessons and recommendations.

So, what is the way forward? The Budapest Water Summit 2016 called for improved water governance by increasing coherence across water-related policies through sound legislation, regulation, institutional arrangements, enforcement, integrity and transparency.

We strongly agree with this appeal. In addition, we believe that the time is ripe to consider, at the global level, a set of strategies to address water matters as issues of peace and security, and to leverage water as a driver of peace.

A set of strategies requires coherence:

- Therefore, **the first task is political**. The vital importance of water for the maintenance of international peace and security must be politically recognized. This will enable the formulation of policies and strategies that are sufficiently comprehensive and coordinated, detailed and data-driven

as well as forward looking, targeted at clearly defined and achievable objectives.

- **The second task is technological**. Water strategies must be supported by strong interdisciplinary research and the development of transformative technologies. Their purpose should be to substantially increase the levels of knowledge about water, to promote water conservation and availability, and to enable wise and rational management that will do no harm but will offer fair and reasonable distribution of water. Although important progress has taken place in water science and technology over the past decades, including in remote sensing and in the improved modeling and control capabilities of the processes, further concentrated research and capacity development are needed. Advanced technologies for water recycling and desalination, technologies for water purification as well as the development of drought-resistant crops must be high on the international agenda.
- **The third task relates to the development of all forms and techniques of water diplomacy**. Obviously, these will have to include existing and well-tested techniques of intergovernmental water cooperation, including in particular the transboundary water management systems. They will also include existing and new diplomatic and humanitarian techniques to address water problems during armed conflicts – both international and non-international. But most importantly, hydro-diplomacy must be strengthened in the framework of conflict prevention strategies. Preventive diplomacy must be well informed about the technical aspects of water problems and, above all, needs to be strongly supported by political leaders.
- **The fourth task requires revisiting and updating what was learned over the past decades**. The world needs an assessment of how valuable the lessons of the past have been and still are in an era of globalization and global change with all its impacts on water resources, in particular on transboundary watercourses, lakes and aquifers. It is forty years since the only UN Conference on Water was held in Mar del Plata, Argentina. That seminal conference brought to the fore the notion of Integrated Water Resources Management (IWRM) which fundamentally changed the water resources development and management scene. Significant global changes and global warming challenges as well as the need for effective implementation of Sustainable Development Goals have created the need to exchange lessons learned and best practices to stimulate and support innovation. This is necessary to set the path towards leveraging water as an important component of peace and conflict prevention. The time has come to convene a full-fledged Global Conference on International Water Cooperation.

The Case of the Jordan Compact

Over one million Syrians, of the more than 13 million who need humanitarian assistance live in Jordan, one of the most water-stressed countries in the world. This large influx of refugees has further reduced freshwater availability for all inhabitants. The pressure on groundwater resources has increased, both in terms of quality and quantity, while competition for water between different economic sectors has also grown. Jordan, therefore, urgently needs to invest in water resources infrastructure development.

The government of Jordan initiated the “Jordan Compact,” a series of major commitments aimed at improving both the resilience of refugees and host communities, thus turning the Syrian refugee crisis into a development opportunity. For example, Syrian refugees can obtain work permits, thus improving their living conditions, including their access to water and sanitation services, and reducing the need of humanitarian assistance.

Source: Global High-Level Panel on Water and Peace, Think Tank Roundtable Summary Report: Refugees and Access to Water: Challenges and Responses, February 2017.



"Oxfam America in Za'atari Camp 2013", Oxfam America, <http://bit.ly/ztsh1Q5>





THE PANEL RECOMMENDS

We share the widely-held understanding that water scarcity and deteriorating quality represent an ever more pronounced conflict-risk multiplier, and that therefore the world needs a fundamental rethinking of the global approach to water issues. The nexus between water, peace and security has to be given urgent attention and thorough consideration in the context of this rethinking.

We welcome the existing engagement of a multitude of actors in this effort and recommend the UN to serve as the vehicle of the much needed policy and institutional changes.

The UN General Assembly has the most important responsibilities in this context, while the UN Security Council is expected to develop a policy framework for the protection of water resources and installations in armed conflicts and in other situations on the Council's agenda.

We recommend that the UN General Assembly convenes a Global Conference on International Water Cooperation with the aim of formulating a strategic framework for global water cooperation and a program of action defining specific priorities for the five-year period following the Global Conference.

Within its primary responsibility for the maintenance of international peace and security, the UN Security Council is expected to design an effective policy framework for the protection of water resources and installations in the situations on the Council's agenda.



CHAPTER 2

Into the Abyss: Water in Armed Conflicts

The increasing tendency to use water resources and infrastructure as targets or as weapons in armed conflicts is of deep concern. In recent armed conflicts, states and non-state armed groups have destroyed and captured water installations. Water supply systems fail: supply lines are deliberately sabotaged or water resources are poisoned to intimidate civilians. Non-state armed groups capture dams and barrages, and use them to flood or starve downstream populations to defeat them. Dams are used to shelter high-value prisoners, while poisoning water harms local civilian populations.

It takes months to repair and restore water supply lines once they are damaged. In the meantime, civilians are displaced, agricultural activities are brought to a halt, and epidemics spread. Humanitarian agencies cannot provide water in large quantities the way they airdrop food and medical packages. The only option is to repair and restore the water systems during ceasefires, but the repaired water systems can be destroyed again, thus creating a vicious cycle.

This use of water resources and infrastructure as a weapon or target in violent conflicts should be condemned, and the international community should be prepared to prevent or mitigate such abuse. States, on the other hand, need to abide by International Humanitarian Law (IHL) and refrain from attacking water infrastructure during war. Moreover, they should cooperate among themselves and with international organizations to prevent non-state armed groups and terrorist organizations from damaging or capturing water resources and infrastructure.

There are many indirect effects of these attacks on water systems.

- Water quality is neglected, often rendering significant portions of rivers and lakes biologically dead;
- Cooperation mechanisms are difficult to establish;
- Large-scale resources need to be raised to restore water systems at a time when competing needs are also required for housing, schools, security and other necessities in a post-conflict scenario.

A Matter of Definition

In order to prevent and mitigate attacks on water infrastructure in armed conflicts, it is necessary to determine whether International Humanitarian Law applies to the particular armed conflict. One problem is the increasing number of non-international armed conflicts in which states deny the existence of armed conflict on its territories, especially in the early stages of the conflict. Since armed conflict is always context specific, the international community has been grappling with defining many armed conflicts, to determine whether they are international, non-international or internationalized.

However, in accordance with IHL, states involved in armed conflicts have the obligation *to respect and to ensure respect* for International Humanitarian Law in all circumstances – as required by Article 1, common to all four Geneva Conventions of 12 August 1949. It must be strongly emphasized that it is therefore the primary responsibility of states to comply with IHL and to use the capacities of the relevant international organizations and arrangements to ensure respect for International Humanitarian Law.

In situations where there are internal disturbances and riots, on the other hand, it is incumbent on the states concerned to apply domestic law, while respecting international human rights standards and the principle of proportionality of their measures with the exigencies of the situation.

Protection of Water Resources and Infrastructure during Armed Conflicts

Civilian objects are afforded protection under IHL, thereby guaranteeing immunity to these objects from attack during armed conflict. Water is also included within the domain of civilian objects. In addition, water by virtue of being “indispensable to the survival of the civilian population” is afforded special protection under Additional Protocols I and II of the Geneva Conventions. The international community should fully harness the provisions of IHL to protect water resources:

- Geneva Convention IV Relating to the Protection of Civilian Persons in Time of War, 1949 (Article 53).
- Additional Protocol to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I) 1977 (Article 54, 55, 56).
- Additional Protocol to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of Non-International Armed Conflicts (Protocol II) 1977 (Article 14, 15).
- Rome Statute of the International Criminal Court (ICC), 1998 (Article 8(2)(b)(ii), 8(2)(b)(iv), 8(2)(b)(xxv), Article 8(2)(e) (xiii)).
- Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques (ENMOD), 1977 (Article I, II).
- 1997 UN Water Courses Convention (Article 29).
- International Covenant on Economic Social and Cultural Rights (ICESCR), Articles 11, 12.
- International Covenant on Civil and Political Rights (ICCPR).

Several provisions of International Humanitarian Law are especially applicable to the efforts to protect water resources and infrastructure during armed conflicts.

Prohibition against attack, destruction or rendering useless water and water infrastructure

Article 54(2) of Additional Protocol I of Geneva Conventions states: “It is prohibited to attack, destroy, remove, or render useless objects indispensable to the survival of the civilian population, such as ... drinking water installations and supplies and irrigation works, for the specific purpose of denying them for their sustenance value to the civilian population or to the adverse Party, whatever the motive, whether in order to starve out civilians, to cause them to move away, or for any other motive.” Similar protection is afforded under Article 14 of Additional Protocol II. Furthermore, this rule is deemed to be customary international law applicable both in international and non-international armed conflicts.

Although it is sometimes argued that the definition of “water installations” is ambiguous, in practice it tends to refer to large entities, which are vital in preventing the starvation of civilians. The quoted provision could also be interpreted to cover situations in which large infrastructure is controlled by a warring party. Article 53 of Geneva Convention IV prohibits occupying powers from destroying property belonging to the state, which is particularly important in the context of water given its necessity for the survival and well-being of the civilian population in the occupied territory.

Prohibition against starvation

In any armed conflict, the starvation of civilians as a method of warfare is expressly prohibited in both international and non-international armed conflicts as noted in Article 54 of Additional Protocol I and Article 14 of Additional Protocol II. A violation of these provisions may be deemed a war crime. Since water is necessary to avoid starvation, the prohibition against starvation given under the Geneva Convention and its Protocols thus applies in the context of water as well.

Prohibition of attacks against installations containing dangerous forces

The Protocols also prohibit the attack on “works or installations containing dangerous forces, namely dams, dykes and nuclear electrical generating stations... even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population” (Additional Protocol I, Article 56). It must be noted that while Protocol I does provide that if these installations are used for “significant and direct support for the military,” then derogation from the rule could be allowed and the object can be attacked. The principles of military necessity and proportionality as laid down under Article 51(5)(b) and 52 of Protocol I would certainly be applicable when deciding upon the derogation mentioned above. The parties to the armed conflict are also under an obligation to ensure that they take all measures necessary to protect civilians and civilian objects (Article 57 of Protocol I).

However, Additional Protocol II applicable in non-international armed conflicts affords no such derogations or exceptions.

Protocol II especially, under Articles 14 and 15 lays down stringent provisions when it comes to the protection of water resources.

Protection of the environment

Provisions of Additional Protocol I give protection to the environment during armed conflicts, as seen mainly in Articles 35 and 55. Article 35 states that: “it is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.” Article 55 focuses on the survival of civilian populations stating that: “1. Care shall be taken in warfare to protect the natural environment against widespread, long-term and severe damage. This protection includes a prohibition of the use of methods or means of warfare which are intended or may be expected to cause such damage to the natural environment and thereby to prejudice the health or survival of the population,” and “2. Attacks against the natural environment by way of reprisals are prohibited.”

Although neither of these provisions directly mentions water, it can be assumed that water, as an integral part of the environment, is afforded protection under these rules, as well as those established to protect the environment.

Furthermore, the Environmental Modification Convention (ENMOD), which came into existence in the context of the Vietnam War, offers some degree of protection to water resources and facilities as well.

In addition,

- The 1997 UN Watercourses Convention further validates this protection under International Humanitarian Law not only for water infrastructure but also for international watercourses. Article 29 states “International Water Courses and related installations facilities and other works shall enjoy the protection accorded by the principles and rules of international law applicable in international and non-international armed conflict and shall not be used in violation of those principles and rules.”
- The Right to Water is guaranteed under International Covenant to Economic Social and Cultural Rights (ICESCR). The General Comment No. 15 adopted by the UN Committee on Economic, Social and Cultural Rights recognizes the right for everyone to have “sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic use” (E/C.12/2002/11). The right entails inter alia the prohibition of threat to the physical security of any person while accessing water facilities and services.
- International Criminal Law under the International Criminal Court Statute declares the intentional destruction of civilian property and the natural environment in an international armed conflict a war crime and water infrastructure could certainly be construed to be included within its ambit (Article 8(2)(b)(iv)). It also prohibits, in an international armed conflict, the use of starvation as a method of warfare, calling it a war crime. Denial of water is a means of starvation (Article 8(2)(b)(xxv)). Due to this broad recognition, the prohibition



on the use of starvation should also be considered a war crime in non-international armed conflicts. With Article 8(2)(e)(xiii) which is applicable in non-international armed conflict, the intentional use of poison is considered a war crime, and could be applied in cases in which water sources are poisoned.

Recent Developments

The evolution of international law in the past decades, especially IHL, provides a solid legal framework for water protection as part of civilian protection in armed conflicts. With the exception of the 1997 UN International Watercourses Convention, the relevant international instruments have also been broadly ratified and accepted by states. Additional ratifications are welcome and continue to be called for.

Compliance problems with IHL in contemporary armed conflicts remain serious, and have been aggravated in several conflicts of our time. Recently a number of international instruments have sought to strengthen IHL. The resolution on “Strengthening of Legal Protection for the Victims of Armed Conflicts” adopted at the 31st International Conference of the Red Cross and the Red Crescent in 2011 is a case in point. The UNEP Assembly adopted an important resolution on the “Protection of the Environment in Areas affected by Armed Conflict” in 2016 (UNEP/EA/Res.15). The 1994 ICRC Guidelines for Military Manuals and Instructions on the Protection of the Environment in Times of Armed Conflict are relevant to the legal regulation and actual conduct of the armed forces of states.

While the normative process intended to strengthen the authority and implementation of IHL continues to be important, the strategic role of water can be seen both in the growing number of armed conflicts in which the warring parties, mainly non-state actors involved in non-international armed conflicts nowadays, tend to use water as a weapon. The fact that many of the conflicts take place in water-stressed areas in the Middle East and North Africa adds to the strategic importance of water in the armed conflicts of our time.

The conflict in Darfur, Sudan is fueled by rivalries between local communities and tribes for access to arable land and water resources. A number of wells were poisoned in a campaign to intimidate local residents during the conflict. Subsequently, water issues were integrated into the Darfur Peace Agreement of 2006 signed by the Government, the Sudan Liberation Movement/Army, and the Justice and Equality Movement.

During the early phase of armed conflict in Libya, Muammar Gaddafi’s forces reportedly shut down two-thirds of Tripoli’s water resources, creating water shortages for a large part of the country’s population.

In Somalia, Al-Shabaab cut water supplies to liberated cities to demonstrate their continued power and presence in the areas they lost to government forces.

These examples demonstrate the ruthless use of water as a weapon of war. A systematic practice was developed in the ongoing armed conflicts in Iraq and Syria, in which since 2014,

Daesh or the “Islamic State” seized large territories in Syria and Iraq. In the course of their military advances, the armed groups seized the Tabqa, Tishrin, Mosul and Fallujah dams on the Euphrates and Tigris rivers, and repeatedly used water as a weapon of war, including against civilian populations.

Daesh has used water as a weapon in three ways: withholding water, flooding and contaminating water supplies. For example, after capturing the Fallujah Dam in early 2014, Daesh first closed the floodgates to deprive the downstream area of water, and then reopened them and flooded large areas downstream. In doing so, it caused significant harm to farmland, livestock and infrastructure, harming the civilian population, with 12,000 families displaced by the flood.

At the same time, Daesh has protected water resources and infrastructure in the areas under its control to ensure reliable water supply and electricity, and thus tried to legitimize its presence there. Furthermore, the group also generated revenue from water (and electricity) services provided in these areas. Despite the fact that government forces, assisted by the anti-terrorist coalition were able to regain control over a number of dams, the problem remains serious.

Another problem is that military conflicts, such as those observed in the Middle East, are increasingly being fought in urban areas. In recent reports on Syria, water resources and installations were attacked by non-state actors and, according to a UN report, at least on one occasion (the al-Feijeh water spring), by government forces as well.

The recent devastating outbreak of cholera in Yemen is largely a consequence of the destruction of water infrastructure by the parties in that armed conflict.

Water resources in cities are crucial for a number of adjacent services and also where water delivery systems are intertwined with other infrastructures. Water storage and delivery systems, pumping stations and water purification plants in cities usually depend on electricity. Longer interruptions of electricity caused by an armed conflict often result in interruptions in the water supply. This, in turn causes further hardships, especially for medical care and education. The centrality of water in these circumstances, in environments where urban armed conflicts are taking place, requires efforts in strengthening the resilience of water systems, an enormously difficult task to accomplish in a war, particularly in situations where water infrastructure is linked to objects that can be legitimate targets of attack.

Displacement

Around 65 million people are currently displaced around the world, mostly as a result of war and persecution. In 2015 alone, an estimated 12.4 million people were newly displaced due to multiple conflicts. While a quarter of displaced people live in refugee camps, the overwhelming majority are hosted in towns and villages, mostly in countries neighboring the armed conflicts.

The United Nations High Commissioner for Refugees (UNHCR), other agencies, and NGOs work to ensure that refugees have access to water and sanitation services both inside and outside of camps, including in urban settings. Water, Sanitation and Hygiene (WASH) services are provided not only for emergency situations but also to ensure that refugees living in protracted refugee situations have long term access to water and sanitation.

The challenges to WASH include military targeting of water points by belligerents, camps that are difficult to reach, and the local impacts of the effects of climate change. Tensions in receiving countries, such as competition for scarce water resources, environmental degradation and water tariff inequalities since refugees receive water mainly free of charge while the local population has to pay for it, further complicate the situation.

UNHCR believes that the right of refugees to work in host countries is a key instrument to enable the refugees to pay for water services, and is the means to empower and integrate them into host communities. However, it is precisely this right to work and the ability to build the self-sustainability of refugees that is lacking in most situations, which further exacerbates tensions around water. On the other hand, in situations where refugees have the right to work and to use land for agricultural use, they are able to earn an income, reduce dependence on humanitarian aid, and increase their capabilities to pay for the provision of services.

A special need relates to situations in long-term refugee settlements, where it is important to develop a good information base regarding the hydrological characteristics and environmental impacts of refugee settlements, both of which need to be included in humanitarian planning.

Since today’s migrations are increasingly caused by heavy rains, floods, and water scarcity, it is encouraging that our level of understanding about the interrelationship between water and migration is improving. It is both possible and essential to integrate migration policies on the one hand, and water governance on the other. In fact, ensuring that migrating populations have water security and the human right to water ought to become an integral part of water governance. Local circumstances and community-based approaches need to be given the appropriate priority in policy making. In this respect – as in many others – good water governance represents an important instrument in the prevention of violent conflict.

The Need to Strengthen International Support to Humanitarian Organizations

Reducing vulnerability and strengthening the resilience of water systems, particularly in urban areas, represents a vital priority in contemporary armed conflicts, and is a fundamental condition for improving the humanitarian situation of civilian populations caught in the crossfire. International humanitarian organizations, as well as the relevant UN agencies, aware of this, have developed numerous valuable practices. In fact, their long-term presence in the field is the most important requirement for success. The successes of the ICRC in restoring water

supplies in the armed conflicts in Iraq and Syria are based on the organization's long-term presence in the region and, especially, on its involvement in the field prior to the outbreak of the conflict. The ICRC already developed a network of good relations with local actors and partners, such as local water boards which, in turn, made it possible to deliver drinking water and to provide other humanitarian aid to those in need.

This type of assistance can face several obstacles including state resistance, witnessed in many situations. In the ICRC's 2015 report "Bled dry: How War in the Middle East is Bringing the Region's Water Supplies to Breaking Point" the following was observed:

"For the men and women of the ICRC's water and habitat unit, often the hardest and most time-consuming part of the job is not coordinating the repairs to damaged infrastructure. Rather it is the negotiations with all parties to the conflict to guarantee safe passage for engineers, technicians and contractors, so they can assess the damage and then make the necessary repairs."

In one instance, it took the ICRC three weeks to negotiate safe access to the main water transmission pipeline, but it only took one week to repair. The urgency of negotiating "water supply ceasefires" is evident in these armed conflicts.

The ICRC partners with local organizations and water boards to help with gaining access to these sites. It is also building skills in geographical information systems (GIS) technology, which will enable the organization to better handle the growing quantity and complexity of information that they receive. Satellite photos and digital mapping systems help the ICRC get a broader overview of the situation and thus better understand, analyze and exchange information. They work with authorities to develop global positioning systems and mechanisms for checking that water points are functioning properly.

Establishing and strengthening ties with local organizations is a very important aspect of improving water infrastructure protection during armed conflicts. Local capacities need to be properly recognized as partners to international humanitarian organizations and UN agencies. In the same vein, and as the experience in Iraq and Syria has shown, accurate information of the local water infrastructure and damages thereto are required to tailor humanitarian assistance adequately. Marking water facilities on publicly available maps with the international special sign for works and installations containing dangerous forces (i.e. three bright orange circles) – as provided for in Article 16 of Annex I to the Protocol I – should help warn warring parties and thus increase the protection of water facilities during armed conflicts.

Cooperation with local actors and partners has proven to be an important element in the work of UN agencies as well. In Syria, UNICEF helped to secure the supply of water to more than 13 million people by providing spare parts, generators, fuel and training to water supply operators. UNICEF has also been providing alternative water resources, such as boreholes and water trucking, when piped water systems are attacked

or damaged. This kind of intervention requires a good level of cooperation with local actors and organizations. UNICEF also supported an agreement with armed opposition groups in Eastern Aleppo in which the Government of Syria agreed to provide fuel for two pumping stations supplying both sides of the city during power supply outages. Negotiations leading to this arrangement marked one of the few occasions in which both parties were engaged for humanitarian purposes and achieved a specific, albeit limited, agreement.

Engaging with local actors and organizations, necessary for the fulfillment of humanitarian tasks, including those related to water, often has to include contact with insurgents and other armed groups. Although such groups seem inherently predatory and hostile, a meaningful engagement can be undertaken while bearing in mind their self-interest for engaging in the talks. The understanding that their compliance with the rules of IHL grants them a modicum of legitimacy is sometimes the way towards progress in both the implementation of humanitarian law as well as in political solutions. There is no "one size fits all" formula here, and engagement at both the local and international level must not be excluded as a matter of principle. A useful guiding principle for this type of engagement is found in Article 56 (6) of Protocol I which states that "The High Contracting Parties and the parties to the conflict are urged to conclude further agreements among themselves to provide additional protection for objects containing dangerous forces."

There are various models of engaging with armed non-state actors in both international and non-international armed conflicts: unilateral declarations, bilateral agreements between governments and armed non-state actors (usually in the context of broader ceasefire agreements), memoranda of understanding involving international NGOs and multilateral undertakings among the armed non-state actors themselves. A promising technique of engagement with armed non-state actors that complies with IHL was created by Geneva Call, an international non-governmental organization. Geneva Call pioneered what became known as "Deeds of Commitment," an initiative that invites armed non-state actors to voluntarily accept external oversight of their practices and to subject themselves to scrutiny by external actors.

Methodology for Protecting Water Infrastructure

As mentioned above, an important issue relates to the identification of water installations for protection purposes. While marking water facilities with the internationally protected signs for works and installations containing dangerous forces is an important and necessary aspect of this effort, it is not sufficient. Identification of potentially threatened water installations and providing the relevant information to humanitarian organizations helps in the coordination of humanitarian assistance and should be encouraged further. In situations involving UN diplomatic and peacekeeping missions or peace-building activities, lists of protected water infrastructure should be made available to the United Nations.

Security and protection of water resources and related infrastructure can also be provided through the use of specific technological devices such as warning systems, anti-hijack systems, password-controlled gates for water facilities, and other security devices.

This is important for the protection of all water installations, including water treatment plants. When treatment plants are attacked, water that could be otherwise used by civilians is left completely unusable. If a wastewater facility is damaged, and untreated water is left to flow, this has a disastrous impact on downstream populations. Moreover, when containers holding chemicals at treatment plants are destroyed, dangerous toxic substances that are lethal for humans, can be released. Since chlorine gas and other commonly used chemicals in water treatment can be deadly during an armed conflict, countries are seeking alternate methods of water treatment, using sodium hypochlorite or ultraviolet light.

Several countries already use advanced technological features to protect water infrastructure. It is important to further develop and use water protection technologies and software, which are effective both in peace and violent conflicts. In addition, the following steps may be helpful:

- Identification of the most critical assets in water and waste water systems to be defined as “vital infrastructures,”
- GPS positioning of those critical assets,
- Strict interdiction to target or occupy those critical points by the parties in the conflict,
- Strict interdiction to steal, destroy or modify parameters of water quality monitoring devices in those critical points, and
- Establishment of and support for online water quality monitoring systems for sensitive sites such as hospitals.

The measures suggested above amount to developing early warning systems. Currently, regional inter-governmental organizations have been making efforts to map hot spots and identify signals of future threats. Effective early warning systems would require a list of water-related infrastructure in relevant regions, but this raises two complications. First, governments may find it intrusive for an international or regional organization to monitor facilities in their jurisdictions. Second, armed non-state actors could obtain such lists and use them to identify targets, which would defeat the very purpose for which these lists were created. In order for this approach in identifying and protecting vital infrastructure to be effective, it is important that the data gathered and lists prepared are handled with care – internally and internationally.

Efforts to find solutions to these problems require an adequate level of international cooperation and confidence building. UN bodies such as the Counterterrorism Committee should study trends in the development of technological means for the protection of water infrastructure and stimulate international cooperation for their effective use.

Religious Precepts

In addition to the UN system and humanitarian organizations, it is useful to explore religious precepts and laws insofar as they relate to water and water protection. Water is significant in all major religions, as a symbol of life and peace. Religious laws and beliefs may be relevant in the context of water protection, where they are conceptually compatible with International Humanitarian Law. These may appeal to certain groups who consider IHL as an alien construct.

In Hindu mythology, rivers are sacred. Water is the basis of life and the foundation of the world. It is a symbol of purity, clarity and calmness in Buddhism, which teaches that people must live in harmony with nature.

Islamic law prohibits water poisoning and goes into great detail on the subject of how to ensure fair and equitable water distribution within the community. Under Islam, every human being is entitled to water, which is considered a gift of God. Water should be freely available to all and it is considered a sin to withhold surplus water. Islam also emphasizes that everyone, not only Muslims, have the right to water.

In both Judaism and Christianity, water plays an important role in religious rituals and practices. Pope Francis emphasized that access to safe drinking water is a basic and universal right. He has encouraged the international community to protect water resources and make water available to all.

It is important to understand the significance of the religious precepts regarding water and insist on them as an obligation to protect water resources in conditions of armed conflict. This may also be helpful in efforts to bring warring parties to the negotiating table – particularly in situations of intense armed conflict in which humanitarian ceasefires or water-related ceasefires are necessary to protect civilian populations.

In practice, references to religious precepts will work primarily within religious communities and within states sharing the same religious traditions. This is of particular relevance in situations where the religious precepts on water are invoked with the objective to delegitimize threats from groups that seek legitimacy on the basis of their interpretation of religion, calculated to attract the support of their followers.

Measures within the United Nations Framework

From 1992 to 2016, UN Secretaries-General Boutros-Boutros Ghali, Kofi Annan, and Ban Ki Moon urged the United Nations Member States to examine linkages between water, peace and security. However, water issues have remained largely confined to the UN development and environmental agenda.

On the other hand, the UN peacekeeping exercise provided important experience relevant to water and peace. In areas marked by armed conflict, UN peacekeeping efforts often

represent the most important and comprehensive contribution of the international community to stabilization and peace. UN peacekeeping is no longer a simple ceasefire monitoring activity such as it was in its early history. Today, the mandates of UN peacekeeping operations are invariably complex and involve a wide range of tasks such as the creation of safe environments allowing humanitarian assistance, political stabilization and the strengthening of the rule of law. This endeavor often requires critically important support to transitional authorities or local governments in establishing or restoring public administration, disarming combatants, assisting the local police and local governments in their efforts to establish control over natural resources. The roles played by UN peacekeeping operations can include digging water wells and other water resource initiatives that involve distributing high-capacity rolling water containers.

The role of UN peacekeeping operations is likely to become even more complex in the future and will increasingly include water issues. There is a growing tendency to include natural resource provisions in peace agreements. The UNEP report titled, “Greening the Blue Helmets” concludes that this tendency has been observed since 2005, at which time peace agreements began to include such provisions. In 2016, the UN Environment Assembly adopted a resolution on the “Protection of the Environment in Areas affected by Armed Conflict,” calling on the different parts of the UN system to provide enhanced assistance to countries affected by armed conflict and those in post-conflict situations to assist in post-crisis environmental assessment and recovery (UNEP/EA/Res. 15). This trend indicates an increasing awareness of the need to address natural resources, including water, in peace mediations and in other forms of UN engagement

in conflict and post-conflict situations, especially in the form of peace operations.

The role of UN peace missions is determined by specific mandates negotiated and adopted by the UN Security Council, with each mandate tailor made to address the specific situation. Many of these situations involve UN peace operations for long periods of time. New mandates in an individual situation reflect the priority needs at the time of adoption, thereby making coherent development of the mandate more difficult to achieve.

The successful implementation of mandates for peace operations is influenced by human, technical and financial resources. The 2015 report of the High Level Independent Panel on Peace Operations emphasized that Member States of the United Nations must provide peace missions with adequate capabilities to implement their mandates. These adequate capabilities should include water and electric power specialists. Most of the UN Member States with highly developed military systems have skilled military specialists, trained to deliver the necessary services, including drilling, water distribution, sanitation, power production and distribution. To strengthen the capacity of UN peace operations, those UN Member States should provide the assistance of these specialists for the evaluation, repair and rehabilitation of water supply systems so as to restore or establish basic services to affected populations in the early stages of the deployment of peace operations.

The UN Security Council must give coherent and complete mandates, as well as match these with the necessary capacity on the ground in the peacekeeping operation.



Issues concerning the protection of water resources also arise in situations where there is no peacekeeping operation in place and where this may not be possible during an active armed conflict. The conditions in Syria and Iraq described above belong to this category. In such situations, questions about the authorization of the use of force by states or groups of states often arise. Although it might not be possible to grant this authorization in each and every case, it should not be impossible for the Security Council to convey a sense of legitimacy on the use of force in situations where civilians are gravely affected and lack access to water during an active armed conflict. Of course, the principles and norms of IHL must be observed in these situations by the states engaged in this type of military activity. This applies especially to the principle of proportionality of the use of force and the distinction between military and non-military objects. These principles also provide the framework for decision making of the Security Council and the platform for the Council's assessment of such situations, and of actions by UN Member States.

Finally, post-conflict peace building may require a long-term effort of the UN in assisting in the restoration or building up of the necessary water infrastructure. This type of engagement will sometimes require long-term engagement of the Security Council and the UN Peace Building Commission (UNPBC). The UNPBC brings together all relevant actors to marshal resources, and to advise on and propose integrated strategies for post-conflict peace building and recovery. Water is already among its top priorities. The periodic reviews of the UN's peace building should keep water issues as an ongoing priority in the effort to promote an integrated, strategic and coherent approach to peace building.

The Central Role of the UN Security Council

A broad look at the water issues in armed conflicts and recent experience leads to the conclusion that the time is becoming ripe for a thematic resolution of the UN Security Council (UNSC) on water, peace and security. This conclusion is echoed by the recent debates of the Security Council itself. On 22 November 2016, Senegal in its role as President of the Security Council, convened its 7818th meeting and, for the first time, debated the linkages between water, peace and security. It was an open session in which UN Member States outside the Security Council could also participate. Representatives of 69 governments including the 15 Security Council members intervened, emphasizing the importance of water in promoting cooperation and peace. Several Member States recommended that the Security Council remain involved with the subject, though a few Member States opposed this approach.

With these beginnings in the Security Council, it is possible to consider various measures that the United Nations could undertake to protect water resources and infrastructure. It will, in the first place, require the recognition of water as "a vital asset of humankind" by the Security Council.

A Security Council Resolution on Water, Peace and Security would constitute follow up to the resolution on the protection of civilians in armed conflicts, S/RES/1265 (1999). This would help

to focus the international community's attention on the specific issues of water and water infrastructure protection during armed conflicts. It would form the basis for the UNSC mandates for UN peacekeeping operations for the protection of water and water infrastructure, similar to the UNSC resolution on women in armed conflicts (S/RES/1325 (2000)) that has influenced peacekeeping operations.

In the past, protection of essential civilian infrastructure has been afforded by the Security Council. In the UNSC Resolutions S/RES/1998 (2011) and S/RES/2286 (2016), the Security Council inter alia called upon Member States to take action against perpetrators who violated international law by attacking schools and hospitals. Specific references aiming at protecting water stations and water supply were made in the Security Council resolutions S/RES/2118 (2013) and S/RES/2165 (2014).

Earlier this year the Security Council adopted its resolution S/RES/2341 (2017) to counter threats to international peace and security caused by acts of terrorism. The resolution is focused on the protection of critical infrastructure, and notes the increasing importance of cross-border infrastructure and interdependencies between nations. Water supply is specifically mentioned in this regard. The Security Council urged all States to ensure that all their relevant domestic departments, agencies and other entities work closely and effectively on matters relating to the protection of critical infrastructure against terrorist attacks.

These resolutions illustrate the trend to strengthening the protection of basic humanitarian facilities and infrastructure. It is necessary to address this need to protect water resources and infrastructure even more explicitly and in more detailed ways in the future.

Subsidiary bodies of the Security Council should review their practices and make certain that the protection of water is among their standing priorities. As mentioned above, the UN Peace Building Commission already includes water in its reconstruction and institution-building work. This work must continue.

The Counterterrorism Committee needs to explore ways in which to design responses to terrorist activities against water infrastructure, including the necessary information sharing aimed at more effective prevention of terrorist acts.

The UN Secretariat should assist in all these activities by bringing together the existing information from within the UN system, as well as specific recommendations to ensure system-wide coherence in addressing the issues of water, security and peace.

The Management of Shared Water Resources During Armed Conflicts

Joint management of water resources can continue in times of armed conflicts, especially when river basin organizations are in place. Examples include the Committee for Co-ordination of Investigations of Lower Mekong River (1957-1974) and the Permanent Indus Commission, which continued their activities during armed conflicts.

In the same vein, the joint management of the Senegal River through the Senegal River Basin Development Organization (OMVS - *Organisation pour la mise en valeur du fleuve Sénégal*) has never been challenged by riparian states. Although relations between Senegal and Mauritania, two of the riparian states, have been occasionally strained due to issues relating to the boundary delimitation of the river, common management has prevailed over the years, including in times of tension.

Source: Mara Tignino, *Water During and After Armed Conflicts*. What Protection in International Law? Brill Research Perspectives in International Water Law, Vol. 1.4, 2016.



"Organisation pour la mise en valeur du fleuve Sénégal", OMVS Communication 2013.
<http://bit.ly/2wHUWFXa>

Protection of Urban Water Services During Armed Conflicts

Armed conflicts are increasingly taking place in urban areas where water resources are crucial for a number of services and water delivery systems are intertwined with other systems that may be legitimate targets. Water storage and delivery systems in cities are very often interconnected with electrical systems. Longer power disruptions as a result of armed conflicts often result in temporary or long-term cuts in water for the civilian population and also impact other urban infrastructures like health care or education. These interconnecting factors increase the vulnerability of water delivery systems in times of armed conflicts.

Based on the experience of the International Commission of the Red Cross (ICRC) in Iraq and Syria, a possible entry point for increasing the resilience of water and electrical facilities is the long-term presence of local and international actors prior to the conflict outbreak. Well-established networks and relationships with local actors are at the basis of ICRC's work today. Only where reliable partners (e.g. inform of water boards) exist, is the ICRC able to deliver drinking water and provide other humanitarian aid.

Sources: Global High-Level Panel on Water and Peace, Think Tank Roundtable Summary Report: *Protection of Water During and After Armed Conflicts*, July 2016; ICRC 2015, *Urban services during protracted armed conflict: a call for a better approach to assisting affected people*, Geneva.

"Syria: Water as a weapon of war", 2015 International Committee of the Red Cross (ICRC),
<http://bit.ly/1EBes9k>







THE PANEL RECOMMENDS

Within its efforts to strengthen the protection of civilians in armed conflicts, the UN Security Council should adopt a resolution that will reflect the experiences of protecting water resources and infrastructure in armed conflicts and guide the Council's decision making relating to specific situations on its agenda. The Panel believes that the resolution could include a number of elements stemming from existing experience. The Security Council should:

- *Recognize* water as “a vital asset of humankind” and emphasize that the protection of water resources and installations constitutes a vital element of protection of civilians in armed conflicts – therefore water must not be affected by armed attack or used as a weapon of war;
- *Strengthen* the respect for and implementation of International Humanitarian Law (IHL) and clarify that IHL principles, such as the principles of distinction and proportionality must be applied both in international and in non-international armed conflicts;
- *Encourage* “water supply ceasefires” during armed conflicts and the inclusion of water issues and water cooperation in peace agreements;
- *Insist* on restraint with respect to the environment during armed conflicts and encourage provisions on environmental protection in ceasefires and peace agreements;
- *Provide* a platform for support to humanitarian organizations in their work before, during and after armed conflicts;
- *Encourage* the quick deployment of military water specialists in peace operations to rehabilitate and rebuild water supply systems;
- *Guide* the formulation and implementation of mandates of the UN peace operations as well as post-conflict peace building activities that will include the protection of water resources and installations;
- *Serve* as an inspiration to other UN bodies, as well as to UN Member States and other international actors.

States and the relevant international organizations and UN bodies, including the Security Council's Counterterrorism Committee, should study the trends in the development of technologies for protecting water infrastructure and stimulate international cooperation for their effective use in situations of armed conflicts. States should be encouraged to develop appropriate legislative frameworks for the protection of transboundary water infrastructures against terrorist acts.

States and the international community as a whole should support non-governmental organizations engaging with non-state actors seeking their full respect of IHL, such as Geneva Call, an NGO which reaches out to non-state actors through the “Deeds of Commitment” in the effort to strengthen their respect for IHL in general and protection of water resources in particular.

Further consideration should be given to proposals to establish:

- An independent international body mandated to gather information about the destruction and cuts to water supplies as well as to foster technical assistance during protracted armed conflicts;
- A mechanism to monitor compliance with IHL and reparations to victims of violations;
- Improved cooperation among the relevant international organizations and agencies to manage post-conflict environmental assessments and remedial measures;
- A rapid reaction water engineering military capacity to restore basic water and sanitation services for civilian populations and, in particular, for sensitive sites such as hospitals and refugee camps.



CHAPTER 3

An Ounce of Prevention: International Water Law and Transboundary Water Cooperation

While the preceding chapter dealt with the issue of water in war, this chapter and subsequent ones are concerned with water cooperation as an important feature of peace and of the prevention of armed conflicts. Existing transboundary water cooperation systems are broadly recognized as essential in this context and are recommended to all states sharing water resources.

Transboundary water cooperation mechanisms may not always be able to prevent political tensions and armed conflicts, but they always provide a viable vehicle towards peace. One example is the Mekong Committee, which continued its activities during the armed conflict in Vietnam, revealing the way to peaceful post-conflict cooperation in Southeast Asia. The Indus Water Treaty of 1960 remained in force and the Permanent Indus Commission established by that treaty continued to serve as the channel of communication between India and Pakistan during armed hostilities between the two parties in the 1960s and 1970s. In the Senegal River Basin, when relations between Senegal and Mauritania were strained due to boundary delimitation issues in the late 1980s and early 1990s, the common management of the river basin, in effect since the 1970s, prevailed. When relations among riparian states are heated or even characterized by violence, joint river mechanisms and commissions established by water agreements may serve as an avenue for communication and dialogue. In these situations, water cooperation serves the broader cause of peace.

Cooperation on the world's transboundary rivers and lakes has a long history, and has resulted in a body of norms communicated in treaties and customs applied to internationally shared rivers, lakes, and groundwater resources. Over time a number of treaties have been established at the basin level; these usually reflect the characteristics of individual river basins and aquifers. It should be noted, however, that in several cases, these treaties are neither sufficiently comprehensive in their coverage nor inclusive of all riparian countries. Some transboundary water treaties also do not meet the test of effective implementation.

Two global conventions, the 1997 UN Watercourses Convention and the 1992 UNECE Water Convention, consolidated the principles underpinning contemporary International Water Law. These global instruments complement existing basin specific treaties and aim at encouraging the necessary regulatory changes in the regimes of those treaties, as well as fill the gaps where no specific treaties exist.

Basic Principles and Norms

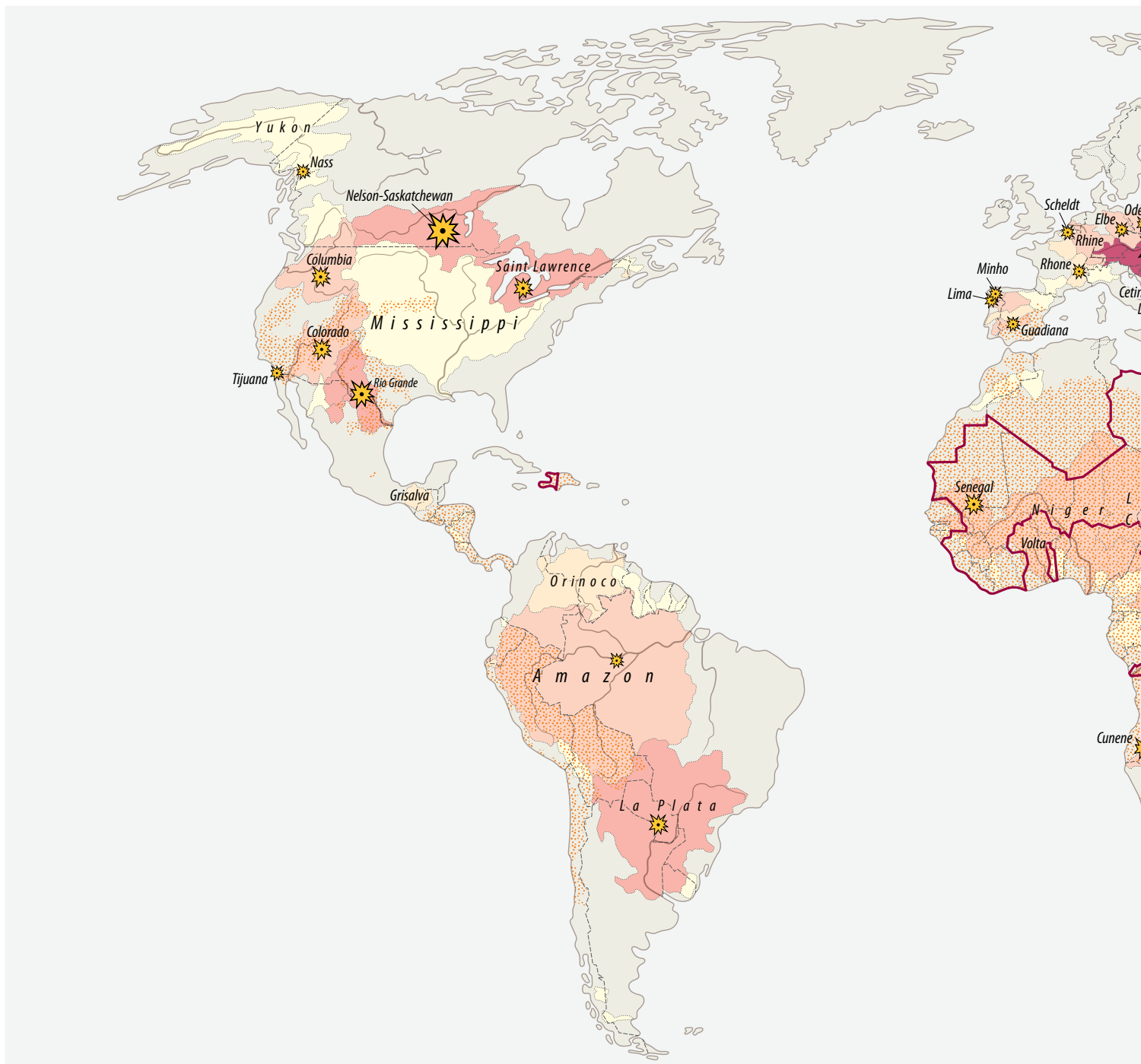
International Water Law constitutes a set of principles and norms of International Law which provide practical tools for the riparian states in identifying solutions that will benefit everyone.

It reflects the practices of states, and aims at facilitating discussion and cooperation among states. The following principles of the 1997 UN Watercourses Convention illustrate the specific nature of International Water Law:

- The two basic principles, expressing the notion of water sharing are the principle of equitable and reasonable utilization of the watercourse and the obligation not to cause significant harm (Articles 5 and 7). These two principles are mutually supportive and should serve as the guide to decision making in any watercourse state: taking into account the effects in other watercourse states is a necessary ingredient of that decision making.
- The second pillar is a general obligation of riparian states to cooperate, taking into account geographic, hydrographic, hydrological, climatic, and environmental factors. This can be achieved by such means as joint mechanisms and commissions where the riparian states are represented, by regular exchange of information and by notification of the planned measures (Articles 8, 9 and 11-19).
- Particular attention needs to be paid to the strengthening and promotion of mechanisms for the exchange of information (Article 9).
- A broad set of norms applicable to the protection, preservation and management of ecosystems is provided in part IV of the Convention (Articles 20-26).
- Disputes need to be avoided or settled peacefully by the usual means of settlement of international disputes or by a fact-finding commission that can be established at the request of one of the parties (Article 33).

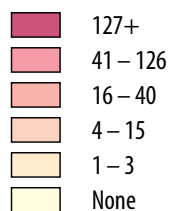
The same principles are embedded in the 1992 UNECE Water Convention. The two Conventions reflect the state of general, customary international law today. They offer any of the two riparian states (or any number of riparian states) the basic norms of fair and equitable sharing of the watercourse, and, at the same time, underline their duty to do no significant harm, as well as the duty to cooperate, including through the exchange of information, protection of ecosystems, and through peaceful settlement of disputes. This provides a sound basis for broader cooperation among the riparian states and for their joint management of water resources.

The UNECE Water Convention includes several additional elements that are potentially of global importance. The Convention covers both surface and groundwater (both connected to surface waters and unconnected), contains more detailed provisions on the protection of the environment (especially as it relates to pollution problems) and provisions related to public information.



Total number of interactions from 1990 to 2008

International exchanges – both conflicts and alliances – over shared water resources

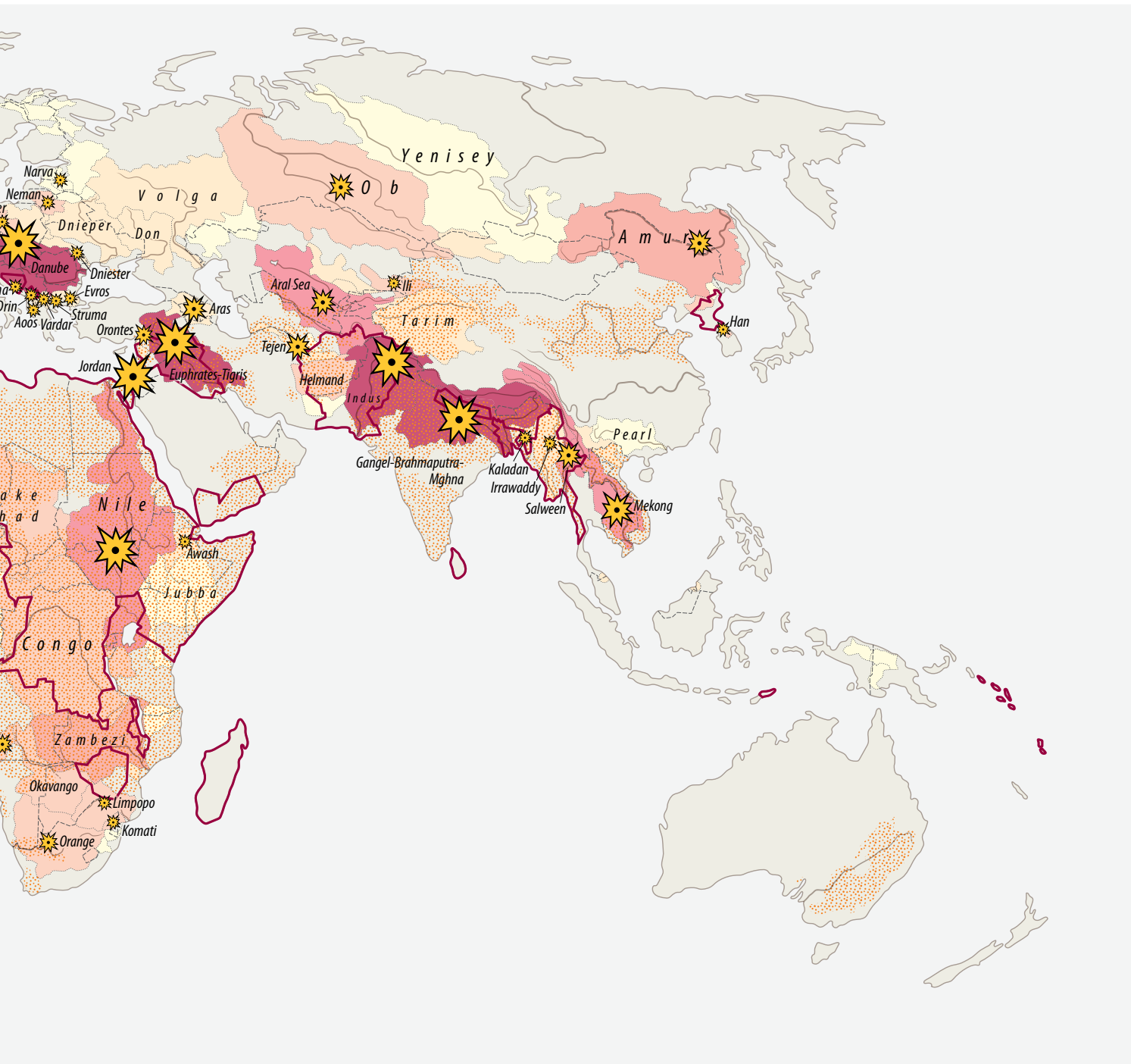


Number of hostile events



Source: Transboundary Freshwater Dispute Database, Department of Geosciences (www.transboundarywaters.orst.edu/database), Oregon State University; Global Runoff Data Centre (GRDC) in the Federal Institute of Hydrology (BfG), Germany (<http://grdc.bafg.de>); Katie Peek (www.popsi.com/article/science/where-will-worlds-water-conflicts-erupt-infographic); OECD, DAC List of ODA Recipients (www.oecd.org/dac/stats/daclist.htm); OECD, States of Fragility 2015 (www.oecd.org/dac/governance-peace); Aqueduct Global Maps 2.1 Indicators, World Resources Institute (www.wri.org/applications/maps/aqueduct-atlas)

Map produced by Zoi Environment Network, August 2017



- Fragile countries
- High water scarcity

The main strength of the UNECE Water Convention is its institutional framework, which is designed to assist its signatories in the implementation of its provisions. This institutional setting includes a series of political and technical intergovernmental bodies, the Implementation Committee and a Secretariat, under the overall guidance of the Meeting of the Parties. Thus, the Convention has had a significant impact on water cooperation among the States Parties.

Moreover, Article 9 contains a number of tasks to be included into bilateral and multilateral agreements, calling for the establishment of international institutions for the management of shared water basins.

Two additional protocols, the 1999 Protocol on Water and Health and the 2003 Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Watercourses (not yet entered into force), were adopted subsequently.

The UNECE Water Convention and its protocols were further complemented by a number of guidelines and recommendations, as well as by the EU Framework Directive on Water adopted in 2000 (Directive 2000/60/EC). The purpose of these instruments is to strengthen the implementation of the basic rules of International Water Law. In this context, an Implementation Committee was established to assist countries which are facing difficulties implementing the Convention.

The UNECE Water Convention is globally significant in two ways: first, the Convention's system indicates the general direction of the development of international water cooperation and second, it specifically emphasizes the importance of permanent institutional arrangements for the management of transboundary water basins. These are features which are of global relevance. A similar development direction is reflected in the Southern African region. The 1995 SADC Protocol on Shared Watercourse Systems, revised in 2000, promotes agreements among countries sharing specific watercourses, along the lines of the norms of the 1997 UN Watercourses Convention.

The UN Watercourses Convention entered into force in 2014 and is binding for the 36 states that have ratified it so far. In 2016, the UNECE Water Convention was opened to all UN Member States, thus creating a possibility for its norms and mechanisms to assist in the creation of appropriate bilateral or multilateral arrangements for specific watercourses or, where such arrangements already exist, to strengthen them further.

Transboundary Aquifers

In transboundary aquifers, however, international cooperation is far less developed, with very few international agreements focused on shared groundwater (five at the global level) and a few more covering groundwater together with surface waters. This poses a special problem given the now well-established facts about groundwater exploitation in many parts of the world where groundwater is withdrawn in quantities greater than nature's ability to recharge those aquifers. In some cases, water

tables are falling by 1-3 meters a year. In a world where 30-40 percent of irrigated land used for food production is supplied from aquifers, this is a critical issue for food security. The problem is expected to get worse in the coming decades.

A basic requirement for the reversal of this trend is the need for territorial states to recognize that certain aquifers are shared and that there is thus a need to develop a coordinated policy of the use of these water resources. This is an essential political condition that when fulfilled, can serve as a point of departure for cooperation among states inspired by International Water Law.

The need for improved international cooperation for the reasonable and equitable exploitation of transboundary aquifers is growing. Rules relating to this type of cooperation can be found in the framework of the UN International Law Commission (ILC), and are based on the principles of International Water Law articulated in the framework of the 1997 UN Watercourses Convention.

In 2008, the ILC adopted the Draft Articles on the Law of Transboundary Aquifers (A/RES/63/124). Based on this work, in 2011, the UN General Assembly recommended to "the states concerned to make appropriate bilateral or regional arrangements for the proper management of their transboundary aquifers, taking into account the provisions of the draft articles annexed to its resolution 63/124" (A/RES/66/104). An additional "soft law instrument" is provided by the 2012 Model Provisions on Transboundary Groundwater developed in the framework of the UNECE Water Convention. This document is also based on the principles and rules embodied in the ILC Draft Articles on the Law of Transboundary Aquifers.

The instruments described above stress two important aspects of groundwater management: the precautionary approach which considers the fragility of groundwater and the need to deepen our knowledge about aquifers (their limits, water quality, and recharge) in order to manage them in a sustainable manner. It is therefore important that further bilateral and multilateral agreements are developed on this issue, within the general guidance of the principles of International Water Law.

International Water Law, Human Needs and Human Rights

International Water Law is designed to serve human needs. This is recognized in the 1997 UN Watercourses Convention, which demands that water is distributed in a fair and reasonable manner, taking into consideration the "social and economic needs" (Article 6). More recently, the UN General Assembly and the Human Rights Council have recognized the right to safe drinking water and sanitation as a human right (A/RES/64/292). In this context, reference was also made to the General Comment no. 15, adopted by the UN Committee on Economic, Social and Cultural Rights in 2002 (E/C.12/2002/11). The same interpretation inspired the 1999 Protocol on Water and Health (protocol additional to the UNECE Water Convention), the 2002

Charter on Water of the Senegal River, the 2008 Water Charter of the River Niger Basin, the 2012 Charter of Water of Lake Chad, and in several other international instruments.

Securing the right to safe drinking water for people is a legitimate policy objective by states in their respective territories. In situations of shared water resources (watercourses and aquifers), bilateral or regional water cooperation is not only legitimate, but also a necessary policy aspect in the prevention of armed conflicts. The principles of equitable and reasonable utilization of watercourses and the obligation to do no significant harm contain an inherent concern for the affected people and their right to safe drinking water and other basic needs.

In addition, determining the right to safe drinking water and sanitation as a human right conveys a number of ethical messages. One of them relates to equity and equality, including gender equality specifically. The role of women as providers of water in many societies has to be adequately recognized and protected, while also extending their role to decision making. In many parts of the world, much still needs to be done to empower women in decision-making processes related to water.

Another ethical message relates to the situation of children, often the most vulnerable victims of water shortages, and in many situations the ones who fetch water. The situation of children and water provision requires systematic attention and effective remedies in cases when children are the victims of water shortages or of child labor exploitation.

Finally, the recognition of the human right to safe drinking water and sanitation has opened up broader questions of water equity. Some aspects of these questions, such as the creation of obstacles to water access for civilian populations in situations of military occupation are already addressed by International Humanitarian Law, as mentioned in the preceding chapter of this report.

The panel is aware that problems of water equity require further consideration, but they can only be partly addressed through the lens of international cooperation, the mandate of the Panel. However, they must be more fully addressed by the relevant players in the international community, including by the international bodies in the field of human rights.

Implementation and Monitoring

A reflection on the implementation of International Water Law is not encouraging. At present, the main multilateral treaties have only a small number of States Parties: the UN Watercourses Convention has 36 while the UNECE Water Convention has 41. Although the latter convention is now open to the entire UN membership, the global impact is yet to develop since all the current Parties are in the pan-European region. An immediate recommendation would therefore be to appeal to UN Member States to accede to these two conventions, and, in the case of the UNECE Water Convention, to take advantage of the mechanisms, especially of its means to assist States to adopt and implement instruments at the basin-level that reflect international good practices.

While accession to global conventions is much desired, countries should be encouraged to negotiate and finalize regional conventions and agreements at the basin level in cases where they see this as a preferred course of action. This may expedite the process of commitment to the principles of transboundary water cooperation and International Water Law, and provide an expedient option to make practical progress in this regard.

An innovative example of the regional approach is the Western Mediterranean Forum, known as “5+5 Dialogue.” This includes Algeria, France, Italy, Libya, Malta, Mauritania, Morocco, Portugal, Spain and Tunisia. While the five northern countries of the Western Mediterranean have experience in collaborative water management, the five southern countries face serious problems of water scarcity and growing dependence on groundwater resources. The Forum enables all the countries to develop joint approaches and the ten countries have adopted a water strategy and action plan for the Western Mediterranean.

A similar cooperative strategy is being developed in Latin America. In 2016, the Iberoamerican Heads of State Summit, held in Colombia invited the Water Directors of the countries in the region to develop action plans based on sustainable and cooperative approaches.

Additional activities could include international discussions intended to increase awareness of International Water Law and its relevance in the maintenance of international peace and security. The thematic debate on water, security and peace organized in the framework of the UN Security Council on 22 November 2016 offered an important example. Many of the 69 UN Member States that participated in the discussion referred to the two main International Water Law conventions. Follow up discussions of this nature will deepen the understanding and strengthen the implementation of their principles and norms in the future.

The other set of mechanisms of implementation should include the development of supplemental instruments (soft law) around key International Water Law principles, including practical guidelines and procedures, as well as the identification of models of long-term promotion of transboundary water cooperation. A number of such instruments have already been developed under the UN Watercourses Convention and the UNECE Water Convention in particular, which have contributed to the strengthening of water cooperation. Although the relevance of these instruments for the prevention of armed conflicts would be indirect, they constitute an important way of amplifying the basic principles with the needed specific content. The richer the texture of the law, the more effective is its implementation.

Dialogue and capacity building remain highly relevant to the development of transboundary water cooperation and, also to the preventive function of International Water Law. There is a need for more comprehensive exchange of experience and views among states, in particularly those with open questions of bilateral or regional water cooperation.



The United Nations has done much useful work in this regard already, through its specialized agencies, funds and programs. Water is an important feature of the work of the World Bank, UNDP, UNEP, FAO, UNESCO, WMO, ESCWA, UNECE and others in the UN system. Secretaries-General have consistently emphasized the importance of water cooperation – not only as a development and environmental issue but also for conflict prevention. Much of this type of work is being done through regional initiatives such as the Lake Chad project, cooperation involving Niger, Cameroon, Nigeria and Chad, which is addressing the inter-related risks of increased insecurity and climate change.

These existing practices could be brought into a coherent policy framework through the implementation of Agenda 2030 and, especially through its Sustainable Development Goals (SDGs). SDG 6 on water and sanitation contains the aim of promoting Integrated Water Resources Management and transboundary cooperation, and a comprehensive system of indicators is being developed to monitor the implementation. This process should be used to strengthen the discussion on applying the principles of International Water Law that already offer a platform for cooperation among states in the domain of transboundary water cooperation.

Reporting mechanisms of international treaties for transboundary water cooperation (bilateral, regional and global) should also collect information relevant for the implementation of SDG 6 and its specific targets. This is already the case for the UNECE Water Convention which included reporting on indicator 6.5.2 relating to the proportion of transboundary basins with

operational arrangements for water cooperation in its reporting system. The complementarity of SDG 6 and transboundary water cooperation should yield greater knowledge and better international cooperation in the global effort to improve water management, and help to reduce tension and conflict surrounding water issues. Other SDGs such as those concerned with peace, justice and strong institutions (SDG 16) and the Global Partnership for Sustainable Development (SDG 17) contribute to the implementation of SDG 6.

The importance of all these efforts for the maintenance of international stability and peace by governments, international institutions and UN agencies, funds and programs must never be underestimated. The role of civil society and non-governmental organizations continues to grow. Experience has shown that water management issues, which by definition affect people, increasingly give rise to initiatives organized by civil society organizations of the people concerned. The actual manner in which such civil society groups are involved in water management as stakeholders, as well the intensity of their involvement, varies from region to region, and from project to project.

For example, although hydropower projects are recognized as important mitigation and adaptation tools which decrease carbon dioxide emissions and are a flexible source of renewable energy, they also carry social and environmental costs. This has been strongly felt in the Danube River Basin which is shared by 19 riparian countries and where roughly 300 large hydropower plants (over 10 megawatts) and around 8000 smaller plants operate and have significantly modified the river system. At

present many new projects are being considered or already being carried out. All this activity has prompted the need to prepare guidelines for the development of new hydropower structures that take into account the views of a large variety of stakeholders, including civil society organizations, private companies, and public agencies. These stakeholders are recognized as observers at the meetings of the relevant expert and decision making bodies of the Commission for the Protection of the Danube River and thus have a say in the decision making process. Other river basin organizations, such as the Cubango-Okavango or the Zambezi River Basins have their own mechanisms for engaging with stakeholders. Stakeholder involvement strengthens the monitoring and implementation of International Water Law.

The experience gained through transboundary water cooperation suggests that civil society organizations should play an increasingly significant role so that needs, requests and concerns, as well as risks and opportunities, are properly mapped out. It is important to recognize the knowledge and capability that these stakeholders bring to the table to find and implement solutions that may be better suited and adapted to the circumstances in which the communities live. The right combination of this “bottom-up” approach and the government-led “top-down” approach, combined with interactive vision building, provides the best insight into problems and can lead to better solutions.

Preventive purpose

The paragraphs above depict some of the work necessary for the promotion and strengthening of International Water Law as an instrument of preventive diplomacy. These include enhancing awareness of the cooperative dimension of International Water Law, as well its usefulness as an instrument of confidence building, and as a platform for developing specific regional and basin agreements. Universal, regional and basin specific agreements, together with international customary law, can

be used to overcome and correct power asymmetries between riparian states. In addition, International Water Law may also serve as a framework for the engagement of non-state actors, such as civil society organizations, the private sector, and the scientific community. Taken together, all these elements constitute a powerful set of useful tools for the strengthening of international peace and stability, and for the prevention of armed conflicts.

However, two critically important tasks have to be emphasized in this context.

First, prevention tools will remain idle unless they are systematically promoted and fully utilized. The leadership of the UN Secretary-General and the UN Secretariat in this regard would be very helpful. The UN should take a broader look across the system and define an agenda for the strengthening of international water cooperation, in addition to the use of the instruments of International Water Law.

Second, it is important to support transboundary water cooperation activities with the necessary improvements in international financing regimes. Many international disputes relating to international water cooperation are centered on large-scale infrastructure projects, such as large dams for hydropower generation. These infrastructures require large amounts of external financing, much of which is provided by international financial institutions, such as the World Bank, and increasingly, by the private sector. Often funding institutions have their own safeguard policies and conditionalities, as well as environmental and social standards. The principles of International Water Law should be central in the overall policy approach to the design and financing of transboundary water cooperation, and all major projects should be developed in this context. In fact, financing for collaborative water infrastructure is of central importance to this topic and will be discussed in a separate chapter.

Water Cooperation Quotient

A number of attempts have been made to measure transboundary cooperation over the years.

The University of Oregon was a pioneer in this effort by making data on transboundary water treaties available in the public domain. This database provides useful information including the respective water shares of countries in every basin, legal treaties, and some case studies.

The UNECE has been mandated to collect data on transboundary cooperation with reference to compliance with SDG 6.5.2 from UN Member States. This work should be completed by December 2017. Its scope will be determined by the number of countries voluntarily choosing to provide the requested information.

The Strategic Foresight Group, a think tank based in Mumbai, India studies the relationship between transboundary water cooperation and peace in order to identify a decision support tool that would enable riparian countries to measure the intensity of cooperation. The Water Cooperation Quotient measures the dynamic interaction between countries sharing freshwater resources in all of the 286 shared river basins listed by the Global Environment Facility. There are 84 mechanisms of transboundary interaction or cooperation managing 153 rivers. Out of this total, 49 institutions governing 90 transboundary rivers promote active water cooperation.

There are only 8 mechanisms facilitating fully-fledged active water cooperation in 19 transboundary river basins, located in West Africa and Europe.

The Water Cooperation Quotient also reveals that countries follow different paths to building cooperation that depend on the local environment. In North America, Canada, Mexico and the United States have all established strong bi-national commissions covering all the rivers shared by each pair of two countries. In Western Europe, regional instruments such as the Water Framework Directive of the European Union support cooperative efforts at the basin level. In West Africa, very effective river basin organizations have been created in the Senegal, Gambia and Niger River basins. The Water Cooperation Quotient provides options for different levels and institutional forms of cooperation that the countries can adopt, according to their circumstances.

A parallel examination of water cooperation in 286 shared river basins in 148 countries and the 22 countries at risk of war suggests that any two countries engaged in active water cooperation do not go to war for any reason. Thus, measuring and promoting water cooperation is required not only for the sustainable management of natural resources, but also for peace and stability in the world.

Source: Strategic Foresight Group http://www.strategicforesight.com/publications_inner.php?id=43



"Mekong: a river rising", 2015 The Guardian, <http://bit.ly/2lkr4du>



THE PANEL RECOMMENDS

We strongly recommend to all States sharing transboundary water resources (rivers and lakes, as well as aquifers) to conclude transboundary water agreements. Where such agreements already exist, we recommend their strengthening along the lines of the principles and norms of International Water Law.

States should adhere to the principles of International Water Law and promote their full implementation. The Panel calls for wide accession by States to the 1997 UN Watercourses Convention and the 1992 UNECE Water Convention, now open for accession to all UN Member States.

Furthermore, we recommend intensified work on supplemental instruments to the two UN Conventions, including “soft law instruments” such as guidelines and procedures facilitating transboundary water cooperation, in particular with respect to the allocation of water, hydropower development and irrigation.

We also encourage the use of UNECE Water Convention’s cooperation mechanisms, in particular resort by countries and civil society to the Convention’s Implementation Committee.

The UN General Assembly should encourage States to strengthen their international water cooperation and to avail themselves of the advantages provided by the conventions embodying International Water Law. The General Assembly should also consider ways to develop effective institutional and financial mechanisms to support transboundary water cooperation.

The role of civil society organizations in promoting transboundary water cooperation, and in the monitoring and implementation of International Water Law should be supported.



Monitor 1 (Top):

Item	QTY	UNIT	PRICE	TOTAL	STATUS
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK

Monitor 2 (Bottom):

Item	QTY	UNIT	PRICE	TOTAL	STATUS
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK
10-2425 63 63000 2410 2201000	1	UNIT	2201000	2201000	OK



CHAPTER 4

Quantity and Quality: Strengthening of the Knowledge-Based and Data-Driven Decision Making and Cooperation for Security and Peace

Water quantity and quality questions are fundamental both in national policy making and at all levels of international water cooperation. Due to the scope of the present report, we limit our consideration of these questions to those relevant to maintaining peace and security. However, it is important to understand that transboundary water cooperation frameworks offer important insights into a wider set of problems.

Research shows that most transboundary water agreements assume that future water supply and quality will not change significantly over time. Therefore, agreements do not include specific mechanisms to address climatic, economic and social changes that have an effect on the quantity and quality of water resources and supply.

An important problem arises when transboundary water systems fail to provide for flexible allocation strategies which can react to changing social and environmental conditions. Drought and flood provisions in watercourse treaties, review procedures and joint management institutions provide a partial answer to this problem. However, they are not always effective and remain largely unrelated to the water quality questions that are often separated from water quantity questions.

Changing Water Conditions

A basic safeguard, applied in some treaty regimes, is the obligation of the upper riparian state to deliver a minimum flow to the lower riparian state in order to maintain basic environmental conditions. Such arrangements can also be made at a practical level, without a prior treaty obligation. An example of this type of technical cooperation exists in the Mekong River Basin where China, the upper riparian country, cooperates with other riparian countries on a project basis.

Another way to enhance the flexibility of the system is to allocate water as a percentage of the flow. This, however, requires a flexible infrastructure, agile management, data sharing and regular communications among the parties. Ultimately, a joint river basin authority is the answer, but these conditions do not exist in many shared water basins and aquifers, even where the basic legal instruments are in place.

An important feature of transboundary agreements is the emphasis on droughts in water allocation schemes. Less attention is paid to floods and the risks they pose to lower riparian states.

The provisions put in place for droughts vary in specificity. One example is the 1944 agreement between Mexico and the United States on the Rio Grande River. Under that treaty, Mexico can

supply less than the minimum amount to the US during an extraordinary drought in a five-year period. Mexico incurs a “water debt” during the dry period that has to be repaid by increasing water flows in the next five-year cycle.

As the above examples illustrate, drought problems can be resolved in various ways. Flood problems, on the other hand, are often not addressed, representing an increasing problem in the era of climate change, in which hydrological processes are volatile. Floods are expected to increase in frequency and intensity in most regions, and failure to manage these risks can have catastrophic consequences. Moreover, with the increased probability of flooding, the probability of droughts is also increasing and is keeping the global water balance in an uncertain equilibrium.

Effective management requires effective institutions. Studies have confirmed that flood losses are larger in those shared water basins that lack institutional capacity. An overwhelming forty-three international river basins where transboundary floods were frequent in the period from 1985 to 2005 lacked the institutional capacity to manage those events. Conversely, flood risk management exercised by appropriate institutions can greatly reduce the risks and effects of transboundary floods. Basin wide coordination of flood management activities is critical. Integrating warning and alarm systems, and flood risk management protocols, including regular data exchange, into transboundary agreements provides an effective risk reduction tool.

Moreover, flood risk management protocols can also become important adaptation tools, a necessity in our era. Climate change is causing not only floods but also a host of additional problems related to water quantity and quality. For example, the sea level rise resulting from climate change will exacerbate saltwater intrusion in deltas and coastal aquifers. In some cases, downstream water-diversion facilities may become unviable unless freshwater flows are increased. These problems also require improved international cooperation and joint institutional management of transboundary watercourses and aquifers.

Deteriorating Water Quality

Questions of water quantity are linked to other issues, especially water quality, but also to the dynamics of demand, the complexity of climate change effects and others. Droughts, floods and other changes in watercourses have an impact on water quality, an issue that deserves more attention than has been hitherto the case. Another set of concerns that needs to be taken into account is the water loss and declining water quality resulting from deteriorating water infrastructure, a problem that affects many developed and developing countries.

Water quality relates to the chemical, biological and bacteriological characteristics of water that may be used for different purposes: human consumption, irrigation, manufacturing, and mining to name just a few. Each potential use has different quality standards. Potable water, obviously, has the highest standards in terms of lowly dissolved solids, absence of heavy metals, and adequate chemical and bacteriological characteristics. Each use renders the water with less quality, which affects users downstream.

Historically, watercourses have been and continue to be used as a cheap and convenient conduit for wastewater disposal. However, rapid industrialization, agriculture growth using harmful chemicals, urbanization and other factors have created a problem of widespread water pollution that needs to be urgently addressed. According to some estimates, in developing countries, about 90 percent of the wastewater flows untreated into freshwater bodies. It is estimated that more than 80 percent of transboundary river basins have serious water quality issues, both in developed and developing countries.

Water quality problems are not the same in different parts of the world: nutrient pollution, mainly nitrogen and phosphorus, is found in the global North while pathogen contamination, i.e. bacteria and viruses, of water resources occur in the global South and Russia. Nevertheless, all quality issues require more urgent attention at the global level.

Although technical, legal and political advances to improve water quality have been made in many parts of the world, they remain highly fragmented and are different in each region and country. Furthermore, these advances are simply not in keeping with

demographic and environmental changes. As mentioned above, and with the exception of the European region, transboundary water systems mostly focus on water quantity and allocation rather than on joint quality management. Problems related to water quality deterioration must not be underestimated even in the advanced systems of transboundary water cooperation.

A 2016 study undertaken by UNEP called “Transboundary River Basins: Status and Trends” shows a disturbing growth in risks to water quality in transboundary river basins in the next 15-30 years due to climate change, socio-economic development and population increase. The study was based on the combined projected impacts of five indicators: environmental water stress, human water stress, nutrient pollution, exacerbating factors to water-based political tensions, and changes in population density. Four hotspots were identified in this context: the Orange and Limpopo basins in Southern Africa; several river basins in Central Asia; the Ganges-Brahmaputra-Meghna basin in South Asia; and the basins of the Jordan River, and the Euphrates and Tigris in the Middle East.

Most of these situations are characterized by the absence of effective river basin arrangements among riparian countries, and efforts to develop such arrangements have so far not succeeded. Nevertheless, we believe that basin agreements and the necessary institutional arrangements are the way forward. The obvious conclusion is the call to improved transboundary water cooperation and joint action by riparian states to address water quality issues. Given the political sensitivities in the hotspot regions, it is assumed that such cooperation and joint management would represent an important contribution to regional stability and peace.



At present, technical solutions and policy measures related to water quality continue to be mostly domestic, developed by each state individually and related to water in that state's territory. Several important achievements were reached in this way. In terms of water reuse, for example, Israel leads with the highest rate of 70 percent. Important achievements in wastewater management systems were reached in many parts of the world, including South Africa. Singapore has made major advances in recycling water and currently meets 30 percent of the country's total water demand through recycled water, with the objective of reaching 50 percent by 2060.

Smart Water Technologies and Their Relevance for Peace and Security

Technical solutions and policy measures related to water quality and reliability of supply, especially potable water supply, are increasingly necessary. According to the World Bank, 25-30 percent of water distributed in the world is lost through leaks and bursts. The annual value of this water, which is produced and lost by utilities, is estimated to be \$14 billion. This financial loss is the reason why water companies, both public and private, are prioritizing the improvement of maintenance and infrastructure planning, as well as repairs and water conservation techniques. Data collection and management are particularly important among these efforts. In addition to their economic value, these efforts are also relevant security reasons, especially in areas where water scarcity and shortfalls constitute a problem for security and peace.

Best practices in data management should be further encouraged. These include deployment of sensors in water networks, collection and analysis of water data, and faster and more effective responses to problems such as water leaks and bursts, as well as the clogging of wells and pipes. In addition, data management techniques also help in securing access to groundwater by preserving and optimizing the extraction of water, in developing predictive performance models and in avoiding the overexploitation of groundwater.

In regions facing water scarcity where conflicts over water usage can lead to violence, these new technological tools can serve as confidence building tools and should be supported both politically and financially.

Data and industrial information technology systems for water supply should be seen as strategically important assets and be protected against theft, destruction or cyber-attacks. In the era in which cyber-attacks are experienced globally, it should be expected that professional hackers could target water supply systems, in addition to businesses, financial institutions, health systems and others.

With this in mind, the protection of Supervisory Control and Data Acquisitions (SCADA) systems for effective water prediction and distribution should be seen as an important priority. Some countries have extended this protection to the water sector.

Countries that have not yet done so and that have the necessary technical capacity, are likely to follow the same path.

The question for the future is how to connect all the existing technological achievements into effective international cooperation, urgently needed because of the expected increase in all forms of water stress and the possible dangers of international tensions, disputes and even armed conflicts. Again, existing International Water Law provides useful guidance in this endeavor.

Water Quality in International Water Law

International instruments contain a number of provisions relating to water quality and the protection of ecosystems. These provisions form an essential normative pillar for water management, and should inspire policy making at the national, regional and international levels. Sovereign states will find useful guidance for responsible and effective water policy, and inspiration for transboundary water cooperation arrangements, both bilateral and regional, as appropriate.

Part IV of the 1997 UN Watercourses Convention (Articles 20-26) contains a number of provisions related to the protection, preservation and management of international watercourses relevant to water quality. It calls for the protection and preservation of the ecosystems of international watercourses and obliges States Parties to cooperate in the prevention, reduction and control of pollution. States may set up joint water quality objectives and criteria, as well as establish lists of substances that should be prohibited or limited from being introduced into transboundary watercourses as pollution prevention and control measures. Watercourse management includes the option of establishing joint management mechanisms to consult and cooperate further.

The 1992 UNECE Water Convention contains detailed provisions to reduce the transboundary impact of pollution through legal, administrative, economic, technical and financial measures to be taken both at the national and at the transboundary level. They may include the adoption of water criteria and emission limits for discharges into surface waters. The States Parties are also obliged to establish programs for monitoring transboundary water conditions.

The 1992 Convention on Biological Diversity stipulates the obligations of States Parties regarding conservation and sustainable use of biological diversity, which includes care for water quality, necessary to sustain biological resources. The States Parties to the Convention have agreed, at the ninth meeting of their Conference (2008), to strengthen international cooperation regarding the allocation and management of water, including through international watercourse agreements.

A number of soft law pronouncements, as well as the interpretation of the International Covenant on Economic, Social and Cultural Rights confirmed international concern for water availability and safety, thus emphasizing water quality.

These international instruments have established a general international framework, but now implementation requires further legal and policy instruments, as well as technical solutions both at the national and international levels.

Although existing and future transboundary water systems provide an immediate opportunity in this context, it is inherently limited in two ways. First, as already explained, mechanisms for transboundary water cooperation include surface watercourses and lakes, and only rarely aquifers. Second, they cannot themselves produce the necessary solutions at the global level. These two problems will need to be tackled separately.

Protecting Aquifers

Depletion of the world's aquifers, and the importance of recognizing shared aquifers by the states concerned has already been mentioned in the preceding chapter. While many specific solutions relating to aquifers depend on policies adopted by individual states, within the responsible exercise of their sovereignty, the appeal to protect aquifers is of global relevance. Moreover, the general information about aquifers is inadequate, which is of concern since aquifers represent about 90 percent of non-frozen global freshwater reserves.

Thus, international cooperation on protecting water quality and quantity in internationally shared aquifers has to be developed much further. As of 2016, only five transboundary aquifers are covered by specific agreements and two aquifers have informal agreements. There is a need for states sharing aquifers to develop the necessary cooperation that will include three types of measures:

- Studies to understand transboundary aquifers and issues specifically related to their quantity and quality, as well as that of the dependent ecosystem.
- Standardized data collection systems on transboundary aquifers to enable a permanent analysis of water quality.
- Joint measures to counter any threat that might be identified as affecting transboundary aquifers.

However, the ability and willingness of countries sharing aquifers to take such measures vary from region to region, and are based on the region's history, technical capacity and the political will of the countries concerned. There are several examples of successful endeavors by countries in collecting and sharing water quality data, including through the work done by transboundary river organizations, which should inspire other states that share surface waters and aquifers but have not yet developed water quality cooperation. Cooperation and increased transparency allow for policy measures capable of addressing emerging water quality problems in a timely fashion, thus preventing serious problems and political tensions that could gradually emerge.

Towards a Global Data Network

Effective management is predicated upon effective monitoring and data sharing: what we cannot monitor and measure, we

cannot manage. As mentioned above, the current level of international water cooperation is hampered by the weaknesses in the efforts to acquire, maintain, and share hydrological data on a regular and sustainable basis to meet the growing demand for such information. In spite of various initiatives aimed at developing water monitoring capabilities and open access to them, geo-referenced data on water remain scarce, fragmented and frequently difficult to access and interpret.

Data can also be seen as a lever for action and initiatives necessary to improve the level of water cooperation. In that sense, the state and availability of data are of importance to the maintenance of international stability and peace. The work led by Oregon State University regarding the transboundary freshwater dispute database offers a remarkable example of integrating spatial and socio-political data. This data allows for better assessment of the problems and can be used to encourage cooperation.

Several UN agencies have built databases to understand the functioning of hydro-systems. Among others, one can cite the WMO's hydrological observation system, UNESCO's Water Information Network System (WINS) and the Transboundary Water Assessment Programme (TWAP) led by UNEP.

Much useful work has been done by UNEP, in the context of its overall mandate in the field of environmental protection. UNEP's Global Environment Monitoring System (GEMS) was already launched in 1978 and is a source of water quality data from the system's 83 participating countries. GEMS has succeeded in creating a unique global water quality monitoring network which provides water quality data to a central database called GEMStat. Since 2006, this database exists online and can be of assistance to technical experts and policy makers.

Regular assessments of the status of transboundary waters are carried out within the framework of the UNECE Water Convention. They involve both States Parties and non-parties, and provide significant information on the pressures on water resources, the transboundary impacts and the response measures. The first two assessments (in 2007 and 2011) focused on European and adjacent countries while the third assessment, planned for 2021, will have global coverage.

The progress made so far must be appreciated, nevertheless, more can and should be done at the global level. The international community ought to be able to use the relevant technologies, in particular remote sensing, in order to strengthen existing databases. The principle of transparency should be more broadly accepted. This would enable better understanding and more easy access to information, even in situations where cooperation among riparian countries remains limited. Moreover, greater accessibility of and, ultimately, open access to water data and transparency in policy making would be of great benefit to the affected people in general, not only those directly dependent on transboundary water.

Better data and knowledge more generally can yield important improvements with regard to protection of the environment, developing the necessary legal frameworks for international



water cooperation, the needed financial frameworks, as well as for hydro-diplomacy. Additional international facilities are needed. Thus WMO established the Global Hydrometry Support Facility (GHSF), designed specifically to build operational systems and capacity in hydrometry and water monitoring, expand the base of hydrological data and exchange capabilities, and facilitate free and open data sharing. This will require the development and application of innovative monitoring and database technologies, supporting regional and local projects aimed at building sustainable hydrometeorological networks and freely accessible data, and promoting the use of quality management principles.

Current developments suggest an already high awareness of the importance of data and monitoring for future water cooperation and, indirectly for the strengthening of international stability and peace. However, it has to be added that states need to use and improve the existing data banks effectively and efficiently. At present, the fragmented nature of data collection and publication makes it difficult to find and combine the existing data in a manner that produces useful and comprehensive information. Many countries have well developed mechanisms to collect and store data. These mechanisms have to be fully used in decision making processes and strengthened as necessary. National and international activities have to go hand in hand. All these efforts have to be complemented by improvement in the internationally agreed standards related to water quality, as well as a greater institutional coherence at the global level.

The UN activities mentioned in the preceding paragraphs represent a good basis for further work. Much needs to be done in the context of the implementation of SDGs and UN peace building activities. The current work on indicators to measure progress in the implementation of the SDGs is promising and should help UN Member States to define their policy priorities and cooperation potential of water cooperation for the future. The expected SDG indicators will also provide an opportunity to connect the technical data with the socio-political ones in a meaningful way, thus contributing to the incentives for intensified cooperation among states.

Standard Setting Related to Water Quality

Data collection and analysis – still imperfect as it may be – must be assessed against the background of the already agreed international standards relating to water quality. At the regional level, the European Union has developed an effective system of standards. They include drinking water contaminant-level standards (Directive 1998/83/EC) and the Water Framework Directive (Directive 2006/7/EC), which established environmental quality standards for 33 pollutants in surface, ground and coastal water. Particular standards are also set for discharges of nitrogen and phosphorus from urban wastewater treatment plants into sensitive water bodies (Directive 1998/15/EC).

The EU directives are legally binding and verifiable. Their application in the region has had a beneficial effect on the whole spectrum of water issues in European Union countries – with the exception of the prevention and management of floods

that are becoming more frequent and damaging as a result of global warming. The EU Directive on Floods thus needs to be strengthened.

While not immediately applicable everywhere, the European standards already serve as an important point of reference for water management in other parts of the world. Moreover, they could represent a valuable technical tool in the evolution of the global norms and techniques relevant to measuring water quality.

Important guidelines and standards are emerging through the work of several UN specialized agencies. For example, WHO has developed guidelines for drinking water contaminant levels and health-based targets for contaminants in wastewater used to irrigate crops or in aquaculture. FAO developed quality guidelines for irrigation water and guidelines for water quality for livestock and poultry.

These are important and necessary achievements. But more is needed both in terms of substantive standards, and in terms of their effective implementation. Naturally, such rules can be established by individual states, based on international guidelines and standards, or by transboundary water cooperation mechanisms, by regional organizations such as the EU and by global institutions, particularly the UN system. An important role will continue to belong to the specialized agencies and programs of the UN.

Development of an international system to deal with various aspects of water quantity and quality is still a work in progress. Lessons learned so far have created an understanding about the strengths and weaknesses in the use of different international instruments in this context. The binding international treaties such as the 1997 UN Watercourses Convention and the 1992 UNECE Water Convention provide a useful legal framework. However, experience has shown that they take a very long time to be drafted and adopted, and then acceded to by states.

Some of these instruments can be conceived as legally binding, for example the idea of an additional protocol on international aquifers to be added to the 1997 UN Watercourses Convention. The 1992 UNECE Convention, open to all UN Member States since 2016, includes two Annexes that will be helpful in the process of the Convention's implementation: Annex II - Guidelines for developing best environmental practices and Annex III - Guidelines for developing water-quality objectives and criteria.

It is important that the core of the legal principles and norms relating to international water cooperation are supplemented by more specific standards. They should gradually include appropriate norms on water quality. However, development of these norms would probably require a variety of inputs. The usual treaty making process would have to be complemented by other techniques, some of which have emerged from the work of transboundary water cooperation systems. Others are the result of activities of regional organizations and from the work of the relevant UN specialized agencies, funds and programs. Transboundary water management agreements should be, as

appropriate, amended or supplemented by additional legal instruments and operational programs to deal with the problems of transboundary aquifers and water quality.

Institutional Coherence

International norms, standards and data systems represent the core of the international effort for improved water management. It is natural that sovereign states play the primary role in this context and that national policy making remains fundamental. However, it is increasingly recognized that stronger international cooperation, including stronger cooperation at the global level is needed so that water use will be fully understood as an emerging common concern that connects most of the impacts of climate change. The need for stronger international cooperation was recognized by Agenda 2030, and in SDG 6 on sustainable water and sanitation in particular.

The question of global cooperation and its institutional aspects was studied in the years 2004-2015 by the UN Secretary-General's Advisory Board on Water and Sanitation (UNSGAB) which highlighted a mismatch between the holistic and ambitious 2030 Agenda and its vision of water and sanitation management, and the fragmented international political structures available to contribute to the implementation of this vision. To overcome the current fragmented institutional landscape, UNSGAB recommended the creation of a UN Intergovernmental Committee on Water and Sanitation, following a proposal from the Budapest Water Summit 2013. This Committee would be comprised of representatives of UN Member States. The strengthened UN-Water would function as its secretariat. This body would review, inter alia, the setting up of a comprehensive global water and sanitation monitoring framework to support SDG 6 follow up, based on high-quality data sets.

The existing global water cooperation structure is still fragmented – as shown in the preceding paragraphs of this report. The UNSGAB initiative is welcome and timely. There may be other ideas coming from the High-Level Panel on Water and Sanitation (SDG 6) as well as from other quarters.

We the members of the Global High-Level Panel on Water and Peace generally agree that the creation of an intergovernmental structure on water and sanitation, endorsed by UN Member States and part of the UN system, would enable more effective global water cooperation work with regard to questions of water quantity and quality in general.

Supporting Water Data Sharing for Cooperation and Peace: The Case Study on the Transboundary Basin of the Chu-Talas Rivers (Kazakhstan/ Kyrgyzstan)

The regular exchange of data and information on water resources and their uses is fundamental to establishing cooperation between riparian states. Since 2014, initially through the Innovative Monitoring and Modelling (iMoMo) project and currently the Water Accounting in Transboundary Chu-Talas River Basins project, the Swiss Agency for Development and Cooperation (SDC) is supporting the daily sharing of hydrological data between Kazakhstan and Kyrgyzstan in the Chu-Talas transboundary basin.

In 2015, the Transboundary Water Commission on the Chu-Talas Rivers between Kazakhstan and Kyrgyzstan requested the publication of quarterly hydrological bulletins and interactive online schemes. The International Office for Water (IOWater) provided technical support and logistical assistance to collect the data and publish the material. Under the supervision of the Commission, these quarterly bulletins are now published regularly and the interactive schemes allow online consultation of the data on river water flows and the levels of the main water intakes for irrigation. Data is provided by national experts and five institutions from the two countries.

Source: Direction de la Coopération Internationale, International Office for Water (IOWater).
<http://www.imomohub.kg/eng/home/>



"UNECE helps Kazakhstan and Kyrgyzstan to cooperate on water management", 2011 UNECE/UN TV, <http://bit.ly/2tRGUuq>





THE PANEL RECOMMENDS

The level of knowledge relating to water quality and quantity issues has to be improved at all levels. Knowledge on groundwater and aquifers, representing more than 90 percent of unfrozen global freshwater reserves, should be enhanced as a matter of priority.

Investing in and cooperating for improved water data should be used for trust building and broader cooperation, and thus contribute to the prevention of potential conflicts.

More specifically we recommend:

- The existing mechanisms of water data collection, storage and access should be developed further and provide for better integration of spatial and disaggregated socio-political data. This development should include innovative, non-traditional data sources such as crowdsourcing in order to strengthen data collection processes.
- Particular attention needs to be paid to the proper understanding of asymmetries among countries and sectors of activity within river basins and to developing methodologies that will help the efforts of conflict prevention with timely and credible information.
- States Parties to treaties establishing transboundary water cooperation systems should strengthen these systems by prioritizing the issues of water quality, pollution and contamination.
- In this context, the Panel recommends systematic application of the relevant provisions of International Water Law and existing international standards (WHO and FAO) and, as appropriate, the relevant regional standards. These standards should guide decision making by states, including the decisions relating to the strengthening of relevant institutional structures.
- The existing data and knowledge bases administered by different UN agencies should be brought together into a coherent system. The Panel supports the system-wide coordination work being done by UN-Water in this regard and recommends the UN General Assembly to stimulate and support this effort, including through the UN World Water Assessment Program and using the experience of relevant non-governmental global water science programs.
- As a matter of a long-term vision, the Panel advocates the establishment of a strong global data system and monitoring mechanism on the basis of existing work. Its task should be to monitor and analyze water quality issues globally and in transboundary basins and aquifers in particular, with a view to providing reliable information to the interested public on short notice.



CHAPTER 5

People's Diplomacy, Inter-Sectoral Water Management and Decision Making

An Ethical Imperative

Water management and transboundary water cooperation affect people's needs and rights, giving rise to legitimate concerns that have to be respected. Moreover, water projects require a careful consideration of the needs of different sectors of society so that effective and sustainable policy decisions are made.

The recent Budapest Water Summit (2016) declared that water is an ethical imperative. This is an important statement of principle. The increasing water-related vulnerabilities that we face require urgent responses. There is no doubt of the need to effectively secure the human right to safe and clean drinking water. Existing water scarcity, as well as the future likelihood for additional problems of accessibility and availability of safe drinking water, underscores its ethical dimension. In other words, water is a matter of human rights. This ethical imperative also includes the responsibility of policy makers to ensure the health of ecosystems and the maintenance of biological process in nature beyond immediate human needs.

Water Governance

Water resources and their governance are closely intertwined with other resource governance systems, especially those related to energy, land use and food production, and often face trade-offs. These challenges to water policy making are recognized through the concepts of water security, the water-energy-food nexus, Integrated Water Resources Management, and adaptive water governance.

It is important for states to responsibly exercise their sovereign rights in managing their natural resources. Governments are responsible for regulation and the actual management of water. This fundamental principle of sovereignty has to be respected, but at the same time, it is important that best practices in water management are studied and compared internationally, and that international cooperation among sovereign states, including their cooperation within the relevant international organizations, is developed further.

The problems of inter-sectoral water management are not new and in some areas, practical experience has already generated guidelines to inspire future decision making. One of the classic examples is the relationship between water and mining. Both historically and presently, mining operations, especially those undertaken by large transnational companies, have spurred social and environmental conflicts, and in several cases, pointed the way towards solutions.

Since most of these experiences have taken place within the boundaries of a single state, it is expected that the government

will handle the situation within its sovereign powers. Governments can, however, take advantage of the experience gained in other countries and of the good practices tested in real circumstances. Although no two situations are exactly the same, several basic features have to be taken into account in almost all cases.

The government should take an active approach and assist in dialogues involving all stakeholders, including importantly, civil society organizations and the affected citizens, without a priori imposing solutions. Both mechanisms and solutions have to emerge as a result of genuinely participatory processes that involve all the legitimate stakeholders. It is also important that all legal requirements are respected and that all other aspects of legitimacy in the process, such as the representative character of participants, and the fair and equal treatment of all participants in the process are observed. The Aarhus Convention on Access to Information, Public Participation and Access to Justice in Environmental Matters, adopted in 1998, has set important standards that help in the conduct of such processes and should inspire governments in the exercise of their responsibilities.

Technical information and other aspects of the proposed solutions must be scientifically sound, so that the environmental and social impact assessments are fully credible.

And above all, the process needs to be transparent so that trust is developed among the participants. The primary importance of the political aspect of the process must not be neglected since unresolved water issues tend to crystallize broader dissatisfaction and revolt, which makes these situations inherently political and to which particular attention should be paid. What is most often needed is citizen diplomacy, a process that engages representatives of local communities, civil society and professional organizations, as well as businesses, in communication and negotiation with governments. Ideally, this communication and negotiation should amount to genuine popular participation in the policy making process, as well in key decisions relating to large-scale water projects. Such participation would provide a genuine link between water governance and human rights.

Education is a fundamental requirement of good water governance. Governments should appreciate the importance of water education as a key factor in the establishment and maintenance of adequate and sustainable use and consumption of water. Education is discussed here in the broadest sense – not only as information gathering, but also as responsible dissemination and conscious acquisition of knowledge and the effort to stimulate the necessary behavioral changes.

All this constitutes a tall order and much depends on the nature and quality of the country's governance in general, as well

as on the adequacy of the legal arrangements and technical sophistication and expertise in water issues. However, the primary importance of transparency in decision making and the efforts to resolve the relevant tensions and disputes must be fully appreciated.

Stakeholders Cooperating – A Voluntary Code of Conduct

The existing experience in water governance varies among countries and is rarely expressed in a single document. However, there are exceptions. An example of a good practice took place recently in Mongolia where the International Finance Corporation (IFC) convened the largest mining companies, active in the country and facilitated the adoption of the Voluntary Code of Practice (VCP) on Water Management in February 2016.

The Code starts with the commitment of the parties to act transparently and with accountability, to comply with national law and international standards and to engage with local communities proactively and inclusively. Furthermore, the VCP committed the parties to an effective water resource management and conservation, to maintain or improve access by the local population to water resources and to support local water infrastructure and services.

The VCP could serve as a conceptual framework for dealing with inter-sectoral issues in mining and in other environmentally-sensitive industries in comparable situations in other regions of the world.

The voluntary nature of the Code deserves special attention – as a guiding principle that can serve a variety of international actors as well as business companies in their efforts to develop socially responsible business practices. In addition, international development banks should consider using the principles in the VCP as parts of their conditionalities.

At the global level, the UN Secretary-General launched a Global Compact in 2000, a set of guiding principles for business operations involving improved respect for human rights, labor standards and environmental concerns. The Global Compact gradually involved several tens of thousands of businesses worldwide, around a set of voluntary principles that include labor standards, protection of the environment and respect for human rights.

The Global Compact includes a CEO Water Mandate, recognizing the importance of water issues in business operations. The Compact, a voluntary mechanism without an intrusive monitoring system, could use this existing CEO Water Mandate in order to play a key role in promoting best practices by major companies aimed at water protection and conservation.

The Voluntary Code of Practice on Water Management, tested in Mongolia, could be used as an example for similar arrangements in other countries, where there are existing needs. In addition, the national entities of the UN Global Compact could play a major

role in the promotion of citizen diplomacy involving companies at the national level, in cooperation with civil society groups.

Regional Arrangements and Inclusion of the Business Sector

A more complex approach is usually required where two or more countries in a geographic region are involved in water management. The basic need in this context is to engage in water management in a systemic way, both at the basin and ecosystem level, which reinforces the fundamental importance of transboundary water cooperation. It is necessary to apply the basic principles of International Water Law and to design appropriate financial mechanisms with the aim of developing transboundary water cooperation systems and infrastructures, as discussed in earlier chapters. At the same time, lessons learned in internal, country-specific inter-sectoral cooperation discussed in the preceding paragraphs of this chapter should be taken into account.

In addition, there are several specific opportunities resulting from the necessary cooperation between governments and businesses in the context of transboundary water cooperation. In such situations, business diplomacy should complement hydro-diplomacy carried out by governments and people's diplomacy involving civil society. A particularly important aspect of communication between businesses and governments relates to the relevant data and information about water where businesses could be of great value to governments. Obviously, companies generally pursue their interests and plans and, above all their profit motive, but companies active in the water sector have to be socially responsible and this is particularly the case when they are engaged in transboundary water cooperation.

Many businesses such as hydropower companies often have more and better hydrological data than state entities. Sharing this data with state and other actors in the effort to improve transboundary water cooperation could contribute substantially to the overall improvement of transboundary water systems. Engagement of companies with governments could make these businesses more aware of political sensitivities and the conflict potential around water. This, in turn, increases the safety of their investments and long-term profitability.

A specific instrument of inter-sectoral cooperation that has been promoted recently is the creation of water funds to which companies contribute. The objective of these funds, established in several Latin American countries, is to provide investment for basin protection and the sustainable use of water, increase water production or contribute to payment for ecosystem services. This type of instrument is worthy of government attention and support.

Evolving Practice

The complexity of inter-sectoral relations at the regional level depends on the size of the international river or lake basin, aquifer, the number of states involved, and the variety of human needs to be satisfied with water from the basin. Historically,

major rivers systems in Europe, such as the Danube River with its 19 riparian countries (this number includes the major tributaries of the Danube), demonstrate the complexity of management and the potential levels of cooperation that can be developed over longer periods of time. Citizen involvement through civil society organizations is becoming an increasingly important feature of water management.

In addition, there are more recent cases where the magnitude of the basin and its vital importance requires an accelerated cooperation process, both intergovernmental and inter-sectoral.

The Mekong River Basin offers one of the most illustrative examples. The Mekong River Basin is an important river basin from the global perspective, providing the largest inland fish resources in the world, with 60 million people depending on the river and its resources for their immediate livelihood. In addition to growing food demand in the basin, the more recent and rapidly evolving demand for energy is producing a complex situation requiring the highest attainable level of intergovernmental and inter-sectoral cooperation. The potential for tensions and disputes should not be underestimated. The basic principles of International Water Law – equitable and reasonable utilization of water and the obligation to do no harm – should help in addressing any problems arising from the increasing emphasis on the use of water for power generation.

Currently, hydropower development is very high on the agenda of many Mekong riparian countries: 11 power plants will be built along the mainstream and more than 80 along the tributaries. Because hydropower is currently an important priority, the perception has developed that energy development for industries and urban centers comes at the expense of poor rural communities that depend on the rivers for food production. This has raised the level of complexity around water cooperation in the basin and has engaged a number of actors involved in the management of the water basin.

In addition to the Mekong River Commission (MRC), the governance structure of the Mekong River Basin also involves the Asian Development Bank (ADB), the Association of Southeast Asian Nations (ASEAN), the regional energy market, and a host of national and sub-national institutions. China's increased participation is concentrated on practical cooperation such as increased water supply to lower riparian countries in dryer periods of the year and on the strengthening of institutional ties within the Mekong River Basin system through the Lancang-Mekong Cooperation Mechanism (LMCM) launched in 2014. This mechanism is expected to increase interconnectivity, production capacity, cross-border economic cooperation, including cooperation in agriculture, and is expected to contribute to poverty alleviation in the riparian countries.

Studies focusing on the upstream hydropower developments and on the downstream ecological and agricultural situations and fisheries in the Mekong River Basin have underlined the need for stakeholders to work together to build capacity for risk, opportunity mapping, and for developing sustainable management options. Furthermore, such cooperation would

identify the critical indicators that encapsulate key developments in the basin. A broader cooperative and institutional arrangement may well be a necessary phase in which the riparian countries develop the full sense of each of their needs as well as their common need to further develop their overall water cooperation.

Inter-sectoral water management in transboundary water situations in different parts of the world shows several common features. In general, technical cooperation can provide information that constitutes the basis for engineering and technical solutions, as well as for broader strategic decisions. It must be understood that technical cooperation and engineering per se cannot substitute for social and ethical decisions. Once the technical analyses are done and engineering possibilities are understood, it is important to move forward in a transparent manner. It is clear that technical and engineering knowledge has to be at a sufficiently high level to enable responsible social and political decisions. However, technical cooperation alone will not remove the danger of tensions and disputes, and will not address the broader social needs. Broad stakeholder participation, including civil society groups, local representatives, scientists and businesses is necessary. Above all, effective hydro-diplomacy and the engagement of political leaders, including the highest level of political leaders from the countries sharing the basin, has to guide the process towards solutions.

This synopsis of the experience of water cooperation epitomizes the challenge of water cooperation in the contemporary world. Some of the conclusions of global relevance are as follows:

- It is indispensable to ensure the sharing of relevant information and data for all key stakeholders, including citizens' groups, from the very early stages of a planned project, prior to beginning actual work. It is important for the principal actors (governments and companies) to understand which data is required by whom and when. The need for transparency has to be fully understood by all stakeholders.
- It is advisable to form representative consultative and decision-making bodies involving all the relevant stakeholders to facilitate an informed discussion during the decision-making process about the anticipated project impacts and to enable peaceful and amicable adjustments of any potential controversy.
- The existing practices have already made it possible to develop general guidelines or voluntary codes of conduct that would guide the cooperation of the principal stakeholders. Such guidelines could be approved by the UN Global Compact and proposed for the voluntary application by businesses involved in water cooperation projects. This practice should over time give rise to internationally agreed standards that would provide the framework for business activity and policy making.
- Public education and information should be standard features of all the activities mentioned. This would involve familiarizing the stakeholders with technical, engineering, management, and financing questions, as well as the environmental and social impacts of water projects.

Case Study: The Voluntary Code of Practice of the Mining Sector in Mongolia

In 2016, the International Finance Corporation (IFC), a member of the World Bank Group, adopted a Voluntary Code of Practice (VCP) for common water management and reporting for the mining industry in the South Gobi region. The aims of the code are to protect water resources and promote the efficient and transparent use of water. Moreover, the VCP is a critical step towards building trust among government authorities, local communities, civil society organizations, and the media.

Mining is the backbone of Mongolia's economy. The arid Gobi region is experiencing a major mining boom. Exploration and mining companies need water for their operations and are becoming increasingly aware that it needs to be managed as a shared resource. A statement issued by the VCP's signatories says: "The VCP is a powerful display of corporate accountability. It is necessary to balance mining sector development with the human need for water in the Gobi region. We have made a statement of intent; now we have to deliver on it." Furthermore, Mr. B. Byambasaikhan, CEO of Erdenes Mongol, Mongolia's largest investment holding company and one of the signatories to the VCP, pointed out that "[t]he VCP provides the framework for a positive impact on water management by conserving ecosystems, strengthening communities, and committing to specific operational practices." Mr. Tuyen D. Nguyen, Resident Representative for IFC in Mongolia added that "[i]n Mongolia, water is a shared resource requiring common awareness and joint management approaches" and noted that "[t]he mining industry's commitment to the VCP shows its willingness to take a sector-wide approach to address a national challenge."

Together, the IFC and the South Gobi Water and Mining Industry worked with over ten companies to develop the VCP, based on leading international practices on community engagement, participatory water management, and monitoring.

The VCP's signatories are: Erdenes Mongol, Oyu Tolgoi, Energy Resources, Erdenes Tavan Tolgoi, Erdene Resource Development, South Gobi Sands, Terra Energy, Gobi Coal and Energy. The Government of Canada, 2030 Water Resources Group, Australian Aid, European Bank for Reconstruction and Development (EBRD), International Council of Mining and Metals (ICMM) supported the process for the adoption of the VCP.

Source: IFC Press Release, 2016. <https://www.commdev.org/press-release-ifc-promotes-responsible-water-management-in-mongolias-mining-sector/>



"Gobi nomads fear desert mega mine" The Guardian, <http://bit.ly/2vmcdWR>

Costa Rica: A Case Study on the Peaceful Resolution of a Local Water Conflict

During the 1990s, Costa Rica was faced with a water resource conflict that unleashed a social and political movement with the objective of stopping the construction of a hydroelectric dam that Costa Rica's Electricity Institute (ICE) was planning to build in the Pacuare River basin.

After years of dialogue and negotiation, a referendum was held and the inhabitants of the Turrialba region voted against hydroelectric projects in the Pacuare River. In 2015, the government of Costa Rica supported this vote with a presidential decree that will remain in force for 25 years.

This water resource conflict was resolved due to strong advocacy and the equal participation of multiple actors involved in the issue. The government backed the community referendum and the ICE played a fundamental role by engaging in an open, positive dialogue on clean energy and energy processes with the communities aiming to find common ground between the institutions and the population. The Costa Rica case study is an invaluable example of a positive outcome to water conflicts at the national level.

Source: Global High-Level Panel on Water and Peace third session field visit, Geneva Water Hub, Valeria Navas case study.



"Reportaje - Actualidad de los proyectos hidroeléctricos en Costa Rica", Canal 15, Universidad de Costa Rica, Era Verde, <http://bit.ly/2vlp4DU>





THE PANEL RECOMMENDS

We recommend that inter-sectoral water management, including management of transboundary water projects, enable participation, sharing of all relevant information and data exchange for all the stakeholders, including civil society groups.

An appropriate level of transparency and data sharing should be provided from the early stages of the project. The process should involve the relevant governmental departments and agencies, businesses, civil society organizations and the scientific community.

We recommend that governments ensure the necessary multi-stakeholder dialogue platforms. In order to enable an effective operation of these platforms, it is necessary to invest systematically in education on water issues and water management at all levels.

More generally, educational systems of states should include water education in order to build the necessary knowledge and awareness regarding water use as well as the capacity of citizens to participate in policy making related to water issues.

Best practices of inter-sectoral water cooperation should be studied and lessons learned for the benefit of future projects. This should gradually contribute to developing a set of global standards for inter-sectoral water management.

The UN Global Compact, exercising its Waters Mandate, should be instrumental in developing a Voluntary Code of Practice on Water Management.



CHAPTER 6

Financial Innovation for Water Cooperation

Rationale

The importance of transboundary water cooperation has been already emphasized in this report. However, it is necessary to develop sustainable financial mechanisms specifically aimed at promoting water as an instrument of peace to foster further transboundary water cooperation.

There is a growing commitment to fund the water sector; the challenge is to channel some of this funding to collaborative projects, which bring riparian countries together and generate growth that also promotes peace, stability and cooperation.

Transboundary water infrastructures, such as dams and irrigation systems that constitute the most important projects in this context, are currently financed by a variety of public and private actors. The guiding color of the current financing is black, to ensure that the project balance sheet is black and does not turn red. Thus the existing, strong domination of “black bottom lines” leads to a heavy emphasis on the techno-economic viability of the project, without much concern for International Water Law or the impact of the project on neighboring countries. When designing financial policies, it is necessary to add a shade of green for environmental sustainability and a shade of blue for transboundary cooperation and peace.

Global guidelines for the financing of major water projects in the transboundary water infrastructure sector, with International Water Law principles at the center, would enable this change to occur. If major political and financial actors and donors agree on the basic normative framework of their funding policies, the design process would support a high level of international water cooperation.

It is important to address the challenges of financing transboundary water infrastructure with an understanding of the basic problems that need to be resolved. These include the need to define an appropriate legal framework and the relevant technical standards and solutions to technical problems, assess the needed financial requirements, manage the interests of the stakeholders, define the role of river basin organizations where such organizations exist and, above all, help in building trust among the cooperating states and reduce political risks.

These challenges need to be addressed comprehensively in the preparatory phase, together with the necessary environmental and social impact assessments. Transboundary infrastructure projects involve complex preparations, a process that also needs funding, and should ensure that projects are bankable, a key requirement for their completion. Thus, it is essential to invest in this stage to ensure the quality of the preparatory phase.

The development of blue instruments of preferential and concessional finance for transboundary water infrastructure

would be an important element of the way forward. Such incentives would induce parties to prefer collaborative approaches to nationalistic ones whenever and wherever possible, which would also generate direct financial benefits. Collaborative projects mitigate the risk of protests by one of the countries due to wider ownership, reduce the overrun of costs, and thereby increase returns on investments.

Innovative financial instruments are needed to further promote cooperation in shared basins. Some such instruments do exist. There is now a clear need to build on this experience in order to increase the scale and coverage of financial support to international water cooperation and water diplomacy.

Innovative financing can help achieve SDG 6.5.2, aimed at the expansion of transboundary cooperation in all shared river basins by 2030. This financing can also be helpful in achieving SDG 6.5.1, which seeks to promote IWRM.

Many Shades of Blue

There are many starting points for introducing financial innovation to support water cooperation.

First, as the ESG Principles (environmental, social and governance factors) become widely accepted in the financial community, they should be extended to transboundary water cooperation.

Second, the riparian states, river basin organizations and water coordination committees of regional economic organizations can prepare Joint Investment Plans. Some institutions in Africa and Latin America are already doing this, but such cases are still rare. There is thus a scope to expand Joint Investment Plans in basins around the world.

Third, conventional sources of finance can be easily utilized for capacity building and institution building. This type of funding is not generally available for large infrastructure projects, but it can be used for enabling and preparatory activities, which pave the way for significant cooperation.

Fourth, non-traditional donors, such as China, India and Islamic countries, are showing growing interest in supporting water infrastructure in the developing world and should be encouraged to support transboundary cooperative projects rather than national projects. This funding can be harnessed for large infrastructure such as dams, irrigation and navigation.

Fifth, several options in the current multilateral space can be explored in a new way.

In short, financial innovation can be based on existing opportunities that provide the occasion to introduce many shades

of blue. Moreover, innovation is encouraged by experience and recent developments in financial markets provide many ideas for creating resources to finance water cooperation projects. Only twenty years ago, it was impossible to secure significant funding for environmentally sustainable projects. Today, green bonds and green syndicated loans are popular in developed as well as emerging capital markets. If green could become popular in the long term, why not blue, even if there is resistance in the short term?

Towards a Blue Peace Framework

There is a growing momentum towards the shaping of a sustainable financial system, which incorporates environmental, social and governance factors – the ESG principles.

Rating agencies have begun to incorporate ESG principles into their methodologies, thus developing sustainable finance capital markets, where debt and equity can be raised, bought and sold. This implies incorporating non-financial information into the plans of capital providers. Therefore, those who believe in the ESG approach are interested in a shade of green and not only the black color of the balance sheets. Although financial instruments based on ESG principles are a niche product, they already represent substantial volumes of capital. From 2012 to 2016, a significant amount of funds worldwide, close to \$100 billion according to rough estimates provided by media reports, were raised through green bonds.

Green bonds have been employed by water sector companies to create water installations using ecological principles, though not without controversy. Thus, the use of special financial instruments for water infrastructure projects, which comply with ESG principles, is already established and available to international financial markets.

The next step in the greening process would be to expand the ESG framework to include the Blue Peace framework, which emphasizes transboundary water cooperation to transform water from a source of conflict to an instrument of peace. The framework needs sustainable and collaborative management of water projects by riparian countries. If countries reach political agreements within the Blue Peace framework, several risks are lessened, including project delay risks, cost escalation and legal disputes over infrastructure, as mentioned earlier in this chapter.

Since capital markets search for favorable risk reduction strategies, it is important to influence investors to expand the existing ESG framework to include the Blue Peace framework wherever applicable. It will not be easy to make this an established strategy, but it was not easy to make the original green financing idea acceptable twenty years ago. An encouraging sign is the significant funds that have been raised in the last five years.

The ESG for Blue Peace can be made even more attractive if countries provided sovereign guarantees and if multilateral financial institutions agreed to special pledges. This would reduce the dependence of water cooperation activities on public

funding sources, and the responsibility of public finance would be limited to defaults, which are exceptional occurrences rather than substantial project funding. Several funds at the national and multinational level have offered loan guarantees that lower investment risks based on ESG principles or by co-investing in projects to attract other investors to participate by lowering the risk perception.

It is known that ESG data collection, analysis, modeling and information sharing is a key factor in the development of these financial products and new innovations since the availability of quality data is instrumental in analyzing and properly calculating risks. This is a key area of work for the insurance and re-insurance sector, and the critical third pillar in risk-reducing practices for investments related to public goods.

Thus, while primary project funding can come from the private sector and financial markets, public sources can reduce project risks through low cost initiatives such as sovereign guarantees, interest and premium subsidies through blue funds. This blue fund concept is discussed in more detail later in this chapter.

Joint Investment Plans

Innovation is the key to developing financial resources for transboundary water cooperation. Countries in West Africa and Central America are already ahead of the curve in crafting joint investment instruments in transboundary rivers basins. The Trifinio Plan in Central America, the Niger Basin Plan and the Joint Investment Plans of the Senegal and Gambia River Basins are endorsed at the heads of state level. There may be other inspiring examples of Joint Investment Plans, but the Panel had first-hand exposure to these plans during our visits to these two regions.

Joint Investment Plans are not easy since they have to overcome sectoral and national objectives, but they are attractive to multilateral financial institutions due to their risk reduction properties. These Joint Investment Plans can mobilize significant funding from the financial sector, if they are communicated properly to the private sector, and guaranteed by both governments and multilateral institutions.

The Panel believes that if interventions are sequenced correctly, and political and financial wills come together, Joint Investment Plans may become a reality in the near future, and should be given monetary value.

This will also be possible due to new technological developments, allowing the collection and analysis of data to define and share future-oriented water availability models. These models are already jointly developed in several mountainous regions of the world and need to be shaped alongside politically-driven agreements. Based on these models and with the support of data, investment plans can take shape.

Even if partners do not strictly abide by the plans, having a Joint Investment Plan in place is better than having no plan at all. The international community should be prepared to initially accept the risk – high indeed – that plans might not be followed by

actual investments due to a lack of real political commitment or sufficient de-risking incentives in the future. This risk will decline over time, once Joint Investment Plans become a standard practice in the financial community and the ESG framework is expanded to include the Blue Peace framework.

The existing instruments, linked to pre-feasibility studies, need political support to be increasingly used in the preparation of or as a result of political agreements. These might focus on multi-sectoral water needs partnering with academia and other technical knowledge sources which would set the stage for preliminary investment choices.

The actual financial investment plans would follow, which is where the sustainable finance concepts and instruments should be adapted and applied to transboundary investment choices of different natures and scopes. The blended finance component, linking national and international public investors, focusing on political, financial and security related de-risking, and private ones assuring the actual investment, is most probably the only way to overcome the financial sector's risk aversion in assuring the necessary financing of global public goods.

Using Conventional Finance

Funding is currently available through the International Waters Program of the Global Environmental Facility, other climate finance mechanisms, as well as bilateral and multilateral donors, for capacity building and institution building of river basin organizations. This normally covers the cost of legal work, training, and administrative costs of the organizations, but does not cover infrastructure or developmental projects, which have a direct impact on the lives of millions in a shared river basin.

Conventional funding is also available for infrastructure projects of small and medium scales, mostly created for demonstration purposes. These could include a boat, a monitoring station, or a micro-size desalination plant. Financing for small-scale infrastructures may be an easier option to begin with than complex large-scale infrastructure projects. Nations that are not cooperating at all may be willing to work together on small-scale projects, which are less complex and tend to be more environmentally friendly. These projects also attract investments from both public and private sources since they involve less risk and time.

Some private sector corporations support water-related projects but they are invariably in the water conservation and water education spheres. The private sector is not known to have invested in water cooperation or transboundary water relations thus far.

Engaging New Actors

Projects that can make a real difference require millions, if not billions of dollars; these are high-stakes games that affect the living conditions of large segments of the population. If projects move from a nationalist sphere to a collaborative one, an enormous peace dividend is possible. New sources

are emerging to fund these projects. The Islamic Development Bank is one such new source, although it has been around a long time. It was the main financier of the Senegal River Basin Development Organization (OMVS - *Organisation pour la mise en valeur du fleuve Sénégal*), one of the biggest success stories in transboundary water cooperation. In fact, all the infrastructure projects in the early stages of OMVS were funded by the Islamic Development Bank. The bank, along with various funds in the Gulf States, could be persuaded to support future transboundary projects that respect ESG principles in the 57 member countries of the Organization of Islamic Conference that the bank serves.

China and institutions based in China have emerged as new sources of finance for the water sector. The Asian Infrastructure Investment Bank, with capitalization of \$100 billion, counts water, sanitation, hydropower, agriculture and the environment among its 10 priority areas. If the bank follows ESG principles, adds a shade of blue to its financial decisions and gives preference to collaborative projects, it will be a game changer in the water sector and make a difference to more than 1.5 billion people living in the shared river basins of Asia. There are encouraging signs that the bank may be open to these new ideas. China, its main patron, launched the Lancang-Mekong mechanism to promote cooperation of its shared river basins with Southeast Asian countries.

India is slowly emerging as another new source of development funding at extremely low interest rates. It has already provided funds to the water and irrigation sectors in Africa and Asia where Indian expertise may be provided along with the financing. There are several indications that India will find it in its country's own interest to provide this low-cost funding to transboundary collaborative projects rather than projects confined to a single country. India also provides buyers credit to transboundary projects through the Exim Bank of India at moderate interest costs.

Spain and the Inter-American Development Bank have a joint facility for water financing in the Western hemisphere, which includes funding for preparing project feasibility studies. This funding source could be used to examine the feasibility of collaborative water projects.

There has been a proliferation of sovereign wealth funds floated by several countries in East Asia, the Gulf States, and some European countries. These funds are in essence state owned, but they finance major infrastructure projects in different parts of the developing world. However, the finances from these funds are available to riparian countries without any consideration for other riparian countries, which could potentially raise tensions between these countries. Thus, it would be well worth the effort to persuade such funds to consider shades of blue in their financial considerations.

A Step Forward: Blue Fund

A variety of financial instruments that are in use today are important for water sector investments. Conventional donor funds are available for institution building exercises, confidence building measures and small demonstration projects from

bilateral and global donor agencies. Private sector philanthropic funding is available for conservation, education and other grassroots activities. Sovereign wealth funds provide financing for large infrastructure projects at the national level, without any concern for the implications on transboundary relations. Financing offered by Multilateral Development Banks (MDBs) for large infrastructure projects at the national level is available without any incentives for collaboration or consideration of the impacts of the project on other riparian countries.

It is thus necessary to create financial incentives for large infrastructure projects, which are collaborative in nature so that the risk of conflicts is mitigated. The objective must be to create preferential support for the countries that collaborate with one another instead of competing within the nationalistic mold.

Such incentives could include preferential and concessional finance for transboundary collaborative projects in water resources and infrastructure of a significant size, including hydro-electricity, irrigation, navigation, eco-tourism, among others. Incentives can be provided in terms of interest subsidies, preparatory costs, insurance costs, and matching grants.

Many new instruments can be created while some current mechanisms can be reshaped. We provide a possible Blue Fund model that meets the objective of incentive financing for using water for peace.

The Blue Fund is conceived as a fund that can be replenished on an annual basis for concessional and preferential funding of transboundary water cooperation on freshwater resources only, such as rivers, lakes and aquifers, and is not meant for seas

and oceans. The Blue Fund could subsidize any combination of interest, insurance and feasibility costs in a joint project promoting transboundary water cooperation between riparian countries, which has an investment promise from MDBs, and which involves capital costs of \$100 million or above. At the very least, the Blue Fund should aim to cover about 3 percent of the annual cost of the project, including interest subsidies, insurance, and project proposal preparatory expenses.

The Blue Fund will provide financing only if the following conditions are met:

- a. *Developing countries:* The Fund will be available only for countries that are in most need of assistance.
- b. *Transboundary freshwater resources:* The Fund will only be available for infrastructure related to shared fresh watercourses between nations, such as lakes, rivers and aquifers.
- c. *Substantial Infrastructure projects:* The Fund is for water infrastructure projects that are worth \$100 million and above, and not for capacity building or institutional strengthening activities, which are the priorities of many conventional funds.
- d. *Enabling finance:* The Blue Fund is not envisaged to finance infrastructure projects, but to ensure that interest rates and other related costs of such projects are covered. Due to the fact that interest rates grow when countries borrow a substantial sum of money from MDBs or bilateral donors, they are often discouraged from taking the loans. The Blue Fund can help by granting them access to larger funds.



- e. *Formal third-party approval*: Any project that seeks the support of the Blue Fund must have been approved by MDBs or other donor agencies which are willing to support the capital costs, implying that feasibility studies and an environmental impact assessment have been carried out.

Technical issues such as cost coverage by the Blue Fund, currency risks, and outreach, among others will need to be reviewed separately by experts. The Blue Fund is being recommended precisely at a time when the High-Level Panel on SDGs is aiming to increase water financing to meet the SDGs. The Blue Fund will encourage the international community to set aside a part of those water funds for transboundary water cooperation.

Blue Fund Regional Test Case

A proposal to support a new funding mechanism for a pilot project in the Congo basin has been put forward to the international community. The Congo Basin Blue Fund will help the riparian nations of the Congo basin to jointly work towards economic development by shifting their focus from deforestation to the benefits derived from the sustainable use of the Congo River and its tributaries. The proposal has support from the riparian countries in order to ensure sustainable development leading to peace and stability in the region. The proposal was formally launched at the Africa Action Summit, a component of the 22nd session of the Conference of the Parties (COP 22) to the United Nations Framework Convention on Climate Change in Marrakesh, Morocco in November 2016.

The Memorandum of Understanding for the Creation of the Congo Basin Blue Fund was signed by Ministers of the Congo basin countries in Oyo, Republic of Congo on 9 March 2017. Ten riparian countries have signed the instrument thus far. The Congo Basin Blue Fund will focus on creating real economic assets such as:

- Improved river navigation and transport, including dredging and small ports infrastructure,
- Hydro-electric projects/small dams,
- Irrigation projects to increase productivity of existing arable and agricultural land,
- Fishing and fish farming,
- Water and waste water treatment, and
- Eco-tourism.

The Fund's annual target is €100 million for project costs, including full costs for some cases and interest subsidies for others.

The Congo Basin Blue Fund will be used for transboundary projects or projects in a single country where transboundary effects require transboundary cooperation. Projects should target climate change objectives and reduce the population's reliance on forest-based resources through the creation of an active "blue economy" based on water. Projects also have to be substantial in size, with a significant potential impact on the population.

Providing a "Safe Space" for the Preparation of Bankable Projects

A serious obstacle to progress in transboundary water cooperation, and in water cooperation more generally, is the current shortage of bankable projects. Two approaches to addressing this problem include taking advantage of existing financial facilities and institutional innovation.

Launched in 2014, the Global Infrastructure Facility (GIF) of the World Bank is an example of an existing financial facility. It is a "global open platform that facilitates the preparation and structuring of complex infrastructure public-private partnerships (PPPs) to enable mobilization of private sector and institutional investor capital. The GIF supports governments in bringing well-structured and bankable infrastructure projects to market. GIF's project support can cover the spectrum of design, preparation, structuring and transaction implementation activities, drawing on the combined expertise of the GIF's Technical and Advisory Partners and focusing on structures that are able to attract a wide range of private investors."

GIF could also serve as a support facility for riparian nations by having a dedicated water component to help countries design projects that are ecologically-sensitive and technologically-sound, but have a transboundary water component. The preparation of such a component, however, would require special effort.

This brings to the fore the need to create a "safe space" or an opportunity for pre-negotiation consultations and other activities at an early stage of project development. The safe space would allow stakeholders to proactively address major implementation issues early, as well as to generate innovative ideas. Additionally, it would help create the necessary confidence among all stakeholders. Facilities for such a safe space could be provided by existing water cooperation organizations or by the Global Observatory for Water and Peace, a new facility proposed in the next chapter of this report.

Good Practices in the Management of Transboundary Water Resources: The Case Study of the Senegal River Basin Development Organization (OMVS)

The Senegal River Basin Development Organization (OMVS) is recognized as one of the best models of water cooperation because of the specificity of its benefit-sharing regime. Under the Senegalese legal framework, benefit sharing is directly linked to the statute of common infrastructures, and all riparian states share the benefits of common water installations. However, this does not mean that states have an equal benefit from common projects. Rather, benefit-sharing is organized on an equitable basis, which consists of matching investment costs with the direct benefits earned from water installations.

Financial arrangements enshrine the principle of equity. OMVS member states jointly guarantee the repayment of the principal and interest on any loans made to the organization for the construction and operation of common facilities. The payments are allocated pro rata according to each country's participation in the costs and expenses of the facilities, in accordance with a cost schedule set out in an agreement between member states. Contributions to the costs and expenses also determine the benefits which are withdrawn from common installations.

Source: Global High-Level Panel on Water and Peace, Think Tank Roundtable Summary Report: *Cooperation and Benefit-Sharing in the Senegal and Niger River Basins*, September 2015.



"Bringing Water for Greater Prosperity in the Senegal River Basin", 2013 World Bank, <http://bit.ly/zuKRdgc>



THE PANEL RECOMMENDS

The international community should create, in a sustained and significant way, financial and other incentives to promote transboundary water cooperation.

The riparian countries in transboundary watercourses, lakes and aquifers should use conventional sources of finance for institution building, capacity building and similar activities. The preparations of transboundary infrastructure projects should ensure high quality and aim at making the projects bankable.

The international community should encourage riparian countries to undertake Joint Investment Plans.

The international financial sector should gradually include transboundary water cooperation in expanded ESG principles. Ultimately, the ESG framework should include a “Blue Peace” framework and serve as an incentive for investment in transboundary water projects.

The multilateral development organizations should consider collaborative projects on a preferential basis and spread awareness of facilities. One example is the regional funds of the International Development Association, which should promote transboundary water infrastructure projects.

New and old sources of finance, including the Asian Infrastructure and Investment Bank, the Islamic Development Bank, and development assistance programs of emerging economies should give priority to collaborative projects.

New instruments such as the Blue Fund should be created to provide preferential and concessional finance to subsidize interest, insurance and related ancillary costs of large infrastructure projects for the countries that are willing to work together in a collaborative way to develop transboundary water projects.

An international task force should be established to assess the evolution of sustainable finance practices and their application to transboundary water cooperation.

The private sector should be encouraged to develop innovative financial instruments such as blue bonds to finance transboundary water cooperation.

The problem of preparing bankable projects should also be addressed by providing a neutral, independent “safe space,” i.e. through pre-negotiation opportunities at an early project development stage with the aim to address major implementation issues early and proactively. This would help in ensuring the adequate quality in project preparation.



CHAPTER 7

In Pursuit of Agency: New Mechanisms of Water Diplomacy

The Meaning of the Concept of “Agency”

In the preceding chapters, references were made to international institutions dealing with water issues, ranging from river basin organizations or transboundary water management systems to research institutes as well as regional intergovernmental organizations and UN organs, agencies, funds and programs. Many of the latter institutions have a variety of water issues included in their mandates and programs. They all contribute significantly to water cooperation to the extent possible at the current level of international cooperation.

These existing organizations and mechanisms are necessary, valuable and impactful. They are doing valuable work in furthering joint water management as a means of advancing peace. Several governments offer confidential political and diplomatic assistance in this particular niche, and numerous donors seek to create or strengthen conditions for closer water cooperation. Activities pursued in the follow up to the adoption of the SDGs, and SDG 6 on water and sanitation in particular, are expected to contribute to strengthening existing forms of cooperation, and perhaps even add a few new ones.

At the same time, it is necessary to recognize the political importance and nature of many water issues that need to be addressed diplomatically, therefore requiring attention beyond the technical dimension of water cooperation. An important feature of discussions relating to international water cooperation is the frequently cited “lack of agency” at the political and diplomatic levels and the search for a global home of hydro-diplomacy. Importantly, “lack of agency” does not refer to the need for an additional international institution. “Agency” is referred to in a philosophical sense, that is, as the capacity of international actors to act effectively in the current global environment in which water problems are growing and are likely to contribute to international tensions, disputes and threats to peace.

Leveraging Water for Peace

These statements suggest that there is a gap in international cooperation and, beyond joint water management, especially in systematically leveraging water for peace. The world needs a global structure to coordinate and facilitate the expansion of water cooperation by providing a trusted, impartial clearing house for promising initiatives. This structure would not primarily coordinate existing initiatives, although that could become one of its tasks, but advise interested parties on potential models of cooperation, ongoing processes in specific regions or basins and potential complementary efforts, and matching particular needs with potential supporters. It would be linked to a variety of regional structures, both those already in existence and ones that could be established in the future, to support water diplomacy that is expressed politically or led diplomatically and goes beyond joint water management.

Such activities would facilitate cooperation and thus would need to be managed with the appropriate tact and ensure meaningful and early engagement so that actors improve their understanding of each other. Initiatives would need to be complementary and mutually supportive, and no basin could be left behind.

But which organization could undertake this task and how would they accomplish it?

A Global Observatory for Water and Peace: Basic Features

The Panel suggests that this facilitation initiative be the “Global Observatory for Water and Peace” (GOWP). Its mandate would be to facilitate assistance to governments to use water as an instrument for avoiding conflicts, developing cooperation mechanisms and peace building activities. The Observatory’s purpose would be to catalyze and facilitate the expansion of water cooperation for peace by:

- Highlighting the potential of using water for peace;
- Showcasing the expertise and assistance that is available to governments;
- Matching governments with existing organizations and approaches;
- Capturing and highlighting the approaches and achievements of organizations that work successfully in this area;
- Facilitating activities of a select network of regional practitioner institutions that are focused on using water for peace;
- Facilitating training and development of water diplomacy skills;
- Acting as a catalyst for financial investment in water cooperation, e.g. by funding early stage research of existing water diplomacy organizations on water cooperation ideas designed to address the needs of governments engaged in conflict;
- In cases of armed conflict, monitoring, evaluating and reporting on the destruction of water supply and sanitation systems.

The Global Observatory for Water and Peace would work closely with organizations and centers at the global and regional levels, which specialize in water cooperation and harness the potential of water for building peace. In short, it would focus on hydro-diplomacy beyond joint management.

The Observatory would strive to capture best practices and lessons learned from the widest variety of actors, including regional organizations and initiatives, as well as entities at the global level. It would maintain a credible network of leading academic, water professional, research, think tank and other organizations to maintain a centralized knowledge base of academic and theoretical approaches, as well as global case studies.

In order to offer practical assistance and advice when necessary, the GOWP would maintain an expert list from practitioner organizations that would be asked to contribute (with funding) to a peace process or government initiative where this is requested.

The Global Observatory for Water and Peace would study the best practices and present this information to governments in a useful, reliable and accessible manner. It would match governments with existing initiatives. In addition, the GOWP would provide the donor community with an overview of global activities on its horizon and offer insight into what activities would be impactful in practice.

The Observatory's collection, integration and analysis of data would help develop the appropriate analysis on early warning, problems that are likely to lead to friction or disputes among states. This would be made available to the affected states, with the aim to prevent further escalation, assist in confidence building, and offer options for peaceful outcomes of the situations in question.

Finally, the GOWP would provide guidance in the search for funding opportunities, including seed funding opportunities of initial feasibility checks and water cooperation ideas. It would provide a "safe space" for pre-negotiation consultations at an early stage of project development. The Observatory would thus proactively help in addressing the main implementation issues, assist in generating innovative ideas, and in creating confidence among stakeholders, including financial institutions. The GOWP would liaise with the proposed Blue Fund and support developing countries with the preparation of bankable projects to attract private sector funding.

The Global Observatory for Water and Peace would have a simple operating structure, inexpensive and administratively light, a secretariat with a diplomatic or governmental head for the network.

The GOWP would thus be a small and flexible organization that supports and collaborates with a broad range of actors with extensive experience on the subject matter, leveraging their existing knowledge and expertise. It would be guided by the principle of not imposing outside advice and prudent assistance in the formation of the political will of states and other parties necessary in the strengthening of water cooperation as an instrument of international stability and peace.

The mandate for the Observatory would come from the Co-Convening Countries of the Global High-Level Panel on Water and Peace. The Co-Convening Countries would be invited to an annual meeting to be held in Geneva or New York.

Since the GOWP would cooperate with governments that are interested in actively working towards solutions to transboundary water issues, it would work with various actors at global, regional and sub-regional levels. This should be possible given that the Observatory will concentrate on knowledge management work, as well as discreet facilitation

rather than traditional dispute settlement, peacemaking or peace building.

The GOWP will focus on cooperation with regional multilateral water centers and initiatives that already exist as well as future ones, thus helping to leverage water for peace. This would help to further reduce the problem of "lack of agency."

Settlement of Disputes: The Availability of Existing Mechanisms

As indicated above, the Global Observatory for Water and Peace would not engage in traditional dispute settlement activities, which would be neither desirable nor necessary. On the other hand, the international system of mechanisms for the settlement of disputes between States, an important aspect of international cooperation, has both a long history of settling water-related disputes among states and important potential to strengthen future water cooperation.

The UN Charter, in its Article 33 para. 1, describes the principle of free choice of means in the settlement of international disputes. It obliges States Parties to seek solutions to any dispute, the continuance of which is likely to endanger international peace and security, through negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their choice. While the legal obligation to settle disputes peacefully is authoritative and universal, the choice of means belongs to States Parties in a dispute.

The UN Security Council has, according to the UN Charter, the authority when it deems necessary, to call upon the parties to settle their dispute by the means quoted above (Article 33, para. 2 of the UN Charter). In addition, the Council itself may investigate and, with the consent of the parties, engage in the settlement of a dispute (Articles 34-38 of the UN Charter).

Article 33 of the UN Charter refers to all the basic means of dispute settlement, whether diplomatic or judicial. There are nuances within each of the diplomatic means. Mediation, for example, can take on different formats as well as a variety of different mediators, ranging from subtle good offices to robust mediation efforts. An individual dispute can be addressed by different means at various stages in the attempt to solve the problem. Judicial means, i.e. arbitration and adjudication, on the other hand, are less flexible in their method since they are subject to clear procedural rules and are therefore more predictable in terms of their actual operation.

There is no hierarchy among the basic means of dispute settlements: any among them that is appropriate in solving a dispute is both equally acceptable and authoritative. The once fashionable distinction between political and legal disputes – the former being appropriate for mediation and the latter for adjudication – has lost its erstwhile significance. Today, for example, arbitrations and the International Court of Justice are among the frequently used mechanisms for border settlement and other territorial disputes,

which were once considered classic examples of political disputes. This has led to significant change in state practices on this issue. A number of water-related disputes have been settled by arbitration or the International Court of Justice.

Role of the Global Observatory for Water and Peace with Respect to Potential Disputes

The Global Observatory for Water and Peace, as suggested above, would strengthen the capacity of international actors to communicate discreetly and to address incipient situations that might, if unattended, lead to friction and even full-scale inter-state disputes. In addition, it would energize the inputs to the prevention of possible armed conflicts that specifically include tensions over water among the causes of the conflict.

In other words, the Observatory's role with respect to potential inter-state disputes would be indirect. Knowledge management, discreet consultations aiming to strengthen communication, assistance in securing financing for transboundary water projects and other similar activities can be helpful in preventing full-fledged disputes from evolving. In addition, the Observatory would have the capacity to address local concerns through professional analysis and advice that expands beyond the scope of transboundary cooperation.

The Global Observatory for Water and Peace will likely face typical dispute situations that involve disagreement and lack of confidence among states, and would concentrate on low threshold situations. Depending on the needs of the parties, the Observatory might help in facilitating fact finding and good offices, while other more direct forms of dispute settlement would be dealt with by existing mechanisms.

Providing Broad Recommendations and Advice for Water Cooperation

Given the informal nature of its operations, the GOWP could cooperate with a variety of regional and national actors, as well as with those involved in inter-sectoral water management.

The Observatory would help in the efforts to expand the number of States Parties to the 1997 UN Watercourses Convention and the 1992 UNECE Water Convention (which since 2016 is open for accession to all UN Member States). It would also strive to facilitate the use of the Implementation Committee under the UNECE Water Convention.

Since several important tasks of international water cooperation need to be addressed anew and with greater urgency at the level of the UN General Assembly, the GOWP would develop the appropriate communication materials in collaboration with the relevant actors within and outside the UN System, including but not limited to such programs and agencies as UNESCO, WMO, UNEP, UNDP, UNHCR, the World Bank and others working on the promotion of water as a factor of peace.

When armed conflicts with significant water-related elements as a cause of conflict do occur, the Global Observatory for Water and Peace would help the UN Security Council to include the protection of water resources and installations adequately in efforts to protect civilians, as well as in the Security Council's efforts in peacemaking, peacekeeping and post-conflict peace building.

Enhancing Hydro-diplomacy

“First and most fundamentally, there is a lack of agency at the international level. Our call for more agency is not about creating new organizations, but about establishing an institutional setting that connects pivotal actors and reinforces and complements existing frameworks, initiatives and expertise to coordinate and execute political action. Its purpose should be to ensure systematic early warning and to support coordinated action to prevent conflicts, facilitate timely responses to emerging crises, and build the appropriate institutions for sustainable and self-reinforcing cooperation.”

Source: *The Rise of Hydro-Diplomacy*, Adelphi Report, Berlin, Germany, 2014, p. 79.



“Hydro-diplomacy: A Tool for Sharing Water across Borders”, 2012
ASEANTV NBC, “Towards 2015”, <http://bit.ly/2vFHd2B>



THE PANEL RECOMMENDS

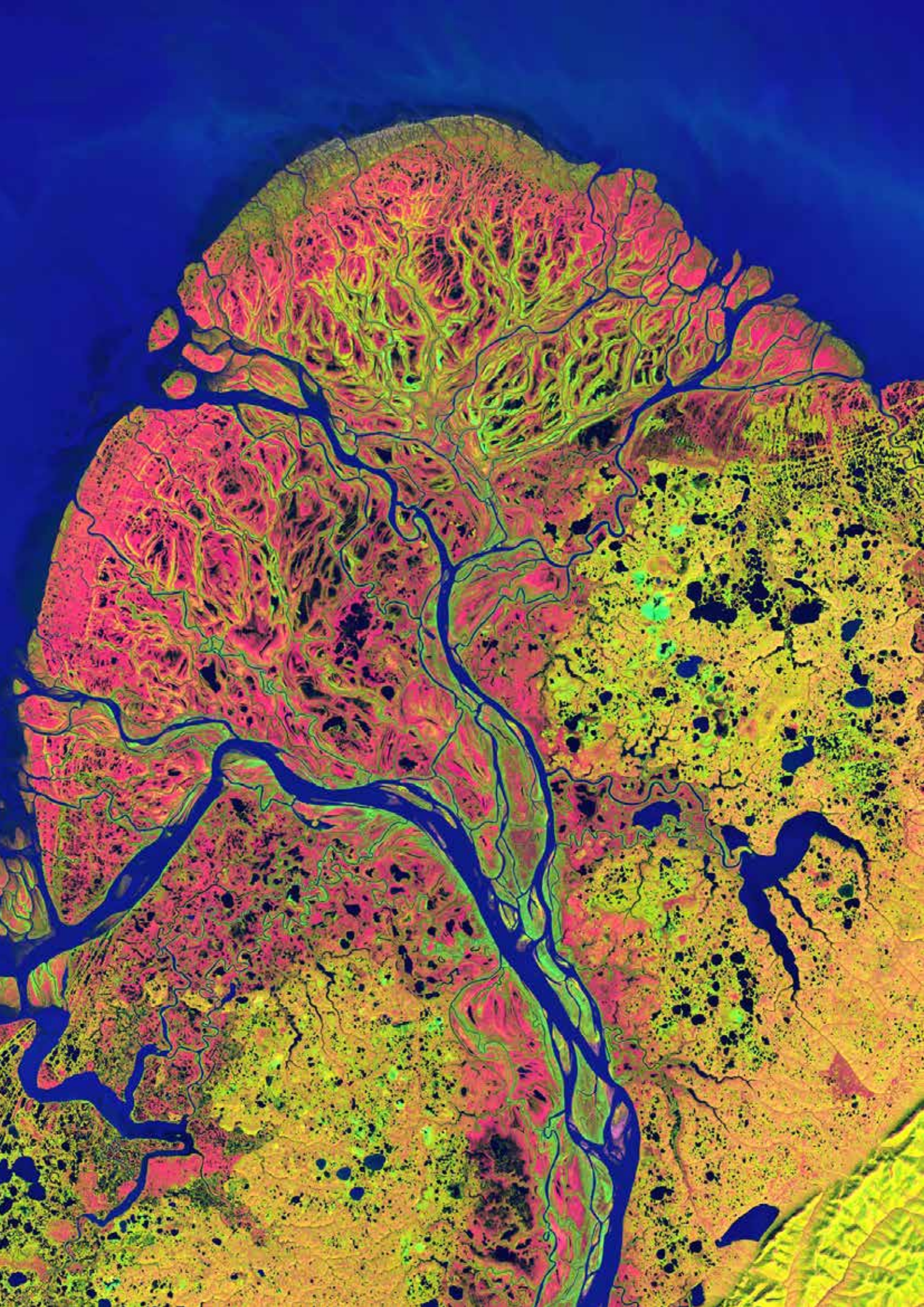
We recommend the establishment of the Global Observatory for Water and Peace, an international facility of hydro-diplomacy with the aim of facilitating, promoting and energizing diplomatic efforts to leverage water for comprehensive peace.

The Global Observatory for Water and Peace should focus specifically on facilitating cooperation in situations of potential tension in order to preempt its escalation through joint vision development, confidence building, and opening ways to its peaceful adjustment. In the implementation of its mandate, the Observatory would cooperate closely with regional multilateral water centers and other relevant organizations.

The Observatory should play an advisory role and should catalyze the understanding of the political importance of water cooperation. It should also facilitate, as necessary, the possibilities for fact finding and good offices, while the established mechanisms for the settlement of international disputes will be available to states that ultimately make the relevant choices.

The Observatory would participate in efforts to create “safe spaces” for financing of transboundary water projects by promoting early consultations among the relevant stakeholders with the aim of addressing design and implementation issues of such projects in a proactive way and by helping to generate innovative ideas, confidence and a joint vision of transboundary water cooperation.

The Co-Convening Countries of the Panel and other like-minded countries are invited to consider initiating the establishment of the Global Observatory for Water and Peace, after having studied the present report and having defined specific niches for its activities.



CHAPTER 8

Water as an Asset for Peace: Conclusions and Recommendations

Promoting water cooperation in its various forms has become an urgent task. Water should be used as an instrument of peace; violent conflicts related to water should be prevented. This is a moral imperative and a recognized political need of our era.

As demonstrated in the previous chapters, international water cooperation takes numerous forms and there are many ideas of how to develop this cooperation further. Existing International Water Law – its structure, basic principles and norms, and implementation mechanisms – already provides a good legal basis for expanded international water cooperation. Mechanisms for monitoring the situation of water quality and quantity are evolving. Progress, albeit modest, exists with regard to inter-sectoral cooperation and management of water resources. In addition to the existing financial mechanisms that are available to projects of international water cooperation, new mechanisms are being proposed. The same tendency is observed in the area of water diplomacy. The UN Security Council is starting to take a broader view of the problems of water as an object of attack and as a weapon in armed conflicts.

The Panel has observed all of these developments. At the same time, it is becoming increasingly clear that it is necessary to bring the highest possible level of coherence to international efforts to address water problems, as well as to make water an instrument of peace. In the first chapter, we emphasized that the drama of water calls for a fundamental rethinking of the global water framework and that the UN should serve as a vehicle for this policy and institutional change. We also stressed that the UN General Assembly has the most important responsibilities in this context, while the UN Security Council is expected to develop a policy framework for protecting water resources and installations in armed conflicts and in other situations on the agenda of the Council.

It is important to proceed from a sound and realistic assessment of the current state of the general international institutional setting. This has been studied in the past by various UN bodies and experts, and there is consensus that the institutional landscape in the area of water remains painfully fragmented. This situation is clearly inadequate and has to be transformed. Proposals for change have already been made by the Budapest Water Summit in 2013 and by the UN Secretary-General's Advisory Board on Water and Sanitation (UNSGAB) in 2015. To overcome the current institutional landscape, UNSGAB recommended the creation of a UN Intergovernmental Committee on Water and Sanitation. This committee would involve the strengthened UN-Water as its secretariat and create a comprehensive global water and sanitation monitoring framework. We agree that the evolution of global water cooperation should include the creation of an intergovernmental structure on water and sanitation, part of the

UN system and endorsed by UN Member States. We hope that the UN General Assembly will consider this proposal at an early date.

Moreover, we believe that a coherent vision and policy approach to water needs to be established at the global level. We therefore recommend to the UN General Assembly to convene a Global Conference on International Water Cooperation with the aim of formulating a strategic framework for global water cooperation and a program of action defining specific priorities for the five-year period following the Global Conference.

This report summarizes our analysis and offers a number of recommendations for the future. **The two key objectives** of our recommendations are: preventing water-related conflicts and leveraging water as an instrument of peace.

Four groups of instruments are necessary at the international level to achieve these two objectives.

First, the legal foundations: The two UN Conventions of 1992 and 1997, respectively, provide the necessary legal basis for expanded international cooperation. Their global acceptance through accession by states should be encouraged. Transboundary water cooperation agreements should be concluded among countries sharing rivers, lakes and aquifers. Regional conventions and agreements for collaborative management of water resources should be encouraged, especially among countries that have decided not to accede to the global conventions. Additional “soft law instruments” need to be developed where necessary, including in the area of inter-sectoral water management. The instruments of International Humanitarian Law and their provisions on protecting water in situations of armed conflict must be respected and politically supported by the UN Security Council.

Second, institutions: Existing transboundary water agreements have proven to be important as the institutional framework for leveraging water as an instrument of peace. They have to be supported, strengthened and updated as necessary. In addition, new institutions are needed to develop further cooperation around the world's 286 shared river basins, as well as around the internationally shared lakes and aquifers. More regional institutions need to be built. International water cooperation should be supported by a variety of other existing institutions. There is a broadly recognized need to strengthen the capacity of international actors to act effectively in leveraging water for peace. This is not primarily about creating new organizations, but about establishing an institutional setting that connects pivotal actors and complements existing frameworks, initiatives and expertise for an effective leveraging of water for peace and preventing water-related armed conflicts. In this spirit, we propose the creation of a Global Observatory for Water and Peace.

Third, finance: The overall investment in water and sanitation needs to be increased substantially. Existing financial facilities, some of which were established with the goal of promoting international cooperation for the protection of the environment and mitigating the effects of climate change, should be used more fully. It is important to underline that the overwhelming proportion of the physical effects of climate change is transmitted through water. Therefore, water-related projects for mitigation and, increasingly, for adaptation to the effects of climate change, have to be given higher priority and better financial support than was hitherto the case. While overall investment in water and sanitation has to increase substantially, there is a need to create instruments for preferential and concessional finance for collaborative projects, especially those in shared water basins. Such projects have a significant impact on the lives of local populations, and have to be given priority. We therefore propose the creation of a new Blue Fund to serve this purpose.

Fourth, political support: Positive linkages between water cooperation and peace need political support. As in all other areas of international cooperation, political will is essential for progress. The UN General Assembly and the Security Council are the key instruments to generate and strengthen such political will. In this framework, other international institutions and states should be encouraged to give high priority to water cooperation in their policymaking. Civil society and grassroots organizations should contribute their views, based on their experience and knowledge.

We have studied the issues of water and peace with passion and strong commitment. Our report reflects our thinking and discussion. Throughout the report we have offered recommendations related specifically to each chapter. We now summarize them in the final chapter with the aim that they are seen together, as a complete set of our proposals for further action and as building blocks for future activities.

1. The Drama of Water

We share the widely held understanding that water scarcity and deteriorating quality represent an ever more pronounced conflict-risk multiplier, and that therefore the world needs a fundamental rethinking of the global approach to water issues. The nexus between water, peace and security has to be given urgent attention and a thorough consideration in the context of this rethinking.

We welcome the existing engagement of a multitude of actors in this effort and recommend that the UN serve as the vehicle of the policy and institutional changes.

The UN General Assembly has the most important responsibilities in this context, while the UN Security Council is expected to develop a policy framework for the protection of water resources and installations in armed conflicts and in other situations on the Council's agenda.

We recommend that the UN General Assembly convenes a Global Conference on International Water Cooperation with the aim of

formulating a strategic framework for global water cooperation and a program of action defining specific priorities for the five-year period following the Global Conference.

Within its primary responsibility for the maintenance of international peace and security, the UN Security Council is expected to design an effective policy framework for the protection of water resources and installations in the situations on the Council's agenda.

2. Into the Abyss: Water in Armed Conflicts

Within its efforts to strengthen the protection of civilians in armed conflicts, the UN Security Council should adopt a resolution that will reflect the experiences of protecting water resources and infrastructure in armed conflicts, and guide the Council's decision making relating to specific situations on its agenda. The Panel believes that the resolution could include a number of elements stemming from existing experience.

The Security Council should:

- Recognize water as "a vital asset of humankind" and emphasize that the protection of water resources and installations constitutes a vital element of the protection of civilians in armed conflicts, therefore water must not be affected by armed attack or used as a weapon of war;
- Strengthen the respect for and implementation of International Humanitarian Law (IHL) and clarify that IHL principles, such as the principles of distinction and proportionality must be applied both in international and in non-international armed conflicts;
- Encourage "water supply ceasefires" during armed conflicts and the inclusion of water issues and water cooperation in peace agreements;
- Insist on restraint with respect to the environment during armed conflicts and encourage provisions on environmental protection in ceasefires and peace agreements;
- Provide a platform for support to humanitarian organizations in their work before, during and after armed conflicts;
- Encourage the quick deployment of military water specialists in peace operations to rehabilitate and rebuild water supply systems;
- Guide the formulation and implementation of mandates of UN peace operations as well as post-conflict activities that will include the protection of water resources and installations;
- Serve as an inspiration to other UN bodies as well as to UN Member States and other international actors.

States and the relevant international organizations and UN bodies, including the Security Council's Counter-Terrorism Committee should study the trends in the development of technologies for protecting water infrastructure and stimulate international cooperation for their effective use in situations of armed conflicts. States should be encouraged to develop the appropriate legislative frameworks for the protection of transboundary water infrastructures against terrorist acts.

States and the international community as a whole should support non-governmental organizations that engage with non-state actors for the full respect of IHL, such as Geneva Call which reaches out to non-state actors through the “Deeds of Commitment” in the effort to strengthen their respect for IHL in general and the protection of water resources in particular.

Further consideration should be given to proposals to establish:

- An independent international body mandated to gather information about destruction and water supply cuts as well as to foster technical assistance during protracted armed conflicts;
- A mechanism to monitor compliance with International Humanitarian Law and reparations to victims of violations;
- Improved cooperation among the relevant international organizations and agencies to manage post-conflict environmental assessments and remedial measures;
- A rapid reaction water engineering military capacity to restore basic water and sanitation services to civilian populations, and to sensitive sites such as hospitals and refugee camps, in particular.

3. An Ounce of Prevention: International Water Law and Transboundary Water Cooperation

We strongly recommend to all states sharing transboundary water resources (rivers and lakes, as well as aquifers) to conclude transboundary water agreements. Where such agreements already exist we recommend their strengthening along the lines of the principles and norms of International Water Law.

States should adhere to the principles of International Water Law and promote their full implementation. The Panel calls for wide accession by states to the 1997 UN Watercourses Convention and the 1992 UNECE Water Convention, now open for accession to all UN Member States.

Furthermore, we recommend intensified work on supplemental instruments to the two UN Conventions, including “soft law instruments” such as guidelines and procedures facilitating transboundary water cooperation, especially with respect to the allocation of water, hydropower development, and irrigation.

We also encourage the use of UNECE Water Convention’s cooperation mechanisms, specifically the resort by countries and civil society to the Convention’s Implementation Committee.

The UN General Assembly should encourage states to strengthen their international water cooperation and to avail themselves of the advantages provided by the conventions embodying International Water Law. The General Assembly should also consider ways to develop effective institutional and financial mechanisms to support transboundary water cooperation.

The role of civil society organizations in promoting transboundary water cooperation and in the monitoring and implementation of International Water Law should be promoted.

4. Quantity and Quality: Strengthening of Knowledge-Based and Data-Driven Decision Making and Cooperation

Knowledge relating to water quality and quantity issues has to be improved at all levels. A particular matter of priority is knowledge on groundwater and aquifers, which represent more than 90 percent of unfrozen global freshwater reserves.

Investing in and cooperating for improved water data will to build trust and broader cooperation, and thus also contribute to the prevention of potential conflicts.

More specifically we recommend:

- Existing mechanisms for water data collection, storage and access should be improved further and provide for better integration of spatial and disaggregated socio-political data. This development should include innovative, non-traditional data sources such as crowdsourcing in order to strengthen data collection processes.
- Particular attention needs to be paid to the proper understanding of asymmetries among countries and sectors of activity within river basins and to developing methodologies that will help the efforts of conflict prevention with timely and credible information.
- States Parties to treaties establishing transboundary water cooperation systems should strengthen these systems by prioritizing issues of water quality, pollution and contamination.
- In this context, the Panel recommends the systematic application of the relevant provisions of International Water Law and the existing international standards (WHO and FAO) and, as appropriate, the relevant regional standards. These standards should guide decision making by states, including decisions relating to the strengthening of relevant institutional structures.
- The existing data and knowledge bases administered by different UN agencies should be brought together into a coherent system. The Panel supports the coordination work being done by UN-Water in this regard and recommends that the UN General Assembly stimulates and supports this effort, including through the UN World Water Assessment Program and the experience of relevant non-governmental global water science programs.
- As a matter of a long-term vision, the Panel advocates the establishment of a strong global data system and monitoring mechanism on the basis of existing work. Its task should be to monitor and analyze water quality issues globally and especially in transboundary basins and aquifers, with a view to providing reliable information to the public on short notice.

5. People’s Diplomacy, Inter-Sectoral Water Management and Decision Making

We recommend that inter-sectoral water management, including the management of transboundary water projects

enable participation, relevant information and exchange of data for all stakeholders, including civil society groups.

An appropriate level of transparency and data sharing should be provided from the early stages of the project. The process should involve relevant governmental departments and agencies, businesses, civil society organizations and the scientific community.

We recommend that governments guarantee the necessary multi-stakeholder dialogue platforms. In order to enable effective operation of these platforms, it is essential to invest systematically in water education and water management at all levels.

More generally, states should include water education in their educational systems in order to build the necessary knowledge and awareness regarding water use as well as to build the capacity of citizens to participate in water policymaking.

Best practices of inter-sectoral water cooperation should be studied and lessons learned used in future projects. This should gradually contribute to the development of a set of global standards on inter-sectoral water management.

The UN Global Compact, exercising its Waters Mandate, should be instrumental in developing a Voluntary Code of Practice on Water Management.

6. Financial Innovation for Water Cooperation

The international community should create financial and other incentives to promote transboundary water cooperation in a sustained and significant way.

The riparian countries in transboundary watercourses, lakes and aquifers should use conventional sources of finance for institution building, capacity building and similar activities. Preparation of transboundary infrastructure projects should be high quality and aim at making the projects bankable.

The international community should encourage riparian countries to undertake Joint Investment Plans.

The international financial sector should gradually include transboundary water cooperation in the expanded ESG principles. Ultimately, the ESG framework should include the Blue Peace framework and serve as an incentive for investment in transboundary water projects.

An international task force should be established to assess the evolution of sustainable finance practices and their application to transboundary water cooperation.

The multilateral development organizations should consider collaborative projects on a preferential basis and spread awareness of facilities. One example is the regional funds of the International Development Association, which should promote transboundary water infrastructure projects.

New and old sources of finance, including the Asian Infrastructure Investment Bank, the Islamic Development Bank, and development assistance programs of emerging economies should give priority to collaborative projects.

New instruments such as the Blue Fund should be created to provide preferential and concessional finance to subsidize interest, insurance and related ancillary costs of large infrastructure projects for the countries that are willing to work together in a collaborative way to develop transboundary water projects.

The private sector should be encouraged to develop innovative financial instruments such as blue bonds to finance transboundary water cooperation.

The problem of preparing bankable projects should also be addressed by offering a neutral, independent “safe space,” through pre-negotiation opportunities at an early project development stage, with the aim of addressing the major implementation issues early and proactively. This would help in ensuring an adequate quality in the preparation of projects.

7. In Pursuit of Agency: New Mechanisms of Water Diplomacy

We recommend the establishment of the Global Observatory for Water and Peace (GOWP), an international facility of hydro-diplomacy with the aim of facilitating, promoting and energizing diplomatic efforts to leverage water for comprehensive peace.

The Observatory should focus specifically on facilitating cooperation in situations of potential tension in order to preempt its escalation through joint vision development, confidence building, and exploring options for peaceful solutions. In the implementation of its mandate, the Observatory would cooperate closely with regional water centers and other relevant organizations.

The Global Observatory for Water and Peace should play an advisory role and catalyze the understanding of the political importance of water cooperation. It should also facilitate, as necessary, the possibilities for fact finding and good offices, while the established mechanisms for the settlement of international disputes will be available to states that ultimately make the relevant choices.

The GOWP would participate in efforts to create a “safe space” for financing of transboundary water projects by promoting early consultations among the relevant stakeholders, with the aim of addressing design and implementation issues of such projects in a proactive way, and by helping to generate innovative ideas, confidence and a joint vision of transboundary water cooperation.

The Co-Convening Countries of the Panel and other like-minded countries are invited to consider initiating the establishment of the Global Observatory for Water and Peace after having studied this report and having defined specific niches for its activities.





ANNEXES



Annex I

Members of The Global High-Level Panel on Water and Peace

Chair

Danilo **Türk** (Slovenia), Former President of Slovenia

Vice Chairs

Mansour **Faye** (Senegal), Minister of Water and Hydraulics

Alvaro Umaña **Quesada** (Costa Rica), Former Minister of Energy and Environment

Members (in alphabetical order)

Abdelaziz **Ameziane** (Morocco), General Engineer of Ministry of Water

His Royal Highness Prince Hassan **bin Talal** (Jordan)

Laurence **Boisson de Chazournes** (Switzerland), Professor of Law at University of Geneva

Thor **Chetha** (Cambodia), Secretary of State of Ministry of Water Resources and Meteorology

Ciarán **Ó Cuinn** (Oman), Director of Middle East Desalination Research Centre

Pascual **Fernández** (Spain), Former State Secretary for Water and Seashore

Franck **Galland** (France), Managing Director of Environmental Emergency & Security Services

Mike Allen **Hammah** (Ghana), Former Minister for Lands and Natural Resources

Claudia Patricia **Mora** (Colombia), Former Vice Minister for Water and Sanitation

Yerlan **Nysanbayev** (Kazakhstan), Vice-Minister of Ministry of Agriculture

András **Szöllösi-Nagy** (Hungary), Professor of Sustainable Water Management, National University of Public Service, Budapest

Andres **Tarand** (Estonia), Former Prime Minister

Observer - UN Water

Annex II

Secretariat of the Global High-Level Panel on Water and Peace and Supporting Institutions

Secretariat of the Panel

Geneva Water Hub (Switzerland)

François **Mün**ger, Director

Christophe **Bö**sch, Lead Water Advisor

Christian **Bré**thaut, Assistant Professor, Director Research and Education

Stéphane **Kl**user, Information and Communication

Jelena **Mil**enkovic, Senior Project Manager

Monica **Nu**ñez, Project Assistant and Analyst

Mara **Tig**nino, Senior Lecturer and Coordinator of the Platform for International Water Law

Supporting Institutions

Strategic Foresight Group (India)

Sundeeep **Was**lekar, President

Ilmas **Fute**hally, Executive Director

Diana **Phil**ip, Senior Research Manager

Anumita **Raj**, Senior Programme Manager

Janaina **Tewa**ney, Research Analyst

Annex III

Background

The decision to establish the Global High-Level Panel on Water and Peace to examine water and peace linkages was taken in response to the need expressed for over two decades by successive Secretaries-General of the United Nations from 1993 to 2013.

The Swiss Agency for Development and Cooperation (SDC) appreciated the importance of examining such a linkage based on its own experience in several transboundary river basins in different parts of the world.

Research published in 2013 by the Strategic Foresight Group (SFG), a think tank based in India, covering 219 shared river basins from 148 countries demonstrated a strong correlation between water cooperation and regional peace.

SDC therefore asked the Strategic Foresight Group to consult governments and experts from across the world to gather perspectives. SFG teams met with the governments of the United States, Senegal, South Africa, Switzerland, Hungary, Austria, Singapore, and South Korea. In addition, SFG teams also had informal consultations in Turkey, Jordan, Kenya, the United Kingdom and India. The visits included the three main UN centers in New York, Geneva and Vienna. A large number of experts and officials were also interviewed by phone.

These consultations in different parts of the world revealed that water was recognized internationally as a development and human rights issue, but its implications for peace and security were inadequately addressed. At a time of growing water scarcity, it was necessary to explore how water conflicts could be prevented and moreover, how water could be converted from a potential source of crisis into an instrument of peace.

The Government of Switzerland therefore decided to convene a meeting of government representatives of interested countries in Geneva on 4-5 May 2015. The meeting was attended by the following countries: Cambodia, Chile, Colombia, Estonia, Finland, France, Germany, Ghana, Hungary, Jordan, Kazakhstan, Morocco, the Netherlands, Oman, Senegal, Slovenia, South Africa, Spain, Sweden, Switzerland, and the United States of America. Representatives of international organisations engaged in water issues also presented their perspectives.

The meeting participants decided to establish a Global High-Level Panel on Water and Peace to be co-convened by those countries that wanted to play such a role. The following 15 countries decided to be Co-convening Countries: Cambodia, Colombia, Costa Rica, Estonia, France, Ghana, Hungary, Jordan, Kazakhstan, Morocco, Oman, Senegal, Spain, Slovenia, and Switzerland.

The Government of Switzerland, through the Swiss Agency for Development and Cooperation, offered to cover the expenses of the initiative, with additional contributions to cover local expenses to be met by host countries convening future meetings of the Panel.

It was decided at this meeting that the Co-convening Countries would nominate eminent persons as Members of the Global High-Level Panel, who would participate in an independent capacity and honorary role, without drawing any salary.

The Meeting of Interested Parties appointed the Geneva Water Hub as the Secretariat of the Global High-Level Panel and requested support from the Strategic Foresight Group to the Panel and its Secretariat in various forms.

The Global High-Level Panel on Water and Peace was formally inaugurated on 15 November 2015 at an inter-ministerial gathering presided over by Mr. Didier Burkhalter, Federal Councillor and Minister of Foreign Affairs of Switzerland.

Annex IV

Terms of Reference of the Global High-Level Panel on Water and Peace

The Terms of Reference were adopted by the Global High-Level Panel on Water and Peace at its first meeting in Geneva on 16 November 2015 and are as follows:

Objectives of the Global High-Level Panel on Water and Peace

The Global High-Level Panel on Water and Peace (hereinafter referred to as the Panel) aims at taking the issue of water in the context of maintenance of peace and security, from a technical to a political level. It has the following objectives:

- Develop a set of proposals aimed at strengthening the global architecture to prevent and resolve water-related conflicts;
- Facilitate the role of water as an important factor of building peace and cooperation; and
- Enhance the relevance of water issues in national and global policy making.

Main themes and specific topics to be addressed by the Panel

The issue of “Water and Peace” has many facets. The Panel will focus on **four main themes**:

- Identify legal, economic, financial and institutional mechanisms to incentivize multi-sectoral and transboundary water cooperation;
- Examine how to cope with and prevent water-related conflicts, namely transboundary and inter-sectoral — possibly exploring potential mechanisms to promote hydro-diplomacy;
- Promote effective implementation of the global water conventions;
- Promote best practices in water cooperation.

In addition, the Panel will address the following **specific topics** in relation to the above core themes:

- The Panel will explore:
 - Appropriate ways to interact with the UN system;
 - The management of inter-sectoral water allocation issues;
 - Solutions to better protect water infrastructure during internal and international armed conflicts and against any terrorist attacks;
 - The transboundary implications of water quantity and quality, and insufficient access to water as a potential source of conflict;
 - The use of technology to prevent water disputes and promote cooperation (including desalination, water purification, strategic water reserves, water grid, innovation in data collection and sharing);
 - The multifaceted role of water that has already been part of the thematic agenda of the United Nations Security Council (UNSC) such as climate change, disease prevention, peacekeeping and post-conflict building;
 - The role of financial instruments in promoting management and cooperation on shared water resources;
 - The role of public/ private partnerships in the context of shared water resources;
 - Ways to strengthen educational institutions contributing to water as an instrument of peaceful cooperation;
 - Ways to align water policy goals and economic integration in transboundary contexts.
- The Panel will explore and exchange best practices in the field of transboundary water management / cooperation / and conflict prevention. In this regard, Senegal River Basin Development Organization (OMVS), Gambia River basin organization were mentioned;
- The Panel will pay particular attention to the governance and protection of groundwater resources;
- The Panel will bring water into discussions of climate change and discuss a strategy to engage in COP22 with a view to adaptation where water plays an important role;
- The Panel will contribute to the goal of increasing the reach of the 1992 and 1997 Conventions on water.

Mandate of the Panel

- Panel members are serving in their individual capacity;
- The Panel is independent and is tasked with outlining concrete proposals and recommendations to enable water to be an instrument of peace. These proposals / recommendations will be non-binding, and will address policy issues at all levels (global, regional, national and local). However, the Panel will not make any country specific recommendations;
- The Panel is established for a period of 2 years, until the end of 2017;
- The mandate of the Panel comes from the fifteen co-convening countries;
- While the Panel will function outside the formal structure of the United Nations, it will work in close cooperation with relevant stakeholders, notably with the UN which is represented in the Panel through UN-Water as observer. It will be the only body serving in this capacity. The Panel will hold consultations or hearings to get inputs from all relevant organizations and stakeholders;

Structure and Modalities of the Global High-Level Panel on Water and Peace

- There are fifteen co-convening countries and panelists forming the Global High-Level Panel on Water and Peace. It is proposed that the number of panelists (and hence co-convening countries) should remain the same;
- It is proposed that a Group of Friends for the Panel should be created in order to include any other country that expresses its interest in being a part of this process;
- The proposal of Switzerland that Dr. Danilo Türk chairs the Panel was accepted by the Panelists;
- H.E. Mansour Faye of Senegal and Dr. Alvaro Umaña Quesada of Costa Rica are Vice Chairs of the Panel;
- All decisions of the Panel shall be made by consensus wherever possible;
- The Panel will work under Chatham House rules;
- With respect to meetings of the Panel:
 - There will be 4 meetings held over the span of the next two years.
 - The first meeting was held in Geneva, with the official launch of the Global High-Level Panel on Water and Peace;
 - The next meetings will be held in different parts of the world in order to have regional representation;
 - The second meeting of the Panel will be held in Senegal, most likely on 5-6 April 2016. The exact dates will be conveyed in January 2016;
 - At the second Full Panel meeting in Senegal, there could be one session with regional bodies in Africa. There could also be a focus on best practices since OMVS was mentioned repeatedly as a good example of cooperation;
 - There could also be interactive sessions on the sidelines of the UN General Assembly. The Slovenian Foreign Ministry and Swiss Foreign Ministry will decide on a suitable date (possibly by September 2016);
 - The third Full Panel meeting will be held towards the end of the year 2016, preferably in Latin America;
 - The fourth Full Panel meeting will be held in April-May 2017;
 - The Panel's outputs are expected to be presented at global events such as the 2016 UN General Assembly, COP22 in Marrakesh, the 2017 World Economic Forum and the 2018 World Water Forum in Brasilia;
 - There could be more meetings of sub groups as and when decided upon by the Panel;
 - There may be smaller meetings (via video conference) held of the Panelists as and when the opportunities present itself;
 - In case of non-attendance by a Panel member no proxy can be sent;
- The final report of the Panel should be prepared by the autumn of 2017;
- The Secretariat of the Panel is provided by the Geneva Water Hub (GWH), with support of the Strategic Foresight Group (SFG).

Annex V

Meetings of the Global High-Level Panel on Water and Peace



First Meeting: 14-16 November 2015, Geneva (Switzerland)



Second Meeting: 5-7 April 2016, Dakar (Senegal)



Third Meeting: 7-9 December 2016, San Jose (Costa Rica)



Fourth Meeting: 3-4 May 2017, Amman (Jordan)

Annex VI

Regional Expert Input, Thematic Roundtables, Consultations and Group of Friends

All relevant information on the inputs to the reflection of the Panel can be found on the website of the Geneva Water Hub, Secretariat of the Panel. The Secretariat wishes to thank all the experts that have provided insightful inputs to the Global High-Level Panel on Water and Peace.

Thematic Roundtables convened by the Geneva Water Hub in Geneva

“Cooperation and Benefit Sharing in the Senegal Niger River Basins”, on 24 September 2015;
“The Protection of Water During and After Armed Conflicts”, on 14 June 2016;
“Promoting the Effectiveness of International Water Law in Support of Security and Peace”, on 26 October 2016;
“Intersectorality and Conflicts”, on 1 November 2016;
“Refugees and Access to Water: Challenges and Responses”, on 3 February 2017;
“Financial Incentives for Water Cooperation”, on 27 February 2017;
“Hydro-Diplomacy for Water, Peace and Security – Beyond Shared Water Management”, on 28 February 2017;
“Data for Water, Peace and Security”, on 20 March 2017.

Consultations

As a part of the research process, the Strategic Foresight Group consulted experts and officials in London, New York, Washington, D.C., Moscow, New Delhi, Brazzaville, Nairobi, Panama, Paris, Ankara, and Entebbe on the issues examined by the Panel.

Regional Experts at the Global High-Level Panel Meetings

First Meeting, Geneva, 15-16 November 2015

Consultations with Permanent Missions and Permanent Observers to the United Nations and to the other international organisations as well as with international organisations in Geneva

Second Meeting, Dakar, 5-7 April, 2016

Laurent **Bergeot**, Director General, Water Agency for Adour Garonne, France
Tanor Meïssa **Dieng**, African Network for Basin Organizations (ANBO)
Jean François **Donzier**, Director General, International Office for Water, France and Executive Secretary, International Network of Basin Organizations (INBO)
Kabiné **Komara**, High Commissioner for OMVS and former Prime Minister of Guinea
El Hadj **Lansana Fofana**, High Commissioner, OMVG
Alain **Poncet**, Director General, Compagnie d'Aménagement des Coteaux de Gascogne (CACG), France
Bai-Mass **Taal**, Executive Secretary, African Ministers' Council on Water (AMCOW)
Cheick Talib **Sylla**, Minister of Water and Energy, Guinea
Nana **Toure-Sy**, Sub-Regional Platform Coordinator (Dakar), UNDP

Third Meeting, San Jose, 7-9 December, 2016

Lilliana **Arrieta**, Manager of the Central American Network of Engineering Institutions (REDICA) – Member of Capacity Development in Sustainable Management (CAP-NET)
Maximiliano **Campos**, Senior Chief for the Integrated Water Resources Management Division at the Organization of American States (OAS)
Miriam **Hirezi**, Executive Secretary, Trifinio Plan
Nazareth **Porras**, Regional Coordinator, Regional Office for Mexico, Central America and the Caribbean, International Union for Conservation of Nature
Cletus **Springer**, Director of the Department of Sustainable Development at the Organization of American States (OAS)

Fourth Meeting, Amman, 3-4 May, 2017

Mohammad **Al-Najjar**, Member of Senate, former Minister of Water and Irrigation of Jordan
Shahab **Araghinejad**, Deputy Director of Tehran Water Institute, University of Tehran
Seyed Peyman **Badiei**, Director of Tehran Water Institute, University of Tehran
Natasha **Carmi**, Policy Advisor, Palestinian Negotiations Support Project
Dr Munther **Haddadin**, Member of Senate and former Minister of Water and Irrigation of Jordan Eng.
Dr Elias **Salameh**, University of Jordan
Mohammadreza **Shahbazbegian**, Tarbiat Modares University, Iran
Mr Michael **Talhami**, Regional Water & Habitat Advisor (Near and Middle East), International Committee of the Red Cross (ICRC)
Abdel Rahman **Tamimi**, Director-General of Palestinian Hydrology Group for Water and Environmental Resources Development

Group of Friends on Water and Peace Meetings in Geneva

The Group of Friends on Water and Peace is a group of countries interested in the issue of water and peace. They have met many times through representatives of their Permanent Missions to the United Nations and other international organisations in Geneva:

On 14 April 2016,
On 26 May 2016,
On 4 July 2016,
On 7 September 2016,
On 21 November 2016,
On 23 February 2017,
On 6 July 2017, and
On 6 September 2017.

The members of the group have continuously expanded. In total, 47 countries have participated at least once in one of the meetings. The Geneva Water Hub is the Secretariat of the Group of Friends

References

Chapter 1: The Drama of Water

- Bakker, K., & Morinville, C. (2013). The governance dimensions of water security: A review. *Phil. Trans. R. Soc. A*, 371(2002), 20130116.
- Bigas, H. (Ed.). (2012). *The global water crisis addressing an urgent security issue*. Hamilton, Ont: United Nations University - Institute for Water, Environment and Health.
- Budapest Water Summit. (2016, November 28-30). *Messages and policy recommendations*. Retrieved from https://www.budapestwatersummit.hu/data/images/Kepek_2016/BWS2016_Messages_Policy_Recommendations.pdf
- Cosgrove, W. J. (2003). *Water security and peace: A synthesis of studies prepared under the PCCP-Water for peace process*. Retrieved from <http://unesdoc.unesco.org/images/0013/001333/133318e.pdf>
- Gallagher, L., Dalton, J., Brethaut, C., Allan, T., Bellfield, H., Crilly, D., & LeFlaive, X. et al. (2016). *The critical role of risk in setting directions for water, food and energy policy and research*. *Current Opinion in Environmental Sustainability*, 23, 12-16. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1877343516300616>
- Geneva Water Hub. (2016, July). *The protection of water during and after armed conflicts: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_armedconflicts_rev_march2017nomail_o.pdf
- International Atomic Energy Agency. (2002, March 22). *World Water Day: Water for development*. Retrieved from <https://www.iaea.org/newscenter/pressreleases/world-water-day-2002-water-development>
- International Committee of the Red Cross. (2015, September). *Urban services during protracted armed conflict: A call for a better approach to assisting affected people*. Retrieved from https://www.icrc.org/sites/default/files/topic/file_plus_list/4249_urban_services_during_protracted_armed_conflict.pdf
- Kurss, E. (2015, March 4). *Water scarcity risks being a source of conflict*. *Journal Fair Observer*. Retrieved from https://www.fairobserver.com/region/middle_east_north_africa/water-scarcity-risks-being-a-source-of-conflict-28740/
- Mbengue, M. M. (2014). *A model for African shared water resources: The Senegal River legal system*. *Review of European, Comparative & International Environmental Law*, 23(1), 59-66. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/mbengue_makane_model_for_african_shared_water_resources.pdf
- Pacific Institute. (2009). *Water conflict chronology list*. Retrieved from <http://www.worldwater.org/conflict/list/>
- Robertson, K. C. (2004). *Design considerations for an international facility to promote cooperation between states sharing a common water resource: A feasibility study on the international water cooperation facility initiative* (M. Sc. Thesis, UNESCO-IHE Institute for Water Education, Delft, The Netherlands). Retrieved from http://www.transboundarywaters.orst.edu/publications/abst_docs/related_research/Thesis_Robertson.pdf
- Sadoff, C. W., Borgomeo, E., & de Waal, D. (2017). *Turbulent waters: Pursuing water security in fragile contexts*. Washington, DC: World Bank. Retrieved from <https://openknowledge.worldbank.org/bitstream/handle/10986/26207/W16005.pdf?sequence=2&isAllowed=y>
- Schmeier, S., Gerlak, A. K., & Blumstein, S. (2016). Clearing the muddy waters of shared watercourses governance: Conceptualizing international River Basin Organizations. *International Environmental Agreements: Politics, Law and Economics*, 16(4), 597-619.
- Strategic Foresight Group. (2015, April). *Water cooperation quotient*. Retrieved from http://www.strategicforesight.com/publication_pdf/28799WCQ-web.pdf
- Strategic Foresight Group (2016). *Financial incentives for water cooperation*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/blue_fund_march_30.pdf
- Strategic Foresight Group (2016). *Recommendations from the Strategic Foresight Group to the Global High-Level Panel on Water and Peace*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/ghlp_recommendations_sfg_input.pdf
- Tignino, M. (2010, September). *Water, international peace and security*. *International Review of the Red Cross*, 92(879). Retrieved from www.icrc.org/eng/assets/files/review/2010/irrc-879-tignino.pdf

- Tignino, M. (2016). *Water during and after armed conflicts: What protection in international law?* Brill Research Perspectives in International Water Law, 1(49).
- United Nations. (2008, February 6). Ban Ki-moon warns that water shortages are increasingly driving conflicts. *UN News Centre*. Retrieved from <http://www.un.org/apps/news/story.asp?NewsID=25527#.WUAT-dykLIU>
- UNESCO World Water Assessment Programme. (2003). *Water for people, water for life: The United Nations World Water Development Report*. Retrieved from http://www.un.org/esa/sustdev/publications/WWDR_english_129556e.pdf
- UNESCO World Water Assessment Programme. (2006). *Water, a shared responsibility: The United Nations World Water Development Report 2*. Retrieved from <http://unesdoc.unesco.org/images/0014/001444/144409E.pdf>
- UNESCO World Water Assessment Programme. (2013). *Managing water under uncertainty and risk: The United Nations World Water Development Report 4*. Retrieved from <http://www.unesco.org/fileadmin/MULTIMEDIA/HQ/SC/pdf/WWDR4%20Volume%201-Managing%20Water%20under%20Uncertainty%20and%20Risk.pdf>
- United Nations General Assembly. (2010, July 28). *The human right to water and sanitation*, A/RES/64/292. Retrieved from http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/64/292
- United Nations General Assembly. (2015, September 25). *Transforming our world: The 2030 Agenda for Sustainable Development*. Retrieved from http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
- United Nations Publications. (1977). *Report of the United Nations Water Conference, Mar del Plata, 14-25 March 1977*, Sales No. E.77.II.A.12. Retrieved from <https://www.ircwash.org/sites/default/files/71UN77-161.6.pdf>
- United Nations Security Council. (2016, November 22). *Maintenance of International peace and security*, S/PV.7818. Retrieved from http://www.un.org/en/ga/search/view_doc.asp?symbol=S/PV.7818
- UN Security Council demands protection of hospitals in war zones. (2016, May 3). *Deccan Chronicle*. Retrieved from <http://www.deccanchronicle.com/world/america/030516/un-security-council-demands-protection-of-hospitals-in-war-zones.html>
- UN Water. (2013). *Water security & global water agenda: A UN-Water analytical brief*. Retrieved from http://www.unwater.org/app/uploads/2017/05/analytical_brief_oct2013_web.pdf
- Von Lossow, T. (2016). *Water as weapon: IS on the Euphrates and Tigris*. German Institute for International and Security Studies (SWP): SWP Comments, 1-8. Retrieved from www.swp-berlin.org/fileadmin/contents/products/comments/2016Co3_lsw.pdf
- Waughray, D. (2011). *Water security: The water-food-energy-climate nexus: The World Economic Forum Water Initiative*. Washington, D.C: Island Press.
- Wolf, A. T., Stahl, K., & Macomber, M. F. (2003). Conflict and cooperation within international river basins: The importance of institutional capacity. *Water resource Updates*, (125), 31-40.
- World Economic Forum. (2015). *Global risks 2015, 10th Edition: Insight report*. Retrieved from http://www3.weforum.org/docs/WEF_Global_Risks_2015_Report15.pdf
- World Wildlife Fund. (2017). *Water scarcity: Overview*. Retrieved from <http://www.worldwildlife.org/threats/water-scarcity>

Chapter 2: Into The Abyss: Water in Armed Conflicts

- Adelphi. (n.d.). Lake Chad - Interstate conflicts and cooperation. Retrieved from <https://library.ecc-platform.org/conflicts/lake-chad-africa-inter-state-conflicts-and-cooperation>
- Al-Shabaab's 'water terrorism' is yielding results and tragedy in Somalia's civil war. (2014). *Public Radio International*. Retrieved from <http://www.pri.org/stories/2014-08-08/how-al-shabaab-using-water-tool-terrorism>
- Arimatsu, L., & Choudhury, M. (2014, March). The legal classification of the armed conflicts in Syria, Yemen and Libya. *International Law Programme Paper*, (1) 1-43. Retrieved from https://www.chathamhouse.org/sites/files/chathamhouse/home/chatham/public_html/sites/default/files/20140300ClassificationConflictsArimatsuChoudhury1.pdf
- Boutruche, T. (2000, December 31). Le statut de l'eau en droit international humanitaire. *International Review of the Red Cross*, (840). Retrieved from www.icrc.org/fre/resources/documents/misc/5fzhpx.htm
- Clingendaal Institute. (1996, February). *Conflict prevention and early warning in the political practice of international organizations*. Retrieved from https://www.clingendael.nl/sites/default/files/19960000_cru_paper.pdf
- Copeland, C., (2010, December 15). *Terrorism and security issues facing the water infrastructure sector*. Retrieved from <https://pdfs.semanticscholar.org/e947/4d546a8843efe23107ad843cf6827a8465e6.pdf>

- Food Agriculture Organization. (1998). Institute of International Law. In *Studies and declarations made by international non-governmental organizations* (pp. 261-271). Retrieved from <ftp://ftp.fao.org/docrep/fao/005/w9549E/w9549E00.pdf>
- Freeland, S. (2005). Crimes against the environment – A role for the International Criminal Court? *Environmental Law in the Pacific: International and Comparative Perspectives*, 335-372. Retrieved from <https://www.peacepalacelibrary.nl/ebooks/files/352205628.pdf>
- Freeland, S. (2005). Human rights, the environment and conflict: Addressing crimes against the environment. *Revista Internacional de Derechos Humanos*, 2(2). Retrieved from http://www.scielo.br/scielo.php?pid=S1806-64452005000100006&script=sci_arttext&tlng=en
- Geneva Call. (2008, November). *Exploring criteria & conditions for engaging armed non-state actors to respect humanitarian law & human rights law*. Retrieved from http://genevacall.org/wp-content/uploads/dlm_uploads/2013/11/20070605_criteria_conditions_engaging_ansa_to_hl.pdf
- Geneva Water Hub. (2016, July). *The protection of water during and after armed conflicts: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_armedconflicts_rev_march2017nomail_o.pdf
- Geneva Water Hub. (2017, February). *Refugees and access to water: Challenges and responses. Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_refugeeswater_rev_march2017nomail.pdf
- German Federal Ministry for Economic Cooperation and Development. (n.d.). Religious leaders support water conservation, water resources management in Jordan – Improvement of communal water efficiency through cooperation with religious authorities. Retrieved from <https://www.giz.de/en/worldwide/31932.html>
- Gleick, P., & Herberger, M. (2014). Water and conflict: Events, trends, and analysis (2011-2012). *Water Brief 3*. Retrieved from <http://worldwater.org/wp-content/uploads/2013/07/www8-water-conflict-events-trends-analysis.pdf>
- Global WASH Cluster. (2009). *The human right to water and sanitation in emergency situations: The legal framework and a guide to advocacy*. Retrieved from http://www.worldwatercouncil.org/fileadmin/wwc/Right_to_Water/Project_8_HRTWS_in_Emergencies_Handbook.pdf
- High Level Independent Panel on Peace Operations. (2015). *Uniting our strengths for peace – Politics, partnership and people* (Report). Retrieved from http://peaceoperationsreview.org/wp-content/uploads/2015/08/HIPPO_Report_1_June_2015.pdf
- Hofmann, C., & Schneekener U. (2011, September). Engaging non-state armed actors: Options and strategies. *International Review of Red Cross*, 93(883).
- Hulme, K. (2016, December 31). The ILC's work stream on protection of the environment in relation to armed conflicts. *Questions of International Law*. Retrieved from <http://www.qil-qdi.org/ilcs-work-stream-protection-environment-relation-armed-conflict/>
- International Committee of the Red Cross. (n.d.). Practice relating to rule 54: Attacks against objects indispensable to the survival of the civilian population. Retrieved from https://ihl-databases.icrc.org/customary-ihl/eng/docs/v1_rul_rule54
- International Committee of the Red Cross. (1996, April 30). Guidelines for military manuals and instructions on the protection of the environment in times of armed conflict. Retrieved from <https://www.icrc.org/eng/resources/documents/article/other/57jn38.htm>
- International Committee of the Red Cross. (2011, December 1). 31st International Conference 2011: Resolution 1 - Strengthening legal protection for victims of armed conflicts. Retrieved from <https://www.icrc.org/eng/resources/documents/resolution/31-international-conference-resolution-1-2011.htm>
- International Committee of the Red Cross. (2014, April 14). Somalia: Delivering clean water in a conflict-stricken country. Retrieved from <https://www.icrc.org/eng/resources/documents/feature/2014/04-14-somalia-safe-access-water.htm>
- International Committee of the Red Cross. (2015, March). Bled dry: How war in the Middle East is bringing the region's water supplies to breaking point. An ICRC report. Retrieved from <https://www.icrc.org/en/document/bled-dry-how-war-middle-east-bringing-region-brink-water-catastrophe>
- International Committee of the Red Cross. (2015, July-November). Health care in danger: Meeting the challenges. Retrieved from <https://www.icrc.org/en/document/health-care-danger-newsletter-july-november-2015>
- International Committee of the Red Cross. (2015, September). *Urban services during protracted armed conflict: A call for a better approach to assisting affected people*. Retrieved from https://www.icrc.org/sites/default/files/topic/file_plus_list/4249_urban_services_during_protracted_armed_conflict.pdf

- International Committee of the Red Cross. (2016, September 6). Protracted conflict and humanitarian action: Some recent ICRC experiences. Retrieved from <https://www.icrc.org/en/document/protracted-conflict-and-humanitarian-action>
- International Federation of Red Cross and Red Crescent Societies. (2009, November). *Migration policy*. Retrieved from www.ifrc.org/Global/Governance/Policies/migration-policy-en.pdf
- International Organization for Migration. (2014). *IOM outlook on migration, environment and climate change*. Retrieved from https://publications.iom.int/fr/system/files/pdf/mecc_outlook.pdf
- Ionesco, D., Mokhnacheva D., & Gemenne F. (2017). *The atlas of environmental migration*. New York, NY: Routledge.
- Jachec-Neale, A. (2015). *The concept of military objectives in international law and targeting practice*. London, United Kingdom: Routledge.
- Kirbyshire, A., Wilkinson, E., Le Masson, V., & Batra, P. (2017). *Mass displacement and the challenge for urban resilience*. Retrieved from <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11202.pdf>
- Lamont, C., Zwitter, A., Heintze, & Herman, J. (Eds.). (2015). *Humanitarian action: Global, regional and domestic legal responses*. Cambridge, United Kingdom: Cambridge University Press.
- Lorenz, F. M., & Shaver G. (2003). *The protection of water facilities under international law* (N° 1). New York, NY: UNESCO.
- Mason, S. J. A., & Blank, D. (2013, November). *Mediating water use conflicts in peace processes* (n° 13). Retrieved from <http://e-collection.library.ethz.ch/eserv/eth:7918/eth-7918-01.pdf>
- Meisser, U., & Palosaari, M. (2013). *Transforming risks into cooperation*. Retrieved from <http://www.envsec.org/publications/ENVSECTransformingRisks.FINAL.web.pdf>
- Pacific Institute. (2009). Water conflict chronology list. Retrieved from <http://www.worldwater.org/conflict/list/>
- Pope Francis at GA: Access to food, water basic human right. (2016, October 19). *Radio Vatican*. Retrieved from http://en.radiovaticana.va/news/2016/10/19/pope_franis_at_ga_access_to_food,_water_basic_human_right/1266209
- Richmond, R. (2016, May 7). Parallel diplomacy in conflict resolution: Hope for a safer world. Retrieved from <http://foreignpolicyblogs.com/2016/05/17/parallel-diplomacy-in-conflict-resolution-hope-for-a-safer-world/>
- Singh, R. (1994). Water symbolism and sacred landscape in Hinduism: A study of Benares (Vārāṇasī). *Erdkunde*, 48(3), 210-227. Retrieved from <http://www.jstor.org/stable/25646594>
- South Korea completes 'Peace Dam' to block flood attack from North. (2005, October 27). *World Tribune.com*. Retrieved from <http://www.worldtribune.com/worldtribune/05/front2453671.077083334.html>
- Strategic Foresight Group. (2016). *Protection of water resources and infrastructures in armed conflict and against acts of terror*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/protection_of_infrastructure_march_30.pdf
- Swain, A., & Jagerskog, A. (2016, July). *Water, migration and how they are interlinked*. Retrieved from <http://www.siwi.org/wp-content/uploads/2016/07/2016-Water-Report-Chapter-1-FINAL-Web.pdf>
- Talhami, M., & Zeitoun, M. (2016). The impact of explosive weapons on urban services: Direct and reverberating effects across space and time. *International Review of the Red Cross* 98(1), 53-70. Retrieved from <https://www.icrc.org/en/international-review/article/impact-explosive-weapons-urban-services-direct-and-reverberating>
- The Council of Canadians. (2015, June 19). Pope Francis underscores the human right to water, objects to water privatization in encyclical. Retrieved from <http://canadians.org/media/pope-francis-underscores-human-right-water-objects-water-privatization-encyclical>
- Tignino, M. (2010, September). Water, international peace and security. *International Review of the Red Cross*, 92(879). Retrieved from www.icrc.org/eng/assets/files/review/2010/irrc-879-tignino.pdf
- Tignino, M. (2011). *L'eau et la guerre. Éléments pour un régime juridique*. Brussels, Belgium: Bruylant.
- Tignino, M. (2011). The right to water and sanitation in post-conflict peacebuilding. *Water International*, 36(2), 242-249. Retrieved from <https://archive-ouverte.unige.ch/unige:17450>
- Tignino, M. (2016). Water during and after armed conflicts: What protection in international law? *Brill Research Perspectives in International Water Law*, 1(49).
- United Nations. (n.d.). Mandate of the Peacebuilding Commission. Retrieved from <http://www.un.org/en/peacebuilding/mandate.shtml>
- United Nations. (n.d.). Security Council Counter-Terrorism Committee. Retrieved from <https://www.un.org/sc/ctc/focus-areas/>

- United Nations Committee on Economic, Social and Cultural Rights. (2002, November 11-29). *General Comment No. 15 (2002): The right to water (arts. 11 and 12 of the International Covenant on Economic, Social and Cultural Rights*, E/C.12/2002/11. Retrieved from <http://www.unhcr.org/publications/operations/49d095742/committee-economic-social-cultural-rights-general-comment-15-2002-right.html>
- United Nations Economic and Social Council. (1998, February 11). *UN guiding principles on internal displacement*, E/CN.4/1998/53/Add.2. Retrieved from <https://documents-dds-ny.un.org/doc/UNDOC/GEN/G98/104/93/PDF/G9810493.pdf?OpenElement>
- United Nations Economic and Social Council. (1999, September 17). *Protection of civilians in armed conflict*, S/RES/1265.
- United Nations Economic and Social Council. (2014, July 14). *Middle East*, S/RES/2165. Retrieved from [https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2165\(2014\)](https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2165(2014))
- United Nations Economic and Social Council. (2017, February 13). *Threats to international peace and security caused by terrorist acts*, S/RES/2341. Retrieved from [https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2341\(2017\)](https://www.un.org/en/ga/search/view_doc.asp?symbol=S/RES/2341(2017))
- United Nations Environment Assembly of the United Nations Environment Programme. (2016, May 23-27). *Protection of the environment in areas affected by armed conflict*, UNEP/EA/Res.15. Retrieved from http://wedocs.unep.org/bitstream/handle/20.500.11822/11189/K16O7252_UNEPEA2_RES15E.pdf?sequence=1&isAllowed=y
- United Nations Environment Programme. (2009). *From conflict to peacebuilding: The role of natural resources and the environment* (No. 1). Nairobi, Kenya: UNEP/Earthprint.
- United Nations Environment Programme. (2012). *Greening the blue helmets: Environment, natural resources and UN peacekeeping operations*. Retrieved from http://postconflict.unep.ch/publications/UNEP_greening_blue_helmets.pdf
- United Nations General Assembly. (2013). *Protection of the environment in relation to armed conflicts. Report of the International Law Commission*, A/68/10. Retrieved from unodocs.org/A/68/10.
- United Nations General Assembly. (2016, June 3). *Third report of the International Law Commission on the protection of the environment in relation to armed conflicts*, A/CN.4/700 Retrieved from <http://undocs.org/%20A/CN.4/700>
- United Nations High Commissioner for Refugees. (1992, November) *Water manual for refugee situations*. Retrieved from <http://www.refworld.org/docid/3dede3434.html>
- United Nations High Commissioner for Refugees (2008, January). *A guidance for UNHCR field operations on water and sanitation services*. Retrieved from <http://www.unhcr.org/cgi-bin/texis/vtx/search?page=search&docid=49d080df2&query=water>
- United Nations Department of Political Affairs & United Nations Environmental Programme. (2015). *Natural resources and conflict: A guide for mediation practitioners*. Nairobi, Kenya: NDPA and UNEP.
- United Nations Office on Drugs and Crime. (n.d.). *International Center for the Prevention of Crime (ICPC)*. Retrieved from <https://www.unodc.org/unodc/en/commissions/CCPCJ/PNI/institutes-ICPC.html> UN Security Council demands protection of hospitals in war zones. (2016, May 3). *Deccan Chronicle*. Retrieved from <http://www.deccanchronicle.com/world/america/030516/un-security-council-demands-protection-of-hospitals-in-war-zones.html>
- United Nations Regional Centre for Preventive Diplomacy for Central Asia. (n.d.). *Programme of action for 2012-2014*. Retrieved from https://unrcca.unmissions.org/sites/default/files/unrcca_programme_of_action_2012-2014_eng.pdf
- UN Water. (2013). *Water cooperation in action: Approaches, tools and processes*. In *Conference report of the International Annual UN-Water Zaragoza Conference 2012-13* (pp.16-25).
- UN Watercourses Convention. (2017). *UN Watercourses Convention: Online user's guide*. Retrieved from <http://www.unwatercoursesconvention.org/>
- United States Department of Homeland Security, Environmental Protection Agency. (2010). *Water sector-specific plan: An annex to the national infrastructure protection plan*. Retrieved from <https://www.dhs.gov/sites/default/files/publications/nipp-ssp-water-2010-508.pdf>
- United States Environmental Protection Agency. (2014). *Water health and economic analysis tool (WHEAT) 3.0- Find out about health and economic impacts from water utility emergencies*. Retrieved from <https://www.epa.gov/waterriskassessment/find-out-about-health-and-economic-impacts-water-utility-emergencies#about>
- United States Environmental Protection Agency. (n.d.). *Conduct a drinking water or wastewater utility risk assessment: Vulnerability self-assessment tool (VSAT) 6*. Retrieved from <https://www.epa.gov/waterriskassessment/conduct-drinking-water-or-wastewater-utility-risk-assessment>
- Von Lossow, T. (2016). *Water as weapon: IS on the Euphrates and Tigris. German Institute for International and Security Studies (SWP): SWP Comments*, 1-8. Retrieved from www.swp-berlin.org/fileadmin/contents/products/comments/2016Co3_lsw.pdf

- Wolf, A. T., Stahl, K., & Macomber, M. F. (2003). Conflict and cooperation within international river basins: The importance of institutional capacity. *Water resource updates*, (125), 31-40.
- Wolf, A. T., Kramer, A., Carius, A., & Dabelko, G. D. (2005). Managing water conflict and cooperation. *State of the world 2005: Redefining global security*, 80-95.
- World Council Churches. (2013, November 4). Religious leaders highlight significance of water at WCC assembly. Retrieved from <https://www.oikoumene.org/en/press-centre/news/religious-leaders-highlight-significance-of-water-at-wcc-assembly>

Chapter 3: An Ounce of Prevention: International Water Law and Transboundary Water Cooperation

- Boisson de Chazournes, L. (2009, January). Freshwater and international law: The interplay between universal, regional and basin perspectives. *The United Nations World Water Development, Development Report N°3*. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2090875
- Boisson de Chazournes, L. (2014). Le droit à l'eau et la satisfaction des besoins humains: Notions de justice. In Alland, D., Chetail, V., de Frouville, O., & Viñuales, J. E. *Unité et Diversité Du Droit International : Ecrits en l'honneur du Professeur Pierre-Marie Dupuy* (pp. 967-981). Leiden, the Netherlands: Martinus Nijhoff. Retrieved from file:///C:/Users/user/Downloads/unige_39283_attachment01.pdf
- Boisson de Chazournes, L. (2015). *Fresh water in international law*. Oxford, United Kingdom: Oxford University Press.
- Boisson de Chazournes, L., Tignino, M., & Sangbana, K. (2015). L'entrée en vigueur de la Convention des Nations Unies sur le droit relatif aux utilisations des cours d'eau internationaux à des fins autres que la navigation (1997). *Geneva Water Hub*, 1-9. Retrieved from <https://www.genevawaterhub.org/sites/default/files/atoms/files/genevawaterhub.pdf>
- Budapest Water Summit. (2013, October 11). *A sustainable world is a water-secure world: The Budapest water summit statement*. Retrieved from http://www.budapestwatersummit.hu/data/images/Budapest_Water_Summit_Statement___Final___11_October_2013.pdf
- Cassese, A. (2005). *International law* (2nd ed.). Oxford, United Kingdom: Oxford University Press.
- Geneva Water Hub. (2016, October). *Promoting the effectiveness of international water law in support of security and peace: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_iwaeffectiveness_rev_march2017nmail_o.pdf
- Leb, Ch. (2013). *Cooperation in the law of transboundary water resources*. Cambridge, United Kingdom: Cambridge University Press.
- Loares, F., & Rieu-Clarke, A. (Eds). (2013). *The UN watercourses convention in force. Strengthening international law for transboundary water management*. Abingdon, Oxon: Routledge.
- McCaffrey, S. C. (2014). International water cooperation in the 21st century: Recent developments in the law of international watercourses. *Review of European, Comparative & International Environmental Law*, 23(1), 4-14.
- Sands, P. (2003). *Principles of international environmental law* (2nd ed.). Cambridge, United Kingdom: Cambridge University Press.
- Tanzi, A., McIntyre, O., Kolliopoulos, A., Rieu-Clarke, A., & Kinna, R. (Eds). (2015). *The UNECE convention on the protection and use of transboundary watercourses and international lakes. Its contribution to international water cooperation*. Leiden, the Netherlands: Brill Nijhoff.
- United Nations Economic Commission for Europe. (2014). *Model Provisions on Transboundary Groundwaters*. Retrieved from http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_model_provisions/ece_mp.wat_40_eng.pdf
- United Nations General Assembly. (2011, December 9). *The law of transboundary aquifers*, A/RES/66/104. Retrieved from http://www.un.org/en/ga/search/view_doc.asp?symbol=%20A/RES/66/104

Chapter 4: Quantity and Quality: Strengthening of the Knowledge-Based and Data Driven Decision Making and Cooperation for Security and Peace Building

- Ayers, R. & Westcot, D. (1985). *Water quality for agriculture*. Rome: Food and Agriculture Organization of the United Nations.
- Baderin, M., & Ssenyonjo, M. (2010). *International human rights law: Six decades after the UDHR and beyond*. Aldershot, United Kingdom: Ashgate Pub.

- Binational.net. (n.d). About the Great Lakes water quality agreement. Retrieved from <https://binational.net/glwqa-aqegl/>
- Christ, W., Fischerhof, H., Klassen, C.W., Manner, E.J., McNaughton, G., Nagibina, & Petrik, M. *Aspects of water pollution control*. (1962). Selection of papers prepared for the Conference on Water Pollution Problems in Europe, WHO, Geneva, Switzerland. Retrieved from http://whqlibdoc.who.int/php/WHO_PHP_13.pdf
- Danube Region Strategy Water Quality. (2014). *Water quality early warning system: On transboundary watercourses of Tisza river basin*. Retrieved from http://www.danubewaterquality.eu/uploads/mod_files/WQM-EWS_part-1-2_v2.4_.pdf
- De Schutter, O., Eide, A., Khalfan, A., Orellana, M., Salomon, M., & Seiderman, I. (2012). Commentary to the Maastricht principles on extraterritorial obligations of states in the area of economic, social and cultural rights. *Human Rights Quarterly*, 34(4), 1084-1169. Retrieved from <http://www.icj.org/wp-content/uploads/2012/12/HRQMaastricht-Maastricht-Principles-on-ETO.pdf>
- Field, C., Barros, V., Dokken, D., Mach, K., Mastrandrea, M., Bilir, T., White, L. et al. (Eds.). (2014). *Climate change 2014: Impacts, adaptation, and vulnerability : summaries, frequently asked questions, and cross-chapter boxes*. Geneva, Switzerland: Intergovernmental Panel on Climate Change. Retrieved from https://www.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-IntegrationBrochure_FINAL.pdf
- Fryefield, C. B. (2013). *The evolution of the 2012 Great Lakes water quality agreement* (Doctoral dissertation, University of Michigan). Retrieved from <https://deepblue.lib.umich.edu/bitstream/handle/2027.42/97364/FRYEFIELD?sequence=1>
- GEF Transboundary Waters Assessment Programme. (n.d). Transboundary aquifers and groundwater systems of small island developing States: Status and trends. Retrieved from <http://www.geftwap.org/water-systems/aquifers>
- Geneva Water Hub. (2017, March). *Data for water, peace and security: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/roundtable_waterdatapeacesecurity_20170428_o.pdf
- Giordano, M. A. (2003). Managing the quality of international rivers: Global principles and basin practice. *Natural Resources Journal*, 43, 111.
- Gorelick, S. M., & Zheng, C. (2015). Global change and the groundwater management challenge. *Water Resources Research*, 51(5), 3031-3051.
- Grantham Institute, Imperial College London. (2012, December 21). How will climate change impact on fresh water security? *The Guardian*. Retrieved from <https://www.theguardian.com/environment/2012/nov/30/climate-change-water>
- Heller, L. (n.d.). *Thematic consultation on water in the post-2015 development agenda: Cross-cutting discussion on human rights and inequalities*. Retrieved from http://www.ohchr.org/Documents/Issues/Water/Framingpaper_HRWash_WaterResources.pdf
- iMoMo Hub (n.d.). iMoMo innovative technologies for monitoring, modeling and managing water. Retrieved from <http://www.imomohub.kg/eng/home/>
- Jardón, L. (2013). The interpretation of jurisdictional clauses in human rights treaties. *Anuario Mexicano de Derecho Internacional*, 13, 99-143. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1870465413710407>
- Jones, W., Eldridge, J., Pedro Silva, J., & Schiessler, N. (2007). *LIFE and Europe's rivers: Protecting and improving our water resources*. Luxembourg: Office for Official Publications of the European Communities. Retrieved from <http://ec.europa.eu/environment/life/publications/lifepublications/lifefocus/documents/rivers.pdf>
- Lovett, I. (2012, November 20). U.S. and Mexico sign a deal on sharing the Colorado River. *The New York Times*. Retrieved from <http://www.nytimes.com/2012/11/21/us/us-and-mexico-sign-deal-on-managing-colorado-river.html>
- McCaffrey, S. C. (2008). The United Nations Convention on the law of the non-navigational uses of international watercourses [Video]. Retrieved from http://legal.un.org/avl/ls/McCaffrey_IW_video_1.html
- Nuwer, R. (2011, November 17). Not all rivers reach the sea, *The New York Times*. Retrieved from <http://green.blogs.nytimes.com/2011/11/17/all-rivers-do-not-run-to-the-sea/?ref=opinion>
- Office of the United Nations High Commissioner for Human Rights. (2010). *The right to water* (Fact Sheet No. 35). Retrieved from <http://www.ohchr.org/Documents/Publications/FactSheet35en.pdf>
- Palaniappan, M., Gleick, P. H., Allen, L., Cohen, M. J., Christian-Smith, J., & Smith, C. (2010). *Clearing waters: A focus on water quality solutions*. Retrieved from http://pacinst.org/app/uploads/2013/02/clearing_the_waters3.pdf
- United Nations. (2013, June 13). World population projected to reach 9.6 billion by 2050. Retrieved from <http://www.un.org/en/development/desa/news/population/un-report-world-population-projected-to-reach-9-6-billion-by-2050.html>
- United Nations Children's Fund. *Introduction to the Convention on the rights of the child*. (n.d). Retrieved from <http://www.unicef.org/crc/files/Definitions.pdf>

- UNESCO World Water Assessment Programme. (2012). *Managing water under uncertainty and risk: The United Nations World Water Development Report 4*. Retrieved from <http://unesdoc.unesco.org/images/0021/002156/215644e.pdf>
- United Nations Education, Scientific and Cultural Organization. (n.d.). *Groundwater development stress*. Retrieved from http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/SC/temp/wwap_pdf/Groundwater_development_stress_GDS.pdf
- UNEP Transboundary Waters Assessment Programme. (2016). River basin component. Retrieved from <http://twap-rivers.org/>
- UN Water. (n.d.). Facts and figures. Retrieved from <http://www.unwater.org/water-cooperation-2013/water-cooperation/facts-and-figures/en/>
- UN Water. (n.d.). Water and urbanization. Retrieved from <http://www.unwater.org/water-facts/water-and-urbanization/>
- UN Water Decade Programme on Advocacy and Communication. (n.d.). *The human right to water and sanitation: Milestones*. Retrieved from http://www.un.org/waterforlifedecade/pdf/human_right_to_water_and_sanitation_milestones.pdf
- UN Watercourses Convention. (n.d.). Frequently asked questions: The UN Watercourses Convention: History and prospects. Retrieved from <http://www.unwatercoursesconvention.org/faqs/>
- U.S. Environmental Protection Agency. (n.d) What is GLWQA? Retrieved from <https://www.epa.gov/glwqa/what-glwqa>
- Utton, A. E. (1973). International water quality law. *International Resources Journal*, 13. Retrieved from http://lawlibrary.unm.edu/nrj/13/2/07-utton_international.pdf
- Walton, B. (2012, November 12). U.S. and Mexico sign major deal on Colorado River issues: Delta restoration, infrastructure, water sharing. *Circle of Blue Water News*. Retrieved from <http://www.circleofblue.org/2012/world/u-s-mexico-sign-major-deal-on-colorado-river-issues-delta-restoration-infrastructure-water-sharing/>
- Waterman, J. (2012, February 14). Where the Colorado runs dry. *The New York Times*. Retrieved from http://www.nytimes.com/2012/02/15/opinion/where-the-colorado-river-runs-dry.html?_r=0
- Winkler, I. (2015). *Conflict and cooperation over water: The role of the EU in ensuring the realisation of human rights*. Brussels: European Parliament. Retrieved from [http://www.europarl.europa.eu/RegData/etudes/STUD/2015/549056/EXPO_STU\(2015\)549056_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/STUD/2015/549056/EXPO_STU(2015)549056_EN.pdf)
- World Health Organization. (2011). *Guidelines for drinking-water quality*. Geneva, Switzerland: World Health Organization.
- World Wildlife Fund. (2017). Water scarcity: Overview. Retrieved from <http://www.worldwildlife.org/threats/water-scarcity>
- Wouters, P. (2013, August). *International law: Facilitating transboundary water cooperation* (Global Water Partnership, Policy Brief). Retrieved from <http://www.gwp.org/globalassets/global/toolbox/publications/policy-briefs/14-international-law.-facilitating-transboundary-water-cooperation.pdf>

Chapter 5: People's Diplomacy, Inter-Sectorial Water Management and Decision Making

- Agarwal, A., delos Angeles, M. S., Bhatia, R., Chéret, I., Davila-Poblete, S., Falkenmark, M., Rees, J. et al. (2000). *Integrated water resources management*. Global Water Partnership.
- Biswas, A. K. (2004). Integrated water resources management: A reassessment: A water forum contribution. *Water International* 29(2), 248-256.
- Earth Security Group. (2016). *CEO briefing: Global depletion of aquifers*. Retrieved from <https://earthsecuritygroup.com/wp-content/uploads/2016/06/ESG-Brief-Aquifers.pdf>
- Geneva Water Hub. (2016, November). *Intersectorality and conflicts: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_intersectorality_rev_march2017nomail_o.pdf
- Hoff, H. (2011). *Understanding the nexus*. Background paper presented at the Bonn conference: the water, energy and food security nexus. Stockholm Environment Institute. Stockholm, Sweden.
- International Finance Corporation. (2016, February 4). Promotes responsible water management in Mongolia's mining sector [Press Release]. *CommDev*. Retrieved from <https://www.commdev.org/press-release-ifc-promotes-responsible-water-management-in-mongolias-mining-sector/>
- International Finance Corporation & International Council on Mining and Metal. (2017). *Shared water, shared responsibility, shared approach: Water in the mining sector*. Retrieved from <http://www.ifc.org/wps/wcm/connect/ee079cb5-222c-4fe7-8844-8210ac77f0dc/ICMM-IFC-Water-and-Mining-FINAL.pdf?MOD=AJPERES>

- Navas, V. (2017). *Case study on peaceful resolution of a local water conflict in Costa Rica*. Retrieved from <https://www.genevawaterhub.org/platforms/global-high-level-panel-water-peace-secretariat#Inputs>
- Pahl-Wostl, C. (2007). Transitions towards adaptive management of water facing climate and global change. *Water resources management*, 21(1), 49-62.
- Pahl-Wostl, C., Bhaduri, A. & Gupta, J. (2016). *Handbook on water security*. Cheltenham, UK Northampton, MA, USA: Edward Elgar Publishing.
- Sosa, M. & Zwartveen M. (2016). Questioning the effectiveness of planned conflict resolution strategies in water disputes between rural communities and mining companies in Peru. *Water International*, 41(3), 483-500.
- United Nations Global Compact. (2014). Future guide to corporate sustainability: Shaping a sustainable future. Retrieved from https://www.unglobalcompact.org/docs/publications/UN_Global_Compact_Guide_to_Corporate_Sustainability.pdf
- Voluntary code of practice for mining companies. (2016, March 2). *Mongolian Economy Journal*. Retrieved from <http://mongolianeconomy.mn/en/i/8750>
- Waughray, D. (2011). *Water security: The water-food-energy-climate nexus: The World Economic Forum Water Initiative*. Washington, D.C: Island Press.
- Zeitoun, M., Lankford, B., Krueger, T., Forsyth, T., Carter, R., Hoekstra, A. Y., Swatuk, L. et al. (2016). Reductionist and integrative research approaches to complex water security policy challenges. *Global environmental change*, 39, 143-154.

Chapter 6: Financial Innovation for Water Cooperation

- Asian Development Bank Water. (n.d.). Water financing partnership facility (WFPF). Retrieved from <https://www.adb.org/site/funds/funds/water-financing-partnership-facility>
- Asian Development Bank. (2010, April). *Cooperation fund for water sector: Final report*. Retrieved from <http://www.adb.org/sites/default/files/institutional-document/33351/files/cfws-final-report.pdf>
- Blue Fund for the Congo Basin [The morning call]. (2016, November 18). *AfricaNews*. Retrieved from <http://www.africanews.com/2016/11/18/blue-fund-fo-the-congo-basin-the-morning-call/>
- Boisson de Chazournes, L., & Leb, C. (2016). Political economy and international water law: Political economy induced changes to the uptake of benefit sharing in international water law. In A. Fabbriotti (Ed.), *The political economy of international law - A european perspective* (pp. 356-383). Cheltenham, UK: Edward Elgar Publishing Ltd. Retrieved from <https://archive-ouverte.unige.ch/unige:85517>
- Bolognesi, T., & Brethaut, C. (2015). *Les facteurs de la coordination au niveau des bassins versants transfrontaliers : Enseignements de l'OMVS et de l'ABN*. Retrieved from <https://archive-ouverte.unige.ch/unige:76170>
- Bolognesi T., Bréthaut Ch., Sangbana K., & Tignino M. (2016). Transboundary governance in the Senegal and Niger river basins: Historical analysis and overview of the status of common facilities and benefit sharing arrangements. *Geneva Water Hub*, 1-5. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_note_on_water_governance_in_omvs_and_abn_final.pdf
- Brazzaville Foundation for Peace and Conservation. *Congo Basin Blue Fund*. Retrieved from http://www.strategicforesight.com/news_pdf/13644Congo%20Basin%20Blue%20Fund.pdf
- Climate Investment Fund (n.d.). The climate investment funds. Retrieved from <http://www-cif.climateinvestmentfunds.org/>
- Ehlers T. (2014, August). *Understanding the challenges for infrastructure finance*. Bank for International Settlements. Retrieved from <http://www.bis.org/publ/work454.pdf>
- European Investment Bank. (2015, July). *EU-Africa infrastructure trust fund: Tackling Africa's infrastructure deficit by blending grants and loans*. Retrieved from http://www.eib.org/attachments/country/eu_africa_infrastructure_trust_fund_2015_en.pdf
- European Union Africa Infrastructure Trust Fund. (n.d.). 10 years of EU-AITF involvement on the ground. Retrieved from <http://www.eu-africa-infrastructure-tf.net/>
- European Union Africa Infrastructure Trust Fund. (2015). *Annual report, 2015*. Retrieved from http://www.eib.org/attachments/country/eu_africa_infrastructure_trust_fund_annual_report_2015_en.pdf
- Foresight Group Strategic. (2014, November). *Blue peace in the Middle East: Mekong learning journey in Cambodia and Lao PDR*. Retrieved from http://www.strategicforesight.com/conference_pdf/73842Mekong%20Report%20Final.pdf

- Geneva Water Hub. (2016, September). *Cooperation and benefit sharing in the Senegal and Niger River Basins: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/gwh_ghlp_roundtable_benefitsenegalniger_march2017nmail.pdf
- Geneva Water Hub. (2017, February). *Financial incentives for water cooperation: Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/roundtable_financial_initiatives_20170427.pdf
- Global Infrastructure Facility. (2015). *Global Infrastructure Facility: A partnership platform for greater investment in the infrastructure of emerging markets and developing economies*. Retrieved from <http://www.unescap.org/sites/default/files/1b%20-%20Annex%20-%20GIF%20Brochure.pdf>
- Green Climate Fund. (2016, February 5). The board is united in our commitment to meet our USD 2.5 billion target. Retrieved from <http://www.greenclimate.fund/-/-we-want-to-take-the-momentum-from-paris-and-ramp-it-up->
- Green Climate Fund. (2016, April 22). From signatures to action – GCF funding proposals need to meet the ambition of the Paris agreement. Retrieved from https://www.greenclimate.fund/documents/20182/44502/From_Signatures_to_Action___GCF_Funding_Proposals_Need_to_Meet_the_Ambition_of_the_Paris_Agreement.pdf/dda4bbc2-a390-49b0-a098-214c70b8f1ab
- Green Climate Fund. (2016, October 14). GCF Board approves USD 745 million in funding proposals. *Green Climate Fund Newsroom*. Retrieved from <http://www.greenclimate.fund/-/gcf-board-approves-usd-745-million-in-funding-proposals-1>
- Green Climate Fund. (2017, May 12). Status of pledges and contributions made to the Green Climate Fund. Retrieved from https://www.greenclimate.fund/documents/20182/24868/Status_of_Pledges.pdf/eef538d3-2987-4659-8c7c-5566ed6afd19
- Nicol, A., van Steenberg, F., & Willem te Velde, D. (2000, January). Financing transboundary water management: Policy brief. *Development Financing 2000 initiative, Swedish Ministry for Foreign Affairs*. Retrieved from <http://www.cap-net.org/documents/2002/09/financing-transboundary-water-management.pdf>
- Nile Information System. (n.d.). Nile trans-boundary environmental action program. Retrieved from <http://nileis.nilebasin.org/content/nile-trans-boundary-environmental-action-program>
- Overseas Development Institute. (2002, July). *Financing transboundary water management: Water policy brief*. Retrieved from <https://www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/1622.pdf>
- Pan-African Agency of the Great Green Wall. (n.d.). Marrakech, COP-22: Declaration of the first Africa action summit for continental co-emergence. Retrieved from <http://www.grandemuraillevrte.org/index.php/changement-climatique/cop-22-final-declaration>
- Pohl, B., Carius, A., Conca, K., Dabelko, G., Kramer, A., Michel, D., Wolf, A. et al. (2014). *The rise of hydro-diplomacy: Strengthening foreign policy for transboundary waters*. Berlin, Germany: Adelphi.
- Pohl, B., & Kramer, A. (2016). Investing in basins of risk: What elements should a putative code of conduct for business operating in basins at risk include?. (Discussion Note). *Geneva Water Hub*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/hlp_brief_-_code_of_conduct.pdf
- Pohl, B., & Kramer, A. (2016). Sharing benefits in shared basins: What are the opportunities of and experiences with benefit-sharing in transboundary basins?. (Discussion Note). *Geneva Water Hub*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/hlp_brief_-_benefit-sharing-opportunities.pdf
- Sadoff, C., Hall, J., Grey, D., Aerts, J., Ait-Kadi, M., Brown, C., Cox, A. et al. (2015). *Securing water, sustaining growth: Report of the GWP/OECD Task Force on Water Security and Sustainable Growth*. Oxford, United Kingdom: University of Oxford.
- Secretariat of the EU-Africa Infrastructure Trust Fund. (2013, June). *The EU-Africa infrastructure trust fund: A snapshot*. Retrieved from https://irena.org/DocumentDownloads/events/2013/July/Africa%20CEC_EIB_Kaltsas_230613.pdf
- Tignino, M., & Sangbana K. (2016). *The status of common facilities and benefit sharing in the Niger and Senegal River Basins*. Retrieved from <https://archive-ouverte.unige.ch/unige:80736>
- United Nations Economic Commission for Europe. (2009). *River basin commissions and other institutions for transboundary water cooperation: Capacity for water cooperation in Eastern Europe, Caucasus and Central Asia*. New York, NY: United Nations.
- United Nations Economic Commission for Europe. (2015). *Police guidance note on benefits of transboundary water cooperation: Identification, assessment and communication*. Retrieved from http://www.unece.org/fileadmin/DAM/env/water/publications/WAT_Benefits_of_Transboundary_Cooperation/ECE_MP.WAT_47_PolicyGuidanceNote_BenefitsCooperation_1522750_E_pdf_web.pdf
- United Nations Environment Programme. (2016, January). *Transboundary river basins: Status and trends* (Vol. 3). Nairobi, Kenya: UNEP.

- United Nations Framework Convention on Climate Change. (2014). United Nations Framework Convention on Climate Change [Website]. Retrieved from <https://unfccc.int/286o.php>
- World Bank. (n.d.). Cooperation in international waters in Africa. Retrieved from <http://www.worldbank.org/en/programs/cooperation-in-international-waters-in-africa>
- World Bank. (n.d.). Global Infrastructure Facility. Retrieved from <http://www.worldbank.org/en/programs/global-infrastructure-facility>
- World Bank (2006, May 12). Central Asia-South Asia electricity transmission and trade project (CASA - 1000). Retrieved from <http://www.worldbank.org/en/news/speech/2016/05/13/central-asia-south-asia-electricity-transmission-and-trade-project-casa-1000>
- World Water Council & OECD. (2015, April). *Water: Fit to finance?: Catalyzing national growth through investment in water security* (Report of the High-Level Panel on Financing Infrastructure for a Water-Secure World). Retrieved from http://www.worldwatercouncil.org/fileadmin/world_water_council/documents/publications/forum_documents/WWC_OECD_Water-fit-to-finance_Report.pdf
- Xuequan, M. (2016, November 17). African leaders commit to promote climate change adaptation measures. *African News*. Retrieved from http://news.xinhuanet.com/english/2016-11/17/c_135835394.htm
- Yu, W., & Winston, H. (2008). Benefit sharing in international rivers: Findings from the Senegal River Basin, the Columbia River Basin, and the Lesotho highlands water project. World Bank AFTWR Working Paper, 1. Retrieved from <http://documents.worldbank.org/curated/en/159191468193140438/Benefit-sharing-in-international-rivers-findings-from-the-Senegal-river-basin-the-Columbia-river-basin-and-the-Lesotho-highlands-water-project>

Chapter 7: In pursuit of Agency: New Mechanisms of Water Diplomacy

- Alvarez-Jimenez, A. (2006). Inter-state environmental disputes, provisional measures and the International Court of Justice's order in the case concerning Pulp Mills on the River Uruguay. *Temple Journal of Science, Technology, & Environmental Law*, 25(161). Retrieved from <http://www.temple.edu/law/tjstel/2006/fall/v25no2-Alvarez.pdf>
- Bernauer, T., & Boehmelt, T. (2014, November) Basins at risk: Predicting international river basin conflict and cooperation. *Global Environmental Politics*, 14(4), 116-138.
- Bernier, I., & Latulippe, N. (n.d.). *The International Convention on the Protection and Promotion of the Diversity of Cultural Expressions: Conciliation as a dispute resolution method in the cultural sector*. Retrieved from http://www.diversite-culturelle.qc.ca/fileadmin/documents/pdf/document_reflexion_eng.pdf
- Cosgrove, W. & Rijsberman, F. (2000). *World water vision: Making water everybody's business*. London, United Kingdom: Earthscan Publications Ltd. Retrieved from <http://www.worldwatercouncil.org/index.php?id=961>
- EU Water Initiative Africa Working Group. (2013, June). Mapping of financial support to transboundary water cooperation in Africa. Retrieved from <http://www.siw.org/publications/mapping-of-financial-support-to-transboundary-water-cooperation-in-africa/>
- Geneva Water Hub. (2017, February). *Hydro-diplomacy for water, peace and security: Beyond shared water management. Think tank roundtable summary report*. Retrieved from https://www.genevawaterhub.org/sites/default/files/atoms/files/roundtable_hydro-diplomacy_20170427.pdf
- Gorbachev, M. (2011). *Mikhail Gorbachev: Prophet of change: From the Cold War to a sustainable world*. Forest Row, East Sussex England: Clairview.
- Green Cross Brazil. (2005). Water for peace, security, democracy La Plata dialogues. In Green Cross International, *Activity report 2003-2005*, p. 6. Retrieved from http://www.gcint.org/wp-content/uploads/GCI_Activity%20Report%202003-2005.pdf
- Green Cross International (2000). *National sovereignty and international watercourses*. Retrieved from http://www.greencrossitalia.it/ita/acqua/wfp/pdf/international_watercourses_2000.pdf
- Halloran, K. (2009). Is the International Court of Justice the right forum for transboundary water pollution disputes. *Sustainable Development Law & Policy*, 10 (39). Retrieved from <http://digitalcommons.wcl.american.edu/cgi/viewcontent.cgi?article=1009&context=sdlp>
- International Groundwater Resources Assessment Centre. (2015, March). *Transboundary Aquifers of the World Map*. Special Edition for the 7 World Water Forum 2015. Retrieved from https://www.un-igrac.org/sites/default/files/resources/files/TBAmmap_2015.pdf

- Jägerskog, A. (2003). *Why states cooperate over shared water: The water negotiations in the Jordan River Basin* (Doctoral dissertation, Linköping University). Retrieved from http://www.transboundarywaters.orst.edu/publications/related_research/jagerskog2003.pdf
- Mason, S. J. A., & Blank, D. (2013, November). *Mediating water use conflicts in peace processes* (n° 13). Retrieved from <http://e-collection.library.ethz.ch/eserv/eth:7918/eth-7918-01.pdf>
- McCaffrey, S. C. (2003). Water disputes defined: Characteristics and trends for resolving them. In Permanent Court of Arbitration, Peace Palace Papers, *Resolution of international water disputes: papers emanating from the Sixth PCA international law seminar* (pp. 49-57). The Hague, Netherlands: Kluwer Law International.
- Meisser, U., & Palosaari, M. (2013). *Transforming risks into cooperation*. Retrieved from <http://www.envsec.org/publications/ENVSECTransformingRisks.FINAL.web.pdf>
- Michel, D. (2016, November). Water security, peace and cooperation. *Geneva Center for Security Policy, Strategic Security Analysis*, 13.
- Nicol, A., van Steenberghe, F., Sunman, H., Turton, A. R., Slaymaker, T., Allan, J. A., van Harten, M. et al. (2001). *Transboundary water management as an international public good*. Stockholm: Sweden: Ministry of Foreign Affairs. Retrieved from <http://www.odi.org.uk/publications/2972-transboundary-water-management-international-public-good>
- Otchet, A., & Le Fournis, I. (2003, March 21). UNESCO creates 'Water Cooperation Facility' to mediate water disputes. Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=10634&URL_DO=DO_TOPIC&URL_SECTION=201.html
- Payne, C. R. (2011). Pulp Mills on the River Uruguay (Argentina v. Uruguay). *American Journal of International Law*, 105(1), 94-101. Retrieved from <https://www.asil.org/insights/volume/14/issue/9/pulp-mills-river-uruguay-international-court-justice-recognizes>
- Pohl, B., Carius, A., Conca, K., Dabelko, G., Kramer, A., Michel, D., Wolf, A. et al. (2014). *The rise of hydro-diplomacy: Strengthening foreign policy for transboundary waters*. Berlin, Germany: Adelphi
- Policy Consensus Initiative (n.d.). *Choosing and working with a neutral forum and facilitator: Practical guide*. Retrieved from https://www.tceq.texas.gov/assets/public/permitting/watersupply/water_rights/eflows/20090402sj_governance.pdf
- Schmeier, S. (2015). The institutional design of river basin organizations – Empirical findings from around the world. *International Journal of River Basin Management*, 13(1), 51-72.
- Selby, J. (2005). The geopolitics of water in the Middle East: Fantasies and realities. *Third World Quarterly*, 26(2), 329-349.
- Sgubini, A., Prieditis, M., & Marighetto, A. (2004, August). Arbitration, mediation and conciliation: Differences and similarities from an international and Italian business perspective. *Mediate.com*. Retrieved from <http://www.mediate.com/articles/sgubinia2.cfm>
- Siccama, J. G. (1996). *Conflict prevention and early warning in the political practice of international organizations*. Retrieved from http://www.clingendael.nl/sites/default/files/19960000_cru_paper.pdf
- Söderbaum, F., & Granit, J. (2014). *The political economy of regionalism: The relevance for transboundary waters and the global environment facility. Resources, Peace and Conflict in the Horn of Africa*. Washington, D.C: Global Environmental Facility.
- Tignino, M. (2010, September). Water, international peace and security. *International Review of the Red Cross*, 92(879). Retrieved from www.icrc.org/eng/assets/files/review/2010/irrc-879-tignino.pdf
- United Nations Educational, Scientific and Cultural Organization. (n.d.). *From potential conflict to co-operation potential: Water for peace prevention and resolution of water related conflicts*. Retrieved from <http://unesdoc.unesco.org/images/0012/001262/126261e.pdf>
- United Nations Educational, Scientific and Cultural Organization. (2003, March). Water for people, water for life: A joint report by the twenty-three UN agencies concerned with freshwater. Retrieved from <http://www.unwater.org/publications/publications-detail/en/c/210593/>
- United Nations Educational, Scientific and Cultural Organization. (2003, June). *Report on the preparations for establishing a water co-operation facility*. Retrieved from <http://unesdoc.unesco.org/images/0013/001306/130675e.pdf>
- United Nations Environment Programme. (2009). *From conflict to peacebuilding: The role of natural resources and the environment* (No. 1). Nairobi, Kenya: UNEP/Earthprint.
- United Nations Environment Programme. (2016, January). *Transboundary river basins: Status and trends* (Vol. 3). Nairobi, Kenya: UNEP.
- United Nations Regional Centre for Preventive Diplomacy for Central Asia. *Programme of Action for 2012-2014*. Retrieved from https://unrcca.unmissions.org/sites/default/files/unrcca_programme_of_action_2012-2014_eng.pdf

UN Water. (2008). *Transboundary waters, sharing benefits, sharing responsibilities*. Retrieved from http://www.unwater.org/app/uploads/2017/05/UNW_TRANSBOUNDARY.pdf

Wolf, A. T., Yoffe, S. B., & Giordano, M. (2003). International waters: Identifying basins at risk. *Water policy*, 5(1), 29-60.

Wolf, A. T. (2007, November). Shared waters: Conflict and cooperation. *Annual Review of Environment and Resources*, 32, 241-269.

World Water Council. (2003). *Analysis of the 3rd World Water Forum*. Retrieved from http://www.worldwatercouncil.org/fileadmin/world_water_council/documents/world_water_forum_3/3d_World_Water_Forum_analysis.pdf

World Water Council. (2003, March). Ministerial conference on the occasion of the 3rd World Water Forum: Final report, Kyoto, Japan. Retrieved from <http://www.mlit.go.jp/tochimizushigen/mizsei/wwf3/FinalReport-Web.pdf>

World Water Council. (2003, March 21). Forum Bulletin. A daily report of the 3rd World Water Forum and Ministerial Conference, Kyoto, Japan. Retrieved from <http://www.iisd.ca/sd/3wwf/sdvol82num6.html>

World Wildlife Fund & Department for International Development (2010, February). *International architecture for transboundary water resources management: Policy analysis and recommendations*. Retrieved from http://assets.wwf.org.uk/downloads/options_international_architecture.pdf

Legal Documents

Agreement between the Republic of Kazakhstan, the Kyrgyz Republic, the Republic of Tajikistan, Turkmenistan, the Republic of Uzbekistan on Cooperation in the field of joint management of the use and conservation of water resources of interstate sources, Almaty, 18 February 1992.

Agreement on cooperation for the protection and sustainable use of the waters of the Spanish-Portuguese hydrographic basins, Albufeira, 30 November 1998.

Agreement on the cooperation for sustainable development of the Mekong river basin, Chiang Rai, 5 April 1995.

Charter of the United Nations, San Francisco, 26 June 1945.

Convention and protocol relating to the status of refugees, Geneva, 28 July 1951.

Convention on access to information, public participation in decision-making and access to justice in environmental matters, Aarhus, 25 June 1998.

Convention on biological diversity, Rio de Janeiro, 5 June 1992.

Convention on the law of the non-navigational uses of international watercourses, New York, 21 May 1997.

Convention on the prohibition of military or any other hostile use of environmental modification techniques, New York, 10 December 1996.

Convention on the protection and use of transboundary watercourses and international lakes, Helsinki, 17 March 1992.

Convention IV relating to the protection of civilian persons in time of war, Geneva, 12 August 1949.

Corfu Channel Case (United Kingdom / Albania), Judgement, I.C.J. Reports, 1949, p. 4.

Darfur Peace Agreement, Abuja, 5 May 2006.

Directive 1998/83/EC of the Council of the European Union on the quality of water intended for human consumption, Brussels, 3 November 1998.

Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy, Luxembourg, 23 October 2000.

Directive 2006/7/EC of the European Parliament and the Council concerning the management of bathing water quality and repealing Directive 76/160/EEC, Strasbourg, 15 February 2006.

Eritrea Ethiopia Claims Commission. (2005). Partial award-western front. *Aerial bombardment and related claims-Eritrea's claims*. In United Nations, *Reports of international arbitral awards* (Vol XXVI, pp.291-349).

Final act of the congress of Vienna, Vienna, 17 June 1815.

Framework agreement on the Sava River Basin, Kranjska Gora, 3 December 2002.

International Covenant on civil and political rights, New York, 16 December 1966.

International Covenant on economic, social and cultural rights, New York, 16 December 1966.

Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of international armed conflicts (Protocol I). Geneva, 8 June 1977.

Protocol additional to the Geneva conventions of 12 August 1949, and relating to the protection of victims of non-international armed conflicts (Protocol II). Geneva, 8 June 1977.

Protocol on civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters to the 1992 Convention on the protection and use of transboundary watercourses and international lakes and to the 1992 Convention on the transboundary effects of industrial accidents, Kyiv, 21 May 2003.

Protocol on water and health to the 1992 Convention on the protection and use of transboundary watercourses and international lakes, London, 17 June 1999.

Pulp Mills on the River Uruguay (Argentina v. Uruguay), Judgment, I.C.J. Reports 2010, p. 14.

Revised Protocol on Shared Watercourses in the Southern African Development Community (SADC), Windhoek, 7 August 2000.

Statute of the International Criminal Court, Rome, 17 July 1998

Trail Smelter Arbitration (US v. Canada), Reports of International Arbitral Awards, 1907, 1941.

Treaty between the United States of America and Mexico on the utilization of waters of the Colorado and Tijuana and of the Rio Grande, Washington, 3 February 1944.

Treaty of Paris, Paris, 30 March 1856.

Photo credits

Cover page	Ernesto Benavides (Conga mine assembly, El Perol, Cajamarca, Peru)
p. 3	Rok Tržan (Dr Danilo Türk)
p. 10	Shutterstock / Milosz Maslanka (Aral Sea)
p. 15	Reuters / Amit Dave (Natwarghad, Gujarat, India)
p. 18	Shutterstock / Climax AP (Jordan Valley)
p. 20	Reuters / Hosan Katan (Aleppo, Syria)
p. 23	Reuters / Youssef Budlal (Mossul, Iraq)
p. 27	Reuters / Joe Penney (Kerawa, Cameroon)
p. 30	Shutterstock / Yury Birukov (Mount Mulanje, Malawi)
p. 32	Shutterstock / Pierpaolo Romano (Victoria Falls Bridge)
p. 38	Shutterstock / Miki Studio (Thai-Lao friendship bridge over the Mekong)
p. 42	Reuters / Paulo Whitaker (Minas Gerais, Brasil)
p. 44	Magnum / Paolo Pellegrin (Ziglab dam, Al Azyya, Jordan)
p. 47	hydrosolutions iMoMo project / Tobias Siegfried (Themí river catchment, Tanzania)
p. 50	UN Photo / John Isaac (Madras, India)
p. 52	Biodiversity International, IFPRI / Trinidad del Rio (Nalitoya, Zambia)
p. 58	hydrosolutions iMoMo project / Tobias Siegfried (Chu-Talas catchment, Kyrgyzstan)
p. 60	Shutterstock (Inguri dam, Georgia)
p. 64	hydrosolutions iMoMo project / Tobias Siegfried (Nurek dam, Tajikistan)
p. 68	Shutterstock / Thanyapat Wanitchanon (Mekong river, Thailand)
p. 74	NASA Goddard Space Flight Center / USGS (Yukon Delta, Alaska, USA)
p. 80-81	Reuters / Anindito Mukherjee (Water Crisis 2016, New Delhi, India)

The copyright of this Report belongs to the Geneva Water Hub, hosted by the University of Geneva, the Strategic Foresight Group and Dr Danilo Türk as Chairman of the Panel.

Any reproduction request is to be addressed to the Geneva Water Hub, as Secretariat of the Panel. This Report might be reproduced in whole and in any forms for educational or non-profit purposes without special permission from the copyright holders, provided acknowledgment of the source is made. The Secretariat of the Panel would appreciate receiving a copy of any publication that uses this Report as a source.

To be cited as: Global High-Level Panel on Water and Peace. (2017). *A Matter of Survival* (Report). Geneva: Geneva Water Hub.

Design, Layout and Maps: Hermine Cooreman, Matthias Beilstein; Zoï Environment Network

Proofreading: Božena Blix

Global High-Level Panel on Water and Peace logo: Marjorie Besch.

The views expressed in this Report only reflect the opinions of the Members of the Panel and its Secretariat.

Water is, without a doubt, one of the major challenges of the 21st century. The world needs to fundamentally rethink its global approach to water - as a matter of survival.

Water quality and quantity is a growing problem in many regions of the world that already suffer from water stress. Climate change aggravates the problem and its devastating effects can be seen in floods, droughts, the melting of ice caps or other natural disasters.

Considering that these factors represent major conflict-risk multipliers and that water is increasingly used as an instrument of war, it is ever more recognized that this reality puts worldwide peace and security at risk.

At the same time, water is a powerful tool to foster cooperation. Nothing can replace water. As such, it is the most powerful incentive for coming to an agreement between stakeholders. The more equitable their part in the accord, the higher the chances are for reaching a stable and long-lasting agreement. The sharing of benefits around water, the creation of river basin water users associations, the implementation of river basin organizations, to name only a few, are entry doors and triggers for dialogue, and incentives for cooperation and peace and stability in the long term.

Fifteen countries share this concern around water and want to address these challenges and see the outcome of the development of such a positive vision. For this reason, in 2015, they established a Global High-Level Panel on Water and Peace. This Report is the result of a two years mandate allowing the Panel to reflect on the challenges of water and peace.

The Report contains the analysis and the recommendations adopted by the Panel in order to prevent water-related conflicts and to make water an instrument of peace. It has the ambition to address the water challenges in an integrated and comprehensive manner, at multiple levels, whether it is by fostering new practices, new institutions, water diplomacy or strengthening international law, among others. We have been profoundly impressed by the commitment of the Members of the Panel to this cause. They share our hope, as Secretariat of the Panel, that the recommendations of the Report will find wide echo and encounter a large support to bring them to life. We hope that the work of the Global High-Level Panel on Water and Peace will mark the beginning of a new era of cooperation around water which will, in turn, strengthen human rights, development, and peace and security worldwide.

The Geneva Water Hub
Secretariat of the Global High-Level Panel on Water and Peace

