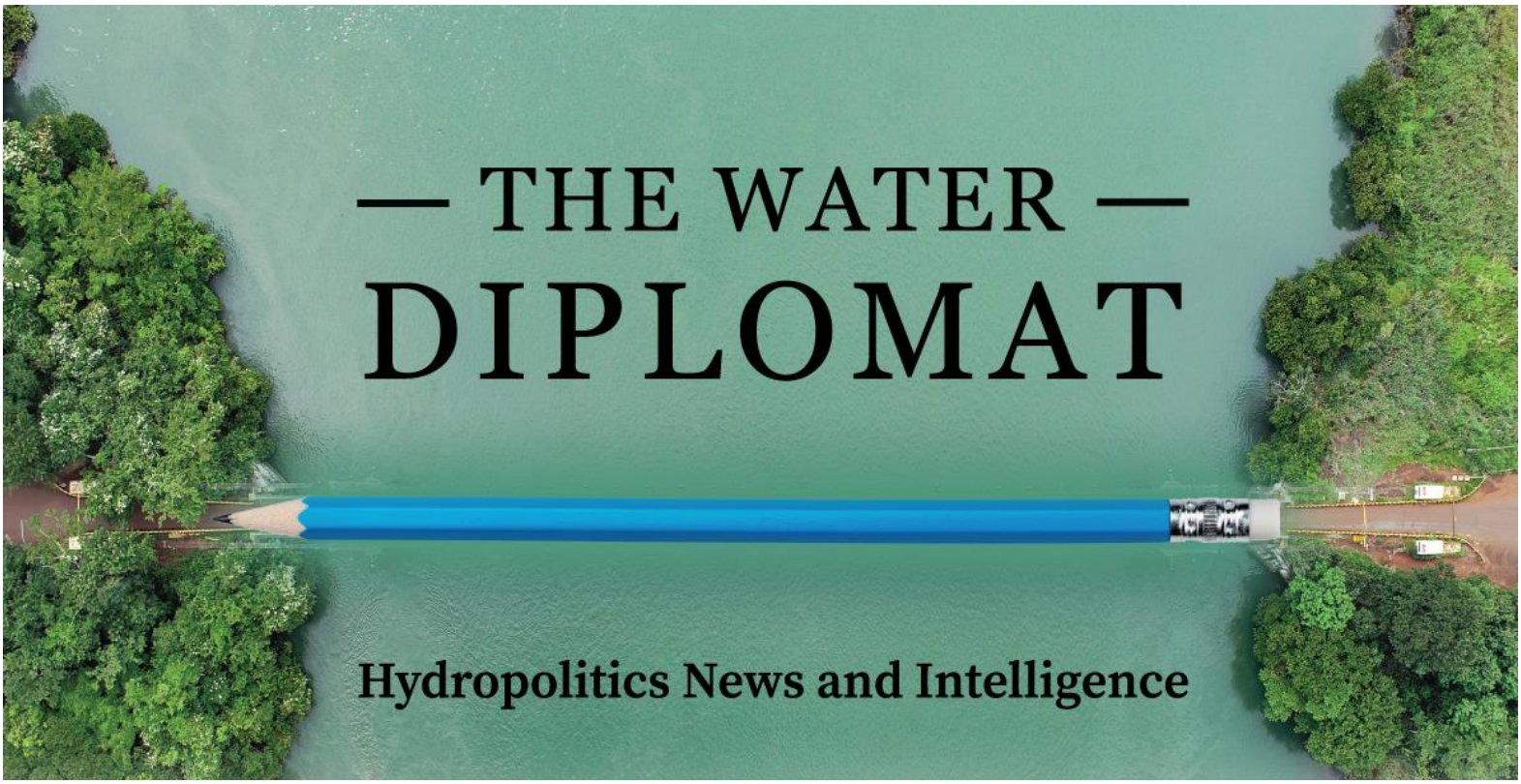

Introduction to current affairs in water management

A starter course for journalists

Dr Tobias Schmitz / The Water Diplomat / March 2022

"International water cooperation should be developed into a major instrument used in strengthening international stability, peace, and conflict prevention". (From : "A Matter of Survival", Report of the Global High-level Panel on Water and Peace, 2017.)

CONTENTS

1. INTRODUCTION

Welcome to the introduction to water diplomacy for journalists wishing to cover the 9th World Water Forum in Dakar. At first glance, water management may seem to be a rather technical profession, perhaps even a rather uninteresting subject dealing with dams and pumps and filters. However, the influence of water is in fact extremely wide ranging, and it touches on a very large number of subjects that are relevant to our daily lives.

Water is a critical enabler for a broad range of Sustainable Development Goals - including combating climate change, ending hunger, ensuring healthy lives, and achieving gender equality. The importance of water stems from the fact that it influences almost everything in our lives: it is central to life itself, it is needed for all aspects of social life, and it is needed for all forms of economic production. This means that water management is a cornerstone for a sustainable, just, and prosperous future. Water plays a central role in maintaining the biosphere, supporting carbon and nutrient cycles, and regulating our climate at various scales. In addition, socioeconomic decisions such as the provision of access to drinking water, the development of infrastructure for irrigation, the use of water in crushing and washing mineral ores or the development of industry all have an impact on the hydrological cycle.

1. Figure 1: Water at the heart of the SDGs

Economic growth and changes in production and trade patterns result in changes in demand for water for domestic, industrial and trade patterns, leading to changes in local water abstractions and the release of pollutants from anthropogenic sources into the environment. These socioeconomic decisions are embedded within the global economy, such that policy decisions or changes in investments in commodities in one area of the world can have an impact on the local water cycle at another location. Different scenarios for economic development can lead to radically different outcomes in water consumption and pollution, i.e., water is very sensitive to key drivers of change and operating within sustainable limits is possible under appropriate economic and policy conditions. [1] In short, water is a highly strategic resource, and it is a good place to start if we want to think about approaches to leverage changes in society and bring together a complex set of different challenges within a single.

1.1 Water Diplomacy

Water is a source of inspiration for all kinds of initiatives in the field of international cooperation. Water resources often cut across political boundaries, from the boundaries between local municipalities at the local level, to the borders between nations at the international level. As such, shared water resources provide the opportunity for cooperation. Where there are differences between stakeholders regarding access to or control over water resources, various tools can be used to avoid conflicts, such as negotiation, mediation, arbitration, litigation, diplomacy, and court judgements.

Water Diplomacy is the art or practice of using water as a tool for conducting international relations. This diplomacy can be bilateral, it can be between two or more countries, and it can involve third parties.

2. THE ROLE OF JOURNALISTS

Public awareness of the central role of water in our lives is fundamental to the achievement of many economic, social and environmental goals. Media, particularly news media, are central to calling global attention to water issues, stimulating public debate, and contributing to constructive dialogues. Media can act as a knowledge broker, building bridges, facilitating new flows of information, shifting narratives towards collaboration and increasing awareness of co-dependency on shared resources. This is important where competition over access to scarce water resources has the potential to spark conflict, i.e. where access to water is seen as a conflict as a zero-sum game, where an advantage for one side is seen as a loss for the other[2]. For instance, society's understanding of the network of stakeholders involved in conflicts is largely informed by information provided in mass media. [3] Of course, there are risks involved in covering conflicts: media coverage can fall prey to 'selective articulation' by covering some conflicts and not others, some stakeholders and not others, or some

[1] Ertug Ercin, A. and Hoekstra, A. (2013): Water Footprint Scenarios for 2050: A Global Analysis. In: Environment International 64 (2014): 71 - 82

[2] Nicol, A. and Nair, N (2021): Beyond Politics: Knowledge Bridge in the Indus Basin. In Dewedar, R (2021): Water conflicts and cooperation: a media handbook. Oxfordshire: CABI

[3] Reyes Garcia, V., Andrés-Conéjero, O., Fernandéz-Llamazares, A., Diaz-Reviriego, I and Molina, J. (2019): A road to conflict: stakeholders and social network analysis of the media portrayals of a social environmental conflict in Bolivia. In: Society & Natural Resources 32 (4): 452-472.

drivers of conflict and not others. [4] These risks can be mitigated through a range of measures such as plurality, ensuring a multidisciplinary approach, providing voice to a diversity of stakeholders, and by devoting more time to the coverage of scientific findings. [5]

The provision of information through media plays a key role in the public participation in debates in society, as well in the engagement of decision makers. [6] In the field of water governance, media are important vehicles to discuss the rules of access to and control over water that lie at the basis of water security. It is through the media that public awareness is raised on topics such as the role of water in armed conflict, the application of international water law, or procedures of international water cooperation.

At The Water Diplomat, we see each news item as an opportunity to shed light on the complexities of water governance. This is an important role, as there is still relatively little coverage of natural resource conflicts in mainstream media, although this does appear to be increasing over time. Fifteen years ago, stories on climate change were published in the scientific or environmental section of newspapers, and rarely made font page news. Currently, extreme weather events and natural disasters associated with climate change are finding their way to the front pages of our news. And although the narrative on these stories tends to focus on climate change or extreme weather, the actual face of these stories tends to be water related: droughts, flood, landslides, damage to infrastructure, etc.

Public awareness of water diplomacy is crucial to the achievement of global objectives on sustainable development, humanitarian action, and peace. Media, particularly news media, are key to calling global attention to water issues, stimulating public debate, and contributing to constructive dialogues. Media can act as a knowledge broker, building bridges, facilitating new flows of information, shifting narratives towards collaboration, and increasing awareness of co-dependency on shared resources rather than viewing water conflicts as a zero-sum game.

However, although water professionals may be convinced of the fundamental role of water as a driver of change, this does not mean that other stakeholders in society are aware of this. Just as journalists have brought climate change from the back pages to the front pages of news over the past 15 years, a concerted effort of awareness raising is needed to transmit the key messages on the fundamental role of water in life itself, in all our economic activities, and in the achievement of all our social goals.

The act of mainstreaming water news can fundamentally support the efforts of water diplomats to bring stakeholders on board and secure a broad and practical agreement on water in New York in 2023. This requires outreach to, amongst others, the broader platform for the achievement of the Sustainable Development Goals, the humanitarian action community and groups working on peacebuilding.

The Water Diplomat would like to welcome all journalists wishing to join the task of awareness raising on water issues. It was a partner to the alliance for the Water Pavilion at COP 26 in Glasgow, it is already working directly with the Executive Secretariat of the 9th World Water Forum on media outreach, and arrangements have been made with the envoy of President Rahmon Emomali of Tajikistan to support the press coverage of the second Dushanbe conference. By working closely with host governments, international organisations and major groups on the Road to New York, key milestones and events in water diplomacy can be shared with ‘unusual suspects’ to encourage their involvement in the process.

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[4] Hamelink, C (2011): Media and conflict: escalating evil. Taylor and Francis, pg 32

[5] Fantiti, E (2021): The Minister, the Prophet and God’s Eye: Scientists voices in media reporting in: In Dewedar, R (2021): Water conflicts and cooperation: a media handbook. Oxfordshire: CABI, Op Cit.

[6] See for instance Boyle (2009): Media use and protest: the role of mainstream and alternative media use in predicting traditional and protest participation. In: Communication Quarterly (2009): vol 57 issue 1 pgs. 1 -17

3. ABOUT THE 9TH WORLD WATER FORUM

3.1 Background to the World Water Forums

International recognition of the importance of water has been growing rapidly in recent years. The first high level international conference on water was the United Nations Conference on Water in Mar del Plata, Argentina, in 1977. In 1992, an International Conference on Water and the Environment was held in Dublin, Ireland, to prepare for the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro in 1992. Both conferences were highly influential, shaping the development of both international and national water law and policies. At the UNCED meeting, the idea of forming a World Water Council was formed. In 1994, the International Water Resources Association resolved to create a World Water Council, which was formally established in 1996. Following this, the World Water Council, together with the government of Morocco, hosted the first World Water Forum, which laid the basis for a long-term vision for water in the 21st century.

The World Water Forums are held every three years in partnership with different host countries, and they are the world's largest event dedicated to water.

3.2 The innovations of the 9th World Water Forum[7]

Senegal's aim with the 9th World Water Forum is to produce a WWF which is efficient, and which produces a series of concrete responses to the low pace of implementation of SDG6. To do this, it has developed a series of innovations:

First, at the level of the preparatory process, it wished to increase the level of inclusiveness and participation, without going back to the parallel processes of previous WWF editions, in a decompartmentalised fashion. The Executive Secretariat wanted to achieve a unique and integrated preparatory process: all stakeholders including political actors, civil society organisations, the scientific community, the youth knowledge – were brought together within one platform to develop joint messages.

Secondly, the Executive Secretariat launched what it calls the Dakar 2022 Initiative. This process has led to the development of a number of concrete responses at field level in the form of earmarked projects which will be presented during the Forum to illustrate the concrete results which the Forum aims to achieve.

The third innovation is at the political level: in the context of the Forum, there will be a High-Level Segment which will bring in heads of state as well as prominent international institutions in order to renew the commitment of the international community to accelerate access to water and sanitation. This is in response to the observation that the current trajectory for SDG 6 is not positive, and the COVID 19 pandemic has served to complicate the situation. In this context, the Executive Secretariat is of the opinion that Dakar presents a good opportunity to recommit and reengage.

[7] From an Interview with Abdoulaye Sene, Executive Secretary of the 9th World Water Forum / Tobias Schmitz, The Water Diplomat, 13/02/2022

Fourth, the Forum is highlighting the issue of sanitation, which often does not receive enough attention in comparison to other SDG objectives, through a 'sanitation village' which will be the focal point of responses in the field of sanitation. The Sanitation Village is not just about household sanitation issues but will also embrace wider topics such as wastewater treatment and the minimalization of the risks of pollution.

Lastly, the Executive Secretariat will emphasise innovations which have an 'African dimension' to them are also implemented.

3.3 High Level Political Engagement

The Executive Secretariat also places a lot of emphasis on the political aspect of the Forum. There is a draft **Dakar Declaration** which has been taken up to the Ministerial and Parliamentary levels. However, this time, the President of Senegal, excellency Mack Sall, would like to involve Heads of State as well as prominent international institutions in the declaration, enabling the political community to remind itself of several goals, reformulate a number of them and recommit to them. Heads of State and international institutions have been invited to the Forum. Ind addition to the Dakar Declaration, the Secretariat of the WWF is calling on other political actors such as Ministers, members of Parliament, elected Councillors and River Basin Organisations to develop road maps for the implementation of the Dakar Declaration. The Declaration will therefore have a signpost function, and it is envisaged that the other political segments will elaborate the plans of action for this declaration. The sessions of the Forum will be designed with a view to provide content to the recommendations and facilitate the implementation of the Declaration at all levels: at local level, national level, but also at international level.

3.4 The Road to the UN Water Conference in New York in 2023

The 9th World Water Forum, although important, is a milestone in a broader process of water diplomacy. The ambition of the Secretariat is that the results of the Dakar Forum, which will be results developed by the entire global water sector, be seen as a contribution by Senegal and of the African Continent to the success of the conference in 2023. The next conference is the 2nd Conference on Water for Sustainable Development Decade, which will take place in Dushanbe, Tajikistan, in June 2022. The Executive Secretariat is in discussion with the government of Tajikistan to ensure that the results from Dakar are taken on board and included in the 'Dushanbe Process'. Both the 9th WWF and the Dushanbe conference are preparatory sessions in the lead up to the UN Conference on water in New York in 2023. In Dakar, the government of Senegal is working together with Tajikistan and the Netherlands on special sessions that will facilitate a better understanding of the issues and process on the UN conference in 2023.

3.5 The WWF's Vision on Water Security for Peace and Development

The African Water Vision 2025 is a vision document developed by African Minsters which speaks of the pursuit of peace and of regional cooperation based on water cooperation and joint river basin management. The 9th World Water Forum also has the theme of peace in its title, and it is no accident that Senegal is hosting the 9th WWF with peace in its title: when Senegal assumed the Presidency of the United Nations Security Council in 2016, it proposed a debate focused on enabling water to become a vector of peace and security. Water has historically been a rallying point for international solidarity and cooperation, but sometimes water has also appeared as a factor which generates conflicts. In this context the Organisation Pour la Mise en Valeur du Fleuve Sénégal (OMVS) and the Organisation Pour la Mise en Valeur de la Fleuve Gambie (OMVG) are well known as examples of transboundary cooperation and peacebuilding in which Senegal has played a

key role. Both the OMVS and the OMVG have their headquarters in Senegal – as models for the construction of peaceful international cooperation on water. This goes to the heart of the African Water Vision 2025 as well as the title of the 9th WWF

3.6 The Four priority areas of the Forum

In the preparations for the Forum, the Executive Secretariat decided to prioritise a number of themes for discussion rather than opening the Forum to all possible water related subjects. The four priority themes are:

- Water Security and Sanitation
- International Cooperation
- Water for Rural Development
- Means and Tools

The Executive Secretary of the 9th WWF explains this as follows:

*"We did not want to discuss all possible subjects but preferred to focus on four priority areas, knowing that there are also other important areas. For us, the theme of W**ater Security and Sanitation** refers in the first place to universal access to water and sanitation for all, everywhere. This is a question of human rights, it is a question of security and of peace for everyone, whether these are natural disasters or whether they are created through conflicts. All of this falls under 'water security'. Beyond this however we feel that we need, beyond matters of access, to be focusing on the security of the resource itself: we need to combat pollution, examine the links between water resources and climate change to develop adaptation programmes, we need to protect ecosystems and biodiversity which are essential for water security. But we also know that currently the problem of rapid population growth can place additional pressure on water, causing water stress and generating risks in terms of water scarcity. We have a limited resource. If the demand increases, we need to find modalities and mechanisms to make sure that this same quantity of water is available and can satisfy basic needs. Thus, all these themes have been grouped together under 'water security'.*

*Next, there is W**ater for Rural Development**. Africa is confronted with a problem of rural development which carries with it important risk linked to migration such as the rural exodus and international migration. We believe that if we can assure rural access to water in the correct manner, we will improve living conditions for rural populations. If we can ensure access to water for agriculture and stock farming without creating conflicts between farmers and pastoralists, this will improve the attractiveness and living conditions in rural areas. We also believe that water is essential to keep populations in their territories: we believe that water in rural areas has an extremely important role to play for mankind but also for nature. Therefore, this is an extremely important theme that we have brought forward, also in relation to African realities.*

***International Cooperation:** It is essential. If we wish, in the context of climate change, in the context of increasing scarcity, in the context of pollution, in the context of water sharing arrangements, it is important to develop instruments to ensure a form of cooperation that is more dynamic, more efficient more dynamic form of cooperation and more diverse.*

*Lastly, our fourth priority is what we call **Tools and Means**. We need sufficient finances, and they need to be sufficiently adapted: Senegal is in the process of developing a "Blue Fund" which will be a dedicated fund for the water sector in all its diversity. We also believe that work is required in the field*

of governance, which is a factor that improves the performance of water management, and we believe that we need to work on science, knowledge and innovations which can help overcome our water challenges. This is a broad summary of the four main priorities which are the subject of high-level round tables and official sessions which form the basis for some 100 sessions which will enable the elaboration and improvement of the support provided to take this forward.

4. SUGGESTED PREPARATORY VIDEOS

The following list of videos is a collection of introductory presentations on different thematic areas that are of importance to the World Water Forum, and which will be covered during the course

4.1 Table 1 :Suggested preparatory videos

Topic	Source	Lecturer
Water Sanitation and Hygiene	https://www.sanitationandwaterforall.org/knowledge-exchange/build-forward-better-water-sanitation-and-hygiene-solutions-sustainable-recovery	Sanitation and Water for All / Catarina de Albuquerque
Transboundary water resources and the evolution of International Water Law	https://www.youtube.com/watch?v=Hy1mqz_d-KU	Prof Laurence Boisson de Chazournes
The protection of water in international humanitarian law	https://www.youtube.com/watch?v=MclYolFG3Cg&t=18s	Dr Mara Tignino
Conflicts between users	https://www.youtube.com/watch?v=Hy1mqz_d-KU	Prof Makane Mbengue
Cooperation in the Senegal Basin	https://www.youtube.com/watch?v-lheAdbwvE_8&feature=youtu.be	Prof Makane Mbengue
Conflicts between users	https://www.youtube.com/watch?v=i0ZpFm7_YK8	Prof Christian Bréthaut

5. KEY REFERENCE POINTS IN WATER LAW AND POLICY

5.1 The Stockholm Declaration

The United Nations Conference on the Human Environment held in Stockholm in 1972 is widely seen as the starting point for international rules for the management and protection of natural resources, i.e., of international environmental law. It also resulted in the establishment of the United Nations Environmental Programme (UNEP). The resultant conference report and 'Stockholm Declaration' represented a common outlook and common principles of natural resources management (including water) amongst the 113 states present[8]. And although the Stockholm Declaration is formally not binding, it contains provisions which at the time were either understood to reflect customary international law, or to shape future normative discussions[9]. The recommendations also laid the basis for some key principles of integration at the transboundary level.

The Stockholm declaration produced a total of 26 principles of which three are particularly relevant from a legal point of view[10], i.e. principles 21, 22 and 24, which focus on state sovereignty over natural resources, the responsibility not to cause environmental damage, the call for the development of international rules on liability for environmental damage and to foster international cooperation on environmental matters[11]:

- Principle 21: States have, in accordance with the Charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.

- Principle 22: States need to jointly develop international law regarding liability and compensation for the victims of pollution and other environmental damage caused by activities within the jurisdiction or control of such States to areas beyond their jurisdiction.

- Principle 24: International matters concerning the protection and improvement of the environment should be handled in a cooperative spirit by all countries, big and small, on an equal footing.

In addition, several recommendations specifically dealt with water resources, of which recommendation 51 is of particular importance in the context of transboundary cooperation[12]. These recommendations are more concrete and amenable to monitoring than the above general principles:

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[8]The United Nations Conference on the Human Environment brought forth a Declaration on the Human Environment, an Action Plan and a Resolution on Financial and Institutional Arrangements

[9] See commentary on the Stockholm Report from the UN Legal Service

[10]Galizzi, P (2005): From Stockholm to New York, via Rio and Johannesburg: has the Environment lost its way on the Global agenda? In: Fordham International Law Journal Vol 29, issue 5: 952-1008

[11]Note also Principle 2 that the natural resources of the earth including water and in particular representative samples of natural ecosystems must be safeguarded for the benefit of present and future generations; Principle 3 that the capacity of the earth to produce vital renewable resources must be maintained and, wherever practicable, restored or improved; Principle 6 that the discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems. These principles are relevant to freshwater management and were elaborated further in the Convention in Biological Diversity, the Ramsar Convention, etc.

[12] Recommendation 22 suggested specific advice to governments from FAO on the role of forests in conserving watersheds; Recommendation 32 encouraged governments to give attention to the need to enact international conventions and treaties to protect species inhabiting international waters; recommendation 48 proposed UN research in support to avoid negative impacts on freshwater fisheries in shared waters, including through invasive species

- The creation of River Basin Commissions for the management of water resources common to more than one jurisdiction;
- Timely notification to riparian states of major planned interventions in water resources;
- Optimisation of water utilisation and avoiding pollution;
- equitable sharing of benefits of waters shared by more than one jurisdiction.

Many of the principles contained in the Stockholm Declaration have found their way into agreements dealing with the protection and management of freshwater, especially the environmental protection of transboundary freshwater systems, which has become a key principle of international water law.

5.2 The Mar del Plata Action Plan

The United Nations Water Conference that took place in Mar del Plata, Argentina in March 1977 was the first global conference devoted exclusively to water issues, and it resulted in both a seminal global resolution and a detailed action plan. Many of the thematic areas identified and initiatives launched at Mar del Plata would come to structure later interventions in the water domain. Most well-known amongst these is probably the proclamation of the period from 1981 to 1990 as the first International Drinking Water Supply and Sanitation Decade.

However, a less well-known fact is that the Mar del Plata declaration and recommendations also contained an exceptionally rich and detailed overview of water resource management concerns and proposed solutions. The conference embraced all of the major issues relevant to water resources management including water assessment, use and efficiency; environment, health and pollution control; policy, planning and management; natural hazards; public information, education, training and research and regional and international cooperation. In fact, it is here that the language of 'integration' first features prominently in the context of (joint) state deliberations on water resources management. The very influential Dublin Statement on Water and Sustainable Development of 1992 is based largely on the recommendations of the Mar del Plata conference. It is therefore useful to extract language on integration and water resources monitoring to identify the constituent elements agreed upon at that stage.

The Mar Del Plata conference is the first international water conference to lay out a detailed road map for both water legislation and water policy[13]. For water legislation, and to counter the fragmentation of administrative responsibilities and provisions regulating water management, the conference report recommended that states conduct a review of existing legislation and enact comprehensive legislation for a coordinated approach to water planning[14].

5.3 The Dublin Conference &Dublin Principles

Following the United Nations Conference on the Human Environment in Stockholm in 1972, global awareness of the manifestation of environmental constraints to existing production and consumption

[13] Salman Salman and Daniel Bradlow (2006): Regulatory Frameworks for Water Resources Management. A Comparative study. Washington: The World Bank

[14] United Nations (1977): Report of the United Nations Water Conference. Mar del Plata, Argentina, 1977

patterns began to grow. This awareness was strengthened by the 1987 release of the Brundtland Report for the World Commission on Environment and Development[15]. This awareness resulted amongst other things in the in the second major International Conference on Water and Environment (January 1992), which took place in Dublin. The Dublin conference, in turn, was a preparatory conference for the United Nations Conference on Environment and Development (UNCED) in Rio in June 1992. The International Conference on Water and Environment ('ICWE' or the 'Dublin Conference') resulted in both the 'Dublin Statement' and in the Report of the Conference. These two documents were very influential in developing a normative reference point for water resources management, although they were largely based on the Mar del Plata deliberations[16].

These 'Dublin Principles' for IWRM were as follows:

1. Freshwater is a finite and vulnerable resource
    - This principle interpreted IWRM as a 'holistic' approach, stating

      ''*since water sustains life, effective management of water resources demands a holistic approach, linking social and economic development with protection of natural ecosystems. Effective management links land and water uses across the whole of a catchment area or groundwater aquifer.*''[17]

2. Its development and management should be based on a participatory approach, involving users, planners and policy makers at all levels
    - Importantly, this principle was not exclusively focused on participation but also introduced the subsidiarity principle and emphasised that

      ''it means that decisions are taken at the lowest appropriate level, with full public consultation and involvement of users in the planning and implementation of water projects.''[18]

3. Women play a central role in water management
    - This principle is strongly related to the human rights concept of non-discrimination, stating that

      ''*the pivotal role of women as providers and users of water and guardians of the living environment has seldom been reflected in institutional arrangements for the development and management of water resources. Acceptance and implementation of this principle requires positive policies to address women's specific needs and to equip and empower women to participate at all levels in water resources programmes, including decision-making and implementation, in ways defined by them.*''[19]

[15] World Commission on Environment and Development (1987): Our Common Future. Oxford: Oxford University Press
[16] Salman Salman and Daniel Bradlow (2006): Op. Cit., pg. 6
[17] International Conference on Water and the Environment (1992): The Dublin Statement on Water and Sustainable Development
[18] Ibid.
[19] Ibid.

4. Water has an economic value in all its competing uses and should be recognised as an economic good

    - This principle was highly controversial as it did not mention that water is also a social good and a cultural good. However, it did already make allusion to human rights:

      ''it is vital to recognize first the basic right of all human beings to have access to clean water and sanitation at an affordable price. Past failure to recognize the economic value of water has led to wasteful and environmentally damaging uses of the resource. Managing water as an economic good is an important way of achieving efficient and equitable use, and of encouraging conservation and protection of water resources''[20].

5.4 The United Nations Conference on Environment and Development

The United Nations Conference on Environment and Development (UNCED)in Rio de Janeiro in 1992 gave birth to three key international instruments that continue to provide much of the multilateral framework for sustainable development: The United Nations Framework Convention on Climate Change, the United Nations Convention on Biological Diversity and the United Nations Convention to Combat Desertification. Although freshwater management plays a key role in all three of these domains, no separate water convention was developed. By default, the key point of reference for the water sector is Agenda 21, which offers a practical approach to applying local- and national-level sustainable development policies[21]. At its 1992 adoption, Agenda 21 was intended as a programme of action for sustainable development worldwide.

Due to water's relevance to the environment and development, Chapter 18 of Agenda 21 was devoted to the "Protection of the Quality and Supply of Freshwater Resources: Application of Integrated Approaches to the Development, Management and Use of Water Resources."

The introduction to Agenda 21; Chapter 18 announced that:

''Water is needed in all aspects of life. The general objective is to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet, while preserving the hydrological, biological and chemical functions of ecosystems, adapting human activities within the capacity limits of nature and combating vectors of water-related diseases. Innovative technologies, including the improvement of indigenous technologies, are needed to fully utilize limited water resources and to safeguard those resources against pollution''.[22]

5.6 The UN Watercourses Convention

The UN Watercourses convention occupies a central place in international law on transboundary water management and is therefore crucial to the understanding of transboundary management of water resources. In 1970, through a resolution of the United Nations General Assembly (UNGA), the International Law Commission (ILC) was requested to initiate a study on the law of non-navigational uses of international watercourses. The research and the ILC's reports spanned 27 years, but in 1997

[20] Ibid.

[21] Business & industry, youth, farmers, NGOs, local authorities, indigenous peoples, scientific & technological community, women, workers &trade unions

[22] United Nations Conference on Environment and Development (1992): "Earth Summit", Agenda 21, Chapter 18

led to the adoption by more than 100 states in the UNGA of the United Nations Convention on the Law of Non-Navigational uses of International Watercourses (hereafter: UN Watercourses Convention). A subject of disagreement was the question whether the convention should include groundwater that is not connected to surface water ('confined groundwater'). Thus, the convention applies only to groundwater that is hydrologically connected to a system of surface waters[23]. In the context of the convention, a watercourse therefore means "a system of surface waters and groundwater constituting by virtue of their physical relationship a unitary whole and normally flowing into a common terminus", and can have parts situated in a different state[24].

The UN Watercourses convention is a framework convention, providing the basic legal infrastructure for further elaboration through protocols, implementation guidelines, etc. In SDG terms this is similar to the 'ladder approach' whereby the general context for targets and monitoring is set and specific norms can be set that are deemed appropriate to a given setting.

Following the trend during most of the 19th and 20th century, the regulation of international watercourses has been 'statist' in its approach, i.e. centred around state sovereignty, whereby states both have rights and bear duties towards each other. This statist approach stands in contrast to an approach which accords rights to *individual rights holders* at the sub-national level. In the UN Watercourses Convention, cooperation with regard to the utilisation of the water resources of a shared basin focused in the first instance on the rights and duties of states and 'competing water demands' referred to situations where the use of water by one state affected the use of water by another states[25]. On the one hand, the UN Watercourses convention continues this legal tradition. On the other hand, the Watercourses convention is 'progressive' when considering the statist approach, and has increasingly embraced concepts which go beyond a statist approach. It is important to note in this regard that recently concepts of 'minimum flow' and 'environmental flow' have emerged in the practice of international water law. Crucially, there is a strong argument in favour of the idea that states extraterritorial include ensuring minimum flow to secure the rights of downstream communities to drinking water and sanitation.

A core principle in the UN Watercourses Convention is the principle of equitable and reasonable utilisation, with as its ultimate objective the sustainable utilisation of the watercourse. This is in broad support of two of the three e's of the Dublin Declaration, as well as with principles 21 and 24 and recommendation 51 of the Stockholm Declaration mentioned above. Article 5 para. 1 reads as follows:

"Watercourse States shall in their respective territories utilize an international watercourse in an equitable and reasonable manner. In particular, an international watercourse shall be used and developed by watercourse States with a view to attaining optimal and sustainable utilization thereof and benefits therefrom, taking into account the interests of the watercourse States concerned, consistent with adequate protection of the watercourse"[26].

[23] United Nations (undated) *UN Watercourses Convention User's Guide Fact Sheet Series: Number 3 Groundwater Systems*. Available at: http://www.unwatercoursesconvention.org/documents/UNWC-Fact-Sheet-3-Groundwater-Systems.pdf[accessed 08-07-2016].
[24] Ibid.
[25] See Bulto, T (2014): the extraterritorial application of the human right to water. Cambridge: Cambridge University Press, pg. 18 and Boisson de Chazournes, L (2013): Fresh Water in International Law. Oxford: Oxford University Press, pg. 8
[26] United Nations General Assembly (1997): Convention on the Law of the Non-Navigational Uses of International Watercourses 1997. New York: UNGA

A second key principle anchored in the UN Watercourses convention is the obligation to avoid doing harm to another right holder: the 'do no harm' principle. Again, this builds on the Stockholm declaration and specifically on principle 21. The Watercourses Convention states that:

"Watercourse states shall, in utilizing an international watercourse in their territories, take all appropriate measures to prevent the causing of significant harm to other watercourse States."[27]

5.7 The UNECE Convention on Transboundary Watercourses and International Lakes

In 1992 the United Nations Economic Commission for Europe (UNECE) the Convention on the Protection and Use of Transboundary Watercourses and International Lakes ('Water Convention') was adopted in Helsinki, providing it with its alternative name as the 'Helsinki Convention'. The Convention entered into force in 1996, i.e., before the UN Watercourses Convention, but it is significantly different in that it is in the first instance a regional convention as it was originally only adopted by UNECE members and provided a framework for transboundary water management and protection in the European region. Although it is in the first instance a regional convention and although there is a plethora of transboundary water agreements internationally, it has extended its state party scope beyond the UNECE since 2013, opening the Convention to accession by states outside the European region, and this significantly enhances its potential to become a source for international water law[28]. In addition, the scope of the Helsinki convention is slightly larger than the UN Watercourses Convention: whereas the 1997 Watercourses Convention does not consider confined groundwater, the Helsinki convention considers all transboundary groundwater. In terms of both Conventions, states have the obligation to adhere to the 'no-harm rule' and the principle of equitable and reasonable utilization. However, the protection of water quality and water related ecosystems is covered in more detail by the Helsinki convention. The latter convention regulates point and non-point source pollution through national wastewater discharge permits and the reduction of nutrients and hazardous substances from diffuse sources respectively.

5.8 The ILA draft articles on Transboundary Aquifers

To complement the lack of consideration of (confined) groundwater in the 1997 Watercourses Convention, the ILC commenced further study on transboundary groundwater in 2003. In 2008, in its report to the United Nations General Assembly (UNGA), the ILC submitted a set of nineteen draft articles on a proposed convention on transboundary aquifers. In resolution 63/124 the UNGA recommended to the States concerned to make appropriate bilateral or regional arrangements for the management of their transboundary aquifers based on the principles contained in these draft articles, as well as to consider the elaboration of a convention on the basis of the draft articles. The Draft Articles apply to aquifers that contribute to the flow of an international watercourse (and are thus transboundary)[29]. As noted by Mechlem,

[27] Ibid, article 7

[28] See for instance UNESCO – IHP (2016): Transboundary Cooperation and the Sustainable Development Goals. Glasgow: Francesco Sindico, Strathclyde Centre for Environmental Law and Governance. See also Boisson de Chazournes (2013): Op Cit, pg. 35

[29] McIntyre, O. (2011): International Water Resources Law and the International Law Commission Draft Articles on Transboundary Aquifers: A Missed Opportunity for Cross-Fertilisation? In: *International Community Law Review*, 13, pp.237-254.

"*[the Draft Articles] are the first official instrument that codifies rules of international law for the management and protection of the world's underground freshwater resources."*[30]

The draft articles are therefore of key importance in defining the rules that apply to the use of transboundary groundwater resources. In doing so they provide a response to an obvious gap in international law, and do so for a resource that is of strategic importance in rural areas and to the majority of the world's vulnerable and marginalised groups in the water sector. Although the scope of the UN Watercourses convention includes groundwater, it does not provide sufficient attention to the specific issues pertaining to shared aquifers.

5.9 The Human Rights to Water, Sanitation and Health

Between 2000 and 2015, the international community has witnessed the emergence and recognition of a right to water for domestic and personal uses. This right has also been expressed as a (singular) right to safe and clean drinking water and sanitation, i.e. in this context sanitation and water are seen as inextricably linked and are both part and parcel of the same right[31]. In the context of water resources management, and therefore of IWRM, this has led to the emergence of a right held by individuals (as opposed to states as rights holders) which in turn has affected the principles and rules governing on the protection and management of fresh water[32]. According to the first UN Special Rapporteur on the Right to Water, *"the rights to water and sanitation... (…) ...have significant implications for how water resources and wastewater are managed*[33]". These implications are explained below.

The idea that water is a human right has been evolving in international law for some time. In fact, the human right to water made its appearance in international soft law several decades before the UN Committee on Economic Social and Cultural Rights (CESCR) released General Comment no. 15 on the right to water in 2003. In the Mar del Plata Action Plan of 1977, resolution II declared that:

"All peoples, whatever their stage of development and their social and economic conditions, have the right to have access to drinking water in quantities and of a quality equal to their basic needs."[34].

Similarly, at the International Conference on Water and the Environment, Dublin Principle no. 4 (which emphasised that water has an economic value and should be regarded as an economic good in all its competing uses) underlined that:

"Within this principle it is important to recognise first the basic right of all human beings to have access to clean water and sanitation at an affordable price."[35]

Turning to a human rights perspective on water and sanitation, the right to water and sanitation is an interpretation of, and derived from, existing rights expressed in a number of human rights treaties. Various articles in international human rights treaties have expressed rights that, taken together, have

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[30] Although it is also argued that the Genevois agreement of 1977 (revised in 2008) is the "only true treaty focusing on the management and allocation of a transboundary aquifer" (Gander 2014, p.320).

[31] On the 28th of July 2010, the United Nations General Assembly recognized water and sanitation as a human right through resolution A/64/292, declaring that it '' Recognizes the *right*to safe and clean drinking water and sanitation as a human right that is essential for the full enjoyment of life and all human rights'' Also, in September 2010, the Human Rights Council adopted a resolution (A/HRC/RES/18) declaring that it ''affirms that the human *right* to safe drinking water and sanitation is derived from the right to an adequate standard of living''.

[32] Boisson de Chazournes (2013) : Op Cit. pg. 147.

[33] OHCHR (2013): Special Rapporteur on the human right to safe drinking water and sanitation. Human rights and WASH, water resources and wastewater.Thematic consultation on water in the post 2015 development agenda. Geneva: OHCHR

[34] United Nations (1977): Mar del Plata Action Plan, Op. Cit, pg. 63

[35] International Conference on Water and the Environment (1992): The Dublin Statement on Water and Sustainable Development, Op. cit.

been deemed to amount to the recognition of the right to water for certain categories of use. The following articles of human rights treaties are of particular importance:

Article 11, paragraph 1 of the International Covenant on Economic Social and Cultural Rights (ICESCR, adopted in 1966) indicates that the signatory states:

"Recognise the right of everyone to an adequate standard of living for himself and his family, including adequate food, clothing and housing and to the continuous improvement of living conditions."[36]

The word 'including' is important in this list as it was later interpreted to include water.

Furthermore, article 12, paragraph 1 of ICESCR indicates that the signatory states recognise the right to the enjoyment of the highest attainable standard of physical and mental health:

"The States parties to the present covenant recognise the right of everyone to the enjoyment of the highest attainable standards of physical and mental health."

Articles 1 and 3 of the Universal Declaration of Human Rights (UDR) indicate the right to dignity and the right to life respectively:

"All human beings are born free and equal in dignity and rights … (…) … everyone has the right to life, liberty and the security of person."[37]

Article 14, paragraph h of the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW, adopted in 1979) indicates that rural women have the right to enjoy adequate living conditions, particularly in relation to housing, sanitation, electricity and water supply, transport and communications:

"States Parties shall take all appropriate measures to eliminate discrimination against women in rural areas … (…) … and shall ensure to such women the right … (…) … to enjoy adequate living conditions, particularly in relation to housing, sanitation, electricity and water supply, transport and communications."[38]

Article 24, paragraph 2 of the Convention on the Rights of the Child (CRC, 1989) recognises the right of the child to the enjoyment of the highest attainable standard of health and in this light emphasises that combating disease and malnutrition involves the provision of clean drinking water:

"States Parties shall take appropriate measures …. (…) … to combat disease and malnutrition, including within the framework of primary health care, through, inter alia, the application of readily available technology and through the provision of adequate nutritious foods and clean drinking-water, taking into consideration the dangers and risks of environmental pollution."[39]

Based on, amongst others,the considerations reflected above, in November 2002, the Committee on Economic Social and Cultural Rights (CESCR), which is tasked with monitoring and interpreting the International Covenant on Economic, Social and Cultural Rights (ICESCR), dedicated a so-called 'General Comment' to the right to water. General Comment no. 15, as it was referred to , provided an authoritative legal interpretation of ICESCR asserting that water is a human right. It provided some details regarding the attributes of this right as well as providing the justification for its elevation to human rights status:

''The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses. An adequate amount of safe water is necessary to

[36] OHCHR (1966): International Covenant on Economic Social and Cultural Rights, art. 11

[37] UN General Assembly (1948): The Universal Declaration of Human Rights, art. 1 and 3

[38] UN General Assembly (1980): Convention on the elimination of all forms of discrimination against women, art 14

[39] UN General Assembly (1989): Convention on the Rights of the Child

prevent death from dehydration, to reduce the risk of water-related disease and to provide for consumption, cooking, personal and domestic hygienic requirements.''[40]

This section lists the attributes of the human right to water for personal and domestic uses. For instance, 'sufficient' water could for a short period be between 20 and 25 litres per person per day for cooking purposes and personal consumption, but to additionally maintain personal and domestic hygiene the World Health Organisation recommends a minimum of 50 litres per day. In a similar manner, each adjective in the excerpt above is a criterion on which the human right is judged, and IWRM needs to ensure the enabling framework to support the realisation of this right in practice. In addition, the passage highlights the fact that the right to water stems from the right to life as well as from the right to health.

This has various consequences for IWRM regarding the allocation of water, regarding the protection of water quality, and in terms of procedural norms. Paragraph 6 makes it clear that the right to water for personal and domestic uses should receive top priority within allocation systems:

"Water is required for a range of different purposes, besides personal and domestic uses, to realise many of the Covenant rights. For instance, water is necessary to produce food (right to adequate food) and ensure environmental hygiene (right to health). Water is essential for securing livelihoods (right to gain a living by work) and enjoying certain cultural practices (right to take part in cultural life).Nevertheless, priority in the allocation of water must be given to the right to water for personal and domestic uses. Priority should also be given to the water resources required to prevent starvation and disease."[41]

Paragraph 6 thus confirms the priority accorded to water for personal and domestic uses in situations of competing water uses that was asserted at UNCED. However, it places water for food above the protection of ecosystems. On water for food specifically it states:

"The Committee notes the importance of ensuring sustainable access to water resources for agriculture to realize the right to adequate food (see General Comment No.12 (1999)). Attention should be given to ensuring that disadvantaged and marginalized farmers, including women farmers, have equitable access to water and water management systems, including sustainable rain harvesting and irrigation technology. Taking note of the duty in article 1, paragraph 2, of the Covenant, which provides that a people may not "be deprived of its means of subsistence", States parties should ensure that there is adequate access to water for subsistence farming and for securing the livelihoods of indigenous peoples."[42]

Furthermore, ecosystems protection is important from the point of view of the right to health but perhaps not as crucial as access to water and food. Winkler (2014) has proposed that even though all human rights are interrelated and interdependent, priority needs to be accorded to the 'survival level' which is necessary to prevent starvation. In this context, minimum quantities of water need to be reserved for drinking, cooking and subsistence food production as a matter of top priority[43].

[40] Committee on Economic, Social and Cultural Rights (2002): Substantive Issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights. General Comment no. 15: The Right to Water.

[41] Ibid., paragraph 6.

[42] Ibid., paragraph 7

[43] Inga Winkler (2014): The Human Right to Waster. Significance, legal status and implications for allocation. Oxford: Hart, pg 153

Turning from quantity to quality, within the framework of the human right to water, water quality is protected to ensure access to safe water for personal and domestic uses[44]. General Comment 15 refers to this in paragraphs 10 and 12:

"The right to water contains both freedoms and entitlements. The freedoms include the right to maintain access to existing water supplies necessary for the right to water, and the right to be free from interference, such as the right to be free from arbitrary disconnections or contamination of water supplies … (…) …thewater required for each personal or domestic use must be safe, therefore free from micro-organisms, chemical substances and radiological hazards that constitute a threat to a person's health"[45]

In order to achieve the freedom from contamination, states have an obligation to protect water resources from biological and chemical pollution:

"Environmental hygiene, as an aspect of the right to health under article 12,paragraph 2 (b), of the Covenant, encompasses taking steps on a non-discriminatory basis to prevent threats to health from unsafe and toxic water conditions. For example, States parties should ensure that natural water resources are protected from contamination by harmful substances and pathogenic microbes. Likewise, States parties should monitor and combat situations where aquatic eco-systems serve as a habitat for vectors of diseases wherever they pose a risk to human living environments."[46]

The protection of water quality is strongly related to the right to sanitation, which the UN Special Rapporteur has defined not only in terms of the protection of one's own health but also in terms of the protection of the health of others:

''Human rights bodies thus understand sanitation broadly to include the treatment and disposal or reuse of excreta and associated wastewater. Sanitation does not stop simply with the use of latrines or toilets, but includes the safe disposal or reuse of faeces, urine and wastewater. Such a broad understanding is warranted, as sanitation concerns not only one's own right to use a latrine or toilet, but also the rights of other people, in particular their right to health, on which there might be negative impacts.''[47]

[44] This is derived from the right to the highest attainable standard of health guaranteed in paragraph 12 of the International Covenant on Economic, Social and Cultural Rights, as mentioned above

[45] Committee on Economic, Social and Cultural Rights (2002): Substantive Issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights. General Comment no. 15: *The Right to Water*. Par 10, 12

[46] Ibid, paragraph 8

[47] United Nations General Assembly (2013-8-5): Report of the Special Rapporteur on the human right to water and sanitation to the 68th session of the UNGA, report A/68/264 on Wastewater

6. GLOSSARY OF WATER TERMS

African Development Bank (AfDB): Regional multilateral bank mobilising investment in economic development and social progress in - and providing policy advice and technical assistance to - regional member countries. This includes supporting SDG 6: ensure availability and sustainable water management for all.

African Ministerial Council on Water (AMCOW): The African Ministers' Council on Water (AMCOW) was formed in 2002 in Abuja Nigeria, primarily to promote cooperation, security, social, economic development and poverty eradication among member states through the effective management of the continent's water resources and provision of water supply services. In 2008, at the 11th ordinary session of the African Union (AU) Assembly in Sharm el-Sheikh, Heads of State and Government of the AU agreed on commitments to accelerate the achievement of water and sanitation goals in Africa and mandated AMCOW to develop and follow up an implementation strategy for these commitments.

Agricultural runoff: The runoff into surface waters of water containing herbicides, fungicides, insecticides, and nitrates and phosphates from fertilisers and animal waste.

Agricultural Water use: Water used for irrigation, stock watering, dairy operations, fish faming and other on farm water needs.

Algal bloom: A heavy growth of algae in or on a body of water, usually resulting from high nitrate and phosphate concentrations entering water bodies from farm runoff and household wastewater.

Allocation: A water allocation is the right to use a certain quantity of water for a given period

Ambient Water Quality: Natural, untreated wate that is affected by natural factors as well as by the results of human activities. In reference to pollution, it means the quality of a water body immediately upstream of a source of pollutants under normal water flow conditions.

Aquifer: An underground layer of rock or sediment that holds water

Artesian Well: A well that produces a flow of water from groundwater in a contained aquifer (trapped water) that is under pressure

Aquaculture: The cultivation of marine or freshwater fish or shellfish under controlled conditions

Base Flood: The flood that can be expected to occur at a given location once in 100 years on average under normal conditions / the flood having a 1% average probability of being equalled or exceeded at a given location.

Base Flow: The flow of streams and rivers that is sustained between precipitation events: flow that is not directly attributable to precipitation events or snowmelt.

Basin Management: The coordination of water, land and related resources in a River Basin, Watershed or Catchment.

Beneficial use (of water): Beneficial use is that amount of water that is reasonable and appropriate under reasonably efficient practices to accomplish without waste the purpose for which the water allocation was intended. Beneficial use is the basis, measure and limit of a water right

Biochemical Oxygen Demand (BOD): Also known as Biochemical Oxygen Demand. The amount of oxygen consumed by bacteria and other microorganisms while decomposing organic matter under aerobic conditions. The oxygen dissolved in water is essential to aquatic life. Human induced pollution

and natural factors can reduce oxygen levels in natural water bodies. Therefore, BOD measures environmental stresses.

Brackish Water: Water containing dissolved minerals in quantities that exceed acceptable standards for municipal, domestic or irrigation purposes

Brine: Water containing large amounts of salt, especially Sodium Chloride. Produced amongst others as a by-product / waste product of desalination of seawater

Catchment area: The area drained by a river and its tributaries

Catchment Management: The coordinated management of water, land and related resources. A form of resource management that uses whole catchments as the unit of operation. It contrasts with politically defined water management areas and forms of management that separate land management from water management.

Coliform organisms: Coliform organisms are found in the environment and in the faeces of warm-blooded animals and humans. Within the group of coliform organisms, there are faecal coliforms and E.Coli. They do not cause illness but their presence in water indicates that pathogens (disease causing organisms) could be present in the water. Therefore total coliform, faecal coliform and E.Coli are all indicators of water quality

Committee on Economic Social and Cultural Rights (CESCR): Committee of 18 independent experts who monitor the implementation of the International Covenant on Economic Social and Cultural Rights (ICESCR). In General Comment no. 15 of 2002, the CESCR concluded that the human right to water was implicit in ICESCR and that the right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses.

Conjunctive water use: The planned use and storage of surface and ground water supplies to improve water supply reliability.

Consumptive Water Use: A use of water which reduces the amount of water available for other uses, for instance water used by the vegetation growth in a particular area. The water, removed from available supplies, cannot be returned to the source.

Conventional Water: A natural water supply. Water sourced from conventional sources can be treated through conventional water treatment systems which are not generally targeted at removing chemicals but make use of coagulation, sedimentation and filtration to prepare water for use.

Demand Management: The implementation of policies, measures or reforms to optimise the use of existing water supplies. This includes controlling use, influencing demand (e.g. through pricing) and promoting efficient use (e.g. by promoting efficient technology and through awareness raising)

Depletion (Groundwater): Withdrawal of water from a groundwater source at a rate greater than the natural rate of recharge.

Desalination: A process that takes away mineral components from saline water, such as the sea or ocean, or from brackish (ground)water.

Discharge permit: A license to discharge a specified amount of a pollutant into natural water bodies or sewer system under certain conditions

Dushanbe Process: Process of international dialogue through conferences hosted by the Government of Tajikistan providing a platform for policy dialogue, partnership and action at the global, regional and national level on the 'Water Action Decade'.

Ecosystem: An ecosystem is a geographic area where plants, animals, and other organisms, as well as weather and landscapes, work together to form a biological community in its physical and chemical environment.

Effluent: Liquid entering the environment from a point source, such as a sewage treatment plant, a sewer pipe, industrial discharge, etc.

End of Pipe Solution: A pollution control approach that treats contaminated flows of water just before the effluent can enter the environment. The wastewater treatment is applied to wastewater from a production process rather than being integrated into the process itself (process integrated solutions). As a metaphor for water governance it refers to solutions that focus on the technology at the end of the production chain (taps, toilets) rather than an integrated and holistic approach.

Environmental Impact Assessment: Procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made. Typically conducted before embarking on major infrastructural works such as a dam or canal system

Eutrophication: The process by which lakes and ponds become enriched with dissolving nutrients resulting in increased growth of algae and microscopic plants

First in turn first in right: Phrase indicating that older water rights have priority over more recent rights if there is not enough water to satisfy all rights. Also known as the Prior Appropriation Doctrine

Floodplain: Area of flat land adjacent to a river which is submerged when the river floods.

Gauging station: gauging station, site on a stream, canal, lake, or reservoir where systematic observations of gauge height (water level) or discharge are obtained.

Grey Water: wastewater from clothes washing machines, showers, bathtubs, handwashing, lavatories and sinks that are not used for disposal of chemical or chemical-biological ingredients.

Groundwater: Groundwater is water that has infiltrated the ground to fill the spaces between sediments and cracks in rock. The top layer of the groundwater is referred to as the water table.

Groundwater recharge: Water added to a groundwater aquifer through the unsaturated zone of the earth after infiltration and percolation following precipitation

Hydroelectric power / hydropower: Electricity produced from generators driven by turbines that convert the potential energy of falling or fast-flowing water into mechanical energy.

Hydrosphere: Region that includes the earth's water in all its forms: liquid water, frozen water, floating ice, frozen upper layer of soil, and the small amounts of water vapor in the Earth's atmosphere.

Impoundment: A body of water such as a pond or a dam created by any transverse barrier to the flow of a river: a weir, dyke or a dam

Infiltration: The movement of water into soil or porous rock. Water flows through larger pores of rock and between through soil particles under the influence of gravity

Integrated Water Resources Management (IWRM): Process that promotes the coordinated development and management of water, land and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Interbasin Transfer: The diversion of water from one drainage basin to another drainage basin.

Leaching: Process by which soluble materials in the soil, such as salts, nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water.

Natural flow: Flow produced from a drainage area for which there have been no artificial effects caused by diversion, storage, import, export, return flow, or changes in consumptive use.

N'gor declaration: Officially the N'gor Declaration on Sanitation and Hygiene signed by Ministers and Heads of Delegations responsible for sanitation and hygiene in Africa. Signed at the 4th African Conference on Sanitation and Hygiene (AFRICASAN) in N'gor, Senegal in May 2015.

Parts Per Million / PPM: The number of "parts" by weight of a substance per million parts of water. Often refers to pollutants.

Pathogens: A bacterium, virus or other microorganism that can cause disease

Peak demand: The maximum quantity of water used in a given period such as hourly, daily or annually.

Peak flow: The maximum discharge of a river or stream during a given period, such as after a storm. Annual peak flow for instance is the maximum flow occurring during a water year

Point Source Pollution: Water pollution coming from a single point, such as an outlet pipe

Reclaimed water: Also known as water reuse or water recycling. Refers to the process of treating and/or diluting used water such as municipal or industrial wastewater such that it can be reused for a variety of purposes.

Sharm el Sheikh Declaration: Declaration by Heads of State and Government of the African Union in 2008, involving commitments towards accelerating the implementation of water and sanitation goals in Africa. This followed reports on slow progress in improving access to improved water sources and especially improved sanitation facilities within the Millennium Development Goal framework.

Sustainable Development Goal 6 (SDG6): Sustainable Development Goal 6 is to “ensure access to water and sanitation for all”. SDG 6 contains 8 different targets and 11 indicators, which are used to track progress towards the goa,l and which are monitored and reported on at country level. Contrary to Millennium Development Goal 7c, which focused on drinking water and sanitation, SDG 6 embraces the whole water cycle

Water Action Decade: Period from 2018 to 2028 dedicated to accelerating the implementation of commitments on water for sustainable development. In December 2016, the United Nations General Assembly declared the period 2018-2028 as the International Decade for Action “Water for Sustainable Development” (known as the Water Action Decade)

Water Footprint: The water footprint measures the amount of water used to produce each of the goods and services we use. It can be measured for a single process, such as growing rice, for a product, such as a pair of jeans, for the fuel we put in our car, or for an entire multi-national company.

Water use efficiency: Defined within Sustainable Development Goal 6 as a combination of the change in value added per cubic metre of water over time (indicator 6.4.1) and water stress levels, i.e. the ratio of water withdrawn for all purposes to the total renewable freshwater resources available (indicator 6.4.2)