



HAL
open science

Achieving water security in developing countries through transboundary waters management

Thomas Etitia

► **To cite this version:**

Thomas Etitia. Achieving water security in developing countries through transboundary waters management. Political science. 2010. dumas-00809206

HAL Id: dumas-00809206

<https://dumas.ccsd.cnrs.fr/dumas-00809206>

Submitted on 8 Apr 2013

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

Vous allez consulter un mémoire réalisé par un étudiant dans le cadre de sa scolarité à Sciences Po Grenoble. L'établissement ne pourra être tenu pour responsable des propos contenus dans ce travail.

Afin de respecter la législation sur le droit d'auteur, ce mémoire est diffusé sur Internet en version protégée sans les annexes. La version intégrale est uniquement disponible en intranet.



UNIVERSITÉ PIERRE MENDÈS FRANCE

Institut d'Etudes Politiques de Grenoble

**Achieving water security in developing
countries through transboundary waters
management**

Thomas ETITIA

Master spécialisé Organisations Internationales
2009-2010
Sous la direction de Stéphane Labranche

UNIVERSITÉ PIERRE MENDÈS FRANCE

Institut d'Etudes Politiques de Grenoble

**Achieving water security in developing
countries through transboundary waters
management**

Thomas ETITIA

Master spécialisé Organisations Internationales
2009-2010
Sous la direction de Stéphane Labranche

The analysis has been undertaken during the internship at UNESCO under the direction of the internship supervisor: Léna Salamé, project coordinator, and: Stéphane Labranche, thesis supervisor, Researcher and professor, IEPG

The analysis expresses the personnel opinion of its author and cannot be attributed to UNESCO where the internship took place.

Contents

Introduction	6
Chapter I Water security and cooperation on transboundary waters.....	11
A) The transboundary dimension of water security	11
1) Defining water security	11
2) Additional challenges posed by transboundary waters	15
B) The institutionalization of cooperation.....	18
1) Theoretical and practical approaches to cooperation	18
2) Constraints and benefits of cooperation on transboundary waters.....	23
Chapter II Obstacles to effective cooperation in developing countries	28
A) Multilevel asymmetries	28
1) Vulnerability to change and development asymmetries	29
2) Power asymmetries	31
B) Institutional weaknesses.....	38
1) Low economic development as a basis for institutional weakness	39
2) Understanding institutional weaknesses through the soft state theory.....	41
Chapter III Solutions for overcoming obstacles to water security	47
A) Best practices in cooperative transboundary waters management	47
1) Shared vision	47
2) Solid and flexible legal-institutional framework.....	50
3) Multilevel political commitment.....	54
B) Supporting cooperation: Track II initiatives and international agencies.....	57
1) Track II initiatives	57
2) International agencies.....	59
Conclusion.....	64

Acronyms

APEC: Asia-Pacific Economic Cooperation

ARF: ASEAN Regional Forum

ASEAN: Association of Southeast Asian Nations EAC: East Asian Community

EAC: East Africa Community

EAEG: East Asian Economic Group

EAS: East Asian Summit

ECAFE: Economic Commission for Asia and the Far East

ILA: International Law Association

IMF: International Monetary Fund

IUCN: International Union for Conservation of Nature

IWRM: Integrated Water Resources Management

OECD: Organisation for Economic Cooperation and Development

OERS: Organisation des Etats Riverains du Sénégal

OMVS: Organisation de Mise en Valeur du fleuve Sénégal

PLA: People's Liberation Army

PRIO: Peace Research Institute Oslo

(T)RBO: (Transboundary) River basin organization

SCO: Shanghai Cooperation Organization

SEATO: Southeast Asia Treaty Organization

UN: United Nations

UNDP: United Nations Development Program

UNEP: United Nations Environment Program

UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

UNESCO: United Nations Educational Scientific and Cultural Organization

UNIDO: United Nations Industrial Development Organization

USSR: Union of Soviet Socialist Republics

WWAP: World Water Assessment Programme

WHO: World Health Organization

WTO: World Trade Organization

Abstract

Water is a fundamental need for life and a prerequisite for development and the realization of a long list of human rights. The challenge of achieving water security through cooperation and peaceful development of transboundary water resources is all the more important since transboundary river basins cover about 45% of the Earth's land surface. However, developing countries still face difficulties regarding cooperation on transboundary waters. Underlining the major role played by the institutionalization of cooperation, we will argue that developing countries' poor performance regarding cooperation on transboundary waters are caused by multilevel asymmetries and institutional weaknesses. We will finally introduce possible solutions for overcoming obstacles to water security. We will insist on best practices in transboundary waters management and cooperation building.

Cooperation, transboundary waters, institutions, international organizations, developing countries

Résumé

L'eau est un besoin fondamental pour la vie est un pré-requis pour le développement et la réalisation d'une longue liste de droits de l'Homme. Le défi de la sécurité en eau à travers la coopération et le développement des ressources en eau transfrontalières est d'autant plus important que les bassins versants transfrontaliers couvrent environ 45% de la surface de la Terre. Cependant, les pays en développement continuent d'éprouver des difficultés à coopérer dans la gestion des eaux transfrontalières. En soulignant le rôle majeur joué par l'institutionnalisation de la coopération, nous soutiendrons que les faibles performances des pays en développement en matière de coopération sont causées par des asymétries multidimensionnelles et des faiblesses institutionnelles. Nous présenterons finalement des possibles solutions pour surmonter les obstacles à la sécurité en eau. Nous insisterons sur les meilleures pratiques en matière de gestion des eaux transfrontalières et de soutien aux processus de coopération.

Coopération, eaux transfrontalières, institutions, relations internationales, pays en développement

Introduction

On 28 July 2010, the United Nations General Assembly approved the water rights resolution, which recognizes access to clean and safe drinking water as an official basic human right everywhere in the world. Introduced by Bolivia, this resolution expands the Universal Declaration of Human Rights to include the right to clean water and sanitation. It received 122 votes in favor and zero votes against, while 41 countries abstained from voting, including the United States. The U.S. deputy representative to the Economic and Social Council justified this abstention by the fact that the UN Human Rights Council in Geneva is working on the issue in a better way that, contrary to this resolution, does not attempt to "take a short-cut around the serious work of formulating, articulating and upholding universal rights"¹. Nevertheless, the majority of commentators welcome this resolution, which can be considered not as a threat to the European Union-led "Geneva process" on water and sanitation, but rather as another component of that process. The objective is now to transform this new human right into reality on the ground.

Water is a fundamental need for life and development. States endeavor to ensure that their citizens have access to the required amount of water to live a decent, long and fulfilled life. Being fundamental for all aspects of life, access to water is, in fact, not only a human right but also a prerequisite for the realization of a long list of other human rights. Numerous uses are associated with water, and the challenge of providing for them is further complicated when water resources are shared by two or more countries. The simple fact that not only water, but also water pollution crosses borders shows how poor cooperation can adversely impact water security. Water security, as we will see, is a concept difficult to define as it covers many fields (energy, food, health, defense etc.) at many scales (local, national, regional and international). No matter what are the elements gathered around this concept, water security is essential for development especially since water possesses an inherent duality: it is both an essential natural resource and threat. It is a natural resource for the reasons we have

¹ WaterWiki, "UN Recognises Access to Clean Water as a Basic Human Right", 28/07/2010, http://waterwiki.net/index.php/UN_Recognises_Access_to_Clean_Water_as_a_Basic_Human_Right

mentioned and a threat as water-related disasters such as floods and cholera epidemics remind us on the fragility and instability of the ecosystems on which our lives depend. Turning water resources into an asset for development depends on the way they are managed and the relations binding stakeholders that share these resources.

The challenge of achieving water security through cooperation and peaceful development of transboundary water resources is all the more important since transboundary water bodies account for a significant part of total water resources worldwide. As well as the 276 transboundary river basins that cover about 45% of the Earth's land surface², an estimated 274 aquifers cross the borders of two or more countries³. These water bodies are essential to the life of over 3 billion people, not to mention the fact that up to 90% of the world's population lives in countries that have at least one transboundary water body. These figures leave no doubt: transboundary waters management is an essential part of global water security and it is crucial to adopt, support and spread best practices in this area.

Most of the countries that share their water resources are likely to face the same challenges: scarcity, sharing, maldistribution, over-utilization and misuse of water.⁴ Scarcity depends on geographic and climatic conditions, but also on pollution and water demand. Today, 884 million people do not use an improved source of drinking water⁵. Maldistribution is conditioned by geography and climatic fluctuations. A basin where resources are generally abundant is not necessarily a basin in which everyone has the same access to water. The issue of sharing is a problem when there is no framework defining clear rules of sharing. Over-utilization and misuse are also crucial issues, as their impact is potentially adverse for all involved, including the riparian countries.

These pressure factors do not have the same impact everywhere, but changing contexts exacerbate already difficult situations. Population growth and movements mathematically increase demand for a scarce but essential resource. Food demand follows the same trends,

² De Stefano, L., De Silva, L., Edwards P. and Wolf, A. (2009). *Updating the International Water Events Database (revised)*. Side publications series, Dialogue Paper, UNESCO WWAP, 12 p

³ Puri, S. and Aureli, A. (Eds), (2009). *Atlas of transboundary aquifers, Global maps, regional cooperation and regional inventories*. UNESCO-IHP, 328 p.

⁴ Kliot, N., Shmueli, D. and Shamir, U. (2010). "Institutions for Management of Transboundary Water Resources: Their Nature, Characteristics and Shortcomings", *Water Policy*, Vol. 3, 2001, pp. 229-255.

⁵ WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation, 2010, <http://www.wssinfo.org/>

while changes in consumer preferences and consumption patterns towards more water-intensive products such as meat amplify the pressure on water withdrawals. Not to mention that dangerous and adverse effects of climate change threaten water and other natural resources.

Nevertheless, water differs from other natural resources by the myriad of uses it provides for. Domestic consumption, agriculture and industry are the three main sectors that rely on secure and sustainable freshwater resources. Water is therefore at the heart of economic and human development and yet the increasing competition between these various uses is degrading the ecosystems on which they depend. The challenge is now to meet all these competing and often complementary needs, through equitable and sustainable means which do not threaten ecosystems.

Hence, water resources management is necessarily conflict management. They are at the roots of conflicts between competing sectors and competing owners. Transboundary water bodies have long been subject to rivalries. *Rival* and *river* have the same Latin root, both are derived from *rivus* or *stream*. Not surprisingly, the world's oldest existing international organization, the Central Commission for Navigation on the Rhine, est. 1815, was established to manage a transboundary river. The dramatic increase in the number of river basin organizations (RBOs) and treaties is another sign of the importance given to cooperation in transboundary basins. However and despite obvious progress, international law in this domain remains embryonic.

The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses is one of the noteworthy efforts made towards an enhanced legal framework on transboundary waters protection, preservation and management.⁶ However, this Convention has not been ratified yet. International law on transboundary surface waters progresses at a slow pace, and so does international law on transboundary aquifers. In 2008, the UN General Assembly adopted a Resolution on the Law of Transboundary Aquifers (A/RES/63/124) which recommends that the states concerned “make appropriate bilateral or regional arrangements for the proper management of their transboundary aquifers, taking into account

⁶ For more details see Chapter I. B) 2)

the provisions of [the] draft articles”⁷ annexed to the resolution. These provisions include cooperation to prevent, reduce and control pollution. Another longstanding example of progress in this context is the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) which focuses on the obligations of parties to protect their transboundary surface waters and groundwaters and manage them in a sound and ecological manner.

These efforts are proof that cooperation in transboundary water management is recognized as an important issue that requires clear and strong political will. Innovative policies must be implemented for all situations where stakeholders face difficulties cooperating over their shared water resources. This process cannot be successful without access to knowledge and information on best practices that have proven to be exemplary for the enhancement of peaceful and cooperative management of transboundary water bodies.

In a survey measuring degrees of cooperative or conflictive relations in the world’s transboundary river basins⁸, researchers from the Oregon State University identified 29 rivers basins at risk. All of them were shared by developing countries or, in a few cases, by one developed country and one or several developing countries. Besides, we can notice that the legal-institutional tools framing cooperation in developing countries are far less sophisticated than those set up by developed countries. For instance, there is no equivalent to the UNECE convention on transboundary watercourses in developing countries. Some cooperation experiences were ambitious and carried high expectations in terms of water security and yet, developing countries face difficulties not only to achieve their objectives but also to make the most of the available frameworks for cooperation on transboundary waters.

This paper will thus be an attempt to identify the conditions and best practices that ensure that cooperation on transboundary waters will help achieving water security in developing countries. Because developing countries have built cooperation frameworks similar to those of the developed countries and benefited from external assistance, the roots of their difficulties have to be found in the characteristics of this group of countries. Underlining

⁷ UNESCO, *UN General Assembly adopts resolution on the Law of Transboundary Aquifers*, http://www.unesco.org/water/news/transboundary_aquifers.shtml

⁸ Yoffe, S., Wolf, A. and Giordano, M. (2001). *Basin at risk: Conflict and Cooperation Over International Freshwater Resources*, Oregon State University, p. 266

the major role played by institutions of cooperation, we will argue that developing countries' poor performance regarding cooperation on transboundary waters are caused by multilevel asymmetries and institutional weaknesses.

Given the emphasis on the institutionalization of cooperation as a condition to efficient transboundary waters management, the analytical framework will give a significant place to institutionalism. Despite the fact that all the various theories related to institutionalism focus on the structures of the international system, it remains broad and gathers multiple approaches such as historical institutionalism, sociological institutionalism or the rational choice approach. Although this study will use various elements from different authors, we will essentially refer to the work of authors such as Krasner for his theory of regimes and Keohane for his work on the influence of institutions on state's behavior and his work on the expected benefits arising from cooperation.

We will start by introducing the transboundary dimension to the concept of water security by studying the multiple definitions of water security and the additional challenges posed by transboundary waters. Then, we will infer the key role of the institutionalization of cooperation (Chapter I). From this point, we will analyze the specific challenges faced by developing countries regarding cooperation on transboundary water resources and underline the impact of multilevel asymmetries and institutional weaknesses (Chapter II). The identification of these challenges and the lessons learned from past experiences will lead us to the introduction of possible solutions for overcoming obstacles to water security (Chapter III).

The scope of this study will be limited to transboundary surface waters and especially river basins in developing countries. Some river basins will regularly serve as examples and case studies. Their main characteristics (size, number of riparian countries etc.) are presented in Annex I. These river basins include the Indus, Lempa, Mekong, Nile, and Senegal basins.

Chapter I Water security and cooperation on transboundary waters

Defining the concept of water security is an interesting objective itself but it is particularly essential to the evaluation of the capacity of developing countries to efficiently cooperate on their shared water resources. We will thus discuss the various meanings associated with this term in order to come up with a base for this study. After defining the concept of water security in a transboundary perspective, we will see in this chapter that since cooperation is only one option among others, institutionalization is a necessary process to guarantee a sound and long-lasting cooperation between riparian states.

A) The transboundary dimension of water security

1) *Defining water security*

The term water security encapsulates the importance of this natural resource along with the multiple uses that need to be protected. Nevertheless, this concept remains too vague and often fails to include the transboundary dimension of water. Besides, water security is also a tool for the competing interests of various actors such as the Army, the ministry of energy, or environmentalists that will use different definitions. The concept of water security is only relevant to the specific context to which it applies. In the case of transboundary waters, it is limited to the scope of cooperation set by the riparian states. However, water, as a cross-sector resource and interdisciplinary subject, covers many interdependent aspects and water security cannot be restricted to only one specific use of the resource. Cooperation needs to take into account the multiple dimensions of water security to be really efficient.

From a strict and traditional definition of security, water security could be seen as the situation in which water infrastructures and transportation are protected from armed conflicts and intentional attacks. International law established this conception consecutively to the end of the two world wars. Indeed, the Fourth La Haye Convention (1907) and the 1925 Geneva Protocol forbade the use or the spread of toxics (La Haye Convention, article 23), gas, asphyxiating products or liquids and germ weapons (1925 Geneva Protocol). Nevertheless, these rules did not specifically refer to watercourses and it is only in 1977 that the First Additional Protocol to the Geneva Conventions of 12 August 1949 clearly stated in the article 54.2 that:

“It is prohibited to attack, destroy, remove or render useless objects indispensable to the survival of the civilian population, such as food-stuffs, agricultural areas for the production of food-stuffs, crops, livestock, 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.”⁹

Nevertheless, water security cannot be limited to a situation where water is a static national property protected from alterations caused by external intervention. Another way of defining water security would be to focus not only on the preservation of the resource but, above all, on the individual and its needs to live a decent, healthy and fulfilled life since water is a basic human need. If we refer to the World Health Organizations standards in terms of access to water, four elements must be taken into account: improved drinking water sources, improved sanitation facilities, reasonable access, and sustainable access. Improved sanitation and drinking water “are defined in terms of the types of technology and levels of services that are more likely [to be sanitary and] to provide safe water than unimproved technologies.”^{10 11} The term reasonable implies a sufficient amount of water (20l/person/day) available from a source within one kilometer of the user's dwelling. The term sustainable implies that

⁹ Additional Protocol to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977

<http://www.icrc.org/ihl.nsf/7c4d08d9b287a42141256739003c636b/f6c8b9fee14a77fdc125641e0052b079>

¹⁰ WHO, Access to improved drinking-water sources and to improved sanitation, <http://www.who.int/whosis/indicators/compendium/2008/2wst/en/>

¹¹ Improved water sources include household connections, public standpipes, boreholes, protected dug wells, protected springs, and rainwater collections. Improved sanitation includes connection to a public sewers, connection to septic systems, pour-flush latrines, simple pit latrines and ventilated improved pit latrines.

withdrawals will not threaten the level of water available and will rely on secure and continuous supply systems. In this perspective, water security could be defined as reasonable and sustainable access, by all individuals, to improved drinking water sources and sanitation facilities to live a decent, healthy and fulfilled life.

The strength of this definition comes from its simplicity and its capacity to focus on the most essential outcomes of water management: the satisfaction of individual needs. However, at greater scale water is expected to provide much more services such as food and energy production. After the Second World War, new concerns such as the protection of the environment were progressively taken into account and added to the concept of security. It is in fact the recognition of water as a multipurpose resource that extended the scope of water security. However, water is not a multipurpose resource in itself and only individuals have the capacity to transform a natural resource into a cultural good, a source of energy or even a weapon. This is one reason why scholars such as Jon Martin Trondalen link water security to the actors directly affected by the availability and use of water:

“The notion of water security in this context is linked to different actors’ need to attain control and access to water resources in order to secure their vital interest on various scales and geographical levels, seen from a strategic, political, economical, cultural, environmental and social perspective.”¹²

This definition, as complete as it can be, relies on different and possibly competing actors’ needs and lacks the “collective project” dimension. Water security should be put at the core center of development projects and thus be conceived not only as basic human need, a national property to protect or a sum of individual needs but also as a necessary condition for achieving development targets that live no one behind. The notion of target, or goal, is important since the needs of the society evolve throughout the time. The definition of water security should not be a closed list of needs but should emphasize the capacity to meet the expectations of the society in terms of development. A brainstorming session held in Bangkok on July 2009 by The United Nations Economic and Social Commission for Asia and the Pacific came out with the following definition: water security is the “capacity to deliver the

¹² Trondalen, J. M.. *Climate Changes, Water Security and Possible Remedies for the Middle East*. UNESCO-IHP, 2003. p. 32

expected outcomes from investment and management in water resources for socially inclusive, environmentally sustainable economic development”.¹³

We will use this definition as a basis for this study. It is certainly perfectible but the emphasis on “expected outcomes”, “capacity” and “development” is particularly important since the purpose of this study is to understand the difficulties faced by developing country in benefiting from the outcomes arising from cooperation on transboundary waters management.

Water security depends on the identification and understanding of the various factors that can affect its achievement. Starting from our definition, water security can be affected by weak capacities and/or important constraints related to the resource itself. Peter Lawrence, Jeremy Meigh and Caroline Sullivan from the Wallingford Center for Ecology and Hydrology (United Kingdom) developed a Water Poverty Index aimed to “express an interdisciplinary measure which links household welfare with water availability and indicates the degree to which water scarcity impacts on human populations.”¹⁴ The purpose of this index (from 0 to 100) differs from our objective but the five indicators enable to identify interesting factors that can affect water security. These indicators include: resources, access, capacity, use and environment.¹⁵ More importantly than the components of each indicator, it is their general relationship that is interesting since it expresses a more accurate and integrated vision of water-related pressures in each country. For instance, Israel and Cameroon had the same score in 2002 (54)¹⁶ for very different reasons. While Israel has the necessary adaptation capacity to overcome difficulties posed by scarce resources, Cameroon has relatively high resources but weak capacities to efficiently mobilize them.

¹³ Definition proposed by UNESCAP, IUCN and UNEP during the Brainstorming Meeting on IWRM, MDGs, and Water Security for the preparation of the State of the Environment in Asia and the Pacific Report 2010 (Bangkok, Thailand, 23 - 24 July 2009).

¹⁴ Lawrence, P., Meigh, J., Sullivan, C., *The Water Poverty Index: An International Comparison*. Keele Economics Research Papers, 2003. p. 17

¹⁵ The resources indicator combines water availability and variability. The access indicator includes access to drinking water and sanitation. The capacity indicator globally measures the degree of development taking into account the GDP per capita, the UNDP Human development index, the under-5 mortality rate and the Gini coefficient. The use indicator calculates the amount of water use for domestic, industrial and agricultural purposes respectively. Finally, the environment indicator combines several environmental indexes: water quality, water stress, regulation and management capacity, informational capacity and biodiversity.

¹⁶ World Resources Institute, *Earthtrends*, <http://earthtrends.wri.org/text/water-resources/variable-1299.html>

A Climate change vulnerability indicator could be added to this index or at least be included as a component. Indeed, some regions are likely to face radical transformations of their environmental patterns in several decades, which would significantly affect water security. The importance of climate change is even more obvious if we consider its impact on transboundary waters. Increased water scarcity, progressive asymmetry in water resources and, on the whole, visible change in water quantity and quality are likely to revive competition and conflicts. Even in more peaceful situations, existing treaties and agreements would have to be reopened and renegotiated to match the new hydrological configurations. In the context of climate change, achieving water security is more than development issue as it affects the states' capacity to deal with potential conflicts. Taking into account the transboundary dimension of water security is all the more necessary.

2) *Additional challenges posed by transboundary waters*

90% of the world's population lives in countries that have at least one transboundary water body. In most countries, water security does not depend only on national features and capacity but also on the degree of cooperation and good neighboring with other countries. Unintentional or intentional mismanagement of water resources in one country can affect another one in three main ways. First, water quality can be altered if industrial, agricultural or domestic wastewaters are not sufficiently treated. Second, water quantity can be affected by increasing demand in one country but also by derivations systems aimed to supply water to regions facing water scarcity issues. The Aral Sea states faced both problems in dramatic proportions. Soviet authorities wanted to turn Central Asia into a major cotton producer. Because of the gigantic withdrawals and transfers, the Aral Sea lost 90% of its volume and salinization jumped from 1 to 100g/l (compared to an average of 35g/l for sea water). Overuse of pesticides and industrial activities led to an ecological catastrophe. Third, transboundary risks also include accidents such as flashfloods caused by releases of water from dams for instance. Such event happened on September 2009 when North Korea unleashed walls of water from one or more of its dams sweeping away six South Koreans. Intentional or not, this accident could have been avoided with communication and closer collaboration. This event reminded South Korean 1986 water panic when it was discovered that North Korea was building a massive dam upstream on the Han River. South Korea feared that a sudden release of water could submerge part of Seoul, and consequently built a counter-dam downstream.

This shows that water security is also a question of uncertainty when it comes to transboundary waters. In absence of clear rules of sharing, close collaboration and general peaceful relations, downstream countries are at the mercy of upstream countries. This uncertainty often fuels conflictive relations.

Uncertainty and more generally the fact that different actors have incompatible, competing, or conflicting needs, values or interests often create conflicts with varying intensity from verbal and moderate hostility to war. During conflicts water can be a strategic goal (securing water supply for instance), a strategic target (seizure of the enemy's resources) or even a tool (intentional flashfloods or drought for instance). Besides, water can also be the roots of conflicts or the roots of vulnerabilities that lead to conflicts

Several scholars have tried to establish direct links between renewable resources scarcity and conflicts. Thomas F. Homer-Dixon conceptualized this relation using three factors of renewable resources scarcity: *environmental change*, *population growth* and *unequal resources distribution*. He described *environmental change* as "a human-induced decline in the quantity or quality of a renewable resource that occurs faster than it is renewed by natural processes."¹⁷ With these three pillars he built an *environmental scarcity model* and established 6 categories of changes that could lead to conflicts. The rarefaction and pollution of freshwater resources is one of them and is determined by three variables: increased demand (population growth and activities by sectors), decrease of supply (overutilization or degradation) and structural rarefaction (unequal distribution and access restrictions). His model established a causal relation between environmental scarcity and violent conflict. Other researches came to the same conclusion and the International Peace Research Institute, Oslo (PRIO) even showed that a river shared across rather than along a border appears to be the form of shared river most frequently associated with conflict.¹⁸ These studies along with increased coverage of tensions over water resources in water-scarce regions such as the Middle-East have developed greater concern about the possibilities of "water wars". At the 2004 World Water Week conference in Stockholm, William Mitsch, professor of natural resources at Ohio State University, stated that "we have had oil wars... Water wars are possible."¹⁹

¹⁷ Homer-Dixon, T. (1994). "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security*, vol. 19, no. 1 (Summer 1994), pp. 5 - 40.

¹⁸ Gleditsch, Nils Petter; Kathryn Furlong, Håvard Hegre et al. (2006). "Conflicts over Shared Rivers: Resource Wars or Fuzzy Boundaries?", *Political Geography* 25(4): 361-382.

¹⁹ Ibid.

Nevertheless, no water war has been observed in modern times and, on the whole, cooperation over water resources exceed from far conflicts.²⁰ If environmental degradations or changes are constitutive elements of disagreements, they rarely are the central causes of armed conflicts since they are linked to other non-environmental issues. Water is obviously an issue for Israel and its neighbors that can explain, for instance, the occupation of the Golan Heights from which originates the Jordan River, but this historical conflict cannot be reduced to a water allocation issue.

In fact, water resources are abundant enough for the world population. Shortages are explained by the inadequacy between current needs and supply. More than an absolute physical constraint, the water issue is above all a political and economic issue. Meeting the world population needs, avoiding conflicts and achieving water security require to change the patterns of supply and consumption and to find solutions to efficiently and peacefully cooperate on shared water resources. In fact, cooperation is *itself* an additional challenge posed by transboundary waters but remains a significant part of the solution.

²⁰ Oregon State University, Transboundary Freshwater Dispute Database, <http://www.transboundarywaters.orst.edu/database/>

B) The institutionalization of cooperation

1) *Theoretical and practical approaches to cooperation*

a) *Theoretical approaches to cooperation*

Many theories in domains as various as political science and economics have been applied to cooperation issues. Some of them are of great interest in the context of transboundary waters. On the whole, we can differentiate theories based on methodological individualism and theories that emphasize the influence of frames.

The *neoclassical economics* based on methodological individualism explains that, cooperation is likely to be chosen if the agent considers that cooperation increases its utility. In other words, the agent will be willing to cooperate if it considers that its relative satisfaction will be higher in a cooperative configuration than in a non-cooperative configuration. Thus, in this theory, cooperation depends on the result of the cost-benefit analysis made by the agents. The conjunction of various self-interests results in cooperation, a collective value added. This mechanism coined by Adam Smith in 1759²¹ was described by Milton Friedman, leading figure of the Chicago school of economics (neoclassical school of thought), as “the possibility of cooperation without coercion.”²² The logic behind this approach is market-driven. The supply and demand of cooperation is determined by the “price” of cooperation, which could be, for instance, the degree of sovereignty that is abandoned.

Following the same logic, the forces behind this market of cooperation can be explained by the *game theory* that attempts to mathematically predict the outcome (equilibrium) of bilateral or multilateral negotiations. During these negotiations, the negative or positive results of the choices made by one agent depend on the schemes and strategies developed by others agents. As illustrated in the famous example of the prisoner’s dilemma²³, agents may choose not to cooperate even if it is the best solution for all of them. One concrete

²¹ Smith, A. (1759), *The Theory of Moral Sentiments*

²² Library of Economics and Liberty,

<http://www.econlib.org/library/Essays/rdPnc10.html#Introduction,%20by%20Milton%20Friedman>

²³ Framed by Merrill Flood and Melvin Dresher in 1950 and formalized later by Albert W. Tucker, this example of game theory is explained in the following page: <http://plato.stanford.edu/entries/prisoner-dilemma/>

example is the Han River basin shared between North Korea and South Korea. This major basin is vital for both countries and cooperation seems advantageous but for several reasons, especially political reasons, the two Koreas have not implemented any cooperation process.

If methodological individualism remains the basis, theorists who adhere to the neoclassical school of thought do not reject rules that frame individual strategies. Ronald Coase explains that a system of rules, based on property rights, that legitimates and guarantees individual initiative can succeed in dealing with positive or negative externalities resulting from the utilization of a resource. Originally, Coase applied his ideas to the social cost of economic activities, such as pollution or resettlement of populations. In the case of transboundary waters, the definition of property rights or utilization rights enables agents, acting in the framework of a market of rights or in direct negotiation, to produce an efficient solution. In this analysis, states are owners of the river or of its related resources and bargain their rights when negotiating treaties or conventions. For instance, a dam built in Laos on the Mekong River continuously supplies nearly 80 percent of its energy to Thailand against royalties paid by the latter. In the same way, Lesotho authorizes South Africa to use a significant part of the Orange River flow for its territory. This approach, however, still gives a preeminent role to the agent's independent and rational choices.

It is therefore interesting to look at the frames that condition the agent choices and, eventually, the recourse to cooperation. To that purpose, the regime theory is particularly enlightening. A regime is defined by Stephen D. Krasner as a set of explicit or implicit "principles, norms, rules, and decision making procedures around which actor expectations converge in a given issue-area."²⁴ By definition, regimes are spaces of cooperation and it is important to underline that regimes are in fact sets of constraints framing the states' behavior that these states accept and define themselves. An institution can be considered as a regime if it respects the conditions mentioned above. Krasner's work influenced greatly neoliberal institutionalism founded by Joseph Nye and Robert Keohane²⁵. The latter explains that as interdependence grows, states are more likely to cooperate within institutions since they provide four main advantages: they reduce transaction costs (for the adoption of treaties for instance), they favor transparency and trust, they provide adequate instruments for resolving

²⁴ Krasner, S. (1982). "Structural Causes and Regime Consequences: Regimes as Intervening Variables." *International Organization* 36/2 (Spring).

²⁵ Keohane, R. and Nye, J., *Power and Interdependence: World Politics in Transition* (Little, Brown, 1977)

conflicts, and they facilitate compromises and decision making processes. The Mekong River Commission (MRC) worked as such and framed the processes that led to the adoption of several treaties that regulate today the use of the Mekong River.

This approach can be completed with inputs from the constructivist theory of international relation. Constructivists underline that the neoliberal approach to cooperation maintain the state as a static actor that impulses change or react to change but that is not altered in itself. In other words, the context affects its acts but does not affect its identity. As Jennifer Sterling-Folker mentioned: “Neoliberal institutionalism attempts to hold identity constant and treat interests as exogenously-given. States are assumed to be self-interested actors seeking to maximize their utility functions which are theoretically designated prior to the strategic interaction and behavior under inquiry.”²⁶ Thus, Keohane’s approach does not contradict methodological individualism as defined by neoclassical economists. Indeed, Robert Keohane specified that among the “advanced market-economy countries” one can assume the “existence of mutual interests as givens”.²⁷ On the contrary, constructivists argue that identity and interests are socially constructed through ongoing processes of social practice and interaction. In this perspective, norms along with the others elements that constitute regimes are not only creations of states that regulate their behavior but also “collective understandings” that modify actors’ identity and interests. States and the elements of international regimes are interacting and are mutually constituted. Thus, institutions are not only tools that frame cooperation since they also participate in the modification of states’ behavior.

For that matter, institutions along with regimes should not be confused with physical organizations. Custom for instance, can also be an institution. Thus, Elinor Ostrom worked on the role played by custom in managing scarce resources. Contrary to Garrett Hardin²⁸ who, in “The Tragedy of the Commons”, argues that without private property systems scarce resources are wasted, she defends the idea that such resources can be efficiently managed in a collective framework. According to her, local know-how transmitted by the custom produces

²⁶ Sterling-Folker, J. (2002). *Theories of International Cooperation and the Primacy of Anarchy Explaining U.S. International Monetary Policy-Making After Bretton Woods*, SUNY series in global politics, p. 320

²⁷ Cit. in Sterling-Folker, J. (2002). *Theories of International Cooperation and the Primacy of Anarchy Explaining U.S. International Monetary Policy-Making After Bretton Woods*, SUNY series in global politics, p. 320

²⁸ Hardin, G. (1968). “The Tragedy of the Commons”. *Science*, 162, 1243-1248.

satisfactory results. Elinor Ostrom recommends self-government as a local governance model in opposition to the private appropriation (market) and to the state intervention. Nevertheless, this approach is hardly applicable to transboundary river basins, especially the big ones. Regional water culture and know-how cannot be reduced to local water culture that varies from place to place. It seems more appropriate to rely on basin-wide institutions involving as many stakeholders as possible from various backgrounds.

To conclude, methodological individualism and the influence of frames should not be opposed one to another. States and other stakeholders decide to build institutions and regimes and influence the way they will evolve according to their objectives and preferences. At the same time, their behavior is influenced by the rules, norms and principles that frame those regimes and institutions. The two prisoners of the prisoner dilemma's gives us a perfect example as their "rational" decisions actually depend on specific "rules" such as the fact that they cannot communicate with each other and the that fact that their options are imposed by the policemen. We must bear in mind this mechanism to understand the role played by institutions in transboundary waters management.

b) Doctrinal and legal bases to states' practices

Several transboundary waters-related doctrines served as a basis for practical cooperation and in some cases for international law. Nurit Kliot, Deborah Shmucli and Uri Shamir²⁹ emphasized the role played by five of these doctrinal bases.

The *Harmon Doctrine* of Absolute Sovereignty is at the lowest extremity of the cooperation scale. It claims the absolute freedom of a riparian state to utilize the waters flowing through its territory. In other words, the upstream country cannot be held responsible for the potential collateral damages caused by the utilization of a transboundary river on the downstream part of the river. Defined in 1896 by an American Attorney General, this doctrine was aimed at preventing Mexico from using the Rio Grande's waters.

²⁹ Kliot, N., Shmucli, D. and Shamir, U., "Institutions for Management of Transboundary Water Resources: Their Nature, Characteristics and Shortcomings", *Water Policy*, Vol. 3, 2001, pp. 229-255.

At the highest extremity of the cooperation scale is the *Doctrine of Absolute Riverian Integrity*, which stipulates that “a state may not alter the natural flow of waters passing through its territory in any manner which will affect the water in another state, be it upstream or downstream.”³⁰ The obvious constraints posed by such a doctrine limit its use in international law and multilateral cooperation.

The Doctrine of the Communalilty of International Waters transcends the other approaches by conceiving the entire river basin as a single geographic and economic unit instead of a sum of various national territories. It “assumes a communalilty or riparian communalism of interest between or among basin states, and treats the total volume of basin water as a shared resource”³¹ and constitutes somehow the extension of the *Doctrine of Absolute Riverian Integrity*.

The Doctrine of Limited Territorial Sovereignty could be seen as an alternative to the previous doctrines despite its vagueness that allows multiples interpretations. The idea behind the doctrine is to limit the externalities resulting from the use of transboundary waters. It refers to the current principle of “equitable utilization”, which is put at the center of several treaties and agreements. Hence, this doctrine can be conceived as a practical tool for cooperation and is in fact the one that prevails in international law.

For that matter, despite continuous progresses, international law of non-maritime transboundary waters remains quite weak. We have seen that up to the 1977 First Additional Protocol to the Geneva Conventions, this issue was dealt with from a security perspective. The 1992 UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention) was an important step³² but was limited to the European region. In 2003, however, the Water Convention was amended to allow accession by countries outside the UNECE region, thus inviting the rest of the world to use the Convention’s legal framework and to benefit from its experience.

³⁰ Ibid.

³¹ Ibid.

³² The Convention creates obligations for its parties to prevent, control and reduce water pollution from point and non-point sources. It also provides for coordination and information among states sharing the same resource, and with the public.

The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses³³ constitutes, in fact, the first significant step towards the construction of an international law of transboundary waters. It is also a clear rejection of the Harmon doctrine thanks to three articles in particular. Article 5 affirms the concept of 'Equitable and reasonable utilization' of the resource. Article 7 affirms the 'Obligation not to cause significant harm'. Finally, Article 8 affirms the 'General obligation to cooperate'. The General Assembly approved the document by 103 votes against 3. Nevertheless, this Convention has not been ratified yet.

China was one of the three states that voted against the Convention and justified its vote claiming the sovereignty over watercourses which flow through one's territory and the imbalance between the rights and obligations of the upstream and downstream states. This line of argument does not really differ from the Harmon doctrine mentioned earlier. Nevertheless, the numerous treaties and other proofs of cooperation by China and other countries tend to confirm the relative inadequacy and abandonment of this doctrine in international relations. In fact, we can even talk about a global process of institutionalization of cooperation. The number of treaties and river basin organizations (RBOs) shows this process even in developing countries. An estimated 450 treaties were signed between 1820 and 2007³⁴ with a clear growth after the Second World War. RBOs multiplied the last years, showing the acceleration of the institutionalization of cooperation with for instance an estimated 23 organizations of this type established in the Asia-Pacific region.³⁵

2) Constraints and benefits of cooperation on transboundary waters

The institutionalization of cooperation progresses at a slow pace that can be explained by the fact that states do not always see cooperation as the easiest way to deal with transboundary waters since it requires agreeing on several rules and principles framing the joint management of the resources. It also induces costs, especially in terms of national sovereignty, which explain the reluctance of states to opt for this form of political action to achieve water security. And yet, institutions of cooperation have several advantages that balance these constraints.

³³ United Nations, http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf

³⁴ Oregon State University, *Transboundary Freshwater Dispute Database*, <http://www.transboundarywaters.orst.edu/database/>

³⁵ *Ibid.*

a) *The constraints of cooperation*

Cooperation is only one of the various options left to states in the management of transboundary resources. States are likely not to choose cooperation as the first option since it constitutes an important constraint: it affects their sovereignty. Sovereignty, which could be roughly defined as the “supreme authority within a territory”³⁶ induces a theoretical complete control on the decision-making process. Sovereignty is the most important attribute of states and the respect of this attribute is often, if not always, a precondition to any form of international cooperation. According to Article 2 of the Charter, the UN and its members are to pursue its purposes according to certain principles, including sovereignty, which is the first of these principles: “1. The Organization is based on the principle of the sovereign equality of all its Members.”³⁷ National sovereignty and its translation, the principle of non-interference, underpin the entire inter-state system and can be found in countless agreements on transboundary water management. For instance, Article 4 of the Mekong River Basin Agreement states that the parties agree “To cooperate on the basis of sovereign equality and territorial integrity in the utilization and protection of the water resources of the Mekong River Basin.”³⁸ Even minor impacts on sovereignty are a cost that cooperation needs to compensate. In addition, cooperation induces the definition of objectives, scopes and means, which all necessitate the convergence and adaptation of national preferences to achieve common water security.

In the context of transboundary waters, the definition of common objectives relies on the recognition of interdependences and more precisely *perceived* interdependence rather than *actual* interdependence. In other words, what matters is the common agenda on which states can agree on, especially since water security relies on the perception that the expectations of the society in terms of water resources management are met. Actual weaknesses and difficulties that cooperation can help overcoming are not always sufficient to move states away from unilateralism. For instance, the position as an upstream or downstream country is not necessarily relevant to determine whether a country will be eager or not to cooperate through river basin organizations and treaties. Myanmar is a downstream country in both the Mekong and Irrawaddy river basins. Nevertheless, it is not party to any treaty or basin

³⁶ Stanford Encyclopedia of philosophy, *Sovereignty*, <http://plato.stanford.edu/entries/sovereignty/>

³⁷ United Nations, Charter of the United Nations, <http://www.un.org/en/documents/charter/index.shtml>

³⁸ Mekong River Commission, Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, http://www.mrcmekong.org/agreement_95/agreement_95.htm

organization. At the contrary, India got involved in many treaties and organizations with its downstream neighbors. Furthermore, it should be underlined that a country that is upstream of another country in one basin is often downstream of that (or a third) country in another basin. Thus, only few countries can benefit from an absolute dominant position. Broadly, three types of non-exclusive objectives can fuel the need for cooperation: preventing conflicts, managing constraints, sharing benefits. Obviously, objectives can change throughout the time, from energy independence to preservation of the environment for instance.

The scope of cooperation refers to the object of cooperation but also to the actors involved. Considering the river basin as one unit seems to be the most appropriate approach to cooperation on surface waters. Indeed, river basins are coherent hydrological entities and that explain why several countries such as Brazil established the river basin as territorial division of water management. The selection of actors is important but can also be a major constraint. Conflictive relations among riparian states or unstable countries can negatively affect the efficiency of cooperation. For instance, the internal turmoil in Cambodia that followed the seizure of power by the Khmer Rouge led to the pause of the Mekong Committee activities between 1976 and 1978.

Finally the issue of the means can also be a constraint as it determines the level of commitment of each riparian state. The nature of the structure of cooperation (integrative, coordinative), the rules defining the decision-making processes, the level of autonomy of national representatives, the financial contribution and so on, are all likely to affect the margins left to states in the management of the water resources and can consequently lead to disagreements.

b) The benefits of cooperation institutions

Despite all these constraints cooperation prevails over direct conflicts as cooperation institutions provide clear advantages. To be clear on the definition of “cooperation institutions”, we agree with Guy Meublât on the following definition of such an institution as “a ‘frame’, ‘structure’, ‘organization’, a set of ‘rules’ or ‘norms’ (inherited or constructed) that *condition* up to a certain degree the agents’ choices and induces behaviors (trust, conformism, imitation, routine, etc.), which reinforce the stability of the institution.”³⁹ As we

³⁹ Meublât, G. (2001). “De la gestion des fleuves internationaux en Afrique et du bassin du Sénégal en particulier”, *Revue Tiers Monde*, 2001. Number 166, pp. 427-453

have seen earlier, states, or other authorities, accept the constraints of institutions only if they can gain from cooperation. In the context of transboundary waters management, the establishment of rules of sharing, joint monitoring programs, conflict resolution mechanisms, common investments and other advantages reduce uncertainty, which is one of the key aspects of water insecurity. Cooperation institutions also enable to implement projects that could not have been implemented unilaterally and facilitate decision making processes by providing room for negotiation. As a result, institutions strengthen cooperation and water security. If we take the example of the prisoner's dilemma, institutional mechanisms consist in repeating this "game" throughout the time with the same actors. Knowing the rules and the consequences of their acts the prisoners would have to build trust and take into account their reputation to have a chance to obtain what they want from the other. Learning from past experiences, they would be more likely to cooperate.

There is a need to institutionalize cooperation to nourish a certain form of political socialization. By getting used to cooperate, states, and other stakeholders, get used to perceive cooperation as a standard tool for political action. This socialization is based on the maintenance of institutional memory of cooperation initiatives that have proven to be useful but, above all, have defined a scheme, a pattern of political action. Political scientists such as Paul Pierson showed how decision-making often emerges from a "path dependency". In other words, considering that agents are never fully rational, decisions from the past, and the context in which they were made, influence the way decisions are made in the present. This phenomenon has negative aspects, especially since it makes difficult to adapt decisions and decision-making processes to new contexts and environments. Nevertheless, cooperation institutions reinforce methods of intervention on transboundary waters management that favor cooperation rather than conflicts or unilateral decisions. Hence, one key advantage of cooperation institutions is that they are "institutionalizing institutions". They strengthen themselves through the emissions of new rules and norms and the progressive extension of their scope. They eventually become standard tools for dealing with transboundary waters issues.

Consequently, once riparian countries initiate the process of cooperation, it takes root. One exemplary case is the Mekong River Commission. Born in 1957 as an intergovernmental agency aimed at assessing and evaluating water resources, it managed to survive the increasing economic divides and, above all, the turmoil of the Cold War. Its four member

countries, Cambodia, Laos, Thailand and Vietnam belonged to opposed blocks and even fight each other but this situation never completely prevented the organization from functioning, even during the defection of Cambodia between 1976 and 1978, which no longer participated in the organization's activities. Today, the Mekong River Commission is one of the most successful examples of cooperation on transboundary water resources in the developing world.

Institutionalizing cooperation is obviously part of the solution for achieving water security in developing countries but cooperation, and the institutions supposed to frame it, remain weak in the developing world. Even good institutions on the paper do not guarantee effective cooperation on the ground. As the water crisis increasingly threatens numerous countries it is all the more necessary to determine the obstacles inherent to developing countries that prevent them from building strong and efficient cooperation institutions.

Chapter II Obstacles to effective cooperation in developing countries

Institutions aimed at framing cooperation exist in most river basins and yet results are often disappointing in terms of water security. It turns out that not only developing countries often fail to build strong cooperation but also face difficulties in delivering the expected outcomes from their collaboration. These two fundamental issues can be explained respectively by multilevel asymmetries and by institutional weaknesses. We will deal with these issues using case studies from The Mekong, Nile, Lempa and Senegal River basins.⁴⁰

A) Multilevel asymmetries

We have seen that regimes could play a major role in fostering cooperation on transboundary waters and in facilitating the convergence of actors' interests and policies in compliance with the regime. Intuitively, one can assume that the construction of regimes is easier if states are similar. Peter Haas⁴¹ showed that states with different political structures could gather to build a regime. He emphasized the case of the Mediterranean Action Plan against sea pollution that gathered states such as Tunisia, Italy, Syria or Israel. However, Peter Haas explains that the main obstacles to cooperation are economic asymmetry and political antipathy. It appears that developing countries are particularly affected by multilevel asymmetries and are very sensitive to changing environments that tend to increase political antipathy.

⁴⁰ See Annex I

⁴¹ Haas, P. (1989). "Do Regimes Matter? Epistemic Communities and Mediterranean Pollution", *International Organization*. Vol. 43. No. 3. The MIT Press Summer, 1989. pp. 377-403.

1) *Vulnerability to change and development asymmetries*

Some aspects of cooperation on transboundary waters managements rely on the establishment of clear rules and measures in order to achieve objectives such as ensuring equal sharing of the river flow, monitoring pollution with precise standards, supplying regular amount of hydropower to riparian countries and so on. These precise measures can be of great interest for cooperation as they reduce the possibilities for diverging interpretations that could lead to conflicts. Nevertheless, measures and rules that used to be satisfactory for all the actors can become obsolete because of changing environments. In 1959, Egypt and Sudan signed the Nile Waters Agreement that divided all the Nile waters between them. Calculated on the basis of an assumed annual average discharge as measured at Aswan (south of Egypt) of 84 billion cubic meters, the agreement guaranteed 55.5 billion cubic meters to Egypt and 18.5 billion cubic meters to Sudan. At that time, it enabled to avoid conflicts between the two countries and did not affect upstream countries, which had limited water needs owing their low level of development. However, the situation has changed and what used to be a harmless agreement is now a bone of contention. Indeed, developing countries often have in common a low degree of industrialization and medium to low standards of living. Therefore, those engaged in a development process face increasing energy and water needs to support industrialization and more consuming standards of living. On the contrary, developed countries are already equipped and some of them tend to limit the expense of their needs thanks to more efficient techniques but also because of a relative deindustrialization. In addition, developing countries and especially the poorest, have to deal with high population growth and urbanization. Ethiopia is exemplary case in the Nile River basin. Compared to an annual rate of growth of 2.6% for the total population between 2000 and 2008 (1.18% for the world population⁴²), the urban population in Ethiopia over the same period has been growing at a rate of 4.2% per annum⁴³.

Climate change must also be taken into account as an important factor of change in developing countries, especially since organizations like the World Bank announced that “Climate change is expected to hit developing countries the hardest”⁴⁴ and one of its worst

⁴² U.S. Census Bureau, <http://www.census.gov/ipc/www/idb/region.php>

⁴³ UNICEF, http://www.unicef.org/infobycountry/ethiopia_statistics.html

⁴⁴ World Bank, <http://beta.worldbank.org/climatechange/overview>

negative effect will be on water. In a 2004 report, OECD⁴⁵ drew a particularly worrying picture of the effects of climate change on Egypt. It underlines that:

“Given that Egypt’s population, land-use and agriculture, as well as its economic activity are all constrained along a narrow T-shaped strip of land along the Nile and the deltaic coast, it is extremely vulnerable to any adverse impacts on its coastal zones and water availability from the Nile.”⁴⁶

The combination of sea level rise (and consequently salinization), potential decrease of precipitations and evaporation due to higher temperature, Egypt is likely to be “water scarce” (less than 1000 cubic meter per capita) by 2025⁴⁷. Needless to say that with such changes, pressure on water resources will skyrocket and might make unbearable previous agreements on water distribution. This is what is happening in the Nile River basin with countries such as Ethiopia, which contest the legitimacy of the 1959 Nile Waters Agreement that Egypt considers as an “acquired right”. Changing contexts affect particularly developing countries and are conflictive forces rather than cooperative ones.

Besides, the various speeds of development and the various effects of climate change can create significant socio-economic asymmetries between riparian countries, which will affect the similitude of their needs. In other words, if riparian countries evolve in different contexts, they will have different needs and goals that will be likely to reduce the potential for cooperation. In the Mekong River basin, the Chinese initiatives worry downstream countries and especially Cambodia. The Mekong River flows through the Yunnan Province that central authorities consider as the gate to South-East Asia. Water-related investments in the Yunnan Province seek to achieve two main objectives: control the river flow (to prevent floods, develop the agricultural and hydroelectric potential) and make the Mekong navigable to favor trade and tourism. In order to achieve its objectives and to provide the necessary resources to a booming economy, China has already completed four of a cascade of eight dams. Cambodia has not achieved such level of development and remains highly dependent on its rich fisheries

⁴⁵ OECD, *Development and Climate Change in Egypt: Focus on Coastal Resources and the Nile*, <http://www.oecd.org/dataoecd/57/4/33330510.pdf>

⁴⁶ Ibid.

⁴⁷ Nicol, A. (2003). *The Nile: Moving Beyond Cooperation*. UNESCO-IHP, 2003. p. 33.

that rely on the complex interaction between the Tonlé Sap Lake and the Mekong River⁴⁸. Therefore, China sees the Mekong River management from an economic development perspective whereas Cambodia focuses on resources conservation. As we will see in the next section, power asymmetries are the main obstacle to cooperation in the Mekong basin but this socio-economic asymmetry is an additional challenge that weakens cooperation between China and its downstream neighbors.

Being particularly affected by changing environments and socio-economic asymmetries, developing countries face difficulties to establish solid grounds for cooperation and shared visions. Uncertainty and opposite needs reinforce self-centred behaviours and tend to weaken institutions and other attempts to frame cooperation. Another problem is that socio-economic asymmetry not only result in conflicting needs but also in different levels of power and influence that might threaten peaceful cooperation and fair transboundary waters management.

2) ***Power asymmetries***

Economic capacities are one of the major tools of power and power obviously matters when it comes to international cooperation. In itself, the notion of power remains difficult to define. Robert Dahl offers what he calls an “intuitive idea of power” according to which “A has power over B to the extent that he can get B to do something that B would not otherwise do”⁴⁹. This simple definition of power does not provide the “elements” that allow to measure it; elements that we can intuitively think about such as military power, economic resources, technology and so on. Besides, the relevance of the elements that constitute the source of power varies from area to area. During negotiations on transboundary waters, important energy capacities could be seen as a disadvantage since they increase the dependence on hydropower and therefore the state would be more likely to make concessions to preserve its source of energy. Besides, climate change and peak oil are redefining the energy issue and thus confirm that sources of power cannot be taken for granted. Hence, it is important to take

⁴⁸ For most of the year the lake is fairly small but during the monsoon season the Tonlé Sap River, which connects the lake with the Mekong River, reverses its flow. Water is pushed up from the Mekong into the lake, increasing its area and flooding nearby fields and forests. The floodplain provides a perfect breeding ground for fish.

⁴⁹ Dahl, R. (1957); “The Concept of Power”, *Behavioral Science*, 2:3 (1957:July), p. 201

into account the sources of power applied to a particular context but also the “bargaining power”, which is linked to the use of context to elaborate strategies and tactics in order to balance the power asymmetries. What we will call power asymmetries are the asymmetries based on unequal capacities of the riparian states to mobilize various resources to significantly affect the behavior of other riparian states.

When it comes to transboundary waters, geographical position is crucial. Upstream countries are responsible for the negative consequences of the utilization of water resources on their environment whereas downstream countries have to undergo these consequences. Being a downstream country can be a handicap especially if the water dependency ratio is high.⁵⁰ Because of its high dependence on the Mekong basin, Cambodia’s water dependency ratio is up to 75%⁵¹. China, country from which the Mekong River originates, is almost water independent with a ratio comprised between 0 and 1 percent. The four Lower Mekong countries (Laos, Thailand, Cambodia, and Vietnam) are relatively interdependent and each is an upstream and downstream country in the basin. This situation favors cooperation as none of these countries can take the risk of implementing unilateralist policies. On the contrary, China has an absolute upstream position in this region. However, acting unilaterally is politically risky and China’s participation in the Mekong basin is on the rise. In June 2010, China invited government officials from the four Lower Mekong countries of Cambodia, Laos, Thailand and Vietnam to visit the new Xiaowan dam and the older Jinghong dam, which are parts of the dam cascade that China intends to create in the Upper Mekong. This tour is one of the recent initiatives conducted by the Chinese authorities to prove their recent shift towards more concern about regional issues and towards more openness. The building of previous dams was highly criticized by the four Southeast Asian countries and by grassroots organizations, which feared that these installations could modify the ecosystem of a river basin where 86 million people live⁵². The position of China as an upstream country facing a water crisis⁵³ explains its relative unilateralist behavior but even when it comes to a resource as vital as water, countries can hardly afford to ignore the consequences of their acts on their neighbors. However, despite recent changes, China prefers to use bilateral negotiations and

⁵⁰ Percent of total renewable water resources originating outside the country

⁵¹ FAO, Aquastat, <http://www.fao.org/nr/water/aquastat/>

⁵² Unver, O., Salamé, L. and Etitia T. (2010). “Best Practices in Transboundary Waters Resources Management”, *Ingeniería y territorio*, N° 91, (forthcoming)

⁵³ According to the World Bank, with only 2124 m³ per capita per year, the water volume in China is one fourth of the world average. More than half of China’s 660 cities suffer from water shortages, affecting 160 million people.

case-by-case approaches that avoid institutionalizing cooperation. This choice also allows China to keep defining the rules and forms of cooperation. China can afford such freedom of choice thanks to its military, economic and political supremacy in the region. Marwa Daoudi underlines that “the confrontation of diverging interests tends to a bigger conflict potential if the downstream riparian is militarily more powerful than the one which controls upstream waters”. In the opposite case, like in the Mekong basin, the conflict potential is moderate. The geographical position is therefore a clear advantage but it does not guarantee an absolute advantage on its own.

In the Nile River Basin, the most powerful of the nine riparian countries is a downstream country, more precisely, it is the one situated at the end of the watercourse. Egypt’s geographical disadvantage is “overcompensated” by a multidimensional asymmetry. Egypt is from far the first economic power with a greater GDP than those of the nine other riparian countries added together⁵⁴. It is also the second largest economy in the Arab world after Saudi Arabia⁵⁵. This economic power gives Egypt the possibility to conduct large investments in its territory but also to use “carrot and stick” policies to obtain what it wants from other countries. Egypt is also a regional military power with defense expenditures that are a bit less than twice as much higher than Sudanese expenditures, the second largest defense spending in the basin⁵⁶. Its rich history also favored its position as a cultural and intellectual leader, not to mention its political leadership gained after its involvement in the Non-Aligned Movement and in the Middle-East affairs (especially in the Israel-Palestine conflict). The British colonization and consecutive decolonization also participated in setting the ground for the Egyptian domination. Seven years after Egypt’s independence, Britain on behalf of Kenya, Tanzania, Sudan and Uganda (still British colonies) signed the 1929 Nile Water Agreement which governs the current water allocation. Clearly at the advantage of Egypt, this agreement has a clause stating that “no works or other measures likely to reduce the amount of water reaching Egypt were to be constructed or taken in Sudan or in territories under British administration without prior Egyptian consent”⁵⁷. The 1959 Nile Water Agreement reinforced Egypt’s domination and currently serves as a basis for claiming “prior use” and “acquired rights”. These two agreements and their content are now considered as a

⁵⁴ Unver, O., Salamé, L. and Etitia T. (2010). “Best Practices in Transboundary Waters Resources Management”, *Ingeniería y territorio*, N° 91, (forthcoming)

⁵⁵ BBC, http://news.bbc.co.uk/2/hi/middle_east/country_profiles/737642.stm

⁵⁶ Stockholm International Peace research Institute, <http://milexdata.sipri.org/>

⁵⁷ Cit. in OECD, Development and Climate Change in Egypt: Focus on Coastal Resources and the Nile <http://www.oecd.org/dataoecd/57/4/33330510.pdf>

red line for negotiation. In May 2010, Mohammed Allam, minister of water resources and irrigation, told the parliament that “Egypt’s share of the Nile’s water is a historic right that Egypt has defended throughout its history” and that “Egypt reserves the right to take whatever course it sees suitable to safeguard its share.”⁵⁸

Some scholars, such as Mark Zeitoun, have claimed that asymmetry was so at the advantage of Egypt that this country was a hydro-hegemon. Mark Zeitoun defines hegemony as a “preponderant influence maintained by the first amongst (formal) equals through a mix of coercion (force) and authority (consent)”⁵⁹. The idea of consent and authority is important as the power of Egypt does not rely only on its capacity to threaten the nine other riparian countries. Until recently, most of them did not contest the legitimacy of the domination of Egypt over the Nile water resources. Ana Cascão explains that Egypt’s hegemon status was reached in three different steps: attainment, maintenance and consolidation⁶⁰. Egypt progressively became a hydraulic state through the ancestral domestication of the Nile and more recently by extensive use of irrigation and engineering. Another achievement was the building of the Aswan dam in the 1960’s aimed at regulating the annual river flooding and providing storage of water for agriculture, and later, to generate hydroelectricity. The maintenance of hegemony was achieved through the signature of agreements, especially the two Nile Waters Agreements that established the legitimacy of Egypt. Finally, Egypt consolidates its status by maintaining the status quo, claiming its “historical rights” but also by benefiting from international support and from the power to set the water-agenda and to conduct most of the expertise work. Several scholars such as Kehonanc and Krasner affirm that hegemons are necessary to the construction and maintenance of regimes for the reasons we have mentioned (expertise, leadership, coercion etc.). Peter Haas claimed that even if hegemony could support the construction of regimes, it was only one of the several configurations that could lead to the creation of regimes. In the context of the Nile basin, this clear hegemony has not resulted in the emergence of a stable and effective regime. In fact, hegemony can be considered as the source of the problem since it is rejected by the other riparian countries.

⁵⁸ Cit. in Circle of Blue, <http://www.circleofblue.org/waternews/2010/world/africa/nile-basin-countries-fail-to-sign-river-treaty-again/>

⁵⁹ Zeitoun, M. and Allan, T., (2008) *Applying Hegemony and Power Theory to Transboundary Water Analysis*. *Water Policy* 10 (S2): 3 - 12.

⁶⁰ Cascão, A., *Hydro-Hegemony & Counter Hydro-Hegemony in the Nile River Basin*, 2006, <http://mykcl.com/content/1/c6/04/77/70/Cascao-HHAndCounterHH-Nile.pdf>

Indeed, despite this hegemonic situation, we have seen that developing countries are more likely to face rapid changes that can reduce the hegemony. With increasing pressures and relative power, countries such as Ethiopia have developed counter-hegemony strategies. Ethiopia started by contesting the legitimacy of Egypt's domination. The Ethiopian authorities have criticized the Nile Waters Agreement on the basis that the other riparian countries were not consulted in the negotiation process. The fact that the first agreement was signed during the colonial period is also highlighted. Other Nile Basin countries denounced the consequent obsolescence of these agreements but Ethiopia was the most active country in the contestation of Egypt's hegemony. It used different types of strategies. Reacting and pro-acting diplomacy were implemented. For instance, Ethiopia denounced Egypt's water projects at the 1977 UN Water Conference and more recently has built diplomatic ties with China, which agreed to invest in several water projects. Within the Nile Basin, Ethiopia attempted to create cooperation frameworks without Egypt: the "Big-Blue" bilateral cooperation with Sudan or the common position against the "colonial agreements" with Kenya and Tanzania are some examples. However, these counter-hegemony strategies do not only focus on other states support. They also seek the support from NGOs and environmentalists. Considered as progressive forces, these actors give moral backing to Ethiopia. This strategy requires creating alternatives to status quo. In other words, Ethiopia needs to create new expertise, new discourses (water as a human and social right) and principles (regional-based conservation of natural resources, equitable utilization) in order to gain support and to redefine the rules set by the hegemon. In the end, counter-hegemony strategies need legitimacy. All these new discourses and principles will help states challenge the hegemon only if they are legitimate enough to gain support from other states and important non-states actors. Consequently, counter-hegemony is often weak because of the "scarcity of power". The hegemon, here Egypt, has already built its legitimacy and is considered as the key actor in the basin and any attempt to redefine rules will necessarily induce its involvement. For that reason, cooperation frameworks that tried to put Egypt aside never emerged as strong regimes. In addition, the hegemon always tries to absorb counter-hegemonic movements. For instance, since the Nile basin countries ask for new rules of sharing and new institutions, Egypt pushes towards the creation of a Nile River Commission based on "acquired rights" in order to discuss these new rules in a framework that protects its interests.

Cooperation is consequently very weak in the Nile River Basin. However, some attempts at institutionalizing cooperation are noteworthy and, on the whole, relations between the ten riparian countries have moved towards cooperation instead of conflict. The shift started about 20 years ago in series of forums and meetings which stressed the need for multi-sectoral thinking. As mentioned by Alan Nicol, these meetings were “originally launched to provide an informal mechanism for riparian dialogue and the exchange of views between countries, as well as with the international community (NBI, 2001), [but they] also enabled informal contact between officials of riparian states and with external ‘facilitating’ organizations”⁶¹. The Nile Basin Initiative (NBI), a transitional riparian-led process of joint decision making and cooperative development was created in 1999. Initiated by nine riparian countries (Eritrea is an observer) and the World Bank, it worked on fostering a shared vision for the Nile “to achieve sustainable socioeconomic development through the equitable utilization of, and benefit from, the common Nile Basin water resources”⁶². The use of the word “equitable” and the new concern in sharing benefits are concrete steps towards cooperation. However, the NBI remains an instance of consultation rather than a cooperation institution. In 2007, its members tried to come up with a Cooperative Framework Agreement aimed to establish a legal framework and to set up the Nile Basin Organization but the Nile Basin countries failed to reach an agreement on Article 14. Upstream countries supported the following phrasing of the article: “(...) Nile Basin States therefore agree, in a spirit of cooperation, to work together to ensure that all states achieve and sustain water security *and not to significantly affect the water of any other Nile Basin State.*” Egypt and Sudan insisted on applying the following modifications: “(...) *Not to adversely affect the water security and current uses and rights of any other Nile Basin States*”⁶³. Again the so-called “acquired rights” constitute a red line for Egypt. As a consequence, Ethiopia, Uganda, Kenya, Tanzania and Rwanda signed the treaty but not the other countries. The future organization is likely to be powerless, as the major Nile Basin States boycotted it and also because most of the treaty is about general principles, which do not include any figures or water allocation formulas.

⁶¹ Nicol, A. (2003). *The Nile: Moving Beyond Cooperation*, UNESCO-IHP, 2003, p. 33

⁶² Ibid.

⁶³ Casção, A. (2007) *Unraveling current hydropolitical cooperation in the Nile Basin*, NATO/Arava Water Conference, Israel, November 19-21 2007, <http://www.slideshare.net/ana.cascao/cascao-arava-hydropolitical-cooperation-nile-basin-presentation>

Asymmetries, in their diversity, are often a negative factor to cooperation even if they are not insurmountable. Overcoming such difficulties requires strong states able to maintain guidance, adapt to change and respect their commitment. Unfortunately, developing countries are often confronted to important institutional weaknesses at the various levels of power. These weaknesses prevent them from concretizing and amplifying the few attempts at cooperating on transboundary water resources management.

B) Institutional weaknesses

We have seen through the Nile and Mekong case studies that asymmetries and the difficulty to cope with changing environments weaken the potential for effective cooperation institutions but even in situations where divides are minor and political will is real, developing countries may face difficulties to achieve their objectives. Weak institutions defined as institutions unable to frame cooperation and to set the rules, norms or principles that condition the agent's choices, are an obvious obstacle to the efficiency of transboundary waters management. Indeed, it requires strong coordination capacities, multi-sector thinking (owing the myriad uses of water) and the establishment of clear objectives (water allocations formulas for instance) that are not compatible with uncertainty and haphazard implementations. The financial issue is crucial since effective institutions require funds, human resources, material, expertise and many other costly needs. Beyond the cost, these needs induce overcoming problems linked to the adaptation of material and human resources to the issues addressed or to the identification of reliable donors. These problems can be political too. For instance, several countries might be reluctant to receive funding or technical expertise from some international agencies or states. Not to mention that developing countries have to deal with several development emergencies⁶⁴ at the same time with limited resources. The issue of the repartition of efforts is therefore an additional problem. Consequently, institutional weaknesses can be caused by financial, organizational and political problems which are themselves linked to low economic development and poor governance capacities. These two main problems are at the roots of institutional weakness.

⁶⁴ These can be summarized by the eight Millennium Development Goals adopted in 2000 by the 192 member states of the United Nations: Eradicate extreme poverty and hunger; Achieve universal primary education; Promote gender equality and empower women; Reduce child mortality; Improve maternal health; Combat HIV/AIDS, malaria and other diseases; Ensure environmental sustainability; Develop a Global Partnership for Development.

1) ***Low economic development as a basis for institutional weakness***

Cooperation on the Upper Lempa River in Central America is regarded as mostly positive thanks to sound political will to peacefully cooperate and to actual projects on the ground. However, the low level of development of the riparian countries has limited the scope and effects of the institutionalization of cooperation.

The Lempa River basin is situated in the Trifinio region, which covers about 7,500 km² in the border areas of Honduras, Guatemala, and El Salvador. In 2000, an estimated 70% of the Trifinio population lived in rural areas, with a strong prevalence of conditions of both relative poverty (87 percent) and extreme poverty (53 percent)⁶⁵. This mountainous region leaves few opportunities to develop strong agricultural or industrial activities and has long been a marginalized and deprived territory. In 1986, the three countries signed a treaty to carry out the Trifinio Plan aimed at encouraging social development, tri-national integration and environmental protection. Hence, a Tri-national Commission was created along with a Secretariat, a Technical entity and a Consultative Committee⁶⁶. This institutional structure involves the vice-presidents of the three nations and relevant ministries, especially ministries of agriculture. Shortcomings nevertheless affect the efficiency of cooperation in many ways.

a) Limited institutional capacities and objectives

Because of limited material and immaterial resources, the Trifinio institutional framework remains weak. Material resources consist of financial resources, qualified personnel, infrastructures, capital and so on. They are obviously essential as even the most disciplined and efficient bureaucracy would fail to achieve its environmental goals without these prerequisites. Immaterial resources have more to do with cognitive aspects such as knowledge and expertise. The current budget only allows the Commission to function and cannot provide resources for large-scale investments or for a permanent technical team, which is essential for the continuity of projects and activities. Consequently, the Trifinio Commission does not benefit from high level expertise and knowledge on water resources

⁶⁵ Artiga, R. (2003). *The Case of the Trifinio Plan in the Upper Lempa: Opportunities and Challenges for the Shared Management of Central American Transnational Basins*, UNESCO-IHP, 2003, p.13

⁶⁶ It consists of departmental governors, mayors of the region, nongovernmental organizations and other civil society organizations.

management and remains highly dependent on external contributions, especially from the European Union. Besides, the absence of economic backing for empowering local bodies decreases possibilities for mobilizing local actors, both public and private. Finally, the necessary compression of human resources leads to the accumulation of responsibilities for each national representative and tends to blur the boundaries between their respective roles. The implementation of policies suffers from this situation since it leads to conflicts in abilities and decisions. The lack of clarity of the mandates along with double commitment to the national and tri-national interests affect and slow down the decision-making process. Consequently, the lack of specialization obviously decreases the efficiency of the Commission.

The ambitiousness of the plan's objectives suffers from this situation. The institutional weakness, limits the scope of the various projects. For instance, the Inter-American Development Bank planned to grant a \$150 million loan for the financing of the Tri-National Program for the Sustainable Development of the Upper Watershed of the Lempa River in 1997. Owing to the low borrowing capacity of the three countries, the loan was significantly reduced to \$32 million. We must underline that immaterial resources also include the capacity to account for links within and among the domains managed by institutions and significant properties of the ecosystem. The existence of such gaps was named "institutional misfit" by Oran R. Young and Julia A. Ekstrom⁶⁷. As they put it, "Institutions that leave such gaps thus do not completely fit the ecosystem that encompasses the resource or activity they are designed to manage".⁶⁸ Because of the combination of both low material and immaterial resources that results in institutional misfit, the Trifinio Commission cannot implement policies based on the principles of Integrated Water Resources Management (IWRM) that imply that the various uses of water resources are interdependent and must be dealt with altogether to achieve satisfactory results in the social, economic and environmental domains. In the case of the Lempa basin, projects mainly focused on conservation and infrastructures for improved access to water resources.

⁶⁷ Ekstrom, J. and Young, O. (2009). "Evaluating functional fit between a set of institutions and an ecosystem", *Ecology and Society* 14(2): 16, 2009

⁶⁸ Ibid.

b) Limited impact and perspectives of institutionalization

On the bright side, the Trifinio Organization is a concrete evidence of the political will to cooperate and the various projects implemented have tangible impact for the population such as the 80,128 inhabitants who had no access to potable domestic water before. However, the scope of the projects remains limited as the plan's implementation only benefited nine municipalities directly, and twenty-two of the region's forty-five municipalities indirectly. Not to mention that some polcs (Metapán and San Ignacio in El Salvador) were treated with less involvement and actions because of their remoteness and the lack of roads and infrastructures.

In addition, most of the local authorities and civil society organizations have a marginal role in the implementation of cooperation. The lack of economic backing and resources assigned to them can explain the minor role played by these relays on the ground. This could turn to be a major problem for the pursuit of the institutionalization process. There is a risk of seeing the Trifinio Organization becoming weaker if it does not succeed in increasing the participation of local actors, which are essential to the transformation of projects from central decisions into local actions.

The Trifinio Organization shows that institutional weakness remains linked to low economic development since even with favorable conditions such as political will and relative socio-economic and cultural homogeneity, riparian countries hardly succeed in implementing effective cooperation on transboundary waters. However, the Trifinio experience is not the most negative one. Indeed the lack of institutional capacity is not only a matter of low economic development. Governance also plays a major role in defining institutional capacity.

2) *Understanding institutional weaknesses through the soft state theory*

The Organisation pour la Mise en Valeur du fleuve Sénégal (OMVS, Organization for the Development of the Senegal River) is a much older attempt to institutionalize cooperation between four developing countries, namely Guinea⁶⁹, Mali, Mauritania and Senegal. Created

⁶⁹ Guinea only integrated the organization in 2006

in 1972, it is the continuation of the earlier *Organisation des Etats Riverains du Sénégal* (OERS, Boundary States of the Senegal River). The organization was originally carried by genuine political will and an ambitious project to use cooperation on the Senegal River to foster panafricanism, in a time (late 1960's) when decolonization carried a lot of hope for former African colonies. Expectations were high and issues such education and culture were included into water management. Less ambitious than its predecessor, the OMVS was nevertheless considered as a model for other African countries thanks to its coherent legal-institutional structure, its political authority and its concrete projects. Similarly to the Trifinio case, the Senegal River countries never really faced power or economic asymmetries. Here, the main cause of institutional weakness is, beyond the lack of material and immaterial resources, the generalized bad governance not only in the riparian countries but also within the organization itself.

a) The Senegal River countries' soft state status

The increasing attention on institutions has risen in several organizations dedicated to development. The World Bank has moved from faith in "getting policies right" (Washington Consensus⁷⁰) to getting the "rules of the game right". In other words, appropriate institutional context for the policies, and not the policies themselves, became the focus of attention. Coined under the name "good governance", it has become closely tied to developing and fostering institutions and strict enforcement of rule of law, which constitute conditionalities for loans and aid. Indeed, the World Bank economists consider that stable, predictable and effective laws encourage investment and economic growth and, by extension, sustainable development.

Following this idea, without strong institutions, large amounts of financial resources along with strong commitment towards water management are almost useless as they will not be translated into effective actions. This institutional weakness can be encompassed in the term "soft state" theorized by the Swedish economist Gunnar Myrdal in 1970. According to him, a soft state has "deficiencies in legislation and in particular law observance and enforcement, a widespread disobedience by public officials on various levels to rules and directives handed down to them, and often their collusion with powerful persons and groups

⁷⁰ The Washington Consensus was a set of specific economic policy prescriptions that several major Washington-based institutions such as the World Bank and the IMF promoted as the "standard" reform package for developing countries. The Washington Consensus is often associated with economic neoliberalism.

of persons whose conduct they regulate”⁷¹. Soft states are thus a group of developing countries that lack a disciplined and efficient bureaucratic culture, and a strong political will to overcome these weaknesses. This approach describes a generalized problem of governance that affects each institution and jeopardizes its effectiveness. However, it does not mean that each institution is weak. It is more like an overall constraint that must be taken into account. Indeed, this approach must be completed with other inputs to fully understand the role played by poor institutional capacity in the failure of several cooperation institutions in the transboundary waters field. Beyond the core issue of discipline and efficiency raised by Myrdal, we have previously pointed out the lack of material and immaterial resources as factors of weakness.

The four Senegal River countries and particularly Guinea correspond to a large extent to the soft state described by Myrdal since law enforcement, governmental effectiveness and general governance are insufficient. Daniel Kaufmann has produced a study aimed at measuring the degree of “good governance” in countries. He selected three main characteristics divided into several indicators: (1) the process by which those in authority are selected and replaced (voice and external accountability and political stability); (2) the capacity of government to formulate and implement policies (government effectiveness and regulatory quality) and (3) the respect of citizens and the state for institutions that govern interaction among citizens (rule of law and control of corruption). On the whole, the Senegal River states perform poorly⁷² and it is also worrying to notice that the situation is deteriorating for each indicator since 2000.

b) Bad governance and neo-patrimonialism

Bad governance not only affects the efficiency of institutions but also their conduct and actual goals. The neo-patrimonialism tendency that affects some African states diverts the goal of cooperation institutions from serving the general interest to serving the head of power or its clients. Christopher Clapham defined neo-patrimonialism as a “form of organization in

⁷¹ Myrdal, G. (1970). *The challenge of world poverty; a world anti-poverty program in outline*, Random House, 1970, 518 p.

⁷² The country’s percentile rank (0-100) indicates rank of countries among all countries in the world. In 2008, percentile ranks for rule of law went from 2.4 (Guinea) to 45.9 (Senegal), from 9.6 (Guinea) to 56.7 (Mali) for voice and accountability, from 4.8 (Guinea) to 35.9 (Mali) in political stability, from 6.2 (Guinea) to 51.2 (Senegal) in government effectiveness, from 13.5 (Guinea) to 44 (Senegal) in regulatory quality and from 4.3 (Guinea) to 38.6 (Senegal) in control of corruption. For more details see: <http://info.worldbank.org/governance/wgi/index.asp>

which relationships of a broadly patrimonial type pervade a political and administrative system which is formally constructed on rational-legal lines.”⁷³ Although such observation does not entirely matches the current situation in the four Senegal River countries, some aspects of their relation with the OMVS tend to be similar to Chirstoper Clapham’s definition.

The OMVS has been perceived by the riparian countries as a tool to attract foreign loans and donations from European states or from institutions such as the World Bank or UNDP rather than a tool to deepen cooperation and political integration. Indeed, one of the first major achievements of the organization was the financing and building of the Manantali and Diama dams in the 1980’s⁷⁴ thanks to a multilateral 1 billion dollars loan of which half of the amount became a donation. This determination to attract loans and donations resulted in the disconnections between the actual needs and the realizations. The Manantali and Diama dams succeeded in regulating the river flow and creating new irrigation areas but the dams’ capacities remain underutilized.⁷⁵ Consequently, the states’ interest in the organization shrank when funding agencies and donors reduced their contribution and started to look closer at the use of funding. Past mistakes such as oversized projects, corruption and generalized poor governance affected the OMVS capacity to attract investments and caused a relative weakening of an institution that used to be ambitious, well-structured and supported by its member states.

Neo-patrimonialism or some of its manifestations, also explain why states not only lost interest in the organization but also consciously decided to limits its power. As a major acotr in a field as important as water resources management, the OVMS could have been a competitor for the harnessing of resources. The Haut-Commissariat, which is the central agency of the OMVS is the most endowed organ in terms of resources and political legitimacy and it is in charge of the common policy along with the general interest. Because of its potential power, the riparian states never nominated a strong or ambitious political figure for the High Commissioner position. Following the same logic, they refuse to open a political space to NGOs and other actors of the civil society. The participatory management of the river along with the appropriation of the transboundary system of cooperation by the river community is reduced in order to guarantee the complete sovereignty and control of the heads

⁷³ Clapham, C. (1985). *Third World Politics: An Introduction*, University of Wisconsin Press, 206 p.

⁷⁴ Planned in 1974-1976 and started in 1981-1982, the dams were achieved in 1986 and 1988.

⁷⁵ See Meublât, G. and Ingles, J. 1997, « L'éternel retour des grands projets -- L'aménagement du fleuve Sénégal en perspective », in: Baré, Jean-François *Regards interdisciplinaires sur les politiques de développement*. L'Harmattan, Paris

of the state over water resources and over the potential benefits arising from their exploitation. The fact that the Senegal River countries are young states created by the decolonization and the fact that, as in most West African countries, they have a wide variety of ethnic groups, reinforce this fear of the loss of sovereignty.

Unfortunately, several of the flaws that affect the states and their relations with cooperation institutions also exist within these institutions, which act as self-centered organizations preoccupied by their survival and their capacity to benefit from as many advantages as possible. Such observation is particularly true in the case of the OMVS Haut-Commissariat that the World Bank denounced for its rigidity, the slowness of its decisions, its shortcomings and its incapacity to renew its heavy and aging staff and to adapt to changing international environments. The main problem might be the “[deficiencies in] law observance and enforcement [and] widespread disobedience by public officials on various levels to rules and directives handed down to them”⁷⁶ that Myrdal underlined in its definition of soft states. Concerning the deficiency in law enforcement, the Haut-Commissariat failed to implement several policies such as the 1987 law on water charge that never was implemented. The Haut-Commissariat also consciously decided not to implement decisions taken by governments such as the connection with universities to exchange expertise and knowledge. According to Guy Meublat⁷⁷, this clear example of disobedience can be explained by the fact that such connection would have threatened the position of the OMVS as the main beneficiary from the allocation of projects, funding, and partnerships.

The OMVS actually entered a vicious circle. The lack efficiency reduces the trust from international donors and the decrease of funding reduces the interest of the member states, which no longer support actively the organization. Consequently, the organization focuses on its own survival instead of focusing on the pursuit of cooperation. Despite some limits, the OMVS used to be a model in the field of transboundary waters management. It had a solid legal-institutional structure able to implement ambitious projects thanks to genuine support and trust from its member states. The increasing impact of bad governance on the organization’s capacity to deliver the expected outcomes from cooperation gradually

⁷⁶ Myrdal, G. (1970). *The challenge of world poverty; a world anti-poverty program in outline*, Random House, 518 pages.

⁷⁷ Meublat, G. (2010). « De la gestion des fleuves internationaux en Afrique et du bassin du Sénégal en particulier », *Revue Tiers Monde*, n°166, avril-juin 2001, pp. 427-453

decreased both its capacities to implement policies and its capacity to attract international donations and loans. Some of the loaners, especially the World Bank, decided to condition their support to the achievement of a tangible institutional reform.

However, going through a radical transformation from weak institutions to strong and effective institutions is difficult, especially since the causes of institutional weakness can be numerous. In the Senegal basin it is based on an overall problem of governance while it has more to do with the difficulty to mobilize material and immaterial resources in the Trifinio region. Asymmetries are an additional challenge for weak institutions since it is particularly difficult to gather states with opposite needs and objectives and unequal power around cooperative initiatives. In the Nile and Mekong basin, the most powerful states (respectively Egypt and China) are even opposed to further institutionalization of cooperation unless it confirms their dominant position. Weak institutions and asymmetries are thus two complementary problems that affect the capacity of developing countries to cooperate in order to achieve water security. Besides, the transversal issue of changing contexts needs to be underlined since it affects particularly developing countries. Indeed, the modification of socio-economic, environmental and political contexts adds the challenge of adaptation to the management of asymmetries and institutional weaknesses. Nevertheless, cooperation on transboundary waters is slowly progressing in developing countries and it not only shows that difficulties can be overcome but also that states give credit to cooperation as a tool to achieve water security. Attempts to foster the institutionalization of cooperation are numerous and inspire many countries and organizations. The experience accumulated in the previous decades need to be studied to spread best practices and avoid repeating past mistakes.

Chapter III Solutions for overcoming obstacles to water security

When water crosses borders, water security cannot be achieved without a certain degree of coordination and consultation. Given the increasing number of organizations and agreements between two or several states, many governments chose to institutionalize cooperation. Even those who benefit from power asymmetries try to institutionalize cooperation at their advantage rather than take the risk to face unregulated oppositions. And it is especially understandable since we have mentioned that some states in developing countries are weak and impose their rules with difficulty. Knowing the specific challenges that face developing countries, notably asymmetries and institutional weaknesses, and having in mind past experiences that have proved to be useful, we can underline solutions for overcoming obstacles to water security in the context of transboundary waters.

A) Best practices in cooperative transboundary waters management

1) Shared vision

In order to last, cooperation needs to be based on something more than a simple list of goals and objectives. Because water security is based on the expectations of the society, riparian states must have a “shared vision” of their action that is sufficiently integrative and inspiring to foster cooperative policies. They need to believe that “their values and ideas are incorporated into what the organization is trying to achieve”⁷⁸. In the case of the Senegal River basin, the shared vision used to be linked to the broader concept of panafrikanism,

⁷⁸ *Glossary of PCCP-related terms*, UNESCO-PCCP, forthcoming

which intended to unify Africans into a transnational African Community. In the same way, the Trifinio Organization, which is the largest and “most advanced [plan] in terms of real territory integration and cooperation in Central America”⁷⁹, works like a laboratory for political integration in the region. A shared vision is therefore essential as it gathers riparian states around concepts that transcend the realization of concrete and measurable objectives like the amount of hydropower generated or the extent of newly irrigated surfaces. In fact, a shared vision expands and strengthens cooperation.

Nevertheless, this requires mutual understanding at multiple scales to be sure that the shared vision and principles that follow, are understood the same way. At lower scale, mutual understanding is essential to the comprehension of the context that determines the expectations and constraints of other riparian states. In a negotiation, mutual understanding enables to take into account elements that might appear negligible to one actor and essential to its counterpart. The case of the Brahmaputra, shared by China, Bangladesh and India, is exemplary and shows the various aspects of the relation between a country and its water resources. Due to increased pressures on waters resources in Tibet and the Northern part of the country, China will drastically amplify its withdrawals and might divert some parts of the Brahmaputra river flow. However, the issue for India, situated in the downstream part of the river, is not only about quantity. Meaning “son of Brahma” in Sanskrit, the Brahmaputra is named after the God of creation and its lower portion is a sacred river to Hindus. This cultural and religious attachment is a potential source of strong opposition from various parts of the Indian society and cannot be marginalized by the Chinese authorities especially since India is, contrary to other downstream countries, powerful enough to get into conflict with China. In this case, a mechanism of compensation would be obviously more difficult to implement because such a cultural loss cannot be compensated with money or water transfers from another river. In that case, water security goes beyond socio-economic concerns.

Mutual understanding is the preliminary step towards trust. Establishing a trusting relationship is not easy since it requires taking the risk to place the fate of one’s interests under the control of others. However, it is an essential aspect of cooperation. Trust can be based on two approaches that are not mutually exclusive. The rationalist approach values the importance of the calculation of interests in the establishment of trust while the binding

⁷⁹ Artiga, R. (2003). *The Case of the Trifinio Plan in the Upper Lempa: Opportunities and Challenges for the Shared Management of Central American Transnational Basins*, UNESCO-IHP, 2003, 13 p.

approach “puts emphasis on the normative meaning that the relationship has for those who establish it”⁸⁰. Hence, in the context of cooperation, trust could be defined as the willingness to take risks and the expectation that others will honor particular obligations because they value cooperation or because it is in their interest to do so. Trust is essential to surpass zero-sum games in which gains in one country are not considered as gains for the entire group. Such situation prevailed in the Senegal River basin. In 1989, Mauritania went on a border war against Senegal in order to take control of grazing lands that were expected to expand after several investments from the OVMS⁸¹. The lack of trust pushed Mauritania to choose conflict instead of hoping to benefit from land improvement in the neighboring country. One counter-example could be the Itaipu Dam, a bi-national hydroelectric dam opened in 1984 that supplies 90% of the energy consumed by Paraguay and 19% of that consumed by Brazil (2008)⁸². Owing the high dependence of Paraguay on the dam’s resources, sharing responsibilities with the powerful Brazil is a sign of trust that leads to a win-win game.

Uncertainty is at the heart of trust problems since trusting others involves making predictions about their future actions. Thus, reaching trust requires mutual understanding through the establishment of a free exchange of information in order to fully comprehend the constraints and cultural, environmental and socio-economic features that condition and explain the behavior and expectations of other riparian countries. The more information you have, the less likely you will make decisions based solely on intuitions or on past decisions. Information reduces uncertainty and facilitates cooperation. This focus on information sharing has been at the center of the cooperation process in the Mekong River Basin. The first regional project carried out by the Mekong Committee was a basin-wide network of hydro-meteorologic stations for regular collection of data. This first project of information sharing was later complemented by several field investigations on hydrography, socioeconomic surveys, annual flood forecasting operations and investigations of other resources. As Le-Huu Ti mentioned, “the *free flow of information* has thus ensured *equality in access to information* and contributed to strengthening mutual understanding among the riparian countries”⁸³. The free flow of information is thus a tool for building trust.

⁸⁰ Ruzicka, J. and Wheeler, N. (2010), “The puzzle of trusting relationships in the Nuclear Non-Proliferation Treaty”, *International Affairs*, Volume 86, Issue 1, pages 69–85, January 2010

⁸¹ Meublât, G. (2001) « De la gestion des fleuves internationaux en Afrique et du bassin du Sénégal en particulier », *Revue Tiers Monde*, n°166, avril-juin 2001, pp. 427-453

⁸² Folha online, <http://www1.folha.uol.com.br/folha/dinheiro/ult91u485484.shtml>

⁸³ Ti Le-Huu and Lien Nguyen Duc et al. (2003). *Mekong Case Study*, UNESCO-IHP, 2003, 56 p.

Shared vision based on mutual understanding and trust can eventually lead to benefits sharing, a concept according to which, “parties sharing water resources go beyond the resource itself (quantity) [and] consider water resources as a common source of benefits that can be shared in addition to the water per se”⁸⁴. Sharing benefits is therefore closely linked to the concept of IWRM as it induces to take into considerations all the various aspects of water resources and the benefits and costs arising from its management. However, putting into practice such concepts require more than a shared vision which is only the basis for a broader and stronger legal-institutional framework.

2) Solid and flexible legal-institutional framework

a) Solid legal-institutional framework

Institutionalizing cooperation in a way that guarantees that common projects and fair utilization of transboundary waters will last relies on the riparian countries’ capacity to create clear rules of management and cooperation along with frameworks that limit free riding. In other words, institutions must avoid situations where “free riders”, in that case states, consume more than their fair share of transboundary water resources, or shoulder less than a fair share of the costs of its management. We have already seen the important role played by governance issues and their link with efficient cooperation on transboundary water resources management. In the Johannesburg Declaration on Sustainable Development that ended the World Summit on Sustainable Development, the heads of state declared: “We undertake to strengthen and improve governance at all levels, for the effective implementation of Agenda 21, the Millennium Development Goals and the Johannesburg Plan of Implementation.”⁸⁵ Despite declarations of good will such as this one, global progresses have clearly to be made especially since the water sector has strong ties with many other development sectors.

Based on the respect of good governance standards, legal frameworks then have to define clear and legitimate rules. To this end, international treaties have several advantages. Owing the importance given to them in international relations and diplomacy, they are good

⁸⁴ *Glossary of PCCP-related terms*, UNESCO-PCCP, forthcoming

⁸⁵ UN-Document.net, Johannesburg Declaration on Sustainable Development, <http://www.un-documents.net/jburgdec.htm>

instruments to bound states by their legal undertakings. The non-respect of legally-binding treaties can have severe effects on a state's reputation and on its future capacity to enter into agreement with other states. More generally, it will hinder future attempts to cooperate. Besides, treaties "provide a clearer manifestation of the legal undertakings made by states; their norms are often more precise and more easily accessible. They are also able to deal with questions of a highly technical nature"⁸⁶. In the transboundary waters context, these technical issues can deal with freshwater quality and quantity standards, norms of water abstraction, criteria for water allocation and so on. This last example was essential to the allocation of waters between India and Pakistan in the early 1950's. Pakistan was, and still is, extremely dependent on the water resources from the Indus River basin in which it has a downstream position. Pakistan's water dependency ratio is up to 75.59%⁸⁷ and its water security therefore depends to a large extent on its relation with India. After the independence and partition of India in 1947, India took the upstream and Pakistan the downstream part of five of the six rivers in the Indus River basin but borders were not clearly determined and both countries quarreled over the distribution of the Indus River basin. Pakistan's fear of deprivation that could cause droughts and famines, especially at times of war, fueled the already conflictive relationship between the two countries and it became urgent to solve this specific problem. With the help of the World Bank and the involvement of David Lilienthal, formerly the chairman of the Tennessee Valley Authority and of the U.S. Atomic Energy Commission, India and Pakistan agreed on a water allocation solution incorporated in the 1960 Indus Water Treaty. The entire flow of the three western rivers of the Indus system (Indus, Jhelum, Sutlej) was made available for the exclusive use of Pakistan (except for a small volume of water for Kashmir) while the entire flow of the three eastern rivers of the Indus system was made available for the exclusive use of India. The Permanent Indus Commission, created after the signing of the treaty therefore provided an on-going mechanism for consultation and conflict resolution through inspection, exchange of data, and visits that survived to three later Indo-Pakistani wars.

On higher level, treaties and other legal frameworks must ensure that principles of cooperation are being recognized and enforced. In the transboundary waters perspective, international law provides guidance and sources of inspiration for projected and reforming

⁸⁶ Cosgrove, W. (2003) *Water security and peace - A synthesis of studies prepared under the PCCP-Water for Peace process*, (compiled by), UNESCO-IHP, 108 p.

⁸⁷ FAO, Aquastat, <http://www.fao.org/nr/water/aquastat/main/index.stm>

cooperation institutions. The 1997 UN Convention on the Law of the Non-Navigational Uses of International Watercourses plays such a role, especially its three main article affirming “Equitable and reasonable utilization” of the resource, the “Obligation not to cause significant harm” and the “General obligation to cooperate”, which were themselves inspired by the 1996 Helsinki rules, the first efforts to codify international law in this domain. The International Law Association (ILA) adopted these rules, which were not mandatory but commonly acknowledged to be a reflection of existing international customary law. These principles largely inspired the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, which established the MRC. Indeed, the three core principles that frame cooperation the Mekong River basin were included in Article 5 on “reasonable and equitable utilization of water”, Article 6 on “maintenance of flows on the mainstream”⁸⁸, and Article 26 on “rules for water utilization and inter-basin diversions”⁸⁹. This legal framework participated in the revival of an organization that was experiencing a significant decline since the late 1970’s.

However, this revival also relied on a solidified institutional framework. Indeed, putting into practice the legal aspects of cooperation requires clear mandates, empowered administrations, material and immaterial resources along with detailed conflict resolution mechanisms. Contrary to the Trifinio Organization for instance, the MRC managed to establish an institutional framework consisted of permanent structures able to develop long-term planning to achieve water security. The *Council*, at the top of the organization, consists of one member from each country at ministerial or cabinet level and is in charge of policy decisions and general guidance. The *Joint Committee* consists of one member from each country at no less than head of department level and implements policy decisions taken by the Council. It also supervises the activities of the permanent *MRC Secretariat* responsible for the day-to-day operations. The existence of the four *national Mekong committees* (one for each country) maintains the link between the Commission and its member states, ensuring the implementation of policies on the ground.

⁸⁸ The existing low water discharge of the Mekong would not be reduced in any way at any site.

⁸⁹ The supplies to be diverted for irrigation purposes would be met by some storage of flow during high stages of the river

b) The flexibility issue

The solidity of the legal-institutional framework is a clear asset but should not be associated with rigidity. Flexibility is essential, all the more as developing countries are more likely to face changing environments and instability. Rigid rules, objectives, mandates and so on reduce the capacity of cooperation institutions to cope with changes affecting transboundary water resources. Such changes can be internal (new members with new needs and objectives, increase or decrease of financial resources, new priorities, new understanding of basin dynamics, new technology etc.) or external (conflicts, environmental change, political change etc.). The essential need for flexibility can be seen through the example of climate change. The water distribution in the Nile River basin was established in a particular environmental context, which is evolving because of climate change. Indeed, climate change might reduce the flow of the Nile whose waters were strictly distributed in the Nile Water Agreement between Egypt and Sudan. Because of climate change, the agreement, which is at the basis of the relationship between Egypt and Sudan regarding water, is likely to become obsolete. According to the current trends⁹⁰, the Nile water flow will significantly shrink and Sudan will not be able to provide to Egypt the 55.5 billion cubic meters guaranteed in the treaty without strong reduction of its own utilization of the flow. Besides, climate change is a test for the capacity of river basins organizations and institutions to cope with changing environments as a few decades ago issues such as global warming, biodiversity or conservation were not at the top of the political agenda.

The use of ambiguity can appear as a solution to achieve flexibility and to facilitate compromises in case of deadlock during negotiations. It gives room for political compromise and enables to conclude agreements when only a few components are subject of discord. However, ambiguity and efficiency are hard to balance. Indeed, the risk would be to weaken the institution by giving too many margins to the riparian countries and by encouraging non-compliance. It can also induce divergent interpretations and hinder the implementation of cooperation. Ana Cascao⁹¹ considers that ambiguity can be a solution *if* ambiguity is backed up by true and sound political commitment at the highest level towards the realization of cooperation on transboundary water resources management. This is a condition to eventually

⁹⁰ See for instance: OECD, *Development and Climate Change in Egypt: Focus on Coastal Resources and the Nile*, <http://www.oecd.org/dataoecd/57/4/33330510.pdf>

⁹¹ See Ana Cascao, *Ambiguity as a solution for the Nile Legal Deadlock?*, presentation to the NBDF, 2008, <http://www.slideshare.net/ana.cascao/cascao-khartoum-ambiguity-nile-political-deadlock-presentation>

reach disambiguation and reinforce cooperation. Obviously, true and sound political commitments are difficult to assess and it is again important to recall the role played by mutual understanding and trust. In any case, this underlines the fact that shared vision and strong and flexible legal-institutional frameworks are not sufficient without political commitment.

3) Multilevel political commitment

As a security, socio-economic, environmental and cultural issue, water security involves the highest level of political power. Heads of state or governments are the actors that negotiate and sign treaties and agreements that serve as a basis for international cooperation on transboundary resources. Thus, the solidity of cooperation institutions along with their capacity to re-invent themselves and to last rely to a large extent on strong political commitment at the highest level. The existence of such political backing in the Trifinio region⁹² maintains and develops cooperation despite limited resources. Besides, this political backing at the highest level is more likely to succeed in achieving the objectives of cooperation if all the riparian countries of a basin are involved. River basins are now considered as coherent ecosystems that have to be dealt with as units in order to implement efficient water management policies. The involvement of upstream countries is particularly important. Obviously, it would be hard to work on flood control or to allocate waters between countries without the participation of the countries that control the upper part of the flow. This is one of the biggest (and maybe the main) challenge for the Mekong River Commission, especially since China increases its presence and action in the basin. Hence, the 1995 agreement that set up the Commission expects to integrate Myanmar and China to “promote and assist in the promotion of *interdependent subregional* growth and cooperation among the *community of Mekong nations*”⁹³.

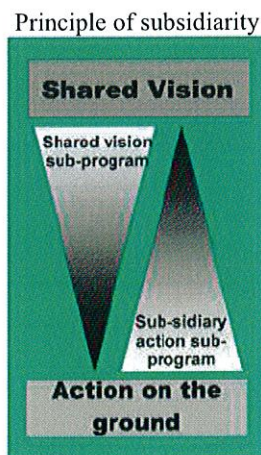
Political commitment of all the riparian countries improves the efficiency of IWRM policies but should not be limited to the highest political level. Water resources management requires the involvement of as many stakeholders as possible in order to benefit from the expertise and knowledge of those who are close to the issue that is dealt with. The

⁹² Cf. Chapter 2. B)

⁹³ Mekong River Commission, *Agreement on the cooperation for the sustainable development of the Mekong River Basin*, http://www.mrcmekong.org/agreement_95/agreement_95.htm

involvement of many stakeholders is also important to use local relays to implement policies. Besides, policy implementation is more likely to be efficient if local actors feel that decisions are not imposed and that they can participate in the decision-making and feel a sense of ownership in the process. Consequently, local managers and people need to be aware that they live in a river basin on which many other people, often from other countries, depend. Raising awareness can be done by local authorities, NGOs or committed citizens from civil society. International agencies such as UNDP or the World Bank have promoted decentralization as a way to improve the efficiency, equity, and sustainability of water resources management. In a document on decentralization of water decision making, UNDP stated that “decentralization, dialoguing, participation and partnerships are therefore critical to build awareness, acceptance and support for a reform process to move forward.”⁹⁴

Decentralization has many forms. Subsidiarity is one of them and, in the context of transboundary waters, it consists in managing a basin at the lowest appropriate level. This principle was implemented in the Nile River basin to increase efficiency and cooperation by adapting projects to the ground realities and by reducing the decision-making complexity. The basin was then split into two sub-basins, comprising the countries of the ‘Eastern Nile’ and the countries of ‘Equatorial Lakes’.



Source: Alan Nicol, *The Nile: Moving Beyond Cooperation*

This example shows the shift in water management towards greater decentralization. This phenomenon tends to confirm that states hope to take advantage of this because it eases the policy implementation process and provide them with multiple relays to reach local

⁹⁴ UNDP Water Governance Facility at SIWI, *Decentralisation of Water Decision Making*, Issue Series, N°1,

population. Nevertheless, decentralization and recourse to the civil society should not be a way to transfer the responsibility and the cost of transboundary waters management to the local authorities and NGOs. To be effective, decentralization of water management must be accompanied with funding, appropriate structures and institutions along with guidelines in order to maintain the coherence of cooperation. Again, it also requires good governance. Indeed, Gunnar Myrdal pointed out that one of the specificities of soft states⁹⁵ was the “widespread disobedience by public officials on various levels to rules and directives handed down to them”⁹⁶. Formal and informal ties among regional and local public and private organizations can be a chance to foster decentralization and cooperation but it can also result in greater corruption to the detriment of local populations. It is therefore essential to improve governance to ensure that the political commitment of local and national actors is genuine and driven by the willingness to effectively cooperate on transboundary waters management. Dealing with this multilevel complexity is nevertheless difficult, especially for developing countries that lack the necessary material and immaterial resources to do so.

⁹⁵ See Chapter 2. B)

⁹⁶ Myrdal, G. (1970). *The challenge of world poverty; a world anti-poverty program in outline*, Random House, 1970, 518 p.

B) Supporting cooperation: Track II initiatives and international agencies

1) Track II initiatives

Overcoming obstacles necessitates having a global understanding of the potential outcomes of cooperation at local, national and regional levels. Such a task can hardly be achieved without the involvement of many players with various visions and areas of expertise along with complementary resources. This is one reason why alternative solutions to traditional diplomacy, Track I, have been implemented to foster cooperation on transboundary waters management. Known as Track II initiatives, they consist of formal or informal interactions between public and/or private stakeholders from different groups and nations to facilitate discussions and exchanges in order to foster peace and cooperation. Some⁹⁷ argue that there is also a Track III diplomacy that would consist of grassroots organizations, minorities, popular movements and other groups with marginal power. We will keep the division between Track I and Track II diplomacy because the fundamental difference is based on the official nature of Track I diplomacy, which refers to the diplomatic communication and relations at the higher level between governmental authorities representing national interests. Consequently, Track II actors are multiple and can be business elites, scholars, media figures, think tanks, political leaders, NGOs, eminent scientists and so on. They use their knowledge, neutrality or relations to help resolving conflicts or propose suitable solutions. Track II initiatives are based on horizontal relations, which encourage partnerships, associations and flexible links instead of vertical relations based on strict hierarchical linkages and control.

The intensification of exchanges, interdependence and connections between various groups of people favored the emergence of transnational issues, which gathered people from various backgrounds and nationalities. This new context has been a favorable ground for the emergence of actors and networks that consider that the national level is not always the most suitable space to deal with issues. The dramatic expansion of information technologies facilitated the creation and reactivity of these networks. Governance can be now considered as polycentric since numerous political actions are no longer the sole prerogative of states even if they remain from far the most powerful and central actors. Non-official actors, in their

⁹⁷ See for instance Dev Raj Dahal, *Track II Diplomacy in South Asia, Limits and Possibilities for Regional Cooperation*, FES Nepal Office, 2010

diversity, are not only forces that cannot be ignored but also useful resources that compensate the difficulties experienced by states in coping with conflicts or problems arising from sub-national or transnational issues. Because states tend to perceive problems from a national perspective, Track II actors help them to realize the regional or global character of water issues and can demonstrate the benefits of cooperative solutions in managing transboundary water resources.

NGOs play an increasing role in this domain. Many of them are involved in water security. For instance, the World Wide Fund for Nature's (WWF), the world's largest independent conservation organization, has developed a Living Waters program aimed at raising awareness of the need to implement "sustainable and participative alternatives to the destructive 'quick fix' development projects of the past"⁹⁸, protecting wetlands, restoring river basins and influencing private sector practices and government policies. NGOs can also serve as neutral mediators for governments that want to avoid the recourse to intergovernmental organizations. For instance, Green Cross Argentina was invited in 2000 to contribute to the resolution of an environmental and social conflict following the construction of the Yacyreta dam between Argentina and Paraguay. This shift towards an increasing recourse to NGOs was encouraged by their professionalization, their possession of resources (funding, volunteers, expertise etc.) that some governments lack. The international networks NGOs built and their capacity to capture the attention and donations of citizens through various channels of communication are obvious assets that explain why governments increasingly go past their suspicion.

In the context of transboundary waters management, Track II initiatives are often based on three pillars: education and training, research and process support. Education and training targets current and future managers of transboundary waters to raise awareness and interest in transboundary waters issues. Research focuses on the assessment of the state, use and management of water resources along with studies on the causes of water conflicts, and best practices in order to strengthen water security. Finally, process support seeks to provide parties facing difficulties managing their transboundary water resources with international fora. It can also consist in setting conflict resolution mechanisms if relations between parties have reached deadlock. For instance, UNESCO recently implemented a new process to

⁹⁸ Cosgrove, W. (2003). *Water security and peace - A synthesis of studies prepared under the PCCP-Water for Peace process*, (compiled by), UNESCO-IHP, 108 p.

enhance cooperation on transboundary water resources management through case studies⁹⁹. The writing process relies on the commitment, in each country involved, of high-level players, governmental advisers and a host of experts and stakeholders who are invited to prepare a consensus document reflecting the status on conflict and/or cooperation in the selected water body. The objective of the reporting process is indeed to constitute a forum for the discussion of sensitive issues. It also supports the actual cooperation and the development of the shared resources. Finally, it offers an opportunity for the stakeholders to build a joint vision for the future joint management of their water resources. The expected outcome of process support is to serve as a basis for stronger and more integrative cooperation institutions. Track II initiatives, by involving different but complementary players in society, disseminate best practices and eventually facilitate cooperation and prevent conflicts related to the management of transboundary water resources.

Of course, not all Track II initiatives are supported by international agencies such as UNESCO. The flexibility that empowers Track II initiatives is also a weakness as they tend to be discontinued because of changing center of interests or non-reliable funding. Besides, being based on networks of various actors, these initiatives suffer from the competition between stakeholders that seek the largest exposure possible. Finally, the lack of institutionalization is the main problem encountered by these initiatives. In the long run, the continuous support from international agencies transform Track II initiatives into more permanent forms of cooperation.

2) International agencies

Because Track II initiatives require going beyond government to government interactions, international organizations have often played a major role in implementing and supporting these initiatives. Given the multiple uses provided by water for every aspect of life and productive activities, more and more organizations are developing series of tools and programmes to facilitate peaceful management and sustainable development of transboundary water resources at local, national and regional levels. The United Nations and its agencies, along with the World Bank, are in a particularly good position to intervene. As neutral

⁹⁹ Two case studies that followed this new process are the Lake Titicaca case study (Bolivia and Peru) and the Mono River case study (Benin and Togo).

organizations, they benefit from technical and financial resources and are at the core of a wide network of individuals and institutions working in the same areas of expertise. Assessed and voluntary contributions from member states finance the biennial budget of the United Nations, which itself contributes to the budget of several organizations working on transboundary waters such as UNESCO and UNDP. This regularity of funding allows long-term planning, which is essential to natural resources management. Besides, governments can decide to provide funding to specific programmes. UNESCO-PCCP programme on transboundary waters is for example financed by donations from the Italian and Japanese governments. Other agencies such as UNICEF are not financed by the UN budget but can leverage a significant amount of donations from individuals and private donors, especially through partnerships (with Danone, FC Barcelona etc.). These financial resources are all the more efficient as these organizations work close to each other and therefore exchange data and accumulate their expertise. This tendency is strongly strengthened by the extensive mobility of the human resources of United Nations. Experts and consultants often work for a limited period, from three months to two years, and use their work experience in the UN System to find contracts in various UN organizations, favouring on the way the homogenization of methods and concepts underlying the action of these institutions. Consequently, formal and informal networks matter in the UN system. UNESCO-PCCP programme is for instance integrated in a network involving other UN organizations along with universities (ex: Roma Tre, Oregon State University), institutes (ex: the Netherlands Institute of International Relations) and NGOs (ex: Green Cross international) that have developed expertise on transboundary waters. The relative neutrality of these agencies facilitates their relations with developing countries that show reluctance to the involvement of the US or the European Union. For instance, UNDP is currently implementing the Nile Transboundary Environmental Action project (NTEAP) in Sudan whose relations with western countries have been gradually degrading for several years. Consequently, the strategic position of international organizations as well as their long experience is a valuable advantage to spread best practices in transboundary water resources management.

Individuals working on transboundary waters sometimes propose the creation of a supranational agency to manage transboundary resources globally. However, there already are hundreds of institutes and programmes dealing with this issue or organizations in charge of coordinating efforts related to water resources management. Creating another organization would result in scattering resources and creating even more overlapping. Indeed, it is not

unusual for organizations dealing with issues not directly connected to water to have one or several programmes on this resource. The United Nations Industrial Development Organization (UNIDO) is for instance active in water management. This programme makes sense given the industrial use of water but it is also symptomatic of a multiplication of overlapping programmes within the United Nations. UNDP, UNEP, UNICEF or WHO all have the legitimacy to work on the water field but in addition to their specific area of expertise (drinking water quality for WHO, hygiene for UNICEF etc.) they tend to expand their scope and therefore work on the same subjects. UNDP¹⁰⁰, UNEP¹⁰¹ and UNESCO¹⁰² all developed programmes on transboundary waters. The priority should be to reinforce mechanisms such as UN-Water, which was created in 2003 to enhance the coherence and coordinate the work of the UN agencies in the freshwater field. Boundaries should be more clearly defined to create one platform dedicated to provide a “one-stop-shop” in this transboundary waters area.

Despite long-lasting challenges, international organizations are still helpful. Their financial resources are not aimed at bearing the cost of development policies and the related investments but can be decisive for launching projects and providing funds for research and experts. This expertise and research assistance is particularly useful for the collection of data on water quantity, quality, withdrawals, consumption along with projections of future change in hydrological and environmental patterns as water resources management requires reliable information for long-term planning, not to mention the role played by the exchange of information in consolidating mutual understanding and trust. To this end, UN-Water has developed the World Water Assessment Programme (WWAP), which seeks to “assess and report on the state, use and management of the world’s freshwater resources and the demands on these resources, define critical problems and assess the ability of nations to cope with water-related stress and conflict.”¹⁰³ These programmes are of great interest for developing countries that do not necessarily have the resources to produce such assessments.

¹⁰⁰ <http://www.undp.org/water/priorityareas/trans.html>

¹⁰¹ http://www.unep.org/gcf/content/activity_international.htm

¹⁰² <http://www.unesco.org/water/wwap/pccp/>

¹⁰³ WWAP, <http://www.unesco.org/water/wwap/description/>

All these interventions serve the institutionalization of cooperation and eventually foster water security. Most of the current institutions dealing with transboundary waters in developing countries benefited from the intervention of international agencies that compensated institutional weaknesses and multilevel asymmetries. The Mekong and Indus basins are two examples among others. In the case of the Mekong Commission, and more precisely its predecessor the Mekong Committee, the institutionalization process started in 1956 with a series of surveys and field reconnaissance led by UNESCAP (formerly ECAFE) on the basin's potentialities with respect to hydropower, irrigation, and flood control. The reports written by the UNESCAP experts provided conceptual frameworks for integrated water management and called for an international approach involving the four riparian countries of the Lower Mekong basin. One year later, the Mekong Committee was created as a response to the UN proposal and fell under its aegis with its Executive Agent (EA) chosen from the carrier staff of UNDP.

Because of the highly conflictive relations between India and Pakistan, the intervention of the World Bank in the Indus River basin was not based on the leadership of the international agency. The Bank acted as a facilitator between two opposite parties that could not agree on the distribution of the transboundary waters of the Indus Rivers. However, because of the lack of progress in the bilateral discussions, the World Bank stepped beyond the limited role it had apportioned (a consultative party charged with offering suggestions and speeding dialogue) and took a proactive role by offering its own proposal of agreement to force both parties to consider concrete plans for the future of the basin. Throughout long negotiations, the World Bank's proposal became a basis for negotiation, then a basis for agreement and, after adjustments, eventually became the Indus Water Treaty. Today, the World Bank is trying to play a similar role in the Nile River basin to transform the existing "transitional riparian-led process of joint decision making and cooperative development" into a real treaty framework. From these two different situations from the same period emerged two examples of cooperation on transboundary waters that have served as models for developing countries. In both cases, international agencies played a major role in launching processes that kept strengthening cooperation throughout the time.

It is also important to underline that in both cases, and it applies to other river basins, cooperation did not start as a complete and integrated framework for transboundary waters management. These processes started as flexible coordination frameworks aimed to solve urgent problems (Indus basin) or share information and data for future joint management (Mekong basin). This is particularly important because states are reluctant to give up their sovereignty and need to progressively assess the advantages of further and more integrated cooperation. An efficient coordination process is far more preferable than unilateral actions or integrated actions based on mistrust and inappropriate frameworks. Hence, directly transposing successful existing frameworks that took decades to advance would be a mistake. Not to mention that regional cooperative experiences are hardly reproducible as such in other contexts. Watercourses flow through complex ecosystems that constitute unique geographical and hydrological entities. Transboundary water management has a regional dimension that requires adopting systemic approaches and tailor-made initiatives that fit geographical, political and cultural specificities of each basin. Hence, examples of successful policies and initiatives must be highlighted and spread out to influence or to be intelligently transposed in a way that takes into account regional realities. Learning from past experiences, processes of cooperation should be given sufficient margins to pave the way for “institutionalizing institutions”.

Conclusion

In the end, are developing countries on the way to achieving water security? If we refer to the Millennium Development Goals, the drinking water target should be met by 2015 though much remains to be done in some regions.¹⁰⁴ Nevertheless, we have seen that water security goes beyond access to water and sanitation and that the transboundary dimension of water needs to be taken into account. Cooperation on transboundary waters in developing countries progressively increases and new initiatives continuously emerge such as the coming forum on the Lake Victoria Basin organized by the East Africa Community (EAC). In this basin where over 40 million people live, the EAC secretariat has expressed its will to develop “increased synergies and cooperation towards the achievement of the Lake Victoria Basin shared vision of a prosperous population.”¹⁰⁵ However, water crisis is still threatening most developing countries and the lack of cooperation is predicted to worsen the situation. For instance, former UN water expert Dr Khan recently explained that Bangladesh, which is a downstream country, will not be able to address the coming severe water crisis without integrated initiative with the other riparian countries.¹⁰⁶ This last example shows that those who are the most vulnerable to multilevel asymmetries in transboundary river basins will suffer the most from the adverse effects of climate change. Bangladesh, among other countries, is also constrained by its institutional weaknesses that prevent it from adopting the necessary measures to manage its water resources.

We have seen in this study that asymmetries and institutional weaknesses were the main obstacles to achieving water security through transboundary waters management. Because these two obstacles will affect the poorest, fair cooperation on transboundary waters must be encouraged and needs to be institutionalized to allow long-lasting cooperation and the development of convergent interests and policies between riparian countries. In the context of

¹⁰⁴ United Nations, *MDG Report 2010*,
<http://www.un.org/millenniumgoals/pdf/MDG%20Report%202010%20En%20r15%20-low%20res%2020100615%20-.pdf#page=60>

¹⁰⁵ Daily Monitor, “EAC to discuss Lake Victoria investment deals”, 02/09/2010,
<http://www.monitor.co.ug/Business/Commodities/-/688610/1001418/-/bs1yt7/-/>

¹⁰⁶ The Daily Star, “Severe water crisis within next two decades, say experts”, 22/08/2010,
<http://www.thedailystar.net/newDesign/news-details.php?nid=151768>

a climate change, adverse impacts on water resources will call for a shift in cooperation paradigm towards greater regular and structured joint management of the resource. In fact, this will create bigger and more frequent opportunities for international cooperation. Asymmetries and institutional weaknesses certainly slow down the move towards cooperation and influence its pattern of development but past experiences have showed that good practices can overcome these difficulties. We have highlighted some of them, such as the recourse to international agencies, the construction of a shared vision, solid and flexible legal and institutional frameworks, multilevel political commitment or Track II initiatives. More importantly, these good practices encourage the institutionalization of cooperation. Once riparian countries initiate the process of cooperation, it takes root. Despite divides, conflicts, delays and even backward steps, it never really stops. This phenomenon should be seen as an encouragement for every attempt to foster cooperation in regions where water resources cross borders.

References

Publications

Aebischer, A. et La Branche, S. (2007). "Les espaces tiers dans les régimes internationaux. Le cas du Lac Léman", *Revue Etudes Internationales*, vol 38, no. 2 juin 2007

Alé, G. et Tchabore, H. *Cas du bassin du Mono (Togo-Bénin)*, UNESCO-IHP, (Forthcoming)

Artiga, R. (2003). *The Case of the Trifinio Plan in the Upper Lempa: Opportunities and Challenges for the Shared Management of Central American Transnational Basins*, UNESCO-IHP, 13 p.

Assouline, J. et Assouline, S. (2009). *Géopolitique de l'eau. Nature et enjeux*, 2^e édition, Studyrama Perspectives, 140 p.

Blanchon, D. (2009). *Atlas mondial de l'eau*, Editions Autrement, 79 p.

Blanchon, D. (2009). *L'espace hydraulique sud-africain. Le partage des eaux*, Editions Kathala, 294 p.

Checkel, J. (1998), "The Constructivist Turn in International Relations Theory", *World Politics* 50 (January 1998), pp. 324-348

Clapham Madison, C. (1985). *Third World Politics: An Introduction*, University of Wisconsin Press, 206 p.

Cosgrove, W. (2003). *Water security and peace - A synthesis of studies prepared under the PCCP-Water for Peace process*, (compiled by), UNESCO-IHP, 108 p.

Dahal, D. R. (2010). *Track II Diplomacy in South Asia, Limits and Possibilities for Regional Cooperation*, FES Nepal Office

Daoudy, M. (2005). *Le partage des eaux entre la Syrie, l'Irak et la Turquie. Négociation, sécurité et asymétrie des pouvoirs*, Paris CNRS Editions, 269 p.

Delamotte, G. et Godemet, F. (2007). *Géopolitique de l'Asie*, Paris, Editions Sedcs, 271 p.

De Stefano, L., De Silva, L., Edwards P. and Wolf, A. (2009). *Updating the International Water Events Database (revised)*. Side publications series, Dialogue Paper, UNESCO WWAP, 12 p.

Ekstrom, J. and Young, O. (2009). "Evaluating functional fit between a set of institutions and an ecosystem", *Ecology and Society* 14(2): 16, 2009

Galland, F. (2008). *L'eau. Géopolitique, enjeux, strategies*, CNRS Editions, 186 p.

Gloditsch, Nils Petter; Kathryn Furlong, Håvard Hegre, Bethany Ann Lacina & Taylor Owen. (2006). "Conflicts over Shared Rivers: Resource Wars or Fuzzy Boundaries?", *Political Geography* 25(4): 361–382.

Hardin, G. (1968). "The Tragedy of the Commons". *Science*, 162, 1243-1248.

Haas, Peter M. "Do Regimes Matter? Epistemic Communities and Mediterranean Pollution." *International Organization*. Vol. 43. No. 3. The MIT Press Summer, 1989. pp. 377-403.

Hoffman, A. (2002). "A Conceptualization of Trust in International Relations", *European Journal of International Relations*, September 2002 vol. 8 no. 3 pp. 375-401

Homer-Dixon, T., (1994). "Environmental Scarcities and Violent Conflict: Evidence from Cases," *International Security*, vol. 19, no. 1 (Summer 1994), pp. 5-40.

Kcothane, R. and Nye, J. (1977) *Power and Interdependence: World Politics in Transition*, Boston: Little, Brown and Company, 273 p.

Kydd, A. (2005). *Trust and Mistrust in International Relations*, Princeton University Press, 313 p.

Krasner, S. (1982). "Structural Causes and Regime Consequences: Regimes as Intervening Variables." *International Organization* 36/2 (Spring).

Lamballe, A. (2009). *L'eau en Asie du Sud : confrontation ou coopération?*, L'Harmattan, 271 p.

Lawrence, P., Meigh, J., Sullivan, C. (2003). *The Water Poverty Index: An International Comparison*. Keele Economics Research Papers, 17 p.

Martinez Gonzalez, I. and Zuleta Roncal, R. et al. (2006). *Co-operation on the lake Titicaca*, UNESCO-IHP, 105 p.

Meublat, G. (2001). « De la gestion des fleuves internationaux en Afrique et du bassin du Sénégal en particulier », *Revue Tiers Monde*, n°166, avril-juin 2001, pp. 427-453

Men Honghua. (2005). *Critiques of the Theory of International Regimes: The Viewpoints of Main Western Schools of thought*, Nankai University, 15 p.

Myrdal, G. (1970). *The challenge of world poverty; a world anti-poverty program in outline*, Random House, 1970, 518 p.

Muckleston, K. (2003) *International Management in the Columbia River System*, UNESCO-IHP, 47 p.

Nicol, A. (2003). *The Nile: Moving Beyond Cooperation*, UNESCO-IHP, 33 p.

Ostrom, E. (1990). *Governing the Commons: The Evolution of Institutions for Collective Action*, Cambridge University Press, 302 p.

Pachova N., Nakayama M. and Jansky L. (ed.), (2008). *International Water Security – Domestic Threats and Opportunities*, United Nations University Press, 313 p.

Puri, S. and Aureli, A. (Eds), (2009). *Atlas of transboundary aquifers, Global maps, regional cooperation and regional inventories*. UNESCO-IHP, 328 p.

Ruzicka, J. and Wheeler, N. (2010), “The puzzle of trusting relationships in the Nuclear Non-Proliferation Treaty”, *International Affairs*, Volume 86, Issue 1, pages 69–85, January 2010

Scudder, T. and Connelly, T. (1985). *Management systems for riverine fisheries*, FAO fisheries technical papers 263, 85 p.

Sironneau, J. (2002) *Le droit international de l'eau existe-t-il? – Evolutions et perspectives*, Ministère de l'Ecologie et du Développement Durable, 19 p.

Sterling-Folker, J. (2002). *Theories of International Cooperation and the Primacy of Anarchy Explaining U.S. International Monetary Policy-Making After Bretton Woods*, SUNY series in global politics, 320 p.

Ti, Le-Huu, Lien Nguyen Duc et al. (2003). *Mekong Case Study*, UNESCO-IHP, 56 p.

Toset, Hans Petter Wollebæk; Nils Petter Gleditsch & Håvard Hegre. (2000). “Shared Rivers and Interstate Conflict”, *Political Geography* 19(6): 971–996.

Unver O., Salamé L. and Etitia T. (2010). “Best Practices in Transboundary Waters Resources Management”, *Ingeniería y territorio*, N° 91 (forthcoming)

Yoffe, S., Wolf, A. and Giordano, M. (2001). *Basin at risk: Conflict and Cooperation Over International Freshwater Resources*, Oregon State University, p. 266

Zeitoun, M. and Allan, T. (2008). “Applying Hegemony and Power Theory to Transboundary Water Analysis”, *Water Policy* 10 (S2): 3 - 12.

Internet

Governmental and intergovernmental websites

ASEAN, *Sovereignty, intervention and the ASEAN way*, 3 July 2000, <http://www.aseansec.org/3221.htm>

FAO, *Aquastat*, <http://www.fao.org/nr/water/aquastat/main/index.stm>

Ministerio de Medio Ambiente y Recursos Naturales, El Salvador, <http://www.marn.gob.sv/>

OECD, *Development and Climate Change in Egypt: Focus on Coastal Resources and the Nile*, <http://www.oecd.org/dataoecd/57/4/33330510.pdf>

UNESCO-PCCP, <http://www.unesco.org/water/wwap/pccp/>

UNESCO-WWAP, <http://www.unesco.org/water/wwap/>

UN-Document.net, Johannesburg Declaration on Sustainable Development, <http://www.un-documents.net/jburgdec.htm>

UNDP Human Development Reports, <http://hdr.undp.org/en/statistics/>

UNDP Transboundary Waters Programme,
<http://www.undp.org/water/priorityareas/trans.html>

United Nations, Aaron Wolf, *Shared Water Resources: Conflict, Cooperation & Climate*, http://www.un.org/esa/dsd/dsd_aofw_wat/wat_pdfs/meetings/wat_gapd1109/Wolf_presentation.pdf

United Nations, Arc. John L.S. Alkali, *Planning Sustainable Urban Growth in Nigeria: Challenges and Strategies*, Conference on Planning Sustainable Urban Growth and Sustainable Architecture, held at the ECOSOC Chambers, United Nations Headquarters, New York, on 6th June 2005. <http://www.un.org/docs/ecosoc/meetings/2005/docs/Alkali.pdf>

UNSTATS, <http://www.unstats.un.org>

U.S. Census Bureau, <http://www.census.gov/ipc/www/idb/region.php>

WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation, <http://www.wssinfo.org/>

World Bank, <http://www.worldbank.org/>

World Bank, <http://beta.worldbank.org/climatechange/overview>

Other references online

Cascão, A. (2007). *Unraveling current hydropolitical cooperation in the Nile Basin*, NATO/Arava Water Conference, Israel, November 19-21 2007, <http://www.slideshare.net/ana.cascao/cascao-arava-hydropolitical-cooperation-nile-basin-presentation>

Cascão, A. (2008), *Ambiguity as a solution for the Nile Legal Deadlock?*, Presentation to the NBDF, Khartoum, <http://www.slideshare.net/ana.cascao/cascao-khartoum-ambiguity-nile-political-deadlock-presentation>

Center for Columbia River History, *Columbia River History*, <http://www.crh.org/river/history.htm>

Circle of Blue, <http://www.circleofblue.org>

Daily Monitor, “EAC to discuss Lake Victoria investment deals”, 02/09/2010, <http://www.monitor.co.ug/Business/Commodities/-/688610/1001418/-/bs1yt7>

Folha Online, “Itaipu bate recorde de produção de energia, mas perde participação no consumo”, 02/02/2009, <http://www1.folha.uol.com.br/folha/dinheiro/ult91u485484.shtml>

King’s College London, Cascão, A., (2006). *Hydro-Hegemony & Counter Hydro-Hegemony in the Nile River Basin*, <http://mykcl.com/content/1/c6/04/77/70/Cascao-HHandCounterHH-Nile.pdf>

Library of Economics and Liberty,
<http://www.econlib.org/library/Essays/rdPnc10.html#Introduction,%20by%20Milton%20Friedman>

Mekong River Commission, <http://www.mrcmekong.org>

Nile Basin Initiative, <http://www.nilebasin.org>

Northwest Power and Conservation Council, <http://www.nwcouncil.org>

Oregon State University, *Transboundary Freshwater Dispute Database*,
<http://www.transboundarywaters.orst.edu/database/>

Stanford Encyclopedia of Philosophy, <http://plato.stanford.edu/entries/prisoner-dilemma/>

The Daily Star, “Severe water crisis within next two decades, say experts”, 22/08/2010,
<http://www.thedailystar.net/newDesign/news-details.php?nid=151768>

The New York Times, Choe Sang-Hun, “North Korea Opens Dam Flow, Sweeping Away 6 in the South”, 06/09/2009,
<http://www.nytimes.com/2009/09/07/world/asia/07korea.html>

The Water Page, <http://www.africanwater.org/nile.htm>

Water Encyclopedia, Allen Cain, *Columbia River Basin*,
<http://www.waterencyclopedia.com/Ce-Cr/Columbia-River-Basin.html>

WaterWiki.net, <http://waterwiki.net/index.php/>

World Resources Institute, *EarthTrends*, <http://earthtrends.wri.org/index.php>

Treaties, conventions and international law

Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, 1995, http://www.mrcmekong.org/agreement_95/agreement_95.htm

Charter of the United Nations, <http://www.un.org/en/documents/charter/index.shtml>

Convention (IV) respecting the Laws and Customs of War on Land and its annex: Regulations concerning the Laws and Customs of War on Land, 1907,

<http://www.icrc.org/ihl.nsf/FULL/195>

Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol I), 8 June 1977
<http://www.icrc.org/ihl.nsf/7c4d08d9b287a42141256739003e636b/f6c8b9fee14a77fdc125641e0052b079>

Protocol for the Prohibition of the Use in War of Asphyxiating, Poisonous or other Gases, and of Bacteriological Methods of Warfare,
http://www.un.org/disarmament/WMD/Bio/pdf/Status_Protocol.pdf

UN Convention on the Law of the Non-Navigational Uses of International Watercourses, 1997,
http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf

UNECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes, 1992, <http://www.unece.org/env/water/pdf/watercon.pdf>

Annexes

I. **Main features of selected transboundary river basins**..... p. 72

Indus River basin..... p. 72

Lempa River basin..... p. 73

Mekong River basin..... p. 74

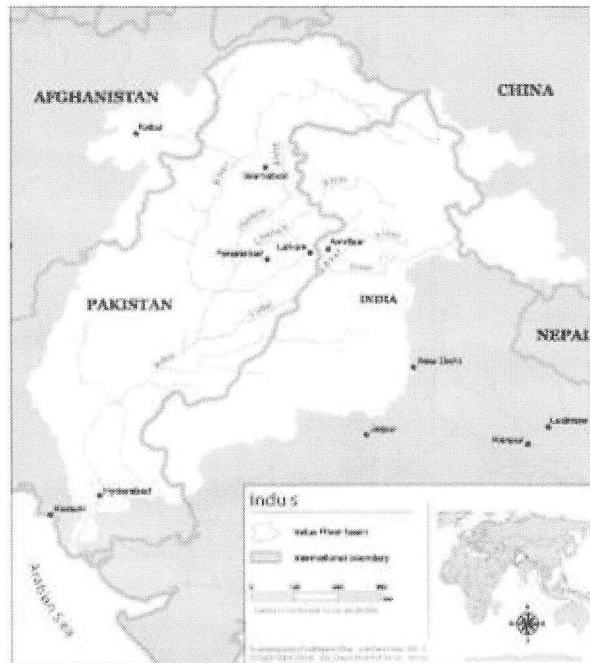
Nile River basin..... p. 75

Senegal River basin..... p. 76

II. **Internship at UNESCO**..... p. 77

I. Main features of selected transboundary river basins

Indus River basin



Source: Oregon State University