

Sustainable Management of the Water Conflicts

Euphrates and Tigris River Basin



Date: 27 August 2012

Name: Semra Basaran

Number: s4171039

E-mail: semra.baaran@ru.nl

Radboud University of Nijmegen

Nijmegen School of Management

European Spatial and Environmental Planning

TABLE OF CONTENTS

ACKNOWLEDGEMENT	iv
LIST OF TABLES AND FIGURES	v
LIST OF ABBREVIATIONS.....	vi
CHAPTER 1	1
1.1 Introduction	1
1.1 Research Goal and Research Questions	4
CHAPTER 2 THEORY OF POLICY TRANSFER.....	6
2.1 Introduction	6
2.2 Theoretical approach	6
2.3 Middle-East and Policy Transfer	9
CHAPTER 3 CONFLICT IN THE EUPHRATES-TIGRIS RIVER BASIN.....	12
3.1 Introduction	12
3.2 Hydrological and Geographical Characteristics	12
3.3 History of the Hydro-political Relations in Euphrates-Tigris River Basin	14
3.3.1 From the 1920s to the 1960s	14
3.3.2 From the 1960s to the present	14
3.4 Southeast Anatolia Development Project (GAP)	18
3.5 Agreements and Protocols	20
3.5.1 The Lausanne Peace Treaty 1923.....	20
3.5.2 The Treaty of Friendship and Neighborly Relations 1946.....	21
3.5.3 The 1987 Economic Protocol.....	21
3.6 Riparian Approaches and International Water Law	21
CHAPTER 4 EU WATER FRAMEWORK DIRECTIVE	24
4.1 Introduction	24
4.2 EU WFD and Principles	24
4.3 WFD Practices in Turkey	27

CHAPTER 5	THE SHARED RIVERS IN THE IBERIAN PENINSULA	30
5.1	Introduction	30
5.2	Hydrological and Geographical Characteristics	30
5.3	Bilateral Treaties and Conventions.....	32
5.3.1	Treaty of Limits 1864.....	32
5.3.2	1927 and 1964 Agreements on the use of Douro River	32
5.3.3	1968 Agreement	33
5.3.4	Albufeira Convention	33
5.4	The Implementation of the WFD in the Iberian Peninsula.....	36
CHAPTER 6	SHARED RIVERS BETWEEN U.S. AND MEXICO	40
6.1	Introduction	40
6.2	Hydrological and Geographical Characteristics	40
6.3	Trans-boundary Water Relations between U.S. and Mexico	42
6.4	Treaty of 1944	43
6.5	1960s and the Salinity Problem	44
6.6	International Boundary and Water Commission	45
6.7	California: A new Conflict?	46
CHAPTER 7	CONCLUSIONS	50
SUMMARY.....		54
ANNEX I	MAJOR DAMS ON THE EUPHRATES RIVER.....	55
ANNEX II	MAJOR DAMS ON THE TIGRIS RIVER	56
ANNEX III	Characteristics of Water Problems of Cases.....	57
LIST OF INTERVIEWS		58
BIBLIOGRAPHY		59

ACKNOWLEDGEMENT

I would like to express my deepest gratitude to my supervisor Dr. J. Duncan Liefferink for his patience, advice, encouragement and insight throughout the research.

I made interviews for data collection in this research. It became clear for me that it is not easy to find someone, who answers the questions, mainly in Spain. The limited answers I had, were made possible with the initiative of Dr. Liefferink. At this point I would like to present again my special thanks to him.

I would like to dedicate this work to my dear parents and Mehmet Akpolat, who are always beside me and supporting me with their love.

LIST OF TABLES AND FIGURES

Figure 1. The Euphrates and Tigris Rivers.....	1
Figure 2. The Euphrates and Tigris River Basin.....	13
Figure 3. The shared river basins in the Iberian Peninsula	31
Figure 4. The Rio Grande and Colorado River	41
Table 1. Theory of Policy Transfer and Questions from Middle-East.....	11
Table 2. Water Resources of Shared River Basins in the Iberian Peninsula.....	32

LIST OF ABBREVIATIONS

DSI	The General Directorate of State Hydraulic Works
ETIC	The Euphrates-Tigris Initiative for Cooperation
EU	European Union
GAP	The Southeastern Anatolian Project
GOLD	The General Organization for Land Development
INAG	Instituto da Agua Portugal (Portugal Water Institute)
INBO	The International Network of Basin Organizations
OECD	Organization for Economic Co-operation and Development
RBMP	River Basin Management Plan
UN	United Nations
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
U.S.	The United States
USAID	The United States Agency for International Development
WFD	Water Framework Directive

CHAPTER 1

1.1 Introduction

Water is a fundamental resource for life. About 20 per cent of the world population suffers from water shortages (UN World Water Development Report 2012, 5). The uneven distribution of water resources makes the human history rich in water conflicts. There are still many ongoing conflicts over water resources all over the world. The growing demand for water under the impact of population growth and industrialization is making the conflicts harsher. The climate change is another factor that puts pressure on water resources.

The Middle-East is one of the places that suffer from water scarcity. The Middle-East together with the North-Africa Region has 5 per cent of the world population, while they have only 0.9 per cent of world's freshwater resources (World Bank Report, 1995). Gleick claims that scarce water resources in the Middle-East are element of international and domestic policy discussions. The water disputes in this region have strategic implications. (Gleick, 1993; 85).

Turkey, Syria and Iraq are the riparian countries of the Euphrates and Tigris rivers. Both of these rivers originate in Turkey, flow through Syria, unite in Shatt-al Arab in Iraq and empty in the Persian Gulf. This is the reason that some authors assume them one river basin (Hakki, 2006; Kibaroglu, 2008). These rivers flow through arid and semi-arid areas. A Mediterranean climate is dominant with rainy winters and warm dry summers in the upstream region. The main characteristic of the river basins is the high evaporation rate caused by high temperatures.



Figure 1. The Euphrates and Tigris Rivers

Source: <http://www.yale.edu/ceo/Projects/swap.html>

All three riparian countries make use of these rivers for irrigation activities, human consumption and generation of electricity. The downstream riparians Iraq and Syria are almost totally dependent on the Euphrates River in their water need (Haftendorn, 2000; 52). Turkey as the upstream riparian, gets 28.5 per cent of its freshwater need from the Euphrates and Tigris river basin, Syria gets 65 per cent, while Iraq is totally dependent on these rivers for its freshwater supply (Kibaroglu, 2008; 186). The problem started when the upstream riparian carried out development projects on these rivers, which had consequences for other riparians.

In order to have a complete picture of the situation, the political aspect of this conflict should also be taken into account, because all the three riparians ascribe political and security significances to this problem.

The problem started in the second half of the 20th century when the riparian countries came through the first phase of state building and committed to great development projects on the Euphrates and Tigris river basins to utilize their water for industrial and domestic use and irrigation activities (Kibaroglu, 2008; 187).

Along with Turkey's Southeastern Anatolia Project (GAP is the Turkish acronym), Syria's Euphrates Valley Project is also crucial. Syria's Tabqa Dam on Euphrates brought Iraq and Syria to the edge of the war in 1970s because of the water shortages experienced in Iraq during the same period. Saudi Arabia's intermediary role provided them with an agreement whose content is still kept secret (Burlison, 2005).

Currently the most controversial project on this river basin is Turkey's major GAP project. This regional development project was started in the mid-1980s and generated concerns by downstream riparians that their flow would be considerably reduced. With GAP, Turkey aims at 26 billion kWh energy generation and the irrigation of 1.65 million hectares of land. Turkey expects to be an electricity exporter in the region. Agricultural production is also expected to increase, which can make Turkey a food exporter in the region. Also, with better living standards in the future through this project in the Southern Anatolia region, Turkey may be able to find a solution to its Kurdish problem (Hakki, 2006;443).

The project has still not been completed because of political and economic issues; such as the armed conflict with Kurdish nationalist organization PKK (Kurdish Worker Party) and the international organization's reluctance to finance the project due to the ongoing water conflict. Turkey's increasing water use has already some qualitative and quantitative consequences on the flow for the downstream riparians, which may bring serious harms to Iraq and Syria economically and socially.

The possible impacts of GAP on downstream countries are estimated as; water quantity as well as quality problems as a result of excessive water use, increase in irrigated land area and use of fertilizers and chemicals in the river basins (Hakki, 2006;444). Irrigation activities of the downstream riparians also have considerable impacts regarding water quality and quantity.

Negotiations among riparians started in 1964 and they established a Joint Technical Committee (JTC) in 1980 to identify the water needs of the countries. However, during 16 meetings of JTC until 1993 they could not produce a resolution. While Turkey perceives the water problem as a

technical one and wants to solve it in technical committees, Iraq and Syria are for an immediate allocation agreement (Kibaroglu, 2008; 188).

The Kurdish problem, which is common among these three countries, also has a considerable impact on the water conflict. With this problem the water issue gained a political significance from the 1990s on. The countries tend to use either Kurdish problem or the water problem as a political tool against each other. The 1998 confrontation between Syria and Turkey is a suitable example. When Syria demanded more water, Turkey demanded that Syria must stop its support for the PKK and both countries exchanged war threats. This ended with the deportation of Abdullah Öcalan (PKK's leader) from Syria and the signing of the technical Adana Accord (Kibaroglu, 2008;189).

As upper-riparian, Turkey's approach plays a crucial role in the problem. This country emphasizes its absolute sovereign rights, which say that "riparians may use the water resources in any way they please regardless of the consequences in other riparians" (Correia, Silva, 1996; 319). This is quite a problematic approach and was declared obsolete by scholars and international tribunals (Wolf, 1999). Instead "limited territorial sovereignty, which recognizes the rights of the downstream countries and at the same time, guarantees the right of reasonable utilization by the upstream country in the framework of equitable usage by all interested parties" (Correia, Silva, 1996; 319) may better serve the riparian states' interests.

International law is in favor of equitable use of international water resources. The UN Convention on the Law of Non-navigational Uses of International Watercourses (1997) sets 'limited territorial sovereignty' as the international standard for international watercourses and promotes the prevention of significant harm to the downstream riparians (Burlinson, 2005; 41).

In the Middle-East water is not only perceived as a natural resource but as a political and military tool. This is making the conflict harder. Some scholars even argue the likelihood of a war on the waters of the Euphrates and Tigris (Darwish, 1993; Gleick, 2000). However, water is not a substitutable resource and the riparians of the Euphrates-Tigris river basin should cooperate with each other in light of this reality to find a sustainable and acceptable solution to the water problem. In this regard the EU Water Framework Directive (WFD) may serve as a tool for better management of the shared Euphrates and Tigris river basin.

WFD, which was adopted in October 2000 and published on 22 December 2000, is one of the most comprehensive arrangements of the EU in the field of water quality and quantity. The implementation of WFD is mandatory for the member states. The directive establishes common objectives and measures to achieve good status of water. It adopts an integrated river basin management system and requires member states to prepare river basin management plans. WFD promotes the harmonization and coordination of water management and information exchange between riparian states as well as stakeholder involvement in the governance of water resources. The EU candidate countries are also required to adopt the WFD (ec.europa.eu, 10-02-2012). Accordingly, Turkey started the implementation in 2000 but delayed it because of technical problems and costs of implementation (Moroglu andYazgan, 2008; 271). Its familiarity with WFD and upper-riparian status can facilitate the establishment of the cooperation, when this country is willing.

In this context, my hypothesis is that an international cooperation between riparians of Euphrates and Tigris on the basis of environment, water quality as well as quantity related problems may have the potential to be an initiative that contributes to the discussion of the water allocation problems as well. At that point the main core ideas of the WFD can be a roadmap for the riparians. Some of these ideas are; the cooperation of the riparian countries in the framework of river basin management, the information exchange, harmonization of the management systems, stakeholder involvement, monitoring of water status etc. Instead of identical implementation of the articles of WFD, which may be hard for the parties; an initiative between governmental and non-governmental representatives from Turkey, Syria and Iraq may consider it as a guide to reach the sustainable management of shared rivers.

In order to control my hypothesis that a co-operation based on the main core ideas of WFD, can have positive impacts on the water problems in the Euphrates-Tigris river basin area; the shared river basins (Tejo, Minho, Lima, Douro, Guadiana) of Portugal and Spain is analyzed.

These states suffer from a water scarcity problem and they have a long history of water disputes. Both are EU members. They have started the implementation of the WFD. Do O authors claim that the core ideas of the WFD affected the problem positively (Do O, 2010; 268). Maia also claims that the cooperation between Portugal and Spain in the framework of WFD contributes to the implementation of the 1998 Convention on Co-operation for Protection and Sustainable Use of Portuguese-Spanish River Basins (Maia, 2003;389). The intention here is to find out to what extent the core ideas of the WFD have impact on the management of shared rivers and scarcity problem in the Iberian Peninsula and whether the results are applicable to the Middle-East case.

As the second case, the shared river basins (Rio Grande and Colorado rivers) between U.S. and Mexico will be analyzed to see whether the measures that have been taken there to resolve the water problems of shared rivers show any similarity with the water management system of the WFD. The aim is to gather information about the implementation of these core ideas outside the EU and their contribution to the management of shared rivers. Thereby lessons can be drawn for the main case of the Euphrates and Tigris rivers.

1.1 Research Goal and Research Questions

This study is interested in what kinds of impacts integrated water management policies have on the problems of shared rivers. And what are the institutional, political, economic and social settings, required for policy transfer to the Middle-East in the context of WFD principles.

In order to address this research, it is important to establish the relationship between water problems and the implementation of integrated water management principles that are formulated in the EU WFD. Following this, two case studies investigate the relationship between water problems in the shared river basins and the impact of these principles.

In this respect my main question is:

To what extent may the core ideas of the WFD be applied in the Euphrates and Tigris river basins and to what extent may these serve as cooperation grounds, which will lead to the solution of scarcity problems?

The sub-questions are:

- What is the situation in the Euphrates and Tigris River basins?
- Which factors have impact on the consensus over the Euphrates and Tigris case?
- What are the characteristics of the trans-boundary river basin system of the WFD that may serve as a solution map?
- To what extent can the main core ideas of the WFD be applied to the Middle-East case?
- Which lessons can be drawn from the case study of the Spain-Portugal river basins in connection with the implementation of the WFD?
- Is there any resemblance between the integrated water management measures implemented to solve the problems of shared rivers between U.S. and Mexico and the water management system of the WFD? What is the impact of these measures on the water problems and which lessons can be drawn for the Middle-East?

Data collection includes primary and secondary literature review and interviews with the professionals of water management.

The thesis consists of the next chapters:

The second chapter introduces policy transfer approach and gives a literature review on it. The relevant ideas of this approach are discussed for the Middle-East case.

The third chapter elaborates the water problem between Turkey, Syria and Iraq in the framework of a historical perspective. The political dimension and the status of the problem in international law are investigated. The Turkish GAP project, its current status is studied.

The fourth chapter elaborates the main core ideas of WFD and investigates the relation between international water law principles. In the last section the implementation of WFD in Turkey is highlighted.

The next chapter gives the outlines of the problems of trans-boundary river basins in the Iberian Peninsula. Within the framework of the relevant agreements the evolution of the problem up to the present day is discussed.

The sixth chapter investigates the problems of trans-boundary rivers between the USA and Mexico. This chapter gives the outlines of the problems and analyses the lessons, which can be drawn for the Middle-East.

The final chapter provides the findings, conclusions and recommendations.

CHAPTER 2 THEORY OF POLICY TRANSFER

2.1 Introduction

In the globalizing world the impact of increasing communication between states facilitates the exchange of experiences, ideas, programmes and policies. The literature about learning from the experiences of others is dispersed between many topics such as:

- diffusion;
- policy-transfer;
- lesson-drawing and
- convergence.

This chapter gives a view of the theoretical framework. First a literature review on the theory of policy transfer is given. After this the relevant ideas for the Middle-East case are discussed.

2.2 Theoretical approach

The concepts of convergence, diffusion, policy-transfer and lesson-drawing are approximately about the same phenomenon namely the exchange of knowledge about policies, ideas and programmes. While policy transfer involves both voluntary and coercive methods of exchange; lesson-drawing and diffusion is based on voluntary communication that enables actors to adapt the gained knowledge to their own system. Convergence however, includes the implementation of more or less the same programme in more than one state.

The theory of Policy transfer is adopted because it involves voluntary methods and gives a more comprehensive account of the conditions in which policies are transferred. Also, it indicates that the policies are not copied but rather adapted to the conditions at home. Before elaborating on the policy transfer, it is useful substantially useful to mention the other concepts to make the reason for choosing policy-transfer approach clear.

Diffusion is defined as “the process by which an innovation is communicated through certain channels over time among members of a social system” (Rogers E.M, 2003; 5). This definition explains the diffusion as a decision taken by the ‘members of social system’. However Stone prefers to define it as a kind of inevitable. She says that “the ‘diffusion literature suggests that policy percolates or diffuses; something that is contagious rather than chosen. It connotes spreading, dispersion and dissemination of ideas or practices from a common source or point of origin.” (Stone, 2004; 546). This concept seeks to identify “the patterns according to which policies spread and the geographic and structural characteristics of countries which might explain them” (Stone, 2000a;4). However working with patterns forms the main handicap of the diffusion that it has little to say about the changing political dynamics that have impact on the policy adoption. Due to this characteristic Peters (1997; 76) qualifies diffusion as apolitical.

Convergence is described as the possible result of the policy-transfer (Stone, 2004; 547). Bennett (Bennett, 1991; 32) suggests a 3 level of experience exchange: “knowledge about a programme, utilization of that knowledge and the adoption of the same programme” to explain the difference between convergence and diffusion. He puts diffusion into the first level while putting convergence into the ‘adoption of the same programme’ level. Here the cumulative

adoption is dominant rather than the selective one. There is no absolute necessity for a direct link between states; convergence can happen in its absence. The pushing factors towards convergence are seen as industrialization, globalization or regionalization (Stone, 2004; 547). The increasing similarity between states is the result of adoption of the same policies.

The lesson-drawing, contrary to convergence, depends on the communication between agents and the selective adoption of the experiences. Except including only the voluntary methods, it has many commonalities with policy-transfer. Robertson claims that “Successful lesson-drawing depends on estimating the potential fungibility of a program and anticipating possible systemic, instrumental, or cost obstacles, whether or not they enter into political debate” (Robertson, 1991; 68). Policy transfer also emphasizes the impact of the political, economic and institutional conditions on the outcome of the process.

It is seen from the literature that the studies of policy-transfer were originally started in the USA to explain the adoption of policies and the spread of diffusion throughout the federal state (Stone, 2004; 546). Dolowitz and Marsh (1996; 344) define both policy-transfer and lesson-drawing as “ the process in which knowledge about policies, administrative arrangements, institutions in one time and/or place is used in the development of policies, administrative arrangements and institutions in another time and/or place”. This is not a determined process. Actors involved in the process, methods, objects, the outcomes and the degree of exchange can be diverse.

In the globalizing world governments face similar problems, which induce them to seek policy transfer. They sometimes search for foreign experiences as the easier, cheaper and faster way of solving a complex problem. In this respect governments can attempt to policy-transfer for the problems that need an urgent resolution (Dolowitz, 2000; 8). Along with the displeasure with the status-quo, the enforcement of another government or international organization and the interdependencies between states can also be reasons for policy-transfer.

Although nation-states are mostly mentioned as the agents of the transfer, these can be various. Actors engaged in transfer can be both governmental and non-governmental such as politicians, bureaucrats, civil servants, experts, non-governmental organizations, transnational and supra-national organizations, consultants, think tanks (Dolowitz, 2000;10), business representatives, in some problems the people that are directly affected through the problem can be actors of transfer.

The object that these various actors want to transfer can be policy goals, structure and content, policy instruments or administrative techniques, institutions, ideology, ideas, attitudes and concepts and negative lessons (Dolowitz and Marsh, 1996; 350).

The actor composition may change according to whether it is a voluntary or coercive policy-transfer. Dolowitz and Marsh (1996) analyze the policy transfer methods under three topics:

- voluntary;
- coercive and
- indirect coercive.

Not only the method but also the reason for transfer differs between the three. Communication is the main attribute of the voluntary transfer. The status quo, which turned out to be a disturbing deadlock, forms the ground to search for new lessons based on voluntary communication (Dolowitz and Marsh, 1996; 346). Here, the push for policy-transfer comes from inside the unit, where it should take place.

However in direct coercive transfer, the push comes from another government or organization. Examples of this kind of transfer are numerous when we consider the World Bank. In 2006 the World Bank's conditional approval of a \$75 million loan to a mining project in Ghana can be an appropriate example. Here the World Bank approved the amount under the condition that certain environmental criterion has to be met (Veenman, 2008; 2).

Indirect coercive transfer, on the other hand, is seen as the method between voluntary and direct coercive transfer. It emerges from externalities that come from outside the government. The environmental externalities from the US in pushed Canada to look to the US for lessons to make new environmental regulations (Dolowitz and Marsh, 1996; 348).

Transferability of a programme may be determined by many factors. "Convenience of the problem, direct relationship between the problem and solution, fewer side-effects, more information agents and easily predicted outcomes are the transfer facilitating factors" (Rose, 1991; 21). Similarity of the political and institutional settings is also among these factors (Dolowitz and Marsh, 1996).

Rose identifies five level of transfer as "copying, emulation, hybridization, synthesis and inspiration.

Copying indicates adoption of a programme, which is in use elsewhere, without any changes. "The easiest way to prove that copying has occurred is to examine the wording of the legislative" (Rose, 1991; 22)..

Emulation happens when a country "reject(s) copying in every detail, [but] accepts that a particular program elsewhere provides the best standard for designing legislation at home" (Rose, 1991; 22).

Hybridization and synthesis involve "combining elements of programmes found in two or more countries to develop a policy best-suited to the emulator" (Rose, 1991; 22)..

Finally, "studying familiar problems in an unfamiliar setting can expand ideas and inspire fresh thinking about what is possible at home" (Rose, 1991; 22).

The water conflict in the Middle-East is complicated through different political and institutional factors. The objective here is to investigate the transferability of the WFD ideas to the Middle-East on the basis of communication, which may bring about an inspiration.

2.3 Middle-East and Policy Transfer

Continuing disputes in the Middle-East region reveal the urgent need to discuss the region's issues in peaceful initiatives that include a wider scale of stakeholders beyond the governmental and military representatives such as non-governmental organizations, think tanks, scholars and people of the region. It is obvious that the harder the conflict is, the more difficult it is to find a resolution and consensus between stakeholders. However, through communication among stakeholders a wide spectrum of interests is considered and in that way the region can establish more effective solutions to its problems.

It is hard to estimate over the conflict-resolution potential of such a multi-actor voluntary communication in the Middle-East; while the government regimes of the parties are a matter of controversy and the problems are so intertwined. However, there are already some examples of voluntary communication in diverse fields, which show that the region has at least the potential to maintain such actions.

One of these actions is related to the Euphrates and Tigris problem. This is the Euphrates and Tigris Initiative for Cooperation (ETIC). It was established in May 2005 by a group of scholars and professionals from Syria, Turkey and Iraq. The aim of the ETIC is to promote the development of social, economic and technical cooperation between these countries (Kibaroglu, 2008; 182). It intends to lead the dialogue on the issues of the region and it involves a wide range of stakeholders. It has organized workshops and projects for the riparians' representatives. ETIC also aims at mobilizing faculty members and students in the regional universities to promote joint research and activities (Kibaroglu, 2008; 194).

Another example is the initiative of the International Dialogues Foundation (IDF) in the field of youth employment in the Middle-East and the European countries. IDF is an independent Dutch non-governmental organization but gained international character through inclusion of various members from Middle-East and Europe (Stone, 2000; 212). It organizes conferences and publishes reports in order to increase dialogue and understanding and to foster the cooperation between Western and Arab countries. Conferences were organized under the name of "Employment for Migrant Youth in Europe and in the Emigration Countries". The participants were NGOs, civil servants and entrepreneurs from the Middle-East and Europe. Youth employment projects were investigated, in which many Arab organizations (including Iraq and Syria) were participated (Stone, 2000; 213).

This initiative is described as an indirect coercive policy transfer because participation in the projects was free but the nature of these projects was largely influenced by the funding priorities of the EU. The degree of transfer is inspiration because "the ideas are likely to be adapted and synthesized depending on each country's individual characteristic" (Stone, 2000; 214). This initiative is expected to promote further policy transfer to the Arab world and cooperation between European and Middle-Eastern countries.

Water policy is one of the policy fields, where governments intensively look for foreign experiences to shape their water management policy. There are also many organizations such as OECD, UN World Water Development or The International Network of Basin Organizations (INBO) that induce the spread of water policies.

The two case studies of the thesis give general information over the social, political and economic conditions in which principles of integrated water management are implemented. This information should give a base to assess the possibility of water policy transfer in the Middle-East.

As Bulmer et al. (2007) do, I prefer to make a distinction between the negotiation and implementation phases of WFD. Bulmer et al. (2007) describe the negotiation process of WFD as voluntary transfer because it is negotiated by member states and the implementation process as coercive transfer because implementation is obligatory for member states. According to this division, there is no obligation to implement the WFD as none of the Middle-Eastern countries are EU members. Nevertheless, there is a need for sustainable water management. On the other hand Turkey endeavors to join the EU, which requires the transposition of WFD into national law. Thus the policy transfer here is somewhere in between voluntary and coercive transfer in the continuum of policy transfer.

Instead of full implementation, I prefer to talk about the transfer of core ideas of the WFD, such as coordination of the water management policies, data exchange, stakeholder involvement in the governance of the policy and more specifically preparation of river basin management plans. These ideas are part of integrated water management approach. In other words, the WFD is anticipated as a roadmap that is discussed in a voluntary communication initiative that may be established between the riparians. From here it can be said the degree of the policy transfer is likely to be the ‘inspiration’ because “familiar problems in an unfamiliar setting is studied to expand ideas and inspire fresh thinking about what is possible at home” (Dolowitz and Marsh, 1996; 351).

Before talking about reasons for choosing policy transfer, the concepts ‘voluntary’ and ‘communication’ need to be highlighted.

Rogers (2003; 35) defines communication as “a process in which participants create and share information with one another in order to reach mutual understanding”. Veenman describes characteristics of ‘communication’ as “different actors communicate about problems or policy issues, providing and creating knowledge and information and exchanging experiences” (Veenman, 2010; 6). Information exchanged and created in this way, namely through participation, information and experience sharing, stimulates actors to produce their own policies according to their conditions and needs.

The ‘voluntary’ method of the communication emphasizes that the governmental actors do not necessarily take part in this initiative (Veenman, 2010; 6). However excluding them would not be realistic since they are the water policy implementing agents. The driving force in voluntary transfer, seen as the “need coming from inside the government for policy change” rather than obligations, power imbalances or economic processes (Dolowitz and Marsh, 1996; 346). However, the push coming from the non-governmental actors should also be listed as the driving force as it fits the description of the voluntary method above.

An initiative that is based on the main core ideas of WFD can be more effective when including all the stakeholders such as governmental representatives, NGOs, think tanks, people from the region and businessmen as much as possible. Wide scale stakeholder involvement contributes

to the discussion of the problem with all the aspects. While the governmental actors think mostly in the framework of the political dimension of the problem, scholars and professionals contribute with data and research as the think tanks and NGOs.

Table 1 below constitutes a summary of the theory and questions from the Middle-East case.

Theory of Policy Transfer		Euphrates-Tigris River Basin-Questions
1	Reasons to search for foreign experiences	Why should we adapt integrated water management i.e. WFD principles?
2	The source of need for policy transfer	Who sees a need for transfer of integrated water management i.e. WFD ideas?
3	The agents of policy transfer	Who should transfer these ideas?
4	The level of policy transfer	Should we adapt these integrated water management i.e. WFD principles to our conditions or accept them as a whole?
5	The object of policy transfer	What should we transfer? Ideas, policies, concepts...
6	Type of policy transfer	Should we transfer these ideas through voluntary, coercive and indirect coercive methods?
7	Transferability of policy	Are the main core ideas of WFD i.e. integrated water management applicable to the Middle-East?

Table 1. *Theory of Policy Transfer and Questions from Middle-East*

CHAPTER 3 CONFLICT IN THE EUPHRATES-TIGRIS RIVER BASIN

3.1 Introduction

The problem on the Euphrates and Tigris rivers is complicated through disagreements on the issues such as whether the negotiations should exclusively be limited to the Euphrates or to include the Tigris as well; whether these rivers are international or not and whether the water should be shared or allocated.

This chapter analyzes the water conflict between Turkey, Syria and Iraq in its political and juridical context. The following points are discussed:

- The hydrological and the geological analysis of the river basins
- The historical evaluation of the problem and the impact of the non-water issues on the conflict
- South Anatolia Project (GAP)
- The important agreements and protocols among the parties that include water related components.

3.2 Hydrological and Geographical Characteristics

The Euphrates and Tigris rivers are the two longest rivers in southwest Asia (Kollars and Mitchell, 1991; 4). Both of them originate from highlands of Turkey flow through Syria and Iraq and empty in Persian Gulf. The Euphrates-Tigris river basin lies in a region with high mountains to the north-west and lowlands in south and east (Kibaroglu, 2002; 160).

The Euphrates River emerges around the city of Elazig in Turkey. Its total length is 2,780 km. It has a river basin area of 444,000km² wide. Thirty three per cent of Euphrates river basin lies in Turkey, 19 per cent in Syria and 46 per cent is in Iraq. Two main tributaries in Turkey are Murat and Karasu rivers. The main tributaries in Syria are Sacir, Balikh and Khabur. Almost 90 per cent of the waters of the river is generated in Turkey while Iraq makes no contribution to the run-off and Syria makes the remaining 10 per cent (Kibaroglu, Scheuman, 2011; 277). It loses a part of its flow into the series of deserts and distributaries after entering Iraq.

Tigris River emerges almost 30 km away from Euphrates near Lake of Hazar in south Elazig. It forms, before entering Iraq, the border, first between Syria and Turkey, then between Syria and Iraq. Fifteen per cent of it lies in Turkey while 0.3 per cent in Syria and 75 per cent in Iraq. Its total length is 1840 km and its river basin covers 387.600 m² area. The main tributaries in Turkey are the Tigris and Batman-su; in Iraq Great Zap, Little Zap, Adhaim and Diyalah. (Kibaroglu, 2002;16). Iraq is totally dependent on the Euphrates and Tigris for its freshwater needs (Haftendorn, 2000; 52).



Figure 2. The Euphrates and Tigris River Basin

Source: <http://www.britannica.com/bps/media-view/546/1/0/0>

Both rivers flow through arid and semi-arid areas. Kollars and Mitchell (1994; 78) characterize the Middle-Eastern streams as being ‘exotic’, which means that “they rise in well-watered areas but before reaching the sea or some inland sink, they flow into an arid zone, where no more water is added, and they actually diminish in volume through evaporation and seepage...that makes them have seasonal periods of high water followed by periods of reduced flow”. Due to these seasonal fluctuations; the Euphrates flows 28 and the Tigris almost 80 times higher than their minimum.

Characteristics of sub-tropical Mediterranean climate in the river basin are wet winters and dry summers. They are evident mostly in southeastern Turkey and northern Syria and Iraq. While in the Mesopotamian plain annual rainfall is around 200 mm/m^2 ; the winter precipitation is between $400\text{-}600 \text{ mm/m}^2$ (Kibaroglu, 2002; 164). The summer season is characterized with high temperatures approaching 50°C , relative low humidity and high evaporation rates especially in the lower regions of the basin.

Due to high seasonal fluctuations (Kibaroglu, 2008), rapid developments on these rivers in recent years and lack of confidence among riparians that prevent data sharing, it is difficult to make a certain evaluation of the Euphrates and Tigris average discharge volume. Kollars and Mitchell claim that maximum average annual volume of the Euphrates reaches up to 35, 9 billion m³ (bcm)/year and of the Tigris up to 70, 4 bcm/year (Kollars and Mitchell, 1991; 3).

Per capita water availability of the three riparians is at the threshold of falling into the ‘water stressed’ category. UN describes water stressed places as areas, where yearly water availability is below 1700 m³ / per capita (<http://www.un.org/waterforlifedecade/scarcity>, 03-2012). According to UNESCO Report, per capita available water in Syria is 1440 m³/year, in Iraq 2920 m³/year and 2950 m³/year in Turkey (UNESCO, 2006). Along with the existing situation, the future demographic expectations are also aggravating the situation. The General Directorate of State Hydraulic Works estimates Turkish population as 100 million by 2030 and per capita available water as 1000 m³/year; while the availability in Syria in 2025 is estimated 770 m³/year by UN Economic and Social Commission for Western Asia (Aydin and Ereker, 2009; 607)

3.3 History of the Hydro-political Relations in Euphrates-Tigris River Basin

Due to great differences in hydro-political relations in the first and the second half of the 20th century the analysis is divided into two periods i.e. from the 1920s to the 1960s and from the 1960s to the present.

3.3.1 From the 1920s to the 1960s

Kibaroglu characterizes the international water resources in this period as “harmonious” (Kibaroglu, 2000; 185). The three riparians of the Euphrates and Tigris were established at the beginning of the 20th century. Consequently, they were mainly engaged in state consolidation such as the establishment of new government institutions and investigation of development potential related to land and water resources in the first part of the century. This agenda prevented them from developing projects on these rivers.

The Treaties signed during this period such as the Lausanne Treaty of 1923 and the 1946 Treaty of Friendship and Neighbourly Relations between Turkey and Iraq mostly regulate the flood control measures rather than allocate water or promote cooperation.

3.3.2 From the 1960s to the present

After the first phase of state consolidation the riparians almost simultaneously started water development projects on the Euphrates and Tigris.

Turkey established its General Directorate of State Hydraulic Works (Turkish acronym DSI), which is the state agency responsible for utilization of water resources, in 1954. (Aydin, Eker, 2009; 608). In 1960 it started the construction of the Keban Dam on the Euphrates as part of the Lower Euphrates Project of Turkey. This project was extended and transformed to GAP later.

In Syria the Baath Party, which came to the power in 1960, gave priority to the water development projects on the Euphrates. The Euphrates Valley Project was initiated for the purposes of irrigation of 640,000 hectares area, the generation of electricity, urban and

industrial use and the prevention of floods through regulating the flow of the Euphrates (Kibaroglu, 2008; 186).

The picture is the same for Iraq. The Iraqi government developed the “Revolutionary Plan” in 1968 for irrigation and agricultural projects. Also some new state organizations such as the Higher Agriculture Council and The Soil and Land Reclamation Organization were established to carry out studies and to provide the development projects (Kibaroglu, 2008; 187).

With the Keban Dam in the upstream region, concerns rose in Iraq and Syria that their flow would be reduced. They claimed a guarantee of absolute minimum flow (Scheuman, 2003; 748). Syria and Iraq tried to manipulate the donors of the Keban Dam namely the World Bank and USAID (US Agency for International Development) to force Turkey to an agreement. Turkey avoided giving such a guarantee (Kibaroglu and Ünver, 2000; 313). Consequently, negotiations started in the 1960s.

During the first trilateral negotiations in Bagdad in 1965, Iraq proposed to establish a joint technical committee (JTC) with the power of supervising a water-sharing agreement. Turkey wanted a JTC with only the power of coordinating the development projects of the three states on the Euphrates and Tigris. Whereas Syria’s proposal was to establish the JTC with the power to study the water needs of the states for irrigation needs and to study the possibility of covering the water shortages of the Euphrates by diverting water from the Tigris. This proposal met with a strong rejection from Iraq (Kibaroglu and Ünver, 2000; 315). The meeting was fruitless.

In the meantime, Turkey unilaterally gave a guarantee for an annual minimum $350\text{m}^3/\text{sec}$ flow at the end of the negotiations with USAID in Ankara, (Aydin, Ereker, 2009; 608).

In another meeting in 1973, a trilateral technical committee studied the development sites of the three riparians and a sub-committee was established to discuss a water allocation agreement. But the Turkish delegation declared that they found 18 bcm water amount that Iraq declared as their water need, exaggerated. Thus, providing this amount was impossible. Turkey claimed that Iraq was using water inefficiently and that their calculations were not based on objective criterion. The outcome of this meeting was the decision that hydrometric information on daily water reservoirs of Keban and Tabqa Dams would be exchanged between the parties (Kibaroglu and Ünver, 2000; 316).

Due to the uncoordinated construction plans of the riparians the problem was escalated to a war threat between Iraq and Syria in 1975. Turkey started with the filling of the Keban Dam while almost simultaneously Syria undertook the filling of the Tabqa Dam and Iraq the Habaniya Lake. As a result Iraq accused Syria of cutting its flow to intolerable levels. Syria refused this accusation and showed the filling of Turkey’s Keban Dam as the main reason of the reduction. Both states threatened each other with war and massed their troops to the border. Scheuman suggests that the competition for hegemony in the Arab world between two Arab Baath regimes was probably played a role in this situation (Scheumann, 2003; 748). The conflict was quieted with the mediation of Saudi Arabia and the then Soviet Union. An agreement was signed, which was not made wholly public. It was declared that through this agreement “Syria was

allowed to keep 40 percent of the Euphrates' that flows within its borders while the rest was to flow to Iraq" (Mehr, 2003; 259). Turkey also declared that it would increase the flow to downstream riparians to $450\text{m}^3/\text{sec}$ (Scheumann, 2003; 748). However without a trilateral water agreement the conflict continues with periodic escalations.

Only two years after the exchange of war threats, Turkey initiated its Karakaya Dam on Euphrates River. Iraq used its oil card and threatened to cut its oil exports to Turkey and demanded immediate debt repayment. Consequently, Turkey increased the flow to Iraq in 1980. Later, during the meeting of the Joint Economic Commission Iraq and Turkey decided to establish the JTC with the power of information exchange about the construction works, definition of procedures and measures to determine the appropriate amount of water necessary for irrigation needs and to discuss plans for the filling of the Karakaya Dam (Scheumann, 748). Syria joined the JTC in 1983. Despite this improvement, the problem became more complex with the integrating political and security aspects through Kurdish problem in the 1980s.

In the 1980s the water conflict gained a new political dimension through the Kurdish problem in the region and the GAP. The Kurdish Worker Party (PKK) was established in Southeast Anatolia in 1982 as an armed organization. It has national claims over this region. Syria provided training bases for PKK militants in the Bekaa Valley, which were controlled by Syria, and allowed the party leader Abdullah Öcalan to stay in Syria (Scheumann, 2003; 749). Aydin and Ereker (2011; 610) claim that Syria supported the PKK as a response to the GAP project of Turkey. This made the water problem an issue of national security for Turkey.

In March 1985 a Border Security Agreement was signed between Turkey and Syria but after a short time the Syrian Prime Minister, during his visit to Ankara, stated that "they were not able to prevent PKK intrusion, but if GAP dams would retain an excessive amount of water, Syria could retaliate with other means" (Scheumann, 2003; 749).

During the Prime Ministry and later the Presidency of Turgut Özal between 1983 and 1993 Turkey pursued a more cooperative approach. Nevertheless, it cannot be said that the main principles were abandoned. During the Gulf War, the USA requested Turkey to reduce the water flowing to Iraq. However Özal refused and stated that Turkey would not use water as a threat (Scheuman, 2003; 749). Also, during the filling process of Karakaya dam, which became a new crisis between riparians, Özal promised more water flow annually to the downstream riparians. (Scheumann, 2003; 749). An Economic Cooperation Protocol between Syria and Turkey was signed. During this meeting a security protocol was also signed with Syria. Though Turkish scholars (Kibaroglu, 2002; Turan, 2011) claim these protocols show that the the Kurdish issue and water problem were dealt together by the riparians.

In the mid-90s the situation turned. Iraq came out of first the Gulf war. The PKK increased its activities against Turkey. At the same time, Turkey started the filling of the Atatürk Dam and informed Iraq and Syria that it would take 4 weeks. However, during this process, the flow of the Euphrates to the downstream riparians stopped for a month. While the Turkish side explained this with technical problems (Altinbilek, 2004; 16), Arab countries claimed that it was a deliberate action by Turkey.

The result of this dispute was a failed oil agreement between Turkey and Iraq. However an agreement signed between Iraq and Syria in Damascus in 1990, in which parties agreed that regardless of water quantity, Syria would receive 42 per cent of Euphrates waters that flows within its boundaries while Iraq would receive the rest of 52 per cent (Gruen, 2000; 566).

The problem went on with the construction of the Birecik Dam. Iraq and Syria managed a strong opposition in the international arena. They demanded that Arab League countries stop their financial support to the construction. The Arab League called Turkey for an agreement based on the equitable use of the waters. Downstream riparians warned international companies that they may cut them from their future business plans, if they fund GAP. Moreover, during peace negotiations with Israel in 2000, Syria wanted the USA and Israel to force Turkey to let more water to the down-stream countries as a compensation for their loss of Golan Heights (Aydin and Ereker, 2009; 612).

At the end of the 1990s relations changed after the ultimatum crisis between Turkey and Syria. Turkey sent an ultimatum to Syria in 1998 saying that as soon as Syria supported PKK and let its leader Abdullah Öcalan to stay in its territory, it would be ready to go to war with Syria. After almost a month of war threat exchanges, Syria deported Abdullah Öcalan and the delegations of the two countries signed the Adana Protocol on 19-20 October 1998. This protocol promotes cooperation in the field of security but does not include any relevant article regarding the water issue (Karmon, 1999).

In this new period, the land and water development administrations of both countries; i.e. GAP and GOLD, started to cooperate in the field of making environmental protection projects, which provide sustainable utilization of regional land and water resources; training programmes, expert and technology exchanges and study missions (Kibaroglu, Ünver, 2000; 189).

The 2000s refers to a new period for Iraq as well. After the US invasion in 2003, establishment of updated databases became a priority and under the impact of US organizations such as the US Bureau of Oceans, Environmental and Scientific Affairs, USACE and USAID, the Ministry of Water Resources in Iraq was reorganized. Within this framework Iraqi authorities emphasize the importance of cooperation and data exchange (Kibaroglu, 2008). However there is still a trust problem. Iraqi people are skeptical of Turkey, due to its water reductions during the hard times of Iraq during wars (Orsam, Interview with Al-Mossavi, 2012). The ongoing chaos in Iraq also forms a barrier for further cooperation.

After a long time, high level visits were made between the two states. Political, economic and cultural relations were improved. Turkey in this period emphasized the good neighbourhood policy (Ministry of Foreign Affairs). The ministers of both sides often mentioned their faith in finding a resolution to the water problem in this atmosphere. In April 2008 within this framework the three riparians started to negotiate through water institute that consists of the water experts of them, to find a reasonable solution (FAO, 2008). A high Level Strategic Cooperation Council was established among riparians. Four pieces of water-related Memorandum of Understanding were signed between Turkey and Syria on the establishment of Orontes Friendship Dam by pumping water from the Tigris on the Syrian side, on the fight

against drought, and on the protection and improvement of water quality (Interview 3). Also Iraq and Syria signed an agreement in 2002 that allowed Syria to install a pumping station on the Tigris for irrigation purposes (FAO, 2008).

A significant development in this period is the establishment of the Euphrates-Tigris Initiative for Cooperation (ETIC) in 2005. This initiative was established by scholars and experts from the three riparians as well as Jordan and the U.S. to promote cooperation. The experts shared information about the national water policies and to develop a common understanding of the situation in the region. This voluntary initiative also aims at contributing to dialogue among the governments and creating sub-networks by bringing together different private stakeholder groups including farmers, community-based organizations, NGOs, business and professional societies (Interview 3). Kibaroglu, as one of its founders says, that “it embraces a holistic, multi-sectoral approach as opposed to one simply aimed at sharing the river flow”. (Kibaroglu, 2008; 192). However, it faces some challenges such as the lacking of institutional structure and funding (Interview 3). This initiative works through workshops, seminars and joint studies and meets each year. The last meeting took place in May 2012 in Istanbul and here the parties decided to extend the database for national and international law regarding water conflicts (Max Plac Institute for Comparative Public Law and International Law).

Nevertheless, the distrust in Syria could mean a break in the good relations. The consequences of this recent situation are not clear yet.

3.4 Southeast Anatolia Development Project (GAP)

Understanding Turkey’s development intentions on the Euphrates and Tigris rivers is essential, due to its upper-riparian position.

GAP is considered as one of the most extensive river basin projects in the developing countries (Harris, 2002; 745). It was launched in 1977 and consists of 22 dams and 19 hydroelectric power plants on the Euphrates and the Tigris within the Turkish territory. The project aims at the irrigation of 1, 65 million hectare areas and an annual 27 billion kWh energy generation (Carkoglu and Eder, 2001; 48). By 2007, 14 dams and 7 hydropower plants had been built. Seventy two per cent of the hydropower generation and 12 per cent of the irrigation areas has been realized (Altinbilek, 2004;25). The total amount needed for full implementation of GAP is \$32 billion and almost this entire amount is financed by the Turkish state itself. International organizations such as the World Bank or UNDP finance only limited activities related to social and economic development aspects of projects such as establishing women centers, literacy programmes or urban rehabilitations in order to avoid contributing to the water conflict (Harris, 2002; 749).

The project is managed by DSI. It is part of the Ministry of Water Affairs and Forestry. DSI is charged with the utilization of surface and ground waters, the prevention of soil erosion, building protective structures against floods, draining swamps, building irrigation and drainage systems, constructing hydroelectric power generation plants and developing all stages of water supply (Mitchell and Kollars, 1991; 8).

GAP covers a 75, 358 km² area, which includes Adiyaman, Gaziantep, Mardin, Siirt, Sirnak, Diyarbakir and Urfa cities of Turkey. Southeast Anatolia is the least developed province of the 7 provinces in Turkey (Carkoglu and Eder, 2001; 44).

GAP means a wide-range of objectives for Turkey, such as reducing its dependence on imports in energy sector or being a food importer in the region. Kollars and Mitchell (1991; 2) say that the energy use between 1975 and 1982 in Turkey increased by 30 per cent; while the inland production increased by 24 per cent. Thirty nine per cent of its energy use came from petroleum imports. With this project Turkey may be an electric importer in the region.

With improved living standards as a result of project implementation, the support for the separatist PKK is expected to disappear. Harris (2002; 749) claims that this political goal is the main point of the project. "As the centerpiece of GAP development, water serves as the integrating resource that has the potential to resolve long-standing conflicts in the region... For example, it is possible that the aggressive development of the southeast will provide the possibility that improvement of living standards in the southeast may undermine bases for the Kurdish separatism and enhance legitimacy of the Turkish state."

However, the downstream riparians also have a stake in the Euphrates-Tigris river basin. They also initiated some development works. It is claimed that if Turkey completely implements GAP, it will consume annually 10 bcm water. That means the reduction of the Euphrates by one third. In that case, Syria can realize only 42 per cent of its project while the percentage of project realization by Iraq is 40 (Scheumann, 2003; 752). It can be seen from the Annex I and II that the existing dam and barrages on these rivers have already exceeded the capacity of rivers.

The negative impacts of the GAP on downstream riparians are predicted more or less as follows: The flow from Turkey to Syria will be reduced from 30 bcm to 16 bcm. On the other hand the flow to Iraq will decrease from 16 bcm to 5 bcm (Hakki, 2006; 444). Also as a result of increased irrigation and agricultural activities in the upstream area; the use of fertilizers and agricultural chemicals as well as the salinity level will increase. As a result making agriculture will no longer be possible (Beaumont, 1996: 142) in the downstream areas.

Turkey claims that dams built on the Euphrates help Turkey to maintain a minimum monthly average of 500 m³/sec flow to Syria (Altinbilek, 2004; Scheumann, 2003). Turkey has also tried to present positive arguments against the environmental considerations, such as the one that came from the United Nations Environment Program (UNEP) in 2001. In the UNEP Report Turkey is blamed for building large dams and damaging the ecosystems. Moreover, it is said that 90 per cent of the marshlands of Mesopotamia had disappeared between 1970 and 2000 (UNEP, 2001). As a response Turkey claimed that "although the period 1999–2001 encompassed dry years for the Euphrates, a sizeable portion of the flow of the rivers was still flowing into the Gulf unused. The main cause of the disappearance of the marshlands was the construction of drainage engineering works such as levees, drainage canals, control structures and gates built by Iraq."(Altinbilek, 2004; 30).

For Syria, the Euphrates River represents 86 per cent of the available water supply (Zawahri, 2006; 1044). It means that the country is dependent on the river for drinking water, agricultural

and industrial use. In 1979 electric generation from the Euphrates namely Tabqa Dam accounts for 70 percent of all generation of electricity. The country is facing electric and water shortages, which it intends to resolve through development projects, mainly on the Euphrates. Between 1985 and 1998 the irrigated areas in Syria increased from 650,000 to 1, 2 million hectare (Kolars and Mitchell, 1991; 3).

In Syria the emphasis has been put on the supply-side management until recently. This causes inefficiency in water use along with the low water availability. Government subsidies for farmers and high crop prices contributed to the groundwater extractions for irrigation use. However, in the last few years the Syrian government started water pricing and demand-side management policies to get efficiency. It has involved the beneficiaries of irrigation systems in the costs of development (Salman and Mualla, 2008, 13).

Iraq's situation is more vulnerable. The country is totally dependent on the Euphrates and the Tigris for freshwater resources and two-thirds of Iraq is desert. Currently, it is using 97 per cent of its available water resources (Zawahri, 2006; 1045). These rivers mean self-sufficiency in agricultural production for all the riparians. After the wars Iraq's irrigation system was totally destroyed. Water management is divided between several authorities, which make the coordination a difficult task. This fact is the same for all three riparians.

In the last few years NGOs were established by Iraqi people regarding the protection of water in Iraq (FAO, 2008). Also a draft law was approved to form a national water council in June 2012 to contribute the participation in water management and to negotiate with neighboring countries regarding water issues (newspaper article Al-shorfa).

Because of climate conditions, high evaporation rates and the inefficient policies of these countries the region faces considerable water problems. Irrigation is done in all the riparians, but mainly in Syria and Iraq, through traditional methods, which causes high salinity. (Salman and Mualla; 2008). This makes new sustainable policies unavoidable.

3.5 Agreements and Protocols

Indeed, none of the agreements since 1920 were mainly on water relations. Here some significant agreements and protocols are studied. These agreements do not include any water share or allocation mechanism that may serve as a resolution. Rather they regulate issues such as building flood control measures on these rivers.

3.5.1 The Lausanne Peace Treaty 1923

The Lausanne Treaty is a kind of establishment declaration of Turkey. At the time of signing Iraq and Syria were under the mandate of the United Kingdom and France. Article 109 determines that in case of tracing a new border between states that would have impact on the water facilities of others, the interests of the parties must be shared through an agreement. It does not indicate any share or principles of water use (Lausanne Treaty).

3.5.2 The Treaty of Friendship and Neighborly Relations 1946

This treaty was concluded between Iraq and Turkey. It provides a framework for the two parties to deal with their interests in the Euphrates-Tigris river basin and tributaries mainly within the framework of building up flood control works (Kibaroglu, 2002; 222).

3.5.3 The 1987 Economic Protocol

The protocol of 1987 was concluded between Turkey and Syria. With this agreement a minimum of 500 m³/sec. water flow should be delivered to Syria. However, this is agreed only for a definite period namely ‘during the filling of Atatürk dam’. Iraq objected to this protocol because 500 m³/sec. did not meet the minimum limit of his legitimate rights to the waters of the Euphrates (Inan, 2002, 14). The protocol emphasizes the importance of cooperation in water issues, speeding up the works of the JTC and the organization of joint irrigation and power generation projects on the Euphrates and the Tigris.

3.6 Riparian Approaches and International Water Law

Despite the negotiations going on between Syria, Iraq and Turkey for more than four decades, they have still not been able to reach a tripartite water agreement.

Turkey makes a difference between international and trans-boundary waters and puts the Euphrates and the Tigris in the second category. According to the Turkish approach “international rivers are those, which forms the border between two or more riparians” (Gruen, 1998, 572) while the trans-boundary rivers are those, which are under a state’s sovereignty until they flow into the border of another state. This approach is described as “Absolute territorial sovereignty” or ‘Harmon Doctrine’¹ which claims that “a state has the right to do whatever it chooses with the waters that flow through its boundaries, regardless of its effect on any other riparian state” (Yonatan Lupu, 2007; 5).

The Harmon Doctrine, which is cited several times by Turkish officials, has already been declared as obsolete by the international tribunal over the Lax Lanoux case in 1957 (Wolf, 1990; 18) and many scholars. Among them is Dante Caponera, the international legal authority, who drafted the International Law Association’s Helsinki Rules on the Uses of the Waters of International Rivers in 1992 (Gruen, 1998; 572) and. As a result of this doctrine, Turkey claims that an agreement between the parties should regulate ‘how to allocate water’ but not ‘how to share water’.

Syria and Iraq however, defend the doctrine of ‘absolute territorial integrity’ which is also seen as obsolete (Burlison, 2005; Kibaroglu; Yonatan Lupu, 2007). As per this doctrine, upper riparians’ activities to harness water that would harm the lower riparian countries can be vetoed by them. According to Yonatan Lupu (2007; 5) “Iraq would then have the strongest position, essentially it will be able to veto any Turkish –or even Syrian- plans to build waterworks along the Tigris and the Euphrates. Such a situation would award a disproportionate share of power to Iraq....and result in the underutilization of the Tigris and Euphrates because Iraq does not have

¹This doctrine is the U.S. State Attorney-General Judson Harmon’s juridical advice over the rights and the obligation of the parties regarding the utilization of the Rio Grande waters between U.S. and Mexico (McCaffrey, 1996).

sufficient demand to use all the waters of both rivers”. Instead of these both obsolete and deadlock generating doctrines international law presents the ‘limited territorial sovereignty principle’ to apply to international water agreements.

International law, serves with a mechanism to regulate water quantity and quality related issues between the riparians of international waters (Fischhendler, 2004; 282). One of the greatest steps in international law in the field of water disputes is the UN Convention on the Non-navigational Uses of International Watercourses signed in 1997 (Burleson, 2005; 10042). The convention makes no difference between international and trans-boundary watercourses (Gruen, 2000; 572) and defines ‘international watercourse’ as “a watercourse parts of which are situated in different states” (UN Convention, 1).

In second the part of the convention general principles to be applied to international watercourses were agreed. “Equitable and reasonable utilization and participation” and “not to cause a significant harm” are set as principles to apply to agreements. In article 6 factors that are relevant for equitable and reasonable use were determined. Some of these factors are “geographic, climatic, ecological factors; social, economic needs of the riparians, the population that depends on these waters and the existing and potential uses of these waters” (UN Convention, 5).

Article 8 emphasizes the importance of cooperation among riparians on the basis of sovereign equality, territorial integrity, mutual benefit and good faith in order to attain optimal utilization and adequate protection of an international watercourse (UN Convention, 5). Cooperation between riparians is characterized as an obligation. It is suggested that article 5 to 7 must be read in a combination that will mean the “balance between sovereignty and integrity” (Burleson, 2005; 10043).

However, according to Wolf the convention institutionalizes the conflict between upstream and downstream riparian by calling for both ‘equitable use’ and the obligation of ‘not to cause appreciable harm’. ”These two principles are in implicit conflict in the setting of an international waterway; upstream riparians have advocated that the emphasis between the two principles be on ‘equitable use’ since that principle gives the needs of the present the same weight as those of the past. In contrast, downstream riparians have pushed for emphasis on ‘no significant harm’ which effectively protects the pre-existing uses, generally found in the lower reaches of most major streams” (1998, 252).

The Convention also emphasizes the protection and presentation of the ecosystem of international water systems (Burleson, 2005; 10044).

The Convention requires 35 ratifications to come into force, which it still lacks. Syria is one of the few countries who ratified the Convention. During the making of the Convention this country was active and able to put a provision to Article 33 in the Convention that says if the parties could not find any resolution after six months of negotiations on the demand of a single party a commission of inquiry can be created (Gruen, 2000; 573). Iraq accessed to the Convention in 2001, while Turkey is one of the three states that voted against it. Turkey claims that the Convention gives a veto right to the downstream riparians on development projects (Burleson, 2005; 1044). Thus “it should have only set out only general principles and not

establish a mechanism for planned measures, which has no basis in international law” (Gruen, 2000; 573).

The water conflict in the Middle-East is a complex one. The Kurdish problem’s impact on the water issue, the country’s obsolete approaches, lack of trust hence lack of healthy information over the real status of water quality and quantity all contributed to this complexity and prevented the international water commission JTC to work efficiently and to produce cooperation among riparians.

However after a decades-long conflict, non-coordination among riparians and inefficient water use policies; the governments as well as the non-governmental actors realize the need for new sustainable policies to protect their waters. The riparians started with revitalization of national water policies. More participation in water management is promoted through different groups.

In the international arena they started to the negotiations over the Euphrates and Tigris. These countries have common historical and cultural features and strong economic relationships that can help improve cooperation. Nevertheless, the impact of the recent distrust in Syria is still not clear. The Turkish government’s attitude towards Syria during the last months was not appreciated by the Syrian government. Thus, this may be a break in the calmer relations. At the same time Turkey’s statement not to use water as a weapon, hence not to reduce the water flowing into Syria (Interview 3) during this period may help to bring the newly started water negotiations further.

CHAPTER 4 EU WATER FRAMEWORK DIRECTIVE

4.1 Introduction

In order to produce sound solutions to water problems, states need a more comprehensive approach that includes both quality and quantity aspects. EU WFD is such a comprehensive framework based on integrated water management. It is intended to give a set of guidelines for integrated water management within the EU. The principles of international water law are incorporated in this directive.

In this regard, the main principles of the WFD can serve with solutions to the management of trans-boundary rivers outside the EU as well.

In this chapter these main principles are discussed with regard to their impact on trans-boundary water management.

In the last section the process of the WFD implementation in Turkey and main problems considering this process are discussed.

4.2 EU WFD and Principles

In the last decades several projects have been produced in order to promote measures aiming at peaceful management, protection and sustainable development of water resources. European Union Water Framework Directive (WFD) is one example that seeks to give an answer to the protection and sustainable management of freshwater resources. It is an innovative framework based on integrated water resources management and focuses on river basins rather than administrative boundaries as management unit. This allows giving a better response to natural variability (EU Commission, 2000; 122).

WFD is aiming at protection of the European Union's waters and as suggested (U.S. Mexico Bi-national Council Report, 2000; 5) "there are no cookie-cut blueprints for the institutional reforms in water sector management". The implementation of WFD is still problematic within the EU, most of the countries have several times delayed the implementation and there are criticisms on the WFD about the methods used for the protection (Schipani et al., 2008). Nonetheless, it adapts the principles of international water law for water resources management and promotes cooperation for the protection of these resources. In this context the principles provided in the WFD for the water management may serve to the states outside the EU as a road-map, which they will adapt to their conditions.

European Union's Water Framework Directive (WFD) was published in December 2000. It is one of the most significant legislative instruments for the integrated environmental management of water resources. Its main objective is the protection of aquatic system and the prevention of further deterioration of water quality (Chave, 2001; 1).

Achieving „good status” in all the European surface and ground waters is the objective of the Directive. This goal must be fulfilled by 2015. However according to a Commissions

assessment report at least 40% of the European waters are not capable to fulfill this objective by 2015. Therefore the member states are allowed to postpone achieving environmental objectives until two further river basin management plan updates i.e. until 2027. Low levels of chemicals and a healthy ecosystem are the criteria that are used to describe the good ecological status. To achieve this objective, states have to address the factors that harm the ecosystem. Pollution, morphological changes such as building dams or extraction of water for irrigation and industrial uses, which may reduce the water levels are some of harmful factors.

The Directive is based on integrated water management concept. This concept is described as “a process which promotes the coordinated development and management of water, land and related resources in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Quevauviller, 2010; 178).

The word ‘integrated’ “encompasses complex interactions among different environmental compartments (land/water, terrestrial/coastal, surface/groundwater etc.) of pollution pathways, of various pressures and impacts (including from climate change) also the operational links between different sectors (agriculture, industry, urban development etc.), stakeholder organizations, decision makers at EU, national and regional levels as well as with the scientific community” (Quevauviller, 2010; 178).

UNESCO (Water Development Report 3, 2009) touches upon the importance of human and natural impact identification for better protection and management of water quality and quantity; because it considers all the relevant aspects while producing and implementing the water plans.

It addresses inland surface waters, transitional waters, coastal waters and ground waters. The major innovation of WFD is that it adopts the river basin as the natural geographic and hydrological management unit (EU Commission). Chave (2001; 11) explains the reason for choosing the river basin as the management unit as follows “In the natural world water naturally drains from the upper reaches of a watershed towards a river network. Although diversions such as man-made reservoirs, natural lakes and canal systems may interrupt the drainage pattern, eventually the water reaches those related environment of estuaries and the near-coast sea. Underground water in aquifers within the catchment areas, although constrained and diverted by the geological strata, is also related in many ways to natural boundaries of rivers, outcropping at springs and often affects the base flow of river systems. Although the boundaries of aquifers do not always match river basin boundaries, it is reasonable to relate aquifers to their nearest or most practical river basin. The Directive therefore adopts the river basin as the natural management unit for the protection of water”. Accordingly WFD calls for cooperation among the states that share these rivers basins. Great emphasis is put on solving trans-boundary water problems jointly (Langaas, Nilsson; 2006).

For the management of river basins, states are required to define administrative authorities and in international river basins the organization set up must be capable of managing the negotiations between the riparians to achieve the objectives. The EU member states have to prepare river basin management plans (RBMPs).

In case of international, WFD encourages rivers the basin states in the joint preparation of RBMPs. To prepare plans they have to examine the physical and geographical characteristics of the basin, population and their activities in the basin. Industrial activities, environmental impact of human activity and an economic analysis of water usage must be done by the member states (Langaas, Nilsson; 2006).

The states must collect data through monitoring activities. Data must be shared between river basin authorities and it must be open to access of a wide public. Monitoring activities provides regular information on the status of the river basin and helps to track the effectiveness of the measures. However, effective monitoring requires economic investigation, which is a handicap for the implementation.

The economic principles of international water law are also promoted by the WFD. The 'polluter-pays principle' of the Directive is also included in the 1992 Helsinki Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes. Nonetheless, the 1997 U.N. Convention vaguely touches upon this principle. This situation is explained with the mainly European feature of the 1992 Convention (UNESCO Report, 2009;8). Most of its signatories are European.

According to the Directive water users should pay the full costs of water and states should do economic analysis of cost effectiveness and costs of alternatives. The price paid for water should cover both the operational and maintenance costs. The aim is to needless losses of water, which is vital for water scarce areas (Chave, 2001). States are free to choose measures to achieve the price efficiency objective. Water is not a commercial product like any other but rather a heritage which must be protected, defended and treated as such" (Water Framework Directive) is the motto of the Directive.

Another significant principle is the stakeholder involvement. In the U.N. Water Management: Guidance of Public Participation and Compliance with Agreement of 2000, which is a part of the 1992 Helsinki Convention, broad public participation and access to information are described as the preconditions for successful water management (UN, 2000; 2). To realize conflict resolution states "among other things, require undertaking negotiations with the neighbouring countries and the involvement of the concerned people in decision making on water projects" (UN, 2000; 5).

Public participation plays a key role in the implementation of the WFD. It refers to stakeholders' right to try to influence the outcome of the plans meant (EU Commission). The input gained through participation of stakeholders will help the states to establish the balance between social, economic and environmental priorities while preparing the management plans. Participation occurs through consultation mechanism in that governments ask for the knowledge and experience of stakeholders.

States are required to identify the key organizations and citizens' groups likely to be affected. To find the best methods to improve public participation studies are conducted together with member states and the results are also published. Harmonicop is one example of these projects. This is a partnership programme supported by the EU Commission to increase the

understanding of participatory river basin management planning in Europe (Tippet et al. 2005; 28). The WFD also calls for providing information to the public properly.

Through these two principles the awareness of the natural resources can be raised and various activities that have impact on the resources can be identified. The WFD provides a well-established policy basis and a stable platform which enables building up communication and best practice exchanges among all actors involved in water management.

The WFD could act as a guideline for international cooperation that can convert the existence of shared water resources from a problematic issue to a strong motivation for trans-boundary co-operation. The International Law Commission defined factors that can lead to equitable and reasonable water utilization, which should be integrated into the water allocation schemes as well. These factors revised by the UN in the Convention on the Law of the Non-Navigational Uses of International Watercourses and revised in 2004 by the International Law Association (ILA) 2004 are as follows:

- Natural conditions, such as geographic, hydrographic, hydrological, climatic and ecological conditions
- Socioeconomic needs
- Population dependent on the watercourse
- Trans-boundary effects of the use of water resources
- Existing and potential water uses
- Protection and economy of use of the water resources and the costs of measures
- Existence of alternatives to different scenarios
- Sustainability of proposed or existing uses
- Minimization of environmental harm (Salman, 2007).

As is obvious these factors form the main requirements of the WFD. Thus it may play a key role as a policy model in non-EU conflicts over the quality as well as quantity of trans-boundary waters.

4.3 WFD Practices in Turkey

The European Council in 1995 emphasized the importance of transposition of European Community Law into national laws and effective implementation by candidate countries. According to that Turkey, as a candidate country since Helsinki European Council of 1999, has to adopt implement and enforce EU Acquis communautaire.

In order to comply with the WFD in time of EU accession, Turkey started working on WFD implementation in 2003. It has joined research programmes to prepare for the implementation. MATRA Project with the Netherlands and Capacity Building Support to the Water Sector in Turkey are two important projects aiming at supporting this country with regard to the WFD implementation (Orsam Report, 2011).

Turkey indicated 2011 as the date of full transposition. However, the draft of the new water law for this aim is still waiting for approval. In this law the requirements of the WFD, such as water

management at river basin level, water quality, conducting intensive water status monitoring, improving the participation to management of resources, transparency in management, taking into account the environmental consideration, establishment of water data base or the polluter pays principle etc. are suggested as main factors of water management (Orsam, 2012).

The Capacity Building Project was conducted between 2007 and 2009. According to this programme; the Netherlands, the United Kingdom and the Slovak Republic cooperated closely with Turkey through workshops, seminars and joint working sessions. Legal and institutional analysis of Turkey was done and the gaps were identified. The Büyük Menderes River Basin area was chosen as a pilot basin area and at the end of the project a draft river basin management plan was prepared by Turkey (www.emwis.net, 06-2012).

This Draft Plan is an important step to identifying the requirements and Turkey's capacity for the implementation. Some relevant lessons drawn from this programme can be listed as:

- Lack of reliable data on water quality. Data is insufficient and dispersed among many institutions such as ministries, provinces etc.
- Monitoring is not adequate, although DSI has monitoring networks they are not enough to cover the requirements of the WFD.
- Water pricing is not efficient, tools must be developed with regard to calculation of costs and characterization of impacts and pressures
- Multiple-headed management of water resources and no clear division of responsibilities among the authorities makes the coordination between these authorities a hard issue (ORSAM, 2011).

Another factor that complicates the implementation is the lack of adequate personnel in the water management (Interview 4).

Herman in its research based on the findings of the Capacity Building Project claims that the awareness among local actors over the shared water problems is quite high. However, the technical implementation has some several difficulties. Implementing pricing mechanism needs finding funds, equipment and people, which would be a challenge. Also Turkish policy makers do not easily share the ecological perspective of WFD and its pricing mechanism (Herman, 2011; 385). The water policy makers are still supportive of the supply-side management (Interview 5). Due to such problems the implementation of WFD will be delayed until 2027.

Several other programmes conducted by DSI also revealed that the participation to water management in Turkey is not sufficient. Except management of irrigation schemes by Water User Associations, there are no significant mechanisms to support participation. Preparation and approval of management plans occurs at the national level (Alparlan et al. 2007). This shows that also the decentralization of water management has not been addressed yet.

Turkey has already started with the transposition of the EU Nitrates, Drinking Water and Bathing Water Quality Directives and updated its law of Environment in 2004 (Moroglu and Yazgan, 2007; 275). These directives are important steps towards the WFD.

According to the WFD Turkey identified 25 river basins, many of which are trans-boundary rivers. In this regard, Turkey seems to ignore the suggestion of the WFD, which says “For river basins extending beyond the boundaries of the Community, Member States should endeavor to ensure the appropriate coordination with the relevant non-member States”. It prefers to lean against the flexibility in the joint management article of the WFD (Interview 4). The full compliance with the EU Acquis was also mentioned in the Accession Negotiations in 2005. According to that Turkey was required to cooperate with the neighbouring countries for management of the trans-boundary waters within the framework of the international agreements that the EU participated (EU Accession Negotiations, 2005). These agreements are the 1992 Helsinki Convention, the 1998 Aarhus Convention and the 1997 Espoo Convention. Turkey has signed none of these. In this regard the Turkish government in its National Programme of 2003 said that Turkey will consider the requirement of the WFD and these Conventions together with the EU membership (Ministry of Foreign Affairs).

As the pilot river basin management practice shows, Turkey has technical, economic and even political difficulties to implementing the ideas of the WFD. However, the main problem with regard to the joint management of international rivers is that this country is clearly reluctant to joint management. This is obvious from the ministerial statements and the attitude of Turkey not to be a part of the International Conventions that forms the basis of WFD and require the cooperation in international waters.

CHAPTER 5 THE SHARED RIVERS IN THE IBERIAN PENINSULA

5.1 Introduction

The Iberian Peninsula, which is naturally bordered with Europe by the Pyrenees mountain chain, includes the most arid states of the EU. This area has a long history of water problems. Along with the semi-arid to arid climatic features, increasing demand for agricultural water use and inefficient water use methods aggravate the problem.

With the treaty process has already started in the 19th century and the additional documents signed between the two riparian of the five rivers, the water problem kept becoming a severe conflict. In the last decades the two countries have focused on cooperation in water management to mitigate water quality degradation and climate change impact on water availability.

This chapter gives information on the hydrological and climatic features of the shared river basin areas and elaborates the historical evolution of the water relations between Spain and Portugal in the framework of treaties and agreements. It is then, built upon the following questions:

- Which requirements of the WFD were being provided by Portugal and Spain in the shared river basins?
- What kinds of difficulties have these states regarding the WFD implementation?
- Has the implementation already made any difference in the water sharing problems?

5.2 Hydrological and Geographical Characteristics

The Iberian Peninsula in the southwestern end of Europe has some unique physiographical features. The peninsula is one of the few places in the EU, where a water scarcity problem is experienced.

Spain and Portugal share five major river basins: Minho, Lima, Douro, Tejo and Guadiana. The total area of the shared river basins is 268 500 km² and it covers almost 45 % of the Peninsula (Maia, 2003; 390). Portugal is mainly the downstream state and 67 per cent of its surface freshwater waters come from these shared rivers, while its average contribution to the flow of these rivers is 31.5 per cent (Santafe-Martinez, 2003; 379).

The climate in the Iberian Peninsula shows differences from south to the north and west to the east. In Portugal a more Atlantic climate can be observed in contrast to the continental climate of Spain. Distribution of rainfall is more regular in Portugal, which makes possible the greater exploitation of its own natural surface water runoffs (Do O, 2010; 269). According to the UNESCO (2006) Water Report the annual precipitation in Portugal is 900mm/m² and available water per capita is 6.820m³/year; in Spain whereas the precipitation is 600mm/m² while the available water per capita is 2.710m³/year.



Figure 3: The shared river basins in the Iberian Peninsula

Source: (www.cadc-albufeira.org)

The Guadiana is one of the most water stressed European river basins (Do O, 2010, 267). The basin shows high rainfall variability, which aggravates the scarcity problem. The average annual rainfall in Portugal is 561mm while it is 540 mm in Spain. In the dry years the precipitation decreases to 422 mm and 386 mm respectively (PBH Guadiana River, 1999;3).

Agriculture takes an important place, especially in Spain, which results in water quality related problems such as the increase of nitrates, phosphates and phytopharmaceutical products in the water. Do O (2010; 269) says that “...water use in the Iberian southwest has traditionally been frugal. Learning from scarcity and variability in the last decades has witnessed a major shift”. Table 3 below shows the main characteristics, water resources and uses of the shared basins, as well as their current water utilization intensity ratio.

According to the table below, it can be said that Spain uses more than 70% of the water of the shared river basins. 2/3 of the existing water storage capacity is located in Spanish territory. In 2001 while the water storage capacity of Spain was 31.1billion km³ Portugal had 4.7 billion km³ (Maia, 2009; 2).

Construction works such as building dams, irrigation channels and pumping stations started after 1950s on both sides. These construction works put a pressure on the available water amount in the basin. The construction works, mainly dams and pumps, increased water availability in many places, which together with low water prices, cause poor water use efficiency on both sides of the rivers.

In the last decades Spain built dams and storage units on the Guadiana River to divert water to its dry southern parts. Portugal also built dams to supply its water and energy needs. Alqueva Dam is one of the Portuguese dams, which caused controversies about environmental problems

during the construction. However, Portugal has less capacity to build dams (Santafe-Martinez, 2003; 379) in comparison to its neighbor.

		Minho/Lima	Douro	Tejo	Guadiana
Population	Spain	0.86 (76%)	2.27 (57%)	6.10 (68%)	1.67 (88%)
(10 ⁶ inhab)	Portugal	0.27 (24%)	1.73 (43%)	2.89 (32%)	0.23 (12%)
Basin Area	Spain	17.53 (90%)	79.0 (81%)	55.8 (70%)	55.3 (83%)
(10 ³ km ²)	Portugal	2.03 (10%)	18.6 (19%)	24.8 (30%)	11.5 (17%)
Total Internal Natural	Spain	15.50 (82%)	16.70 (63%)	13.3 (60%)	6.3 (73%)
Water Resources, (1)	Portugal	3.30 (18%)	10.00 (37%)	8.9 (40%)	2.3 (27%)
(km ³ /year)	Total (Iberian)	18.80	26.7	22.2	8.6
Water Use, (2)	Spain ^(a)	0.62 (70%)	3.86 (70%)	4.4 (61%)	2.69 (86%)
(km ³ /year)	Portugal	0.26 (30%)	1.69 (30%)	2.81 (39%)	0.44 (14%)
	Total (Iberian) ^(b)	0.83	5.55	7.21	3.13
Water Intensity	Spain	4 %	23 %	33 %	43 %
Utilisation Ratio,	Portugal	8 %	17 %	32 %	19 %
(2)/(1) (%)	Global (Iberian)	4 %	21 %	32 %	36 %

^(a) Only irrigation, for Lima

^(b) in accordance with (a)

Table 2. *Water Resources of Shared River Basins in the Iberian Peninsula*

Source: Rodrigo Maia, 2003: 391

5.3 Bilateral Treaties and Conventions

Garrido and Llamas characterize the water relations between Spain and Portugal as five centuries lasting “peacefully conflict” (Garrido and Llamas, 2009; 220). Portugal and Spain signed several agreements on water issues.

5.3.1 Treaty of Limits 1864

This agreement forms the beginning of the formal international relations on water issues (Do O, 2010; 271). The Treaty of Limits is mainly about the rivers, which stretch along the borders of the two states. It was decided that the water resources in the border stretches would be used for the mutual benefit of the parties. According to this treaty, “the waters, which forms the border, are in common use of both Kingdoms” (Plano Nacional da Agua, 2004; 14). They are obliged not to harm the other side through abusing water by construction works, which change the course of water or modify the common use of water. These kinds of works are prohibited until they are approved by the authorities on the both sides of the border (Plano Nacional da Agua, 2004; 13).

A commission of civil governors of both sides and a technical delegation for the fulfillment of treaty conditions was established (Santafe-Martinez, 2003; 380).

5.3.2 1927 and 1964 Agreements on the use of Douro River

The 1927 Agreement was signed to settle the dispute on energy generation from Douro River. The assignment of River’s waters to the states for energy generation was undertaken for the

first time. According to this, “each state shall have the right to use the flow, which runs through the area assigned to them for electricity production” (Plano Nacional da Agua, 2004; 13).

In 1964 the parties agreed to make a new convention that covers the gaps and remedy less suitable aspects and shortcomings of the 1927 Treaty. 1964 Agreement allocated the hydropower generation potential of the Douro River equally between the two states. Each state is free to develop hydropower generation plans on their parts (Santafe-Martinez, 2003; 381).

This method was expanded to other shared river basins with the 1968 Agreement. With Article 14 an international commission, which has advisory, regulatory and supervisory functions, was established for the implementation of the agreement (Maia, 2000; 228).

5.3.3 1968 Agreement

The parties decided to expand the method of the 1964 Agreement to the other shared river basins except the Guadiana, where the dominant water use is for agricultural irrigation. According to this agreement the hydropower generation capacity of these rivers is divided between the riparians, regardless of their location to get the maximum water use efficiency (Correia and Silva, 1997). Exchange of information and public information are other issues mentioned in this agreement (Plano Nacional da Agua, 2004).

However, all of these treaties are on allocating the hydropower generation capacity of shared rivers. They do not include regulation over water allocation. Also, the system anticipated with them is not based on cooperation. Development works, agricultural activities and increasing water use on both sides necessitate a more coordinated and cooperative framework for the management of the shared waters. After the droughts in the 1990s, Portugal convinced Spain that they need a new and comprehensive Convention, namely the Albufeira Convention. Provisions of the European Union regarding safe drinking water, the prevention and control of trans-boundary pollution and the almost simultaneously starting WFD negotiations also had an impact on the making of this Convention (Interview I).

5.3.4 Albufeira Convention

The Convention on Cooperation for the Protection and Sustainable Use of Waters in Portuguese-Spanish River Basins namely the Albufeira Convention is the most recent bilateral agreement on water relations between Portugal and Spain. It is about the management of shared rivers.

The system, based on assignment of rivers and their tributaries, functioned until 1993. However, the changes in water management made a new and broader regulation necessary. According to Correia and Silva (1997; 332) one of the reasons for this agreement is the new Spanish National Hydrological Plan of the. By this plan, Spain attempted to make substantial changes in the status quo built up by the bilateral agreements up to that date. It had ignored the requirements of Portugal and intended to make water transfers from shared rivers. The serious drought in Portugal and Spain in 1995 is another reason for a new agreement (Llamas, 1997). However, at that the time negotiated WFD put the governments in a negotiation path that led to the Albufeira Convention (Garrido and Llamas, 2003; 220).

In these circumstances, during the Spanish and Portugal ministerial summit in Mallorca in 1993 parties decided to start the negotiations for an agreement based on sustainable management (Correia and Silva, 1997; 331). This agreement is also a product of water relations created through previous treaty and conventions between the two states.

The Convention represents a holistic view of shared waters between two riparian countries. Sustainable use of waters became an objective along with the sharing of these waters. With this Convention the scope of cooperation on shared rivers broadened from an economic approach which built upon the allocation of hydroelectric power generation (A Do, 2010; 271) to sustainable management of these rivers.

It covers a wide range of issues such as information exchange, information of public, consultation on and evaluation of trans-boundary impacts, pollution control and prevention, water streams, droughts, resource scarcity, assignments of rights and dispute resolution.

It shows a wide harmony with the international water law. Costa et al. (2008; 6) suggest that 'equitable use of waters' is not explicitly mentioned but the water use promoted by the Convention shows a wide harmony with the requirement of the UN Convention of 1997. The Conflict resolution mechanism of the Convention is also based on the advices of international law.

With this Convention an institutional framework was created that includes the CADC (Commission for the Implementation and Development on the Convention on Cooperation) and Parties of Conference. The Commission is an extended successor of the 'Commission on International Watercourses', which was established by the 1864 Treaty. Also, the office of consultation for the information and experience exchange was established.

CADC consists of national delegations of both states. The delegations formed by seven, maximum nine delegates, are composed of Chairman, vice-chairman and delegates. They are nominated by the governments and chaired by ministers of each state in rotation. The participants are from various groups including public administration and social groups. The involvement of civil society is an important objective and requirement of the Convention but has still presents some difficulties. The different perception of the problems by the two societies is one of the barriers for more participation (Santafe-Martinez, 2003; 383).

The Commission is generally responsible with acting as a forum for information exchange, communication, assessment and consultation among parties. It is the authority that observes the implementation of the Convention. It makes proposals for water quality and measures in conformity with the WFD. The decisions are taken by consensus and the national governments have the authority to review. The CADC works through 'work groups' that deal with specific issues. One of the work groups is the WFD implementation group (Correia and Silva, 1997; 333). It commission supports the government with technical assistance in the process of decision making. And it acts as a regular platform, where Spain and Portugal regularly meet (Interview 2).

The commission meets in plenary sessions once a year. During these meetings documents relating the hydrological plans of both parties are exchanged and discussed. The delegations

can decide the establishment of new technical work groups according to need. These technical groups conduct joint studies. In 2005, Spanish delegation presented the document “Proposal for action on the public information system on the activities of the Commission relating the implementation and the development of Albufeira Convention” (Commission for the Implementation of Albufeira Convention). According to this document the Drought Management and the Public Participation work groups were established in order to facilitate the implementation of the WFD. The reports and activities of CADC are published regularly in the commission website, which is accessible to everyone.

Monitoring the commission’s work and planning its meetings are responsibilities of the technical Secretariat within the CADC. Until 2005, due to political instability of Portugal the CADC did not work efficiently and practices such as information exchange could not be conducted regularly. Costa et al. suggested that the CADC’s work will be more efficient when two states defined common river basin authorities for shared river basins (Costa et al. 2008; 10).

The Parties of Conference is another institution. It is more political in comparison with the CADC. The representatives are assigned by the national governments. It is responsible for development of the agreements. It has no regular meeting schedule. It steps in when a problem cannot be solved within CADC (Santafe-Martinez, 2003; 387).

In the preamble of the Convention sustainable water use, protection of aquatic system, prevention of common risks and coordination of water management of both states were mentioned as objectives.

In the Convention, the issues which should be ‘homogenous and comparable’ were identified and a five year timeline is set for the realization. Data exchange, records and joint studies are promoted. The regular information exchange includes technical, administrative information and information on the legislation of both states in order to improve the harmonization of water management (Albufeira Convention, Article 5). The information to the public is promoted. Any citizen can demand information in the framework of this Convention (Albufeira Convention).

Cooperation mechanism and its scope are explained. The parties are required to define the administrative bodies responsible for water management in order to cooperate and annual reports on development of the Convention requirements shall be presented to the Commission by both sides (Albufeira Convention). Additionally, the parties should inform each other on the construction works, which may have a negative impact on the other side.

The trans-boundary impact of the activities on water should be monitored and evaluated in order to attain good water quality. The Commission is responsible with the impact assessment. The conditions of impact assessment are determined in Annex II of the Convention.

The flow regime allocation rules of the Convention were a matter of criticism. The stream flows to be allocated to Portugal is set as one third of the average stream for an average years. Costa et al. (2008; 6) claim that the share of Portugal is low and it is to apply to normal years, where rainfall variability is relatively high.

Parties decided that the CADC would make a proposal for the allocation of waters. This came in 2008 and the 'Revision Protocol' agreed to by both states' governments. This protocol sets the assessment criteria for the annual and seasonal flow regime. In this way, it assures the environmental sustainability of the shared rivers (Interview I).

The Convention also ensures the compliance with the EU law for the protection of waters (Convention, Article 13).

As a consequence of the data exchange related articles of the Convention, both states presented their National Hydrological Plans to the consideration of the other state's CADC delegation (Santafe-Martinez, 2003; 387). The Convention can be seen as a step further in the cooperation between Spain and Portugal.

The two neighbor's approach to protecting their interest, while avoiding conflicts as much as possible and search for solutions to satisfy both sides makes this convention possible. It also reflects the developments of international water law.

5.4 The Implementation of the WFD in the Iberian Peninsula

In the context of the WFD implementation in the Iberian Peninsula the similarity between requirements of the Albufeira Convention and the WFD are noteworthy. The implementation of the WFD and Convention is intertwined. One of the four Work Groups established within the CADC in 2006 is the WFD and Water Quality Work Group. Moreover both states have decided that the work of the CADC should be adequate to WFD provisions. Portugal declared to the EU Commission the CADC is the competent authority for the coordination of the WFD and Spain stated its intention in the same direction (Barreira, 2003; 387).

In the last decade both countries have undertaken intensive legislation work in order to adjust themselves to the new conditions. Spain changed its supply-management based water management model to a demand-management based one in the 1980s. According to Avella and Garcia-Molla (2009; 61) the WFD implementation strongly facilitates the attempts to persuade water users to save water.

Water resources management in Spain has already been instigated at river basin level since the beginning of the 20th century. According to the 1895 Water Act, rivers that pass through more than one autonomous region shall be administered by the River Basin Authorities that are under the responsibility of the Ministry of the Environment (Maia, 2008; 4). The 1985 Act was revised with the approval of the Consolidated Water Act in 2001 in order to transpose the EU legislation (Barreira, 2003; 352). On the last day of 2003, with additional modifications in the 2001 Water Act, the WFD transposed into national law, by which definition of river basin districts is given and the Competent Authorities' Committee established. In order to complement the transposition process in 2007, 3 new Decree Laws were approved that define the geographical delimitation of the River Basin Districts and the responsibilities of the competent authorities (Confederaciones Hidrográficas) (Maia, 2008; 5).

According to the WFD, Spain defined 24 River Basin Districts. However it has adopted a complete River Basin Management Plan (RBMP) only for the Catalonia Region and submitted the draft RBMPs for 13 (<http://circa.europa>). Spain was late with regard to compliance with the WFD timetable. Some authors (Barreira, 2003; Maia, 2009) explain that with state structure. Spanish autonomous regions' struggle to have more power in the field of water management is slowing the implementation process. Characterization of these river basin districts in terms of economic analysis, pressures and impact was formalized by Spain in 2007 (Maia, 2009; 6).

Portugal was also late with the WFD implementation. The transposition of the WFD was realized in Portugal with the new Water Law of 2005. This Law is providing a tool for protection of water resources by regional authorities. The Water Institute (INAG) was established in 1993. It is responsible for the water resources management and shown as the competent authority responsible for the transposition of the WFD and preparing the RBMPs together with the Hydrographic Regional Administrations (Administrações da Região Hidrográficas) (Maia, 2008; 7). Transposition process was completed in 2006. In EU Commission's first WFD Implementation Report, Portugal was shown as one of the three member states who achieved an overall satisfactory implementation (SEC, 2007; 11). In 2008, new Hydrographic Regional Administrations were created for the management of RBDs. They are responsible with reporting the implementation status to the EU Commission and providing public information (Portela et.al, 4).

Portugal designed 8 River Basin Districts (RBD). Consultation works started and the characterization of the RBDs was completed in 2005 and draft plans for all of the RBDs were submitted in 2009. Intercalibration works have been done within the Mediterranean Geographical Intercalibration Group with Spain, France, Greece and Italy (Maia, 2009; 7).

Considering the efforts towards implementation, both of the countries faced some difficulties. Participation in resource management is one of the problematic fields. Barreira (2003; 356) shows lack of participation culture in the Iberian Peninsula as the reason that both states have not established an adequate participation mechanism that provides participation of a broad public. Different perceptions of problems by the public of each side

In both states water users are those who have a direct economic interest in water or who hold a concession title such as farmers, hydropower generators and industrial users. Thus, they still have the challenge to provide a wide public participation in water management. Both states use tools such as internet, workshops and public events to raise public awareness and participation. Additionally, Portugal promotes the awareness about the water issue through including the WFD goals in the books of school children (Interview I).

Both states undertook some cooperative initiatives to overcome this difficulty and to facilitate joint management of the shared rivers. The IBERAQUA Project, which is supported by the water management authorities and the NGOs aimed at analyzing the challenges for the implementation, is one of these projects. The results of this project indicates lack of knowledge about the WFD and its implementation by the water administrations on the both sides and the need to foster the cooperation at local and grassroots level. According to the project public participation in water management should also be improved (Matos, 2004; 217). These kinds of

projects are significant in showing parties' willingness to jointly manage shared rivers. Nevertheless, in documents such as EU Commissions' first WFD Implementation Report (2007) the need for more cooperation between Spain and Portugal in the field of trans-boundary rivers is emphasized (SEC, 2007). In 2008 Spain and Portugal decided to establish a common Technical Secretariat within CADC to coordinate development of river basin plans for shared river basin districts (Maia, 2009; 4).

Another problem is the recovery-of-costs principle. Water users on the both side are reluctant to pay more (Maia, 2009; 8). Distribution of the water use costs is also not yet adequately answered. Costa et al. say that the cost recovery principle causes higher prices and in case of recovering 50 per cent of costs, farmers may switch one third of irrigated to dry land (Costa et al. 2008; 4). Nonetheless, the World Bank Report indicates water savings up to 88 per cent through the last modernizations in some areas of Spain (Word Bank, 2005; 49).

Beyond the difficulties of implementation, the WFD until now has proven that it stimulates new water management policies. Llamas claims that the coordination among Spain and Portugal is stronger than ever thanks to the transposition of larger legislation under the incentive of the WFD (Llamas, 1997; 348).

In these countries a new approach emerged that considers water as an economic, social and environmental heritage that must be protected. Both countries expect that negative impacts of droughts and scarcity can be reduced through adoption of measures and management plans (EEA, 2007; 95).

Agricultural use is the main source of consumption in both countries. Irrigation activities together with rising temperatures bring about salinity problem and deterioration of the water resources (EEA, 2007; 95). In addition to that, Spain has a problem of overexploitation of ground waters (Maia, 2009; Do O, 2010). As a result these countries expect that through the implementation of the WFD integrated management plans will be developed that can consider environmental challenges and provide better drought management (MED, 2007; 67). At this point it must be mentioned that Iberian countries' specific demand from EU WFD is to give more attention to water stress (EEA, 2007; 103).

Spain and Portugal manage their water problems peacefully through agreements. In times of crisis, such as the drought of 1995, they realized the need for cooperation and sustainable management and started negotiations. Their EU membership as well as the WFD negotiations that started almost simultaneously probably had an impact on this situation.

The WFD raised the awareness of the problems and provided parties with an effective framework for negotiating these problems (Interview I).

The WFD implementation by most of the EU members can be qualified as still young. Spain and Portugal are also having technical and economic problems with regard to the requirements such as participation, cost recovery or preparation of RBMPs. Making an adequate assessment of the WFD impact on international waters needs progress in the implementation by these countries.

From steps taken until now, it is seen that the WFD provides a systematical programme for the cooperation for sustainable management of waters. It induced Spain and Portugal to make new legislation, promoted participation and stimulated awareness about the problems among the water users.

Regular monitoring activities, data collection and data sharing requirements of the WFD; made the efficient allocation of shared waters possible among these states. Consequently, the Iberian countries signed the 'Revision Protocol' in 2008.

However the requirements of the WFD need technical, economic and social adjustments. The implementation is costly. It needs personnel and a social capacity. These factors makes the implementation difficult even for the EU members. But Spain and Portugal have alsosome advantages coming from a history with the CADC. This institution played a significant role in the coordination of new water management policies through the experience of its preceding commissions.

CHAPTER 6 SHARED RIVERS BETWEEN U.S. AND MEXICO

6.1 Introduction

For over a century, the United States of America and Mexico managed to find diplomatic and sometimes cooperative solutions to the problem of managing shared waters. However, as a result of changing conditions the international waters have continued to be the topic of controversies. These states emphasize the need for a more comprehensive approach that addresses the impact of various factors such as climate change and environmental degradation.

In the previous chapter water problems of shared rivers and the implementation of the WFD in the Iberian Peninsula were discussed.

In this chapter the problems between the U.S. and Mexico and the measures they implemented to avoid these problems is studied with regard to commonality of these measures with integrated water management system internal to the WFD's main ideas, in order to discern lessons for Middle-East.

6.2 Hydrological and Geographical Characteristics

The border between the U.S. and Mexico is 3141 km long. The Rio Grande/ Rio Bravo and the Colorado rivers form most of the border. Much of this area is desert and in some places the average annual rainfall is less than 25 mm/m² and droughts are part of the semi-arid climate of the border region. Water provided by the Rio Grande and the Colorado Rivers is crucial for traditional irrigated agriculture, the trade and mining sector and urban growth accelerated by the border assembly plant industry (Bernal, Solis; 2000; 651).

The Rio Grande flows 2019 km along the border through Colorado and New Mexico into Mexico. It originates from the United States, while most of its major tributaries are in Mexico. Rio Conchos in Mexico is the largest tributary and it contributes 35-40 % of rivers flow (Kibel and Schutz, 2007; 104). The average annual flow of the Rio Grande is estimated between 80 and 120 bcm (Mccaffrey, 1996; 551).

The Colorado River originates in the Rocky Mountains flows into Mexico and discharges into the Gulf of California. In the U.S. the upper basin states are Colorado, New Mexico, Wyoming Utah and the lower basin states are California, Nevada, Arizona (Donahue and Klaver, 2009; 10). In Mexico, the river runs through Baja California.

The border region between the U. S. and the Mexico has many features that put a pressure on water availability and quality. Rapid population growth, extensive industrial growth along the border, which has been promoted through the Border Industrialization Programme since 1965 and the North America Free Trade Agreement, excessive groundwater extractions as a result of non-sufficient water availability, salinity problem and global environmental changes are some of them (Report of U.S. Mexico Binational Council, 2003; 7).

The negative impact of climate change on the water resources has recently become one of the challenges for both countries. The Colorado River's water did not meet the population's water demand in the lower basin already in the 1990s. The river's water has already been consumed before it discharged into the Gulf of California. Thus the higher temperatures and evaporation rates and earlier snow melting, which is critical for the border area due to low summer precipitation, may exacerbate the water stress (Szekely, 1993; 37). Depending on all these various factors, which emerged during the last decade, the U. S. and Mexico perceive the need to develop broader cooperation on shared waters.



Figure 4. *The Rio Grande and Colorado River*

Source: Good Neighbor Environmental Board Eighth Report, 2005

6.3 Trans-boundary Water Relations between U.S. and Mexico

The conflict between Mexico and the U.S. over the trans-boundary waters emerged at the end of the 19th century when the upper riparian states of the Rio Grande in the U.S. started to divert more water for irrigation (Donahue and Klaver, 2009; 8). These increased diversions combined with low rainfalls caused water shortages in Mexico. The then Mexican Minister at Washington sent notes to the American Secretary of State saying that “water diversions from the Rio Bravo (Rio Grande) in the state of Colorado have so seriously affected the existence of the frontier communities” and claimed that ‘prior right principle’ of civil law gave priority to the Mexican claims (McCaffrey, 1996; 557).

Hereupon, the U. S. General Secretary asked for the advice of Attorney General of State Judson Harmon over the rights and obligations of the parties. Harmon’s opinion, called as ‘absolute territorial sovereignty’ today, is that

“the rule of the international law imposed upon the United States no duty to deny to its inhabitants the use of the waters of that part of Rio Grande lying wholly within the United States, although such use resulted in reducing the volume of water in the river below the point where it ceased to be entirely within the United States, the suppositions of the existence of such a duty being inconsistent with the sovereign jurisdiction of the United States over the national domain” (Kumar Garg, 1999; 19).

This doctrine had impact on the American view of water problems until the 1944 Treaty. Donahue and Klever (2009; 8) say that until the 1944 Treaty the position of the U.S. was not to give unnecessarily a right to the other side. Mexico also perceived the problem from a nationalist perspective as these waters were part of its territory several decades ago.

While the conflict went on under the shadow of Harmon Doctrine, the International Boundary Commission (IBC), which was established by the U.S and Mexico in 1889 to provide a forum for the resolution of boundary disputes, came to the scene and the ‘Convention for Equitable Distribution of the Waters of the Rio Grande’ was signed in 1906. This Treaty allocated the Rio Grande waters between the U.S. and Mexico (Kibel and Schutz, 2007).

In the 1920s the problem concentrated on the Colorado River. The U.S. federal state introduced its Reclamation Act in 1930. It included the construction of flood control units and dams on the Colorado River. However, the water management is the prerogative of the states. Thus the federal state brought the upper and lower basin states (California, Nevada, Arizona, Colorado, Wyoming, Utah, New Mexico) of the U.S. to negotiate construction works but under the condition that they would agree with each other regarding the allocation of Colorado River’s water. These states signed the Colorado River Compact, which allocated the total flow of Colorado river among upper and lower basin states and left approximately 1.5 million AF non-allocated to satisfy Mexican claims (Kibel and Schutz, 2007; 105) whereas Mexico claimed 3 million AF. California was the most resistant state to Mexican demands and said that “sharing water with Mexico is the problem of Texas” (Donahue and Klever, 2009; 11).

While disputes over allocation of shared waters continued, the U.S. turned to a good neighborhood policy. Cooperation and good relations with the neighbors took an important place in order to increase its safety.

6.4 Treaty of 1944

In 1941 allocation of international waters became a problem again and Mexico demanded a clearer agreement. U.S. accepted this claim as a result of good neighbor policy. The negotiations started under the assistance of the IBC.

During the negotiations for the “Treaty for utilization of waters of the Colorado and Tijuana Rivers and of the Rio Grande in 1944” the legal adviser of the U.S. Department of State advised that “none of the treaties regarding international rivers and lakes adopt the Harmon Doctrine and that the United States’ purpose should be to find a reasonable equitation by which rights to the water may be equitably distributed (Kuokkanen, 2002; 17). This shows that the U.S. drew away from the Harmon Doctrine. Despite, U.S. and Mexico had several other problems such as drug trafficking, illegal border trade etc. at the time of the treaty negotiations and its aftermath; they managed to handle these problems and the water problem separately. This is an important point to reach an agreement based on the equitable use of trans-boundary rivers (Report of Binational Council, 2003).

The Rio Grande waters were already allocated by the 1906 treaty; with this Treaty parties agreed additionally that Mexico would deliver annually 350,000 AF water from the main tributaries of Rio Grande in Mexico to the U.S. in a cycle of five years (1944 Treaty, article IV). However any deficiencies existing at the end of the five-year cycle due to “extraordinary drought,” should be made up in the following five year cycle” (Kibel and Shutz, 2007; 111). Mexico failed to deliver treaty waters on the grounds of having extraordinary droughts in 1990s. However, this agreement did not describe the extraordinary drought conditions. Thus, the question of what really constitute the extraordinary drought conditions became a problem until the 2000s.

In 2003, on IBWC’s initiative, high-level negotiations started between governments of each state on how to pay the water debt. Finally, Mexico agreed to pay 400,000 AF at the end of the 2004 and in 2005 IBWC announced that the parties agreed to eliminate Mexico’s water debt completely (Kibel and Schutz, 2007; 115). Also they agreed to take measures for effective use of water and modernization of the irrigation system in Mexico (Report of Binational Council, 2003; 5).

The negotiations over the Colorado River were more contentious. While Mexico claimed 3 million AF that its anticipated future use should also be incorporated into the treaty, U.S. negotiators took the existing use, which was less than 1.5 million AF, as basis. Finally, U.S. and Mexico agreed to allocate 1.5 million AF water from the Colorado River to Mexico. It is claimed that this amount was much more than what Mexico used during that time, that is why Mexico accepted to have half of what it had demanded (Donahue and Klever, 2009; 12).

The Treaty called for joint construction of international storage dams. Accordingly, the Amistad and Falcon reservoirs were completed in 1969 and the water stored there would be shared evenly (1944 Treaty, Article 5).

The Treaty transforms the IBC into the International Boundary and Water Commission (IBWC). According to Article II of the Treaty, the IBWC is responsible for the observation of the Treaty implementation, interpretation and settlement of disputes. It determines rights and obligations for each party. It has an international status and is comprised of commissioners from the U.S. and Mexico (1944 Treaty, Article II). It consists of a Mexican and a United Nations section. Each section is headed by an engineer commissioner and they work under the guidance of each country's respective foreign affairs department (Bernal and Soli, 2000; 653).

Although this treaty allocated the waters of shared rivers between U.S. and Mexico, it does not say anything over the quality of water to be delivered and this became a source of dispute in the form of salinity problem from the 1960s onward.

6.5 1960s and the Salinity Problem

Since the 1944 Treaty the U.S. and Mexico have had quiet relations over water. However from 1960s onwards, the salinity of the Colorado River waters were that delivered to Mexico raised the controversies again.

The source of the salinity was the Wellton-Mohawk Irrigation District in Arizona. Water from the district discharged into the Colorado River through its tributary the Gila River and flowed into Mexico (Bernal and Soli, 2000; 655). Mexico claimed that the salinity rates in the upper part of the Colorado River until Mohawk Dam, where Mexico divert most of its Treaty waters were satisfactory. However, in the lower part of the Dam, where the U.S. delivers an additional 246 697 000 m³/year to Mexico, waters received from the Colorado River became unusable for irrigation due to high salinity (Bernal, Soli, 2000; 657). Thus, Mexico's Treaty waters should be delivered from the northern point of Mohawk Dam" (Bernal and Soli, 2000; 657). The U.S. claimed that making the deliveries at the demanded point would mean release of the stored waters that is already fully appropriated by users and rejected.

Thereupon IBWC formed The Colorado River International Task Force from Mexican and U.S. experts to investigate the claims and to make recommendations. They began to investigate issue with analyzing Mexican irrigation system. Mexican system introduced to U.S. basin states representatives through a tour to Mexico's Mexicali Valley and they provided with data over salinity (Bernal and Soli, 2000; 657). The group presented its report in 1965.

The main recommendation made is that U.S. is to construct a channel to convey Wellton-Mohawks saline waters to the Mohawk Dam below the Mexican main diversion point (Minute 218). It is also recommended that U.S. would bear all the costs of construction and during the construction the minimum amount of 900 AF/sec water as per 1944 Treaty should not be reduced and saline (Minute 218).

As a result, several Minutes were signed between countries regarding salinity of Colorado River and Rio Grande and the Main Outlet Drain Extension was built to convey saline waters (McCaffrey, 1996).

Despite this progress, problems still exist such as Texans' claims on Mexico over shared waters according to the NAFTA Treaty or California's excessive water use. However, the experience of decades of institutional arrangements among the U.S. and Mexico, their determination and willingness not to make water a matter of conflict and the cooperative approach of mainly U.S. federal law that promotes the joint management of rivers, protection of water and broad stakeholder participation, help them to manage their shared waters through cooperation.

6.6 International Boundary and Water Commission

One of the main successes of Mexico and U.S. in managing their shared waters is the establishment of the IBWC. Creating a long term institution, with technical expertise and apolitical character increased the countries trust in it. Decision making power given to the IBWC (under the condition of approval of governments) and the political will of the two countries to incorporate its decisions into agreements make the IBWC more efficient.

The IBWC consist of the U.S. and Mexican sections each headed by an engineer commissioner as well as two principal engineers, a legal adviser and a secretary. They have diplomatic privileges in territory of each country. IBWC and its personnel can freely carry out their work in other country's territory (International Boundary and Water Commission).

It is responsible for communication and coordination between each national sections; initiation, investigation and planning necessary actions for the implementation of treaties as well as settlement of the disputes over shared rivers along the border area. Boundary demarcation, maintenance of flood controls and water storage units are some of other responsibilities (Mumme, 1993; 95). The commission sections of each country exchange information regularly. They undertake joint works such as conducting hydrological analyzes of trans-boundary rivers and preparing reports. The IBWC also coordinates the establishment of joint power plants and dams (Szekely, 1993). The information about water including treaties, reports, maps and citizen forums is published regularly in the web-sites of both sections (International Boundary and Water Commission).

However, it cannot be said that each section works in the same circumstances. In the U.S. the federal states have a significant impact on the resource policies of the central government in this way on the work of IBWC. This is a concern of Mexico that communicate with central government is easier than convincing many states (Mumme, 1993). The same situation is seen in the Iberian Peninsula. In the recent years the regional authorities of the Spain want more power in the field of resource management. However, Portugal considers that this will complicate the management of shared rivers (SantafeMartinez, 2003).

With the climate change and salinity problems, the IBWC sometimes had difficulties in coping with these new issues but the investigations and reports prepared from the 1990s onwards includes relevant recommendations for the IBWC and riparian states such as establishing an accurate and harmonious data collection system, decentralization of the water management to the lowest appropriate level and the promotion of participation. It is suggested that “input of local stakeholders, in conjunction with viable allocation enforcement mechanisms, is one way to mitigate inequitable politicization of water management and encourage the development and effective enforcement of allocation rules....encouraging the broad range of community may prevent the issue from snowballing to seemingly unmanageable levels.” (Report of Binational Council, 2003; 8).

As Donahue and Klever describe (2009), the period from the 1990s up until the present is the period of transition to river basin based management. So that, the public participation in water management and a healthy environmental habitat became the two main issues for the IBWC to cope with.

In the Middle-East case the JTC was established to play the role of conducting communication and coordination among riparians, exchanging information regularly and undertaking joint works as with the IBWC. However the countries unwillingness to equip this institution with adequate authority prevented the JTC from being an influential actor that coordinates the states’ activities and promotes cooperation.

6.7 California: A new Conflict?

California, with population of almost 40 million, high urbanization and intensive agriculture activities is experiencing an increasing pressure on its water resources.

The population of California is increased from 30 million in 1990 to 36, 5 million in 2005 (Pombo and Wright, 201; 191). It has 9 million acres of agricultural land and more than 200 irrigation districts (Davidoff, 2009; 153). Adequate and reliable water supply is vital for all sectors in California. The Colorado River is the main water source. It is also one of the most important water resources for six other U.S. states (Wyoming, Colorado, Utah, New Mexico, Nevada, and Arizona) and the Baja California state of Mexico. Between the U.S. states there is a water allocation compact that gives the greatest portion (4.40 million AF / year) to California.

Through international agreements, the share of the Baja California from Colorado was decided as 1.5 million AF annually (Donahue and Klever, 2009; 12). Baja California is almost totally dependent on the water from Colorado, while the U.S. states have various water sources. This makes the situation of Baja California fragile. A reduction of water supply in the upper part can cause a conflict considering the rapid population growth and water supply at the edge of carrying capacity (Pombo and Wright, 2012; 187). The impact of climate change is also a scary phenomenon for these states.

Until 2003, California had used annually more than 4.40 million AF water. However, after that time, Arizona and Nevada began to use their full entitlement. Thus, California is expected to reduce its water use to the agreed amount (Pombo and Wright, 2012; 192), otherwise it will bring about problems in downstream states, mainly in Baja California.

In these circumstances both California and Baja California need to develop strategies to better cope with the problem of sustainable use of scarce water resources. There have been projects for this aim such as the U.S. experts' visit to Mexicali Valley to analyze the irrigation methods and to give advice (Bernal and Soli, 2000; 657).

At local level, grassroots organizations from both states take action and establish Report of Binational Council collaboration to implement programmes such as the Tijuana River Valley Recovery Programme and the U.S. - Mexico Border Environment Programme. The latter one is implemented by the NGOs and national environmental agencies of both states. This is a bottom-up approach that aims at protecting the natural resources of the border regions (Pombo and Wright, 2012; 198). Such bottom-up approaches are significant to preventing the conflict from becoming harsher.

In addition to such programmes, California took measures such as towards more efficient use of water resources after water shortages in 1990 as a result of the drought. "California's Water; A Crisis We cannot Ignore" is a programme managed by The Association of California Water Agencies to educate Californians about challenges as well as water supply and delivery systems (The Association of California Water Agencies).

California Department of Water Resources developed a programme, which includes the proposals below:

- Prepare and adopt water management plans
- Improve communication and cooperation among water suppliers and water users
- Facilitate alternative land-use
- Facilitate use of recycled water
- Facilitate the financing of capital improvements
- Make water monitoring and prepare water use reports
- Use pricing and other incentives for efficient water use (Davidoff, 2009; 159).

These proposals were integrated into the 5 yearly California Water Plan Updates. The last update was made in 2009. The intended content of the plan is made public through several internet pages to give the possibility to participate in the preparation of this plan. The main component of the planned 2013 Updates are; integrated water management, improved data matrix and analysis, improved discussions of climate change, all stakeholder involvement etc. Through this kind of preventive approach, states avoid the conflict and try to solve the problem within the framework of cooperation.

Furthermore, the principles provided by the Federal Clean Water Act of 1972 such as management at river basin level, interstate cooperation, research investigation, public

information and cost effectiveness (U.S. Federal Clean Water Act Amendment, 2011) contribute to the promotion of joint management of the rivers.

Mexico also started rapid implementation of integrated water management system from the 1990s onward. To join the NAFTA, Mexico had to modernize its water management system. The new National Water Law of Mexico in 1992 and its revision in 2004 were containing sweeping changes. This law promoted the modernization of irrigation methods, public participation, new cost recovery principles, decentralization of management etc. The uprising civil society initiatives that promotes such as the Alianza Civica or the Zapatista strongly promoted the participation to water management (Wilder, 2010). These improvements facilitated the cooperation in trans-boundary rivers with the U.S. and prevented further conflicts.

The activities in the field of the water management are being made public through websites of responsible national and regional authorities on the both sides of the border.

The IBWC is the responsible authority for the management of shared rivers under the authority of the U.S. and Mexico and the willingness of both states to cooperate is facilitating its tasks.

The water conflict along the border area exists from the end of the 19th century until today. In the first period, under the influence of the Harmon Doctrine the U.S. tended to give as little as possible right to the Mexican claims. However, as a result of changing political dynamics the U.S. adopted a good neighbourship policy and gave up its extreme approach. This improved the relations significantly. The powerful upstream riparian had a significant impact on the course of the problem.

In this conflict also, the problem started with increased water use and went on with aquifer depletion and pollution problems. At the first phases of the conflict the U.S. Harmon Doctrine had impact and prevented the U.S. to consider the counter claims. As soon as this approach was abandoned the water negotiations were stimulated; even there were several other problems between the parties.

After the salinity problem, the parties saw the need for a more comprehensive water management approach that integrates environmental considerations as well. In this sense the cooperation in the international river basins started.

The relatively developed economic conditions of the U.S., its willingness to bear some extra costs as seen from the construction of joint dams together with the willingness and the effort of the downstream riparian to implement an integrated resource management approach contributed to establish a cooperative and sustainable management system in international river basins.

The IBWC as in the CADC case played a significant role in the establishment of the new water management policies and their coordination.

CHAPTER 7 CONCLUSIONS

In this research a case study has been conducted to understand the water conflict in the Euphrates-Tigris river basin. The main question was:

To what extent may the core ideas of WFD be applied in the Euphrates-Tigris river basin and to what extent may these serve as a cooperation ground, which will lead to the solution of scarcity problems?

In the Middle-East also the status quo turned to be disturbing as a result of related crises caused by increased water use, droughts or salinity problems. In the U.S. case and Iberian Peninsula the crises emerged also as a result of increased water use, droughts and salinity problems. These countries managed to find solutions through agreements. However, the riparian of Euphrates-Tigris River basin could not still reach such an agreement. The main reasons of this emerge as the impact of the non-water issues such as Kurdish problem and the obsolete approaches of the riparian countries regarding rights and obligations. ‘Absolute territorial sovereignty’ approach of Turkey or the ‘absolute territorial integrity’ approach of downstream riparian is not compatible with the principles of the international law for resource management.

Syria and Iraq show an improvement with regard to recognition of international law. These countries signed the UN convention of 1997 and two agreements between each other in 1990 and 2002 about shared waters. Downstream position of them has impact on this. However, it should not be forgotten that they are up- and downstream riparian between each other. At this point Turkey can look at the U.S. experience to find policy options.

The U.S. advocated the Harmon Doctrine i.e. ‘absolute territorial sovereignty’ until the beginning of the 1940s. As soon as it abandoned this doctrine as a result of good neighbourship policy, the relations with Mexico changed significantly. They signed the 1944 Treaty, which forms the main base of water relations even today. During the making of this agreement and later, U.S. and Mexico also have some other problems such as drought trafficking in the border area. However, they handled these issues separately.

Turkey as upstream and powerful riparian has an essential role in the progress of the problem. In 1998 it enforced Syria not to use Kurdish problem as a retaliation of water problem, without any compromise in form of more water flows. Turkish governments also claim that they want to pursue good neighborhood policy. If Turkey gives up its obsolete approach and if all the riparians of the Euphrates-Tigris River basin handle the issues separately, they can reach an agreement based on the equitable and sustainable use of shared rivers as U.S. and Mexico did.

As seen from the cases, a permanent international water institution among the riparian countries, with responsibilities to coordinate the management efforts of the states plays a significant role in the facilitating the resolution and later in the implementing the new integrated water management principles. The IBWC and the CADRC were equipped with the power of conducting communication and coordination among the riparian countries, making

studies, gathering and sharing data regularly and preparing agreement proposals, etc. Their existence as coordinators is essential with regard to generating trust and fostering the efforts for policy change. By means of its experience in the management of shared rivers, the CADC later became an adequate and responsible organ for coordinating the implementation of WFD. IBWC also promotes and coordinates public participation, monitoring activities, data sharing and water policy harmonization on the U.S.-Mexican border. Such an institution can be object of policy transfer to the Middle-East.

As we look at the practice in the Middle-East, it is seen that the JTC among the riparian countries of the Euphrates and Tigris was established in 1980 as an international water institute. However, these countries tend to define its responsibilities as narrowly as possible. They did not support this institution with adequate power to be an influential actor in the resolution of water problem as in the other cases. This institution also consists of technical experts. It has just in several occasions exchanged water data such as during the meeting of 1973. Limited data collection capacity of these countries is one of the reasons of JTC inefficiency along with countries' reluctance to share the existing data. The Capacity Building Project, conducted to facilitate the implementation of the WFD, revealed that technical monitoring capacity and data regarding water is not sufficient and this data is dispersed between several authorities. To improve their monitoring capacity Turkey and other developing countries need funding and technical personnel.

Due to these different conditions of Middle-East, the experience of the U.S. and Mexico and Iberian Peninsula gives ideas about the utility of such an institution in the water problem. That makes the level of the policy transfer 'inspiration'.

Due to non-existence of a foreign actor to enforce the transfer of an institution, like the IBWC and the CADC, the type of transfer would be voluntary.

In the further steps, the problem in the Iberian Peninsula and the U.S.-Mexico case focused on the environmental deterioration such as salinity problem or climate change. In order to address these problems, they started implementing the integrated water management principles such as public participation, management at hydrological level, efficient water pricing policies, water status monitoring and preparing management plans etc.

The WFD and integrated water management principles in case of the U.S.-Mexico and the Iberian Peninsula gave an impulse with regard to institutional change. It requires social, political and technical changes such as introduction of new legislative, establishment of new administrative institutions or promotion of public participation to water management.

Water quality deterioration namely salinity problem in the Middle-East is at alarming levels. Climate change in addition to already high temperatures and evaporation rates requires an integrated water management approach.

In U.S. border and Iberian Peninsula, awareness for water problems raised, through participation and public information. Also the impact of the stakeholders on water and their interests assessed comprehensively, which help to determine measures for efficient protection of their rivers. Nevertheless, promotion of these principles was not free from problems,

mainly for the Iberian case. In order to overcome the lack of participation culture, Spain and Portugal undertook joint programmes, some of whom supported by the EU.

The participation principle of the integrated water management system i.e. the WFD as the object of policy transfer in the Middle-East will encounter difficulties. Despite this, there are also possibilities that can facilitate the policy transfer.

Firstly, participation principle is expected to become part of Turkish water law through the new Draft Water Law. Secondly, several NGOs and civil initiatives such as the ETIC emerged that promote sustainable management of the water resources in the Middle-East. However, these initiatives and NGOs are still young in this field and they have institutional and financial shortcomings.

The Iberian Peninsula has been making progress regarding the promotion of participation through the support of the EU, the work of the CADIC and governmental initiatives such as education programmes for children.

Lack of participation culture, also, the lack of an institutions such as the EU, which stimulates the process of policy change through its economic and political support, makes the Middle-East different from the Iberian Peninsula. Indeed, Turkey makes the use of the EU support through programmes such as the Capacity Building Programme. Turkey can communicate the results of these programmes with downstream riparian countries in the newly started negotiation process. Also, the experiences of the Spain and Portugal can give an inspiration in overcoming their participation shortcomings.

The need for implementing integrated water management principles is coming from the governments and to a limited extent from non-governmental actors, but for Turkey the EU membership also plays a role. This country should implement these principles if it wants to join the EU. In this regard, the implementation of these principles is falling into the indirect coercive transfer for Turkey; while it is falling into voluntary transfer for downstream riparians.

Other objects of the policy transfer are water status monitoring and data sharing. Sustainable management of waters requires regular monitoring and data sharing, which keep better track of water quality and quantity possible. In the Middle-East data regarding the average annual flow of the rivers and the water quality is not exact. Without this data, riparians cannot protect water resources and produce efficient water allocation agreements. Spain and Portugal after regular monitoring and data exchange in the 2000s were capable of producing an agreement in 2008. This agreement allocates waters and determines the annual and seasonal flow regimes for each of the shared rivers. Through different annual and seasonal regimes an effective allocation is achieved.

However, monitoring of the water status is an expensive requirement. High costs are one of the reasons that principles of sustainable water management are implemented mostly by the developed countries, as the U.S. and the Iberian case show. Thus, the implementation of these principles require a certain level of economic development, which will be a problem in case of the Middle-East.

Consequently, the adaption to new water management culture i.e. WFD by the riparians of Euphrates-Tigris river basin will be a hard and long issue that needs determined governments and essential modifications. Due to specific characteristics of the Middle-East, mentioned above, economic, political and technical investments are needed to realize an inspiration for policy transfer.

The governmental actors in Turkey undertook policy change in recent years, but they lack a holistic view to find a solution for water problems. Turkey's unwillingness to join any of the international conventions that form the main base of integrated water management principles, namely WFD, reveals this. This country intends to implement the WFD only in the national rivers and ignore the articles of WFD on cooperation in trans-boundary river basins.

SUMMARY

The water problem among Turkey, Syria and Iraq in the Euphrates-Tigris river basin was started in the second half of the 20th century with increased water use and the uncoordinated water development projects. It is complicated by several factors such as the Kurdish problem or the approaches of the riparians about the rights and obligations. These factors prevented them to find an allocation agreement that based on equitable and sustainable use of these rivers. Along with the absence of an allocation agreement, the high salinity rates of the basin show the urgent need for a holistic solution that includes the integrated river basin management approach.

In this regard, the integrated management principles, internal in the WFD, can be a solution for the Middle-East. However, their success depends on specific political, economic and social settings.

In order to draw lessons about the transferability of these principles to the Middle-East, their implementation in the Spain-Portugal and the U.S.-Mexico cases investigated.

Consequently, the Middle-Eastern countries need essential specific political, economic and social modifications to adapt the integrated resource management approach that requires cooperation in the shared river basins.

ANNEX I

MAJOR DAMS ON THE EUPHRATES RIVER

Country	Name of Dam	Use	River	Date of Completion	Gross Storage (BCM)	Surface Area (km ²)	HP (MW)
Turkey	Adiyaman	HP	Goksu	Planned	1.887	60	75
Turkey	Ataturk	HP, Irrigation	Euphrates	1992	48.70	817	2400
Turkey	Birecik	HP, Irrigation	Euphrates	2000	1.22	56.25	672
Turkey	Camgazi	Irrigation	Euphrates	1998	0.056	5.55	-
Turkey	Derik-Dumulca	Irrigation	Euphrates	1991	0.022	2.23	-
Turkey	Hacihidir	Irrigation	Euphrates	1989	0.062	4.4	-
Turkey	Hancagiz	Irrigation	Euphrates	1988	0.100	7.50	-
Turkey	Kahta	HP	Kahta	Planned	1.887	100	-
Turkey	Karakaya	HP	Euphrates	1987	9.58	268	1800
Turkey	Karkamis	HP, Flood Control	Euphrates	1999	0.157	28.4	189
Turkey	Kayacik	Irrigation	Euphrates	UC	0.116	2.91	-
Turkey	Keban	HP	Euphrates	1975	31	675	1330
Syria	Baath	HP, Irrigation, Flow Regulation	Euphrates	1988	0.09	27.15	75
Syria	Tabaqa	HP, Irrigation	Euphrates	1975	11.7	610	800
Syria	Tishrine	HP	Euphrates	1999	1.9	166	630
Syria	Upper Khabur ¹	Irrigation	Khabur	1992	0.988	1.37	-
Iraq	Al Hindiyah Barrage	Flow Diversion	Euphrates	1918, rebuilt 1989	-	-	-
Iraq	Al Qadisiyah ²	HP, Irrigation	Euphrates	1984	8.2	500	660
Iraq	Fallujah Barrage	Irrigation	Euphrates	1985	-	-	-
Iraq	Baghdadi	Flow Regulation	Euphrates	Planned	-	-	-
Iraq	Ramadi-Habbaniyah ³	Flood Protection	Euphrates	1948	3.3	426	-
Iraq	Ramadi-Razaza ⁴	Flood Protection	Euphrates	1951	26	1850	-

HP: hydropower; I: irrigation; FC: flood control; FD: flow division.

Source: UNEP (2001)

ANNEX II MAJOR DAMS ON THE TIGRIS RIVER

Country	Name of Dam	Use	River	Date of Completion	Gross Storage (BCM)	Surface Area (km ²)	HP (MW)
Turkey	Batman	HP, Irrigation	Tigris	1998	1.175	49.25	198
Turkey	Cag-Cag	HP	Tigris		-	-	-
Turkey	Cizre	HP, Irrigation	Tigris	Planned	0.36	21	240
Turkey	Devegeci	Irrigation	Tigris	1972	0.202	32.14	-
Turkey	Dicle	HP, Irrigation	Tigris	1997	0.595	24	110
Turkey	Dipni		Tigris		1.02	46	
Turkey	Dilimi	Irrigation	Great Zab	UC	0.0591	2.41	-
Turkey	Garzan	HP, Irrigation	Tigris	Planned	.983	46	80
Turkey	Ilisu	HP	Tigris	Planned	10.41	299.5	1200
Turkey	Goksu	Irrigation	Tigris	1991	0.062	3.9	-
Turkey	Kralkizi	HP	Tigris	1997	1.919	57.5	90
Turkey	Silvan	HP, Irrigation	Tigris	Planned	0.82	164	150
Iraq	Al-Adheem	HP, Irrigation	Al-Adheem	1999	1.5		
Iraq	Al-Amarah Barrage	Flow Regulation	Tigris	UC	-	-	-
Iraq	Al-Faris ¹	HP, Irrigation	Great Zab	Not Completed	3.30	56	1600
Iraq	Al-Kut Barrage	Flow diversion	Tigris	1939	-	-	-
Iraq	Derbendikhan	Irrigation	Diyala	1962	3.0	121	-
Iraq	Dibbis	Irrigation	Little Zab	1965	3.0	32	-
Iraq	Diyala Barrage	Irrigation	Diyala	1969	-	-	-
Iraq	Dokan	Irrigation	Little Zab	1961	6.8	270	-
Iraq	Hamrin	Irrigation	Diyala	1980	3.95	440	-
Iraq	Saddam ²	HP, Irrigation	Tigris	1985	11.1	371	320
Iraq	Samarra-Tharthar ³	Flow diversion	Tigris	1954	72.8	2170	-
Iraq	Sennacherib ⁴	Flow Regulation	Tigris		0.5	-	-
Iran	Bazoft		Bazoft	Under Design			
Iran	Dez ⁵	HP, Irrigation	Dez	1962	3.460	-	520
Iran	Garm-ab		Karkheh	Under Design			
Iran	Karkheh	HP, Irrigation, Flood Control	Karkheh	2001	7.795		400
Iran	Karun-1 ⁶	HP, Irrigation	Karun	1977	3.139	54.8	1000
Iran	Karun-2	HP	Karun	UC-2005			1000
Iran	Karun-3	HP, Flood control	Karun	UC – 2001	2.750	2000 (3000)	
Iran	Karun-4	HP, Flood control	Karun	UC-2006	2.190		1000
Iran	Khersan I	HP	Khersan	Under Design	0.520		750
Iran	Khersan II	HP	Khersan	Under Design	0.500		500
Iran	Khersan III	HP	Khersan	Under Design	0.730		750
Iran	Marun	Irrigation, HP	Marun	1998	1.2	25	145
Iran	Masdjied-e-Soleiman ⁷	HP, Irrigation	Karun	UC-2001	0.228	1000(2000)	
Iran	Saz-e-bon		Karkheh	2004			500
Iran	Shushtar ⁸	HP	Karun	UC – 2005	4.53		2000
Iran	Simareh	HP	Karkheh	UC-2004			500
Iran	Tang-e-mashoreh		Karkheh	Under Design			
Iran	Upper Gotvand	HP	Karun			1000 (2000)	

HP: hydropower; I: irrigation; FC: flood control; FD: flow division.

Source: UNEP (2001)

ANNEX III Characteristics of Water Problems of Cases

Question	Spain-Portugal Case	U.S.-Mexico Case	Middle-East Case
The problem started with	Increasing water extractions for irrigation and construction works	Increasing water extractions for irrigation and construction works	Increasing water extractions for irrigation and construction works
A permanent international water institution	CADC	IBWC	-
Agreements of water allocation and cooperation	1998 Albufeira Convention	Treaty of 1944, Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande	-
Water management level	At river basin level	At river basin level	Geographical boundaries
Water status monitoring activities	Started	Started	Started but not adequate
Public participation in water management	Started	Started	-
Data sharing	Regular through CADC and concerned authorities	Regular through IBWC and concerned authorities	Not regular
The present problem	Water quality degradation- salinity- impact of climate change	Water quality degradation- salinity- impact of climate change - salinity	Water allocation, water quality degradation- salinity- impact of climate change

LIST OF INTERVIEWS

	Name	Position	Country	Date
1	Manuela da Camara Falcao	Technical Advisor, Comissão Interministerial de Limite das Bacias Hidrográficas Luso-Espanholas	Portugal	08-06-2012
2	Ana Almeida	Expert at the Ministry for Agriculture, Sea, Environment and Spatial Planning, Department for International Affairs	Portugal	21-08-2012
3	Dr. Vakur Sümer	Selcuk University International Relations,	Turkey	22-04-12
4	Dursun Yildiz	Hydropolitics specialist and former DSI employee	Turkey	07-06-12
5	Özlem Yalcin	Agriculture Engineer, Directorate for agriculture and rural affairs, Gaziantep	Turkey	16-07-12

BIBLIOGRAPHY

- Alparslan A.H., A. Atac, T. Kimence (2007), River Basin Management Plans in Turkey During the Accession Period to European Union, International Congress on River Basin Management, Antalya, Turkey, pp. 230-244. Available at <http://www2.dsi.gov.tr/english/congress2007/chapter_1/14.pdf> 24-08-2012
- Altinbilek D. (2004), Development and management of the Euphrates–Tigris Basin, *International Journal of Water Resources Development*, 20:1, pp. 15-33.
- Avella L. and M. Garcia-Molla, (2009), ‘Institutional Factors and Technology Adoption in Irrigated Farming in Spain: Impacts on Water Consumption’. In: Albiac J. and A. Dinar, *The Management of Water Quality and Irrigation Technologies*, UK: Earthscan
- Aydin M., F. Ereker (2009), Water Scarcity and Political Wrangling: Security in the Euphrates and Tigris Basin, *Hexagon Series on Human and Environmental Security and Peace*, 4:7, pp. 603-613.
- Barnes J. (2009), Managing the Waters of Baath Country: The Politics of Water Scarcity in Syria, *Geopolitics*, 14:3, pp.510-530.
- Barreira A. (2003), The Participatory Regime of Water Governance in the Iberian Peninsula, *Water International*, 28:3, pp. 350-357.
- Beaumont P.(1996), Agricultural and Environmental Changes in the Upper Euphrates catchment of Turkey and Syria and Their Political and Economic Implications, *Applied Geography*, 16: 2, pp. 137-157.
- Bennett C.J. (1991), How States Utilize Foreign Evidence, *Journal of public Policy*, 11:1, pp. 31-54.
- Bernal J. M. and A.H. Solis (2000), Conflict and Cooperation on International Rivers: The Case of the Colorado River on the US–Mexico Border, *Water Resources Development*, 16: 4, pp. 651–660.
- Bulloch J., A. Darwish (1993), *Water Wars Coming Conflicts in the Middle-East*, London: Gollancz.
- Bulmer S., D. Dolowitz, P. Humphreys, P. Stephen, (2007), *Policy Transfer in European Union Governance: Regulating the Utilities*, New York: Routledge.
- Burleson E. (2005) ‘Equitable and Reasonable Use of Water within the Euphrates-Tigris River Basin’, Washington: Environmental Law Institute.
- Carkoglu A., M. Eder (2001), Domestic Concerns and the Water Conflict over the Euphrates-Tigris River Basin, *Middle Eastern Studies*, 37:1, pp. 41-71.

- U.S. Mexico Binational Council, (2003), *U.S. – Mexico Trans-boundary Water Management: The Case of Rio Grande-Rio Bravo*, CSIS/ITAM/University of Texas, Washington. Available at < http://csis.org/files/media/csis/pubs/binational_council.pdf> 24-05-12.
- Chave P. (2001), *Water Framework Directive: An Introduction*, IWA Publishing, UK.
- Correia F. N., E. J. da Silva (1997) ‘Transboundary Issues in Water Resources’ In: Gleditsch P., *Conflict and the Environment*, the Netherlands: Kluwer Academic Publishers.
- Costa L., J. C. Verges, B. Baraque (2008), *Shaping a New Luso-Spanish Convention*, Porto, Universidade Católica Portuguesa, Working Papers No.8/2008, available at <<http://ideas.repec.org/p/cap/wpaper/082008.html>> 08-04-12.
- Davidoff B. (2009), ‘Three Essential Elements of on-Farm Irrigation Efficiency and Conversation’. In: Albiac J. and A. Dinar (eds), *The Management of Water Quality and Irrigation Technologies*, UK: Earthscan.
- Do O A. (2010), ‘Trans-boundary drought risk management in Mediterranean Europe: A state-of-the-art analysis for the Guadiana River Basin’, *Options Méditerranéennes A*, No. 95, pp.267-272.
- Dolowitz D. P. and D. Marsh (1996), ‘Who Learns What from Whom: a Review of the Policy Transfer Literature’, *Political Studies*, 44:2, pp. 343-357.
- Dolowitz D. P. and D. Marsh (2000), ‘Learning from Abroad: The Role of Policy Transfer in Contemporary Policy-Making’, *Governance: An International Journal of Policy and Administration*, 13: 1, pp. 5–24.
- EEA (2007), *Climate change and water adaptation issues*, Technical Report No 2, Copenhagen: EEA. Available at <http://www.eea.europa.eu/publications/technical_report_2007_2> accessed 03-07-12.
- EU Commission (2005), *The EU Accession Negotiations with Turkey*, Brussels. Available at <http://www.mfa.gov.tr/data/AB/mcb_eng.pdf> 28-07-12.
- EU Commission (2007), *Mediterranean Water Scarcity and Drought Report*, MED WS&D WG, available at <<http://www.emwis.net/topics/WaterScarcity>> 03-05-12.
- EU Parliament (2000), Directive 2000/60/EC of the European Parliament and of The Council of 23 October 2000 establishing a framework for Community action in the field of water policy, Official Journal of the European Communities 327. Available at <<http://eurlex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2000:327:0001:0072:EN:PDF>> 18-01-12.
- FAO (2008), *Factsheet Iraq*, available at <<http://www.fao.org/nr/water/aquastat/countries/iraq/index.stm>> 12-07-12.
- Garrido A. (2010), *Water Policy in Spain*, Balkema: CRC Press.

- Gleick P. H. (1993), Water and Conflict: Fresh Water Resources and International Security, *International Security*, 18: 1, pp. 79-112.
- Gruen G.E. (2000), Turkish Waters: Source of Regional Conflict or Catalyst for Peace, Water, Air, and Soil Pollution, 123:1, pp.565–579.
- Haftendorn H. (2000), Water and International Conflicts, *Third World Quarterly*, 21: 1, pp. 51-68.
- Hakki M. M. (2006), Turkey, Water and the Middle-East: Some Issues lying Ahead, *Chinese Journal of International Law*, 5: 2, pp. 441-45.
- Harris L.M. (2002): Water and Conflict Geographies of the Southeastern Anatolia Project, *Society & Natural Resources: An International Journal*, 15:8, pp. 743-759.
- Irak ve Türkiye Arasında Dostlukve İyi Komsuluk Anlaşması 1947, available at <<http://ua.mfa.gov.tr/>>, accessed on 06-04-12.
- Karmon E. (1999), A Solution to Syrian Terrorism, *Middle East Quarterly*, 6:2, pp. 23-32.
- Kibaroglu A., O. Unver (2000), An Institutional Framework for Facilitating Cooperation in the Euphrates-Tigris river basin, *International Negotiation*, 5: 2, pp. 311–330.
- Kibaroglu A. (2002), *Building a regime for the waters of the Euphrates-Tigris river basin*, Kluwer Law International, New York.
- Kibaroglu A., W. Scheumann (2011) ‘Euphrates-Tigris Rivers System: Political Rapprochement and Trans-boundary Water Cooperation’. In: Scheumann W., Kramer A., A. Kibaroglu (eds.), *Turkey’s Water Policy*, Berlin-Heidelberg: Springer Verlag.
- Kibel S. P. and R. J. Schutz (2007), Rio Grande Designs: Texans’ NAFTA Water Claim against Mexico, *Berkeley Journal of International Law*, 25:2, pp.101-140.
- Klaver I. J. and J. M. Donahue (2009), Sharing Water Internationally, Past, Present and Future Mexico and The United States, *Southern Rural Sociology*, 24:1, pp.7-20.
- Kolars J. F. and W. A. Mitchell (1991), *The Euphrates River and the Southeast Anatolia Development Project*, Illinois: Southern Illinois University Press.
- Kumar Garg S. (1999), *International and Interstate River Water Disputes*, New Delhi: Laxmi Publication.
- Kuokkanen T. (2002), *International Law and the Environment*, The Hague: Kluwer Law International.
- Llamas R. M. (1997) ‘Transboundary Water Resources in the Iberian Peninsula’. In: Gleditsch P., *Conflict and the Environment*, the Netherlands: Kluwer Academic Publishers.
- Lozan Anlaşması, available at <<http://ua.mfa.gov.tr/>> 06-04-12.

- Lupu Y. (2007), *International law and the waters of the Euphrates and Tigris*, available at <http://www.envirozan.info/EZ_Docs/Water_resources/IJET.pdf> 12-03-12
- Nilsson S. and S. Langaas (2006) , International River Basin Management under the EU Water Framework Directive: An Assessment of Cooperation and Water Quality in the Baltic Sea Drainage Basin, *Royal Swedish Academy of Sciences*, 35: 6, pp. 304-311
- Matos R. (2004) 'The Spanish-Portuguese Trans-boundary Water Information and Management Approach'. In: *Environmental Information In European Trans-boundary Water Management*, UK: IWA Publishing.
- Maia R. (2003), The Iberian Peninsula's Shared Rivers Harmonization of Use: A Portuguese Perspective, *Water International*, 28:3, pp. 389-397.
- McCaffrey, S.C. (1996), The Harmon Doctrine One Hundred Years Later: Buried, not praised, *Natural Resources Journal*, 36:1, pp. 549-590.
- Mcevoy D., F. Cots, K. Lonsdale, D. J. Tabara and S. Werners (2008), 'The Role of Institutional Capacity in Enabling Climate Change Adaptation: The Case of Guadiana River Basin.' In: De Jong W. *Transborder Environmental and Natural Resource Management*, Japan: Kyoto University.
- Mehr F. (2003), 'The Politics of Water'. In: Zichicci A., Ragaini R. (eds.) *International Seminar on Nuclear War and Planetary Emergencies*, Singapore: World Scientific Publishing.
- Ministry of Foreign Affairs, Avrupa Birliği ile Su Konusu, available at <<http://www.mfa.gov.tr/avrupa-birligi-ile-su-konusu-.tr.mfa>>, 04-19-2012
- Minute 218, available at <<http://www.ibwc.gov/Files/Minutes/Min218.pdf>>, 05-17-2012
- Moroglu M., M. S. Yazgan (2008), Implementation of EU Water Framework Directive in Turkey, *Desalination*, 226:1, pp. 271-278.
- Mumme S. (1993), Innovation and Reform in Transboundary Resource Management: A Critical Look at the International Boundary and Water Commission, United States and Mexico, *Natural Resources*, 33:1, pp. 93-120.
- Orsam, (2011), *EU Water Framework Directive Implementation in Turkey: The Draft National Implementation Plan*, Report No. 1, Türkiye: Ankara.
- Plano Nacional da Agua, (1998), Institution of Water, Portugal. Available at <http://www.inag.pt/inag2004/port/a_intervencao/planeamento/pna/pdf_pna_v1/v1_c2_t03.pdf> 21-04-12.

- Pombo A. O. and R. D. Wright (2012) 'Water Perspective in the Western U.S. Mexican Border: Future Conflict?' In: *Lee E. and Ganster P.(eds), The U.S: Mexican Border Environment: Progress and Challenges for Sustainability*, San Diego:San Diego State University Press.
- Portela M. M., A. B.Almeida and M. Machado (2009), Development in River Basin Management in Portugal: Past and Future Perspectives, *Striver Technical Brief*, No.10, pp.1-9.
- Quevauviller P. (2010), Is IWRM achievable in practice: Attempts to Break Disciplinary and Sectoral Walls through a Science-policy Interfacing Framework in the Context of the EU Water Framework Directive, *Irrigation and Drainage Systems*, 2:3-44, pp. 177-189.
- Robertson D. B. (1991), Political Conflict and Lesson Drawing, *Journal of Public Policy*, 11:1, pp. 55-78.
- Rogers E. M. (2003), *Diffusion of Innovations*, U.S., New York: Free Press.
- Rose R. (1991), "What is Lesson Drawing?" *Journal of Public Policy* 11:1, pp. 3-30.
- Salman M.A.S. (The Helsinki Rules, the UN Watercourses Convention and the Berlin Rules: Perspectives on International Water Law, *Water Resources Development*, 23: 4, pp. 625–640,
- Salman M., W. Mualla (2008), Water Demand Management in Syria: Centralized and Decentralized Views, *Water Policy*, 10:6, pp. 549-562.
- Santafe-Martínez J. M. (2003), The Spanish-Portuguese Trans-boundary Waters Agreements: Historic Perspective, *Water International*, 28:3, pp. 379-388
- Santoz F.D., K. Forbes and R. Moita (2002), *Climate Change in Portugal Scenarios Impacts and Adaptation Measures*, SIAM Project, Lisbon, Portugal.
- Scheumann W. (2003), 'The Euphrates Issue in Turkish - Syrian Relations'. In: Brauch H. G., Liotta P.H., Marquina A., Rogers P., Selim M. (eds.) *Security and Environment in the Mediterranean*, Berlin Heidelberg: Springer Verlag.
- Stone, D. (2000a) Non-Governmental Policy Transfer: The Strategies of Independent Policy Institutes, *Governance: An International Journal of Policy and Administration*, 13: 1, pp. 45-62.
- Stone D. (2000), *Banking on Knowledge: The Genesis of the Global Development Network*, USA, New York: Routledge.
- Stone D. (2004), Transfer agents and global networks in the 'transnationalization' of Policy, *Journal of European Public Policy*, 11:3, pp. 545-566.
- Szekely A. (1993), Emerging Boundary Environmental Challenges and Institutional Issues: Mexico and the United States, *Natural Resources Journal*, Vol. 33, pp. 33-46.

- Szekely A. (1993), How to Accommodate an Uncertain Future into Institutional Responsiveness and Planning: The Case of Mexico and the United States, *Natural Resources Journal*, Vol. 33, pp. 397- 403.
- T.C. Çevre ve Orman Bakanlığı DSI Genel Müdürlüğü 2009 Yılı Faaliyet Raporu, Ankara, available at <http://www2.dsi.gov.tr/faaliyet_raporlari/2009_faaliyet_raporu.pdf>, 20-04-2012.
- Tippet J., B Searle, C. Pahl-Wostl, Y. Rees (2005), Social Learning in Public Participation in River Basin Management: Early Findings from Harmonicop European Case Studies, *Environmental Science & Policy*, 8:3, pp.287-299
- Treaty of 1944, Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande, available at <<http://www.ibwc.gov/Files/1944Treaty.pdf>>, 05-17-2012
- Turan I. (2011), 'The Water Dimension in Turkish Foreign Policy' In: Scheumann W., Kramer A., A. Kibaroglu (eds.), *Turkey's Water Policy*, Berlin-Heidelberg: Springer Verlag.
- Türkiye Cumhuriyeti ile Suriye Arap Cumhuriyeti Arasında Ekonomik İşbirliği Protokolü, available at <<http://ua.mfa.gov.tr/>> 06-04-12.
- Wilder M. 2010. Water governance in Mexico: political and economic apertures and a shifting state-citizen relationship, *Ecology and Society*, 15:2.
- Wolf A.T. (1998), Conflict and cooperation along international waterways, *Water Policy*, 1:2, pp. 251-265.
- Wolf T. A. (1999), Criteria for Equitable Allocations: The Heart of International Water conflict, *Natural Resources Forum*. 23:1, pp. 3-30.
- World Bank, (1995), *From Scarcity to Security: Averting a water crisis in the Middle East and North Africa*. Washington, DC, USA: World Bank.
- Zawahri A.N. (2006), Stabilizing Iraq's Water Supply: What the Euphrates and Tigris Rivers Can Learn from the Indus, *Third World Quarterly*, 27:6, pp. 1041-1058.
- U.N. (2000) Water Management: Guidance of Public Participation and Compliance with Agreement, ECE/ UNEP, Geneva: UN.
- U.N. (2005), United Nations Convention on the Law of the Non-navigational Uses of International Watercourses 1997, available at<http://untreaty.un.org/ilc/texts/instruments/english/conventions/8_3_1997.pdf> 19-03-12
- U.N. (2006), *Water A Shared Responsibility*, World Water Development Report 2, Paris, France: UNESCO.

World Water Assessment Programme (2009), *The United Nations World Water Development Report 3: Water in a Changing World*. Paris: UNESCO.

U.N. (2012), World Water Development Report: *Managing Water under Uncertainty and Risk*, USA, Washington: UNESCO.

UNEP (2001), *The Mesopotamian Marshlands: Demise of an Ecosystem*, Early Warning and Assessment Technical Report no. 3, UNEP/DEWA/TR.01–3, Geneva: UNEP.

See for Commission for the Implementation of Albufeira Convention

<http://www.cadc-albufeira.org/es/index.html>

See for Good Neighbourship Policy of Turkey,

<http://www.mfa.gov.tr/komsularla-sifir-sorun-politikamiz.tr.mfa>

See for International Boundary and Water Commission

<http://www.ibwc.state.gov/>

See for Orsam Interview with Al-Mosavi

<http://www.orsam.org.tr/tr/SuKaynaklari/uzmangorusugoster.aspx?ID=457>

See for newspaper article al-shorfa,

http://mawtani.al-shorfa.com/en_GB/articles/iii/features/iraqtoday/2012/06/15/feature-01,

accessed on 19-08-12

See for the The Association of California Water Agencies,

http://www.calwatercrisis.org/pdf/ACWA_FactSheet_Sept2007.pdf accessed 21-08-12

See for Max Planck Institute for Comparative Public Law and International Law,

http://www.mpil.de/ww/en/pub/research/details/know_transfer/water/projekte/euphrat_und_tigris.cfm