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DISSERTATION

***“Political and International implications of integrated
water resources management of transboundary river
basins: The case of Axios/Vardar River basin”***

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Abstract

The political rivalries over the water resources are highly increased due to their scarcity, several types of pollution, increasing water consumption and several environmental shifts. These tensions are a result of the great number of transboundary river basins worldwide (261). The international institutions promote a remarkable legal framework in order to regulate those dimensions amongst the riparian states. The new EU Water Framework Directive 2000/60 and the decisions of Helsinki convention could be the road map for integrated water resources management (IWRM). In Greece the main renewable resources are “imported” and for this reason the necessity of an IWRM is obvious and a hard task at the same time. This dissertation focuses on the Axios/Vardar river basin and examines the possibility of a possible transnational cooperation in respect of the international law framework.

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Introduction

The problem of water scarcity, the pollution of water, the problem of water resources shared amongst states and the rapidly increasing water needs for crop production and the residential human needs, are some of the reasons, which impose the development of water resources management. In order to avoid conflicts and tensions between the states which are concerned, the international institutions and the states took into consideration the issues at stake and are making efforts to promote cooperation and consultation to succeed a viable integrated water resources management.

This dissertation is examining the case of Axios/Vardar river basin, which is shared mainly between Greece and FYROM. At the outset the meaning of water resources will be presented, as well as their crisis and the meaning of integrated water resources management. Secondly the legal framework and the legal tools, which can secure and promote this procedure, will be presented. In addition there will be a reference to international river basins and the Greek transnational river basins.

In the third part the status of Axios/Vardar river basin will be presented and analyzed and it will be attempted to present a model for a possible future agreement on the exploitation of the common river basin amongst Greece and FYROM.

Chapter 1: Water resources management

1.1 Introduction to water resources

Water remains the most vital good for human's existence, growth and survival. Water is plenty on Earth, but the quantities of freshwater are just 2.5%. However the greater amount of freshwater appears as ice (70%), so it cannot be used by human. Only 0.4% of freshwater is on surface and it can be used for human needs. The figure of Shiklomanov and Rodda demonstrates water's allocation very clearly.

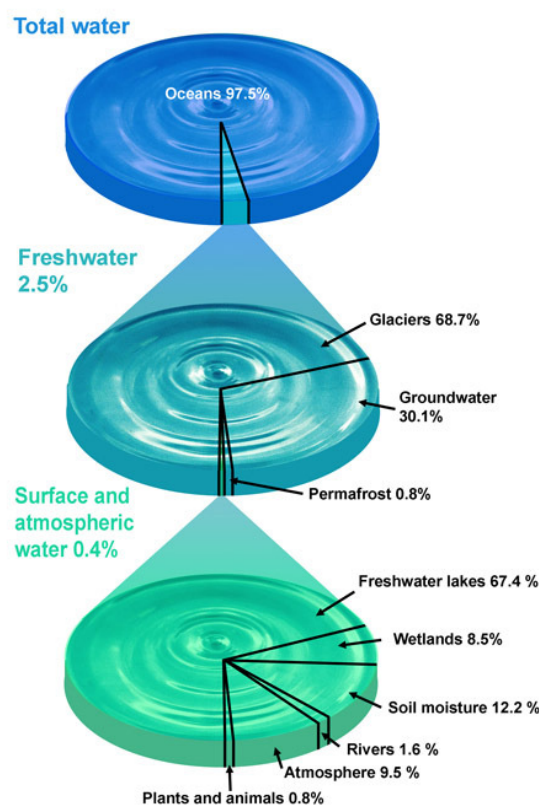


Figure 1 Worldwide water distribution by Shiklomanov and Rodda

The limited amount of freshwater worldwide demonstrated its utility since ancient times. “Civilizations are constrained directly by the quality and quantity of available safe drinking and subsistence water. They are also constrained indirectly by the influence of water on food, energy, transportation, and industry”. (Fekri Hassan, 2003)

Moreover people attempted to take advantage of freshwater consumption for their benefit. Water is the mainspring of civilization and this could be recognized from the appearance of the first civilizations in Mesopotamia and Egypt, where the rivers

played vital role. Water was conceived as the source of all things, eternal and primeval. Until today water promoted the economic and agricultural development, the facilitation of transportation, the determination of war activities and in contemporary era the development of new models of energy, which can cover the needs of modern urban centers.

Moreover “human societies have throughout history found new means to secure availability of water where they settled” (Fekri Hassan, 2003). They develop methods to “harvest, transport, and store rainwater, spring water, groundwater, and even air moisture” (Fekri Hassan, 2003). As we have seen above the percentage of freshwater, which can be consumed by people is very low. This scarcity, combined with several other factors could provoke serious security issues and conflicts among modern states.

1.2 The water resources crisis

The importance of water and the close relation with mankind has been underlined before. Due to the fact that the human population throughout time has increased, the problem of water scarcity has become very intense. The main reasons, which provoke water resources crisis worldwide, are:

- a) Fresh water resources are limited
- b) Those fresh water resources are becoming more and more polluted, rendering them unfit for human consumption and also unfit to sustain the ecosystem
- c) Those fresh resources have to be divided amongst competing needs and demands in society
- d) Many people do not have access to sufficient safe fresh water resources
- e) Huge increase of crop production and efforts to develop the harvesting techniques.
- f) Structures to control water, which may often have undesirable consequences on the environment
- g) There is an intimate relationship between groundwater and surface water, between coastal water and fresh water, etc. Regulating one system and not the others may not achieve the desired results. (Savenije, Zaag, 2008)

Having said all the above we could add that the water availability is “highly erratic in different regions of the world”. According to A. Swain the 80% of the total global runoff is concentrated in the North, which has a relatively small population. However in tropical and arid areas, where the majority of population lives, water availability is

complicated due to the massive population growth and the extensive urbanization (Swain, 2001).

Many experts (Wolf, 2010) support that the reasons that lay behind the water crisis and disputes are that water ignores the political boundaries amongst the states, evades institutional classification and eludes legal generalizations.

Furthermore disputes and conflicts could be produced for three causes, quantity, quality and control. “The incompatibility on the last two issues (quality and control) is relatively easier to address with some financial land technical support” (Swain, 2001). Nevertheless, the quantity issue is the major factor, which provokes malfunctions amongst riparian countries and eventually agreements are cancelled. That has occurred because “water is not easily replaced, so the problem of its reduced quantity is more difficult to address” (Swain, 2001). The quantity issue was the cause for disputes between riparian states in the arid regions of Asia and Africa. The disputes over international rivers—Zambezi, Mekong, Nile, Jordan, Euphrates–Tigris, and Ganges are a characteristic example demonstrating the quantity issue. Fortunately those differences did not lead to wars over water resources control, but according to experts the possibility could not be excluded in the future.

1.3 Integrated water resources management

In 2002, at the Johannesburg World Summit on Sustainable Development (WSSD), The Technical Advisory Committee of the Global Water Partnership defined Integrated Water Resources Management (IWRM) “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”. In addition, he emphasized that water should be managed in a basin-wide context, under the principles of good governance and public participation (Rahaman & Varis, 2005).

Throughout history water resources management has been developed and evolved in a number of countries. It is observed that in Valencia, Spain multi-stakeholders, participatory water tribunals have operated at least since the tenth Century (Rahaman & Varis, 2005). According to Embid, Spain was probably the first country, which organized water resources management on the basis of river basins. Spain adopted the system of “confederaciones hidrográficas” in 1926 (Embid, 2003).

There have been serious attempts in order to promote the IWRM in different regions globally and especially during last decades. An early model of IWRM could be observed in the 1940s when the Tennessee Valley Authority began to develop the water resources for the region (Rahaman & Varis, 2005). In addition in 1960, in Hessen, Germany, IWRM Planning was prepared on the basis of a multidisciplinary integrated approach.

A milestone for the evolution of IWRM was the United Nations Conference on Water in the Mar de Plata (1977), where the IWRM was recognized as the “recommended approach to incorporate the multiple competing uses of water resources” (Rahaman & Varis, 2005). Despite that in 1980s water was displaced by the political agenda. Fortunately this situation shifted during 1990s thanks to the efforts of numerous conferences and international organizations, which promoted IWRM’s contribution. Significant points were the International Conference on Water and Environment (1992), Second World Water Forum (2000), International Conference on Freshwater (2001), World Summit on Sustainable Development (2002) and Third World Water Forum (2003). All these underline the importance of IWRM and thrust it onto the political agenda. (Rahaman & Varis, 2005)

The main objective of IWRM is to “manage the water resources in a comprehensive and holistic way” (Savenije, Zaag, 2008). For this reason the water resources have to be examined by several perspectives and dimensions. IWRM due to the nature of water has to take into consideration the following four dimensions:

1. The water resources, or the natural dimension, taking the entire hydrological cycle into account, including stock and flows, as well as water quantity and water quality; distinguishing, for example, rainfall, soil moisture, water in rivers, lakes, and aquifers, in wetlands and estuaries, considering also return flows, etc.
2. the water users, the human dimension, all economic interests and stakeholders;
3. the spatial scale, including;
 - the spatial distribution of water resources and uses(e.g. well- watered upstream watersheds and arid plains downstream);
 - the various spatial scales at which water is being managed ,i.e. individual user, user groups (e.g. userboards), watershed, catchment,

(international) basin; and the institutional arrangements that exist at these various scales;

4. the temporal scale; taking into account the temporal variation in availability of and demand for water resources, but also the physical structures that have been built to even out fluctuations and to better match the supply with demand (Savenije, Zaag, 2008).

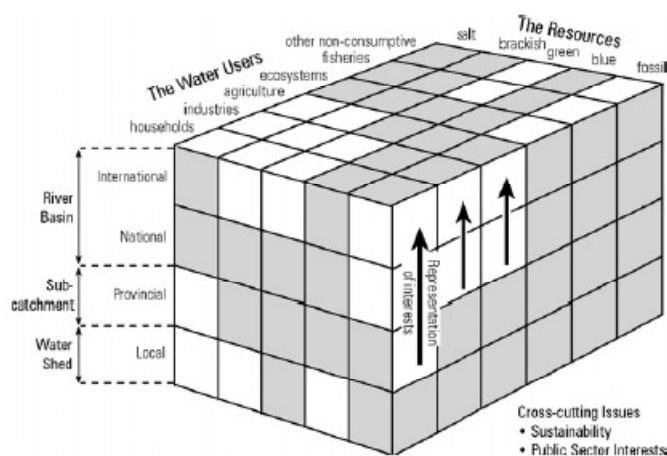


Figure 2 Three of the four dimensions of Integrated Water Resources according to Savenije

In March 2000 during the 2nd World Water Forum in Hague, delegations of 113 countries met in a parallel ministerial conference and unanimously accepted that the IWRM is connected with the Water Security (Savenije, Zaag, 2008). Many experts, who attended the Forum achieved “access to water to be declared as a human right”(Savenije, Zaag, 2008). The successful progress of IWRM is closely related to the principals of Water security, which are important to be ensured amongst the international community. The concept of water Security consists of four principals:

- Freshwater, coastal and related ecosystems are protected and improved.
- Sustainable development and political stability are promoted.
- Every person has access to enough safe water at an affordable cost to lead a healthy and productive life
- The vulnerable are protected from the risks of water related hazards (Savenije, Zaag, 2008).

In order to achieve the concept of Water Security the following challenges should be faced. First of all it should be recognized that access to safe and sufficient water

and sanitation are basic human needs and vital for health and welfare. In addition people have to participate in the process of water management and women's contribution (*meeting basic needs*) should be encouraged too. Secondly, food conservation should be ensured so that the vulnerable and the poor would be protected. Water could contribute to food production if allocated properly (*food security*).

Furthermore it is vital the ecosystems to be protected by sustainable water resources management (*protecting ecosystems*).

In addition the promotion of a peaceful and a win-win cooperation between different users of water, within and between states, delivers sustainable river management (*sharing water resources*).

Another important challenge is the protection by several disasters natural or no, such as floods, droughts and pollution (*managing risks*).

Additionally water management should be done under economic, social, environmental and cultural valuation of water and its uses -water services pricing, cost of their provision- (*valuing water*).

Last but not least is to ensure the good governance, so the involvement of the public and the interests of the stakeholders to be included in the management of water resources (*governing water wisely*).

Chapter 2: Transnational River Basins

2.1 Introduction- Definition

Transboundary or transborder or transnational water resources are defined as surface or groundwater resources (rivers, lakes) shared by two countries or more. Due to the fact that water is in motion continuously, the issues of control, jurisdiction and sovereignty are very complicated and difficult to be resolved in contrary to static land resources.

According to Wolf the percentage of international rivers is covering 45.3% of the land surface of the earth. He counted about 261 transboundary river basins (Wolf et al., 1999). However Green cross extended the above number to 280 transboundary river basins (Green Cross, 2000). Finally in a recent World Bank's workpaper the number of transboundary river basins is counted up to 245 (Swain, 2001). The largest number of international basins is in Europe (69). In the second place is Africa (59), Asia (57), North America (40) and South America (38). According to Puri in Western and Central Europe have been identified more than 150 major rivers and 50 large lakes, which run over run along or straddle the border between two or more countries, over 100 transboundary groundwater aquifers. The institution, which supervises them, is the United Nations Economic Commission for Europe (Kallioras, Pliakas, Diamantis, 2006).

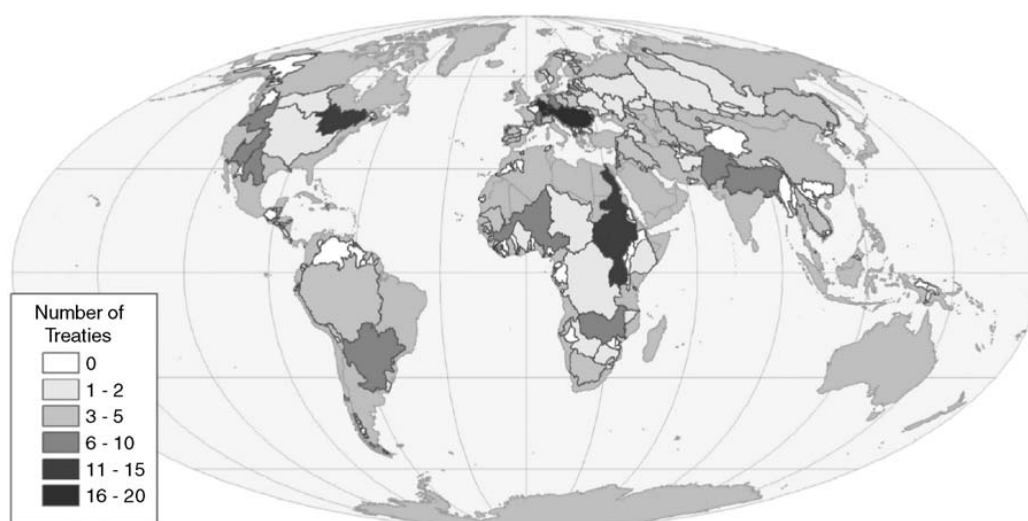


Figure 3 International river basins and the number of Treaties, which are held amongst the states (UNEP,2002)

The transboundary water resources management meets several obstacles. At the outset, water is vital for human's existence. Secondly water is used for drinking and domestic purposes, irrigation, fishing and navigation, hydropower generation, flood management, recreation and tourism. (Kliot, Smueli, Shamir, 2001). For this reason the fulfillment of one could provoke obstructions to the others. Moreover this situation could be very difficult especially amongst different states, with varied interests and aims.

2.2 International Law and organization of transboundary water resources

The classical definition of International law is given by Brown-Weiss: "The body of rules and principles of action which are binding upon civilized states in their relations with one another". In addition through international law the normative framework and several procedures of coordination are promoted in order to "control conflicts, facilitate cooperation and achieve values" (Kliot, Smueli, Shamir, 2001). Another source of International law is the explicit and implicit agreement of the participants. Explicit agreements are termed "treaties" or "conventions". Implicit agreements are termed "custom" or "general principles". This body, termed "customary international law," is more complex and uncertain than formal agreement such as treaties and conventions (Kliot, Smueli, Shamir, 2001).

International law as it concerns the water resources "regulates relationships between states with respect to the utilization of "shared" common or "transboundary" water resources" (Kliot, Smueli, Shamir, 2001).

Geographically if a river flows through or between the territories of sovereign states, it can be recognized as an international river. The legal view considers "a river as international, if a riparian state does not have all the powers over the waters of that river" (Kliot, Smueli, Shamir, 2001).

There are two the categories from which the international law's rules emanate: a) The Treaties and the b) Customary International Law or State Practice (Kliot, Smueli, Shamir, 2001).

According to Caponera there are about 286 international treaties, which control fresh water and concern mainly the regions of Europe and North America. Most agreements concerning shared water resources are bilateral and relate to specific rivers that form or cross boundaries, or lakes that straddle them. There is a smaller number of multilateral agreements (Kliot, Smueli, Shamir, 2001).

The Customary International Law is based on “doctrinal principals”, which led to the state action concerning the fresh water issues. The five doctrines are:

- *The Harmon Doctrine of Absolute Sovereignty*, which describes the absolute freedom of the state to “utilize the waters flowing through its territory, regardless of the effect of its actions on other riparian states”. However this doctrine is not well-accepted and is considered rival to the international law declarations.
- *The Doctrine of Absolute Riverian Integrity*, describes the state’s willingness not to “alter the natural flow of waters passing through its territory in any manner which will affect the water in another state, be it upstream or downstream”. This doctrine due to the fact that restricts the states is not very preferable. Sometimes is used more by downstream states.
- *The Doctrine of Limited Territorial Sovereignty* is an important doctrine for the resolve of the majority of international disputes around water. Treaties and experts support this doctrine widely. To summarize it conforms to the general legal obligation to use one’s property in a manner which will not cause injury to others. Delapenna connects restricted sovereignty with “equitable utilization” (Delapenna, 1999).
- *The Doctrine of the Communality of International Waters*, is more theoretical, because it presents a communality of riparian states, which promote their common interests. Moreover this theory presents the entire river basin as a single geographic and economic unit that exceeds the national borders.
- *The Doctrine of Correlative Rights* emphasizes the most efficient utilization of joint water resources, rather than on ownership rights.

Those five doctrines became the pillars of the international law which are binding the states. The four pillars are:

- (a) The duty to cooperate and to negotiate in good faith with the genuine intention of reaching an agreement;
- (b) The prohibition of management practices likely to cause substantial injury to other states (prevention of harm)
- (c) The duty of prior consultation;
- (d) The principle of equitable utilization of shared water resources. (Kliot, Smueli, Shamir, 2001)

Several institutions and organizations around the world promote and impose the legislative frame in order to secure the efficiency of transnational water resources management. The most known documents regarding the management of international water resources are defined and supervised by the United Nations Economic Commission for Europe (Kallioras, Pliakas, Diamantis, 2006). There are guidelines for the monitoring and assessment of lakes, rivers and groundwater. All these actions derived from the 1992 UN/ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes which was signed in Helsinki, 17 March 1992, and enforced by the United Nations in 1994 (Kallioras, Pliakas, Diamantis, 2006). The European water resources management has been regulated by legal and administrative aspects, which was a result of UN Convention on the Law of the Non Navigational Uses of International Watercourses in 1997 (Kallioras, Pliakas, Diamantis, 2006).

Furthermore, legislative work is produced by European Water Framework Directive, WFD 2000, which is an important frame for EU member states, EU candidate states and in general other European states.

2.2.1 The Helsinki Convention

The most vital initiative of UN was the Convention on the Protection and Use of Transboundary Water sources and International Lakes, which took part in Helsinki in 1992. The outcomes of this convention encourage co-riparian states to coordinate their efforts for the management of their international waters. The bases for the cooperation are based on the following:

- the establishment of monitoring network for data exchange regarding the quantity and quality of waters;
- the joint analysis of information on the quantity and type of water used for various purposes in each country;
- the exchange of information on protection measures for groundwater, upper catchments and wetlands;
- the exchange of information on structural and nonstructural mechanisms for regulating flow for navigation and flood protection.

The results of UN Convention were incorporated by United Nations General Assembly in 1997 in the Law of the Non- Navigational Uses of International

Watercourses with 103 votes in favor, 3 against and 27 abstentions (Kallioras, Pliakas, Diamantis, 2006).

According to Wolf and to Giordano there is an ambiguous management and aims after the 1997 UN Convention, concerning the articles for “water allocation which includes provisions for both ‘reasonable and equitable use’ and an obligation not to cause ‘significant’ harm, whereas the definition of ‘reasonable use’ is based on seven, non-exhaustive factors” (Giordano and Wolf, 2001). These factors include:

- (1) geographic, hydrographic, hydrological, climatic, ecological and other natural factors;
- (2) social and economic needs of each riparian state;
- (3) population on the watercourse;
- (4) effects of use in one state on the uses of other states;
- (5) existing and potential uses;
- (6) conservation, protection, development and economy of use, and the costs of measures taken to that effect;
- (7) The availability of alternatives, of corresponding value, to a particular planned or existing use.

If somebody examines the targets of UN Convention in 1992, it is obvious that the stake was water quality issues, while in 1997’s UN Convention were the problems of apportionment of water.

All the above guidelines and have been finalized and adopted by the Task Force on Monitoring and Assessment of the United Nations Economic Commission for Europe at the seventh Meeting in Bled (Slovenia) in November 1999 as part of the 1997–2000 work-plan under the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki, 1992).(Kallioras, Pliakas, Diamantis, 2006).

Moreover, the utility of those guidelines is important for the assistance of ECE governments and bilateral or multilateral river commissions in order to develop and consequently implement appropriate procedures for monitoring and assessing transboundary waters within their region.

Monitoring and assessment of the transboundary river basin demands a lot of information, which could be provided by the above guidelines. The resulted information system will be the key aspect for the development of appropriate

strategies for monitoring and assessment, which in turn will be used for the monitoring programme (Kallioras, Pliakas, Diamantis, 2006).

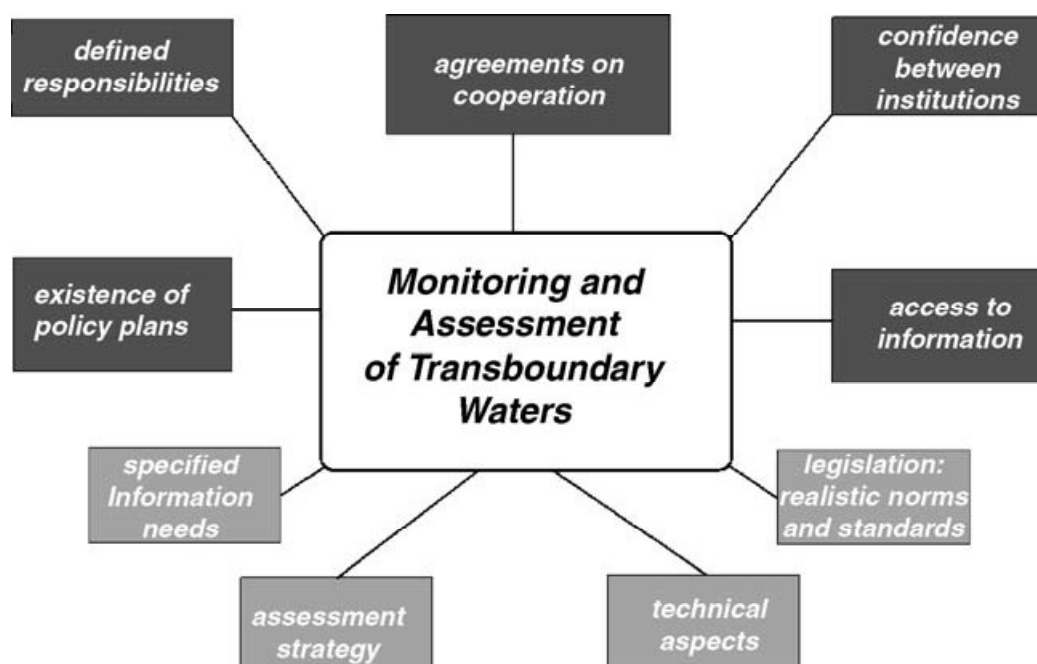


Figure 4 Monitoring and assessment related to policy and management areas (UN/ECE, 2000a,b,c)

The majority of monitoring programme refers especially to technical issues, such as field measurements, sampling, chemical analyses and data collection which will be used as inputs for the data management process. The above information could be provided to those who will request them in order to investigate the process of water management for the Transboundary Rivers.

Another important part, which is ruled by the Convention, is the principle of the joint bodies. As joint body is identified any bilateral or multilateral commission or other appropriate institutional arrangements for cooperation between the Riparian Parties. An example of such a joint body is the International Commission for the Protection of the Rhine, which has its own secretariat in Koblenz, Germany. Similarly, international commissions have been established for the Rivers Danube, Elbe, Meuse, Moselle, Oder, Rhine, Saar and Scheldtand for Lake Geneva, which are all run by their own secretariats (Kallioras, Pliakas, Diamantis, 2006).

2.2.2 The Water Framework Directive 2000/60 EC

The first European attempt for the regulation of transboundary water resources was in 1975. The main target of this legislation was the adjustment to economic, political and social changes related to water management.

This was the precursor of the Water Framework Directive in 2000 (WFD), whose philosophy is that the EU member states should “endeavour in order to ensure the appropriate coordination with the relevant Member or non-Member States”(Kallioras, Pliakas, Diamantis, 2006). WFD takes into account both the United Nations convention on the protection and use of transboundary watercourses and international lakes which has been approved by the European Community through the Council Decision 95/308/EC.

Furthermore the Articles 3, 5, 11 and 13 promote the coordination of administrative arrangements within river basin districts, the characteristics of the river basin districts, the programme of measures and the river basin management plan.

The WFD gives also importance to the national treaties and agreements, as it calls the Member States to consider them, whereas in case of failure of coordination between adjacent countries, and after the request of the involved Member States, the Commission shall act to facilitate the establishment of the programs of measures (Kallioras, Pliakas, Diamantis, 2006).

2.3 International examples for transnational river basins

Transboundary river basins covered up to 50% of earth's area and this percentage is increasing due to the foundation of new states. Moreover 40% of the total population lives in those river basins. In addition the 95% of 33 countries around the world belongs to transboundary river basins (Philips, 2006).

Below are listed some of the most characteristic examples of transnational river basins worldwide:

- The Danube river: The second bigger river of Europe, which has 2,857 km length and flows through about 16 countries. The total area of its river basin is 817,000 km². For decades Danube River was a spot of rivalry between Western states and the States of the “Iron Curtain”. The main utility of Danube before the World Wars was navigation, but after the 80's other issues submerged, such as the water quality, the pollution and etc.

Nowadays the river accepts a big amount of waste, which belongs to the millions of citizens and industries nearby. Moreover it has been observed that the levels of pollution in all thirty tributaries of Danube have increased.

- Another case of a transboundary river basin is Jordan River. Due to the extremely political tensions, that dominate the region, Jordan's waters are shared between Syria, Israel, Jordan, Lebanon and Palestine. In addition the Middle East region confronts a severe problem of water scarcity. This is another reason, which provokes rivalries. Israel imposes restrictions especially to the Palestinian side. Furthermore Israel is the only state in which the Ministry of Defense has control over water resources.
- The Mekong River is located in Southeast Asia and is the world's 12th longest river. Its estimated length is 4,350 and it drains an area of 795,000 km². Mekong River runs through China, Bruma (Myanmar), Laos, Thailand, Cambodia and Vietnam. In 1995, Laos, Thailand, Cambodia and Vietnam established the Mekong River Commission to assist in the management and coordinated use of the Mekong's resources. In 1996 China and Burma (Myanmar) became "dialogue partners" of the MRC and the six countries now work together within a cooperative framework. The river is a major trading route linking China's southwestern province of Yunnan to Laos, Burma (Myanmar) and Thailand to the south, an important trade route between western China and Southeast Asia. The Mekong River became conflicts "theater" especially during cold war era. USA promotes the interests of Thailand against the others -Laos, Cambodia and Vietnam- (Swain, 2001).
- Nile River is regarded as the longest river in the World. It is a major north flowing river in northeastern Africa and its length is 6,853 km. Nile flows through eleven countries (Tanzania, Uganda, Rwanda, Burundi, Democratic Republic of the Congo, Kenya, Ethiopia, Eritrea, South Sudan, Sudan and Egypt). The northern section of the river flows almost entirely through desert, from Sudan into Egypt, a country whose civilization has depended on the river since ancient times. Most of the population and cities of Egypt lie along those parts of the Nile

valley north of Aswan, and nearly all the cultural and historical sites of Ancient Egypt are found along riverbanks. The Nile ends in a large delta that empties into the Mediterranean Sea.

- The Columbia River is the largest river in the Pacific Northwest region of North America. The riparian states are USA and Canada. The river has 2000 km length and its largest tributary is the Snake River. Its drainage basin is roughly the size of France and extends into seven U.S. states and a Canadian province. Columbia River is the fourth largest river in the United States; it has the greatest flow of any North American river draining into the Pacific. The river's heavy flow and its relatively steep gradient give it tremendous potential for the generation of electricity. The 14 hydroelectric dams on the Columbia's main stem and many more on its tributaries produce more hydroelectric power than those of any other North American river. The Columbia River and its tributaries has been used for transportation for centuries and linked cultural groups of the region. Moreover the ecological importance of this river is remarkable, due to the hosting of many species of anadromous fish, which migrate between freshwater habitats and the saline Pacific Ocean. These fish—especially the salmon species—provided the core subsistence for natives; in past centuries, traders from across western North America traveled to the Columbia to trade for fish. However after 19th century public and private sector interfere with the river's environment. In addition the production of nuclear power and the elaboration of plutonium are taking part there. This procedure results in the pollution of the river and blocks fish migration.
- The Indus River is the major river in Asia. It flows through Pakistan (93%), India (5%) and China (2%). The total length of the river is 3,180 km and its drainage area is exceeding 1,165,000 km². Beginning in a mountain spring and fed with glaciers and rivers in the Himalayas, the river supports ecosystems of temperate forests, plains and arid countryside.

2.4 Greek transnational river basins

The issue of Transboundary Rivers is a major problem for Greece. It is estimated that the 25% of Greek water sources come from transnational waters and from neighboring states.

These transnational rivers are Evros, Strymonas, Nestos and Axios. The four of them are downstream rivers contrary to Aaos River, which is upstream. Referring to the four downstream rivers the major problem is that the river management and the growth of activities (tourism, industry, etc) is connected closely with the neighbors' management (Bulgaria, FYROM).

- Strymonas River is one of the rivers, which is shared with Bulgaria and its river basin is also extended to Serbia and FYROM. It has 400km length and the river basin area is up to 18,078km². The transnational agreements have little progress despite the cooperation's memorandum between Greece and Bulgaria, which was signed in 1994.
- Nestos River is a transboundary river between Bulgaria and Greece. The length of the river is 230 km, 126 km of which in Bulgaria and the rest in Greece. The basin area is calculated up to 2767km². Nestos flows into the Aegean Sea and creates a deltaic system near Chrysoupolis. Nestos Delta is known for its environmental importance.
- The third river, which is shared between Greece and Bulgaria, is Evros River. Moreover it is a natural border line between Greece-Bulgaria and Turkey. It has total length 530km and its river basin area is about 53.000 km². It springs from mountain Rila in Bulgaria and it flows through Greece, creating the Evros Delta, which is a famous wetland.
- Axios River springs from FYROM region and ends in Greece. It has 380km length and its river basin's area is 24.338 km². The river confronts several problems, especially the pollution from FYROM's industrial activity. This is the main reason for the destruction of Axios Delta, despite its protection by Ramsar and Bern agreements and despite the fact that it is characterized as a NATURA 2000 region.
- Finally the Aaos River is the only transnational river in upstream position in Greece. It springs from Pindus Mountain and ends into Adriatic Sea in the Albanian region. Its total length is about 272 kilometers of which the

first 80 kilometers are in Greece, and the remaining 192 kilometers are in Albania. Due to the good quality of its waters Aaos is a choice of water sports fans, tourists and several other people.

2.5 Water wars and Hydro-diplomacy

According to Wolf “Water is the only scarce resource for which there is no substitute, over which there is poorly developed international law, and the need for which is overwhelming, constant and immediate” (Wolf, 1997). It is clearly stated that water is “a key resource for most human activity and with regard to the ecosystem as a whole” (Bernauer, 2001).

Gleik adds another argument and supports that “no region of the world with shared international water is exempt from water-related controversies, though the most serious problems occur in water-scarce regions” (Vlachos 1998). Without cooperative management a zero-sum competition will emerge over water. Seasonal and regional water shortages may exacerbate social tensions and precipitate violence. Sharing and cooperation can provide benefits that exceed those achieved by attempts to maximize individual and national self-interest. Ideally, such cooperation requires a new "diplomacy", alternative institutional arrangements, larger financial resources, and effective adjudication or conflict management mechanisms (Vlachos, 1998).

Although scientists and engineers have produced a big amount of literature over the international freshwater issues, “they cannot provide conclusive explanations of success and failure in international river management” (Bernauer, 2001). Bernauer claims that “technological know-how and innovation are obviously important to finding solutions to international freshwater problems; however, in most cases, the most serious obstacles to successful international river management do not appear to be technical but political” (Bernauer, 2001). The contribution of political science, economics and other social sciences is to give answers when and why the efforts for water resources management are successful or not. According to Bernauer international environmental policy is still a small subfield in social sciences. Moreover there are few researchers focused on environmental policy and its socioeconomic perception. “Given the large number of international rivers, the even larger number of associated transboundary institutions and treaties, and the small number of researchers active in this area, social scientists have, at this stage, very

limited knowledge of the nature and extent of variation in the performance of existing international river management schemes” (Bernauer, 2001).

The rapid socioeconomic shifts demonstrated “the increasing emphasis on the variety of environmental challenges, the search for sustainable development, the promotion of integrated planning and management, and the attempt to combine structural and non-structural solutions to persistent water resources problems” (Vlachos, 1998). According to Vlachos there is an urgent need for intergovernmental integration (through coordination, cooperation and consolidation) a) hydrological interdependencies in terms of both uses (rural, urban, industrial, recreational, etc.) and water regime (i.e., surface and ground water, quality and quantity); b) political interdependencies both in terms of horizontal coordination in space and vertical cooperation between levels of government units; c) transboundary interdependencies, representing both social and hydrological trans-state interdependencies; and d) exogenous interdependencies, most notably the potentially dramatic impacts and consequences of climatic shifts and emerging hydrological alterations.

Rose divides the international responsibilities to three parts. Firstly there are “the downstream responsibilities” of the water of one state which flows into another. Secondly the "upstream responsibilities" of states whose activities may extend upstream and affect another state. And, finally "cross-stream responsibilities" of countries whose common border is formed by a river, or even when they share underground reserves (Rose 1993).

Le Marquand supports the cooperation between the riparian states, especially when they have common interests, win-win solutions are created, and if national leadership is committed to solving the problem. “Secondly, economic optimization is less crucial to cooperation than non-economic factors. Third, cooperation is more successful when social concerns and objectives are evaluated and defined in the planning process, and when consequences and costs of alternative strategies are assessed in detail. Fourth, cooperation is more successful when agreements are flexible enough to adapt to changing values, technologies, and market conditions. Fifth, reciprocal interests in cooperation are most conducive to problem solving, whereas upstream downstream problems are the most difficult to deal. Third parties, such as international organizations and donor countries, were instrumental in overcoming the latter type of problems” (Bernauer, 2001).

Although moving water connects lands and civilizations, provokes also repercussions elsewhere in the basin. “While geographic ties prescribe the unitary development of river basins, politics and history distort this process” (Vlachos, 1998). According to Vlachos, a nation- state desire to maximize its benefits by a river basin and to exploit river basin’s resources unilaterally. This myopic behavior can generate international frictions, confrontations, conflicts, and even war. We are, therefore, faced with a situation in which states, confronted with sub-optimal choices tend to adopt a non cooperative stance, although cooperation, on specific issues, would be in their mutual interest.

Hydro-diplomacy’s practices contribute the principles and the opportunity to the states to discuss, solve their differences and manage the river basin’s resources rationally. There are five major legal principles, which are the substructure of hydro-diplomacy.

Firstly the Principle of international water and the concept of an international "watercourse;" Secondly the Principle of reasonable and equitable utilization, a principle that has generated interminable debates and interpretations as to "reasonableness" and "equity;" Third is the obligation not to cause significant harm and the exercise of due diligence in the utilization of an international watercourse; Fourth is the Principle of notification and negotiations on planned measures; and Last but not least the Duty to cooperate, including regular exchanges of data.

Hydro-diplomacy based also on the principals of cooperation, political will and on mediation of international organizations.

First of all is important according to Swain political leadership to show an active interest for the outcomes of the river basin’s issue. “Political interest may help to overcome the bureaucratic delays in order to find a common agreement. Without support from the people, it is difficult to implement any elite driven river sharing arrangement. For the effective implementation of the agreement, there is a need to accentuate the use of public involvement and participation in water resources planning”(Swain, 2001).

The success of a transnational agreement depends on the “mediation” of international organizations. Vlachos supports that the mediation of a third party, whose judgment is respected, can contribute “viable alternative to adversarial processes” (Vlachos, 1998).

However, as Vlachos continues “the gamut of adjudication, arbitration, mediation, conciliation and even "principled negotiation" expresses various alternative processes of dispute resolution. But criticisms have also risen as to whether such processes can compensate for inequitable power relations or can provide incentives for compliance or acknowledgement of the third party decision when there is no recourse to legal sanctions” (Vlachos, 1998).

The sustainable development and the idea of holistic treatment of the transboundary river basins worldwide guide the international institutions to their further involvement. World Bank, the International Monetary Fund often finances projects and agreements between riparian states. Moreover EU has encouraged several projects and efforts through the EU Water Initiative in Africa, Central Asia and Latin America in order to achieve coordination and cooperation and deliver more effective development assistance (<http://www.euwi.net/about-euwi>). EUWI takes a partnership approach with national governments, donors, the water industry, NGOs and other stakeholders.

The political contribution and the governances’ involvement are crucial for the positive or not ending of a consultation process. Moreover the local interests have to mobilize their national governments to “put” the river management on the top of “political agendas”.

Marty and Dorth support that specific river management problems have to be removed from “high politics” in order to minimize the tense between the riparian countries. However several authors argue that “*technocratic de-linking* is usually not feasible and that technocratic problem solving efforts usually remain hostage to higher-level conflicts among riparian countries (e.g., in the Middle East). Moreover, this recommendation appears to contradict the recommendation by Marty and others that engaging policy makers at the highest level is crucial to success” (Bernauer, 2001).

However Wolf seems to disagree with Marty’s aspect in regard to the linkage-politics and integrated water management. He suggests that multi-resource linkages provide opportunities for creative trade-offs. He argues that “Creating incentives for voluntary resolution of water resource conflicts is key. While international institutions may not have the laws and authorities to enforce solutions, they often have access to other carrots and sticks – some of which maybe resources other than water – which can help induce agreement by capitalizing on differences, and creating trades or

linkages. The issue is watershed management, not river management. This links quality and quantity, surface- and groundwater, water and people. Everything is connected to everything else” (Wolf, 1997).

In addition Wolf underlines the importance of financing by international institutions, such as World Bank (World Bank financing for the resolution of the Indus dispute between India and Pakistan) and UN (UN-led funding of the Mekong Commission)

Chapter 3: Case study of Axios/Vardar river basin

3.1 General Description of Axios/Vardar river basin

Axios River is one of the biggest and most important rivers in the Balkan region. Its river basin outspreads in four countries (FYROM, Greece, Serbia and Bulgaria) and its area is about 25,000 km².

Greece and FYROM control the 95% of the total river basin's area. The area of river basin is not united. It is consisted of:

- Axios' valley in Kilkis county (from the eastern slopes of Paiko Mountain to the northwestern slopes of Kroussies sierra and the sub-basin of Doirani Lake) and the Delta of Axios river.
- A smaller part in Florina county, which includes the river basin of "Floriniotikos" watercourse, which ends in FYROM's region with the big tributary of Vardar, Crna.

Vardar's river basin in FYROM's territory is united and consists the 80% of the total country's area.



Figure 5 Map of Axios/Vardar River Basin

3.2 Existing Problems in Greece and FYROM

The main problems of Axios River in the Greek part are caused by human intervention and activities that affect both the area of the river basin and Axios Delta (Karageorgis, 2004). The main problems are:

- The water over pumping from the irrigation networks of Kilkis, Thessaloniki and Florina
- The pollution, which is caused by the industrial areas out of the river basin (the regions of Kalochori, Sindos, Axioupolis- Polukastrou and Koufalia-Gefyra)
- The pollution, which is caused by rural activities and the use of pesticides and fertilizers.
- The extended fish farming, aquaculture and shellfish culture (mainly in Axios Delta)
- The expansion of the cities
- The illegal sand extraction from all the riverbed's length
- The water supply needs of the region
- The silting as a result of erosion of upland river basin.
- The drainage projects in order to promote rural exploitation (through overgrazing or/and deforestation).
- The illegal hunting activity mainly at Axios Delta.(Karageorgis et al, 2004)

However the problems and the pressures of Vardar river, faced by FYROM are undoubtedly larger and more serious, due to the larger area, which is controlled by FYROM. In addition a large number of small and large cities located in the Vardar's river basin exacerbate the problems. The main concerns for FYROM's river part are focused on:

- The pollution, which is derived from sewage networks (gathered domestic and industrial waste and rainwater) of the cities Tetovo, Veles, Skopje, Bitola, Kocani, Stip, Gevgelija. In many cases the waste is disposed into the river without any treatment process.
- The pollution, which is derived from industrial activities mainly in Skopje, Bitola, Kumanovo, Veles. There are about 130 small and larger industries located in the area of the river basin.

- The pollution, caused by waste of farms and slaughterhouses, especially near Bitola and Kumanovo.
- The extended use of river waters for irrigation of rural areas.
- The use of waters for the production of hydropower.
- The shifts of the riverbed, the flow control and the projects for the prevention of flooding phenomena especially near large urban centers, which have brought about the alteration of the riverbed.
- The alluvium due to soil erosion, caused by the destruction of forests and overgrazing.(Karageorgis et al, 2004)

3.3 The stakeholders in FYROM and Greece

It is argued by several scholars that the participation and the role of stakeholders in water management of a river basin is important and in many cases determines the final result of an agreement.

With the term “stakeholders” we define persons or groups of people, who are concerned or are interested about something (Ramirez 2000).

Freeman defines them as “any group or individual who can affect or be affected by the achievement of a collective purpose” (Freeman 1984).Concerning the natural resources, as stakeholders we define all “the users and the administrators of a natural resource”.

In the case of Axios/Vardar river basin there are stakeholders in both sides (Greece and FYROM), with different and sometimes rival interests.

3.3.1 Stakeholders in Vardar river basin in FYROM

As mentioned above Vardar’s river basin covers a large area of FYROM. The correlation with the stakeholders, their interests and their use of the river basin is a crucial factor for FYROM’s economy. The stakeholders are:

- Farmers as the greatest water consumers of FYROM
- Breeders. Although their activities are limited to the south and west part of the river basin
- Fishermen and fish farmers although their action is limited
- Local and super regional NGO’s whose influence and activity is increasing

- The Public Enterprise of Water Management with 24 local businesses throughout the country
- Municipal Enterprises for Water
- The Public Enterprise for electricity and especially with the large number of thermo-hydro plants
- The numerous industries, especially due to the issue of pollution
- The local government
- The Ministries of Agriculture, Forestry and Water Economy
- The Hydrometeorological Institute, which is responsible for monitoring the quality of surface and groundwater
- The Ministry of Environment and Physical Planning, which will undertake the water management of the country according to the new Law on Water
- The Ministry of Transport and Communications (MTC), which is responsible for providing water to the Municipal Water's Enterprises
- The Ministry of Health, which is responsible for controlling the quality of water intended for irrigation and swimming through the Public Health Institute
- The Ministry of Finance, as it is responsible for the construction of large dams of national importance and hydropower plants
- The Ministry of Foreign Affairs, which is responsible for negotiating and signing international agreements on transboundary water resources issues
- FYROM's Economic Chamber with regional branches in 12 cities within the basin Vardar
- EU as a crucial economic funding factor through the programs PHARE and CARDS
- The European Agency for Reconstruction of Balkans, which is located in Thessaloniki and remains an important funding factor for activities related to the monitoring of water quality of the Vardar
- The U.S. Agency for International Development (USAID), which has funded actions based on quality and building infrastructure for water distribution. In addition its the main representative of USA in the region, influencing the political life

GTZ as a financier of several projects for example the new National Plan for Water Management

3.3.2 Stakeholders in Axios river basin in Greece

Regardless of the fact that the area of Axios river basin is not as large in Greece as it is in FYROM, its importance for human activities in the region and its ecological significance, produce a list of stakeholders in Greece too (Manousis, 2005).

- Farmers in the region of Thessaloniki and Kilkis
 - Oyster-farmers and fishermen, especially in the region of Axios Delta
 - Breeders
 - Industrialists- through their Association of Industries of Northern Greece
 - Hunters
 - The General Organization of Land Improvement
 - Local NGO's
 - The Ministry of Environment, Energy and Climate Change
 - The Region of Central Macedonia and its competent secretariats
 - National environmental NGO's (WWF, Greek Ornithological Society)
 - Thessaloniki chamber of commerce and Industry (TCCI)
 - The Hellenic Centre For Marine Research
- The European Union

3.4 Legal framework for waters of FYROM and Greece- Harmonization with EU law.

3.4.1 FYROM

FYROM proceeded to the enforcement of its legal framework, which regulates issues about the environment, waters and nature protection generally, in order to approach EU standards and the international rules.

According to the Water Strategy Draft for FYROM the important legislation for the water related issues was established in line with the transformation process of the country. "A number of respective regulations still in force date back or are taken over unchanged from the years of former Yugoslavia" (UN, 2002; EC, 2007 Analytica, 2009). There is not only the legislation, which deals with the water management directly but there are important links with environmental or other sector or horizontal

legislation, which affect the institutions and procedures in the field of water management (UN, 2002; EC, 2007 Analytica, 2009).

The presentation of FYROM's legal framework follows next:

Legislation about environmental protection

- Law on environment Official gazette of R.M, no. 53/05 from 05.07.2005
- Supplement of the Law on environment Official gazette of R.M, no. 81/05 from 27.09.2005
- Supplement of the Law on environment Official gazette of R.M, no. 24/07 from 01.03.2007
- Supplement on changes in the Law on environment Official gazette of R.M, no. 159/08 from 22.12.2008

Legislation relevant to environmental impact assessment

- Decree on determination of projects and criteria for which an environmental impact assessment should be carried out (Official gazette of R.M, no. 74/05 from 05.09.2005)
- Decree on regulating costs for carrying out an environmental impact assessment procedure covered by an Investor (Official gazette of R.M, no.116/09 from 22.09.2009)
- Ordinance on the content of intention for carrying out a project, on the decision for need for an environmental impact assessment procedure, on the public consultations (Official gazette of R.M, no. 33/06 from 20.03.2006)
- Ordinance on the form, content, procedure for preparation of the Report for suitability of the study for environmental assessment for the proposed project and on the procedure for authorization of Experts on the preparation of the Report (Official gazette of R.M, no.33/06 from 20.03.2006)
- Ordinance on the content of the necessary information needed in an environmental impact assessment study of the proposed project (Official gazette of R.M, no. 33/06 from 20.03.2006)

- Decree on the content of the Environmental Report Official gazette of R.Mno.35/06 from 23.03.2006
- Decree on the commission for carrying out the Examination for the Experts on EIA/SEA, programme of work, costs for taking an Expert exam, procedure for sustaining the List of Experts on EIA/SEA. (Official gazette of R.M no. 93/07 from 26.07.2007)

Legislation relevant to the protection of nature

- Law on nature protection (Official gazette of R.M no.67/04 from 04.10.2004)
- Supplement on the Law on nature protection (Official gazette of R.M no 14/06 from 03.02.2006)
- Supplement on the Law on nature protection (Official gazette of R.M no. 84/07 from 04.07.2007)

Legislation relevant to waste management

- Law on waste management (Official gazette of R.M no.68/04 from 05.10.2004)
- Corrections on the Law on waste management (Official gazette of R.M no. 71/04 from 13.10.2004)
- Supplement on the Law on waste management (Official gazette of R.M no. 107/07 from 07.09.2007)
- Supplement on the Law on waste management (Official gazette of R.M no. 102/08 from 18.08.2008)
- Supplement on the Law on waste management (Official gazette of R.M no. 134/08 from 13.11.2008)
- Law on waste management (purified text) (Official gazette of R.M no. 09/11 from 25.01.2011)
- Rulebook on general provisions for management of communal and other non-hazardous wastes (Official gazette of R.M no.147/07 from 07.12.2007)

- List of waste classification according to European Waste Catalogue (Official gazette of R.M no.100/05 from 21.11.2005)
- Rulebook on the form and content of Licence for collection and transport of hazardous wastes (Official gazette of R.M no.118/10 from 06.09.2010)
- Rulebook on management of hazardous wastes and provisions for labelling and packaging of hazardous wastes (Official gazette of R.M no.15/08 from 30.01.2008)
- Rulebook on provisions for collection, transport, processing, treatment, storage and disposal of waste oils (Official gazette of R.M no.156/07 from 26.12.2007)
- Rulebook on the content and procedure for establishing the Register of Wastes (Official gazette of R.M no.39/09 from 20.03.2009)
- Rulebook on the form and content of log diary for waste treatment & processing, forms for identification and transport of wastes, forms for yearly reports on waste treatment & disposal (Official gazette of R.M no.7/06 from 19.01.2006)
- Rulebook on provisions regarding medical wastes, labelling and packaging of medical wastes (Official gazette of R.M no.146/07 from 06.12.2007)
- Law on managing packaging and waste from packaging (Official gazette of R.M no.161/09 from 30.12.2009)
- Rulebook on the form and content of request for issuing Licence for processing, treatment, storage of wastes and the minimal technical conditions for installations for processing, treatment, storage of wastes (Official gazette of R.M no.23/07 from 27.02.2007)

Legislation relevant to water protection

- Law on waters (Official gazette of R.M no. 87/08 from 15.07.2008)
- Supplement on the Law on waters (Official gazette of R.M no 6/09 from 15.01.2009)

Legislation relevant to classification of water

- Regulation for Classification of Water (Official gazette of R.M no.18/99 from 31.09.1999)

The water Law (compliance of FYROM with WFD) is in use from 2010. In addition, this Law establishes a basis for the transposition of the requirements contained in other relevant Directives that will remain in effect after the adoption of the Framework Water Directive (WFD) 2000/60 within the period specified for each of them (Water Strategy for the Republic of Macedonia, 2010).

Harmonization with EU legislation

The main political aim of FYROM is to be integrated and accepted as an EU member state. In order to achieve this goal FYROM has to fulfill several shifts and adjust national legislation to EU standards.

In regard to the environmental policy FYROM has to start promoting legal framework, which covers the EU requirements. According to the Water Strategy for FYROM of 2010 is estimated that the majority of the most important legislation over the water management is already established. At this point it is very crucial that legislation, which is already or will be consolidated, is meeting the obligations determined by the European Union and its legislation in the field of water management.

The harmonization of FYROM's legal framework with the EU law is assigned on several institutions and ministries of FYROM. Competencies are divided into six ministries, Ministry of environment and physical planning, Ministry of agriculture, forestry and water-economy, Ministry of economy, Ministry of transport and communications, Ministry of education and science, Ministry of health and the Republic institute for health protection (Economic Commission for Europe, 2002; MEPP, 2007).

In addition in these institutions there are departments, units, inspectorates and directorates with defined responsibilities related to water. There are four river basins in Macedonia and currently there are four departments established at the MEPP.

These departments are responsible for:

- carrying out the basic analysis of river basin characteristics;

- Preparation and implementation of the river basin management plans (RBMP);
- Preparation of the Programme of measures;
- collecting the monitoring data, controlling the operators (drinking water supply utilities, irrigation operators, industry water suppliers, etc.);
- Protection from the adverse effects of the water;
- Protection of the water from pollution, preparation and updating of polluters cadastre;
- establishing and updating of registered of protected areas and
- international cooperation regarding the preparation of international river basins management plans, performing scientific research in water field, etc. (Water Strategy for the Republic of Macedonia, 2010).

Regarding this current organization of FYROM's water sector, several shifts, steps and recommendations have to be fulfilled. Some important challenges are described in Water Strategy final draft:

- Firstly achieving the EU standards for environmental quality by developing and implementing the framework of the laws related to water and environment
- Secondly the participation of local self government, industry, environmental service providers, government institutions and non-governmental organizations is important - to fulfill its responsibilities.
- Thirdly the decentralization of the state is also important. Many services that are being performed by the national administration can (and many times should) be delegated to the local or regional authorities.
- Finally its important that the staff of MEPP should be professional and motivated in order to be more effective in its effort to meet and achieve the EU standards (Water Strategy for the Republic of Macedonia, 2010).

3.4.2 Greece

Greece is a full member state of EU and so there are high standards related to the environmental policy and to water issues. Greece attempted to harmonize its national legal framework to the requirements, which are originated from the EU law.

Additionally in order to adapt Greek legislation to the requirements of the European Directive 2000/60, the following legislative provisions have been voted:

- **Law 3199/9-12-2003** (GGG 280 A): “Protection and water management - harmonization with Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000”
- **Presidential Decree 51/2007**(GGG 54A/8-3-2007): “Establishment of measures and procedures for integrated protection and water management in compliance with the provisions of Directive 2000/60/EC "establishing a framework for Community action in the field of water policy" of the European Parliament and of the Council of 23 October 2000.
- **Joint Ministerial Decision (J.M.D.) 49139/24-11-2005** (GGG 1695B 2-12-2005): “Organization of Central Water Agency of the Ministry of Environment, Physical Planning and Public Works”.
- **J.M.D. 49139/24-11-2005** GGG 1695B 2-12-2005): “Organization of Central Water Agency of Ministry of Environment, Physical Planning and Public Works”.
- **J.M.D.43504/5-12-2005** (GGG 1784B 20-12-2005): “Categories of water use licenses and projects for their development-publishing process, content, duration of them”.
- **Ministerial Decision 34685/6-12-2005** (GGG 1736B 09-12-2005): “Establishment of the National Water Council”
- **Ministerial Decision 26798/22-06-2005** (GGG895B 01-07-2005): “Function of the National Water Council”
- **Newsletter 150673/13-07-2011**: “Responsibilities of the devolved Administrations and Regions of the country on the water sector under the law 3852/2010”.
- **J.M.D.39626/2208/E130**: (GGG. 2075B/25-09-2009): “Definition of measures for the protection of groundwater from the pollution and deterioration, which are incorporated the Subsidiary Directive 2006/118/EC on "the protection of groundwater against pollution and deterioration," pursuant to the provisions of Article 17 of Directive 2000/60/EC.
- **J.M.D.51354/2641/E103/2010**: “Setting Environmental Quality Standards (EQS) for concentrations of certain pollutants and priority substances in surface water, in compliance with the provisions of Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008”.

- **Decision 706/16.07** (GGG 1383/B'/02.09.2010) of the National Water Committee: "Determination of country's River Basins and definition of the relevant Regions for river basins' management and protection.
- **J.M.D. 140384/2011** (GGG2017/B'/09.09.2011): "Designation of National Monitoring Network for waters' quality and quantity through the establishment of measurements' stations and operators in accordance with Article 4, paragraph 4 of Law 3199/2003".
- **J.M.D.150559/2011** (GGG1440 B/16-6-2011): "Procedures, terms and conditions for the granting of permits for existing water use rights", as amended by Joint Ministerial Decision 110424/2012 (Government Gazette 1190V/11-04-2012)".
- **J.M.D. 8600/416/E103** (GGG356 B/26-2-2009): Regulation of the waters' quality and management for swimming in accordance with the provisions of Directive 2006/7/EC and repealing Directive 76/160/EEC.
- **J.M.D. 31822/1542/E103** (GGG1108 B/21-7-2010): "Assessment and management of flood risks, in compliance with the provisions of Directive 2007/60/EC".
- **J.M.D.145116/2011** (GGG354 B/8-3-2011): "Regulation of reuse of wastewater"
- **J.M.D 322/2013** (GGG 679 B 22.03.2013): "Organization of the Special Waters' Secretary.

3.5 The political dimensions between Greece and FYROM

The collapse of communism and the regime changes in Eastern Europe, have delivered several shifts in the Balkan region. Bulgaria and Albania left behind the communist regimes and Yugoslavia, after the death of its powerful leader, General Tito, was fragmented.

In 1991 the Socialist Republic of Macedonia and its president Kiro Gligorov declared full independence and the renaming of the state in Republic of Macedonia. After this declaration an effort for worldwide recognition and participation to international institutions has started.

However, the self-determination of a “Macedonian identity” provoked a strong Greek opposition. Greece then asked for the deletion of the name “Macedonia” (13 April 1992).

On 27th of June 1992 the European Council in Lisbon supported Greek claims and proposed the recognition of the new state under conditions. On 8th April 1993 the United Nations recognized the new state with the name “Former Yugoslav Republic of Macedonia”. Under this regime Greece and FYROM started a cycle of negotiations in order to promote a common accepted solution. However on 16th February 1994 Greece imposed embargo to FYROM in order to put pressure on the rival side. The results were catastrophic for FYROM’s economy and provoked serious economic losses (1, 5 billion dollars).

Greece after several international pressures decided to end the embargo and on 4th September of 1995 announced the agreement for dialogue procedures. On 13th September 1995 the “Interim Agreement” was signed between the two states and several issues and problems were faced.

The last tension between FYROM and Greece was in 2008, when Greece claimed veto to FYROM’s accession in NATO.

Although there has been no agreement until today, the FYROM’s Government declares that more than 130 countries have recognized the country under its constitutional name, among them Bulgaria, Turkey, Russia, China, the U.S. and Canada which will use its constitutional name only in bilateral relations.

Due to the crucial problem between the two states it is obvious that the negotiation about low politics issues is difficult. A successful agreement between FYROM and Greece on Axios/Vardar river basin is connected with the official and final designation of FYROM.

As it mentioned above there are two opinions on the negotiation about the transnational river basins. The one (Marty and Dorth) supports that specific water management issues have to be de-linked from the “high politics” issues and to be solved in technocratic ways and the other (Wolf) that supports the multi-resource linkages in order to provide more opportunities for cooperation and agreement.

Under these circumstances Axios/Vardar river basin’s situation will be evaluated and there will be estimation on whether there are any opportunities for a successful and sustainable agreement between Greece and FYROM.

3.6 Model agreement on transboundary water management on Axios/Vardar river basin

As mentioned above the water management issues between two or more riparian states are closely related to their political and economical relationships. It is obvious that the progress on environmental sectors depends on their willingness to promote and highlight them.

In the case of Axios/Vardar river basin the main problem between Greece and FYROM is the name of FYROM, which affects the relations of the two neighbors, even in “low politics” issues.

Moreover FYROM desires its participation in international organizations, such as NATO and EU, but it is being blocked by the complicated situation with Greece.

However as it is described above the situation of the river is burdened by the pollution and the exhaustive waters’ use by several stakeholders. Achieving a vital agreement between Greece and FYROM, which will promote a more reasonable and proper use of the river’s benefits is a priority for the future of Axios/Vardar and its river basin.

3.6.1 The Agreement of 1959

Greece and Yugoslavia came very close and promoted their cooperation in 1959, despite the regime differences. The two parts finalized a very important agreement on 31st October 1959, which settled various issues on the water management of Vardar/Axios River, Doirani Lake and Prespes Lakes (GGG, 1959).

The agreement foresaw the establishment of a Permanent Greek-Yugoslav Hydro-economy’s Committee. Its duty was the research of problems and projects of hydro-economy.

The agreement described the Committee’s duties in detail, which were revolutionary for that time and especially under the “Cold War regime”. In addition the agreement foresaw the details of the constructive projects, the selection of the members, the facilitations of the customs, the meteorological and geological data interchange and generally the aims of this cooperation (GGG, 1959).

Unfortunately this agreement ended due to Yugoslavia’s fragmentation and it was officially terminated in 1991 when FYROM declared its independency.

3.6.2 Possibilities of transboundary cooperation

The agreement on the water management of Axios/Vardar in 1959 was in the right path. It fulfilled crucial circumstances such as the data interchange, the establishment of an independent Committee and generally the promotion of cooperation for the realization of projects for a viable exploitation of the river.

Since 1991 there were not any notable efforts for a new agreement between the two riparian states. The political differences were an important obstacle for a possible agreement. According to Swain “when the political leadership an active interest in the outcome of the international river water issue, there is a greater probability of arriving at a speedy agreement” (Swain, 2001). In addition Swain supports public involvement for the better implementation of the agreement.

In the case of Axios/Vardar river basin it is estimated that there is no serious political initiative for the establishment of a viable agreement between Greece and FYROM. In order to change this existing situation the first priority is the two countries to face the problems of the river basin and to demonstrate the appropriate willingness to promote cooperation.

Many scholars support the establishment of an independent Committee with the participation of the parts concerned and the involvement of a third part- international institution as an arbitrator- supervisor of the agreement. The example of Elbe River (Convention on the International Commission for the Protection of the Elbe River) between three parts (Germany, Czechoslovakia and EC) and the example of Mekong river (Cambodia, Lao PDR, Thailand and Viet Nam with the contribution of international organizations, Banks and states), demonstrate the need of an international contribution.

In the case of Axios/Vardar river basin Greece and FYROM should create an independent commission, with the contribution of an international organization, probably EU, where water resources specialists, experts of all sectors (economic system, politics, environmental, hydraulic sector, geological and biologic) and members of NGOs from both sides will participate, under the supervision of EU.

Secondly it is important for this independent commission to secure its funding. This could happen with the contribution of international institutions and states. The World Bank, the European Bank for Reconstruction and Development, the European Investment Bank, Global Environment Fund and other several institutions could

contribute to succeed the project of this independent commission for the future of Axios/Vardar River Basin. It is notable that regardless of the fact that there is no agreement between Greece and FYROM, several funding programs promoted the transboundary cooperation (INTERREG III/A CARDS Greece - Former Yugoslav Republic of Macedonia 2000-2006 and INTERREG IV "Greece - FYROM 2007-2013). Of course the effectiveness and the contribution of those initiatives could be increased with the existence of an independent commission and an agreement between the two riparian states.

The third priority is the establishment of a common monitoring system of observations and measurements through this independent commission. The exact parameters, methodologies and the consistency of measurements are the only way to demonstrate the state of the river. In addition the two parts have to exchange measurements without any effort to conceal them or to present them in a different angle. Furthermore the creation of a common data base, which will be updated by both sides consistently, could contribute important elements for examination and research.

The common data base and the frequent measurements could indicate the existing situation of Axios/Vardar river basin more accurately and will guide the experts to focus on the appropriate solutions.

Moreover the received data could highlight all the river basin's existing problems and critical issues. Firstly a *considerable reduction of the water flows* observed, especially during the summer period. This phenomenon causes problems to the terrestrial environment (continuous decrease in the quantity and quality of water for irrigation), but also to the marine environment of Thermaikos Golf. Secondly another issue is the *alteration of FYROM's urban environment*. The absence of sufficient infrastructure and funding could deliver the outcomes of FYROM's urbanization to Greece, through Axios river basin and Doirani Lake. Furthermore a *considerable environmental degradation and pollution* is observed due to the untreated industrial waste and sewage from FYROM's part. It is important to emphasize the risks of *industrial accidents*, which could jeopardize the sensitive ecosystems of Axios Delta and Thermaikos Golf, as well as the economic activities that are connected to Axios River, which are based on the mussels' monoculture and agriculture.

In the Greek part of the river there is the *"domestic" pollution* apart from the *"imported"* one. The industrialization of Thessaloniki's west part and the fertilizers

from intensive agricultural use affect the river mainly with nitrates and phosphates (NO₃ and PO₄), burden it and put Axios-Aliakmonas-Loudias Delta and the environment of Thermaikos Golf at risk.

Greece should be concerned about the future of Axios River due to its *significant economic importance*. The 77% of Greek rice production takes place in Axios Valley. Apart from that, it is notable that the region's mussel cultivation contributes 90% to the Greek total production. It is obvious that further environmental degradation and quantification of the Axios' waters will be disastrous for the local economy and by extension for the country.

Another critical issue for Greece is to preserve the current state of the second wetland in Greece, Axios Delta and to constrain the level of pollution and degradation. The Delta region, which is inhabited by rare species of flora and fauna, is protected by European initiatives (Ramsar Treaty, Natura 2000). However it is in danger due to the extensive agricultural operations, the industrial development and the lack of control over the quantity and quality of Axios' water coming from FYROM.

The main problems and risks for the future of the river have been mentioned above. The two sides have to focus on them and try to promote a sincere solution in order to improve river basin's environment.

After the delineation of all the critical issues, the two riparian states have to create a "strategy plan", which will delimit the actions and the projects, and which will materialize the cooperation and the effectiveness of a possible agreement amongst them.

According to "The handbook for integrated water resources management in transboundary basins of rivers, lakes and aquifers" (March 2012), planning actions in a transboundary basin may take various forms and names. It should include a component: 1) In the long term (20-30 years): A strategic plan for management and development 2) In the short term (3-5 years): Action plan with an investment program, structural (including environmental objectives such as maintaining ecological functions) and non-structural measures (including those related to governance). The importance of a strategic plan is based on the fact that this plan will be "consensually developed by the transboundary basin organization, showing the sharing of costs and benefits between the countries of the basin". Furthermore a transboundary legal framework is a prerequisite for the success of a strategic plan.

With regard to the action plan, the two states concerned must formally approve it and proceed to the necessary actions to enforce it.

According to the handbook the involvement of non- governmental stakeholders' groups in the form of thematic working groups, consultation process and through their representatives in the bodies of the transboundary basin organization is a crucial point for the success of an agreement.

Another important issue, which is analyzed in the handbook, is the investments' plan. The strategic plan is a long term one, but all the priority actions are described in a short term action plan. "Its budget is estimated in a realistic manner and given in the form of an investment plan (consisting of financially viable projects) and activities (training, education, development of information systems), distributed as fairly as possible among the basin countries. The implementation process is iterative, as the plan is to be reviewed every few years for the implementation of the next plan, incorporating new data and taking into account new results and future developments". The independent organization is responsible to develop the strategy and funding arrangements which may be different (self-financing, external financing in the form of loans or grants, public-private partnerships depending on the type of action. "The arrangement for cost sharing between countries is linked to the sharing of benefits generated by actions" (The handbook for integrated water resources management in transboundary basins of rivers, lakes and aquifers" -March 2012).

Last but not least with regard to the issue of financing there must be a sustainable and appropriate financing system in order to secure the effectiveness and the long-lasting "life" of the transboundary organization. "This system should especially foster budget autonomy in the daily operating of the organization, giving it some independence from the Member States and giving it long-term financial resources on which to rely. Sustainability of the financing system will be established when most of the operating budget will be covered by guaranteed and regular resources".

Furthermore the financing system of the basin's organization has to fulfill three conditions:

- the different missions / functions of the basin organization,
- the financing needs of the basin,
- the desired deadlines (financing need in the short, medium or long term)

In the case of Axios/Vardar river basin's organization the participation of private funds and state capitals is necessary, due to the necessity of constructive projects river's condition improvement and the regulation of all functional issues of the organization.

3.6.3 Objectives and methods of consultation

The main objectives of a possible agreement could be focused on the following:

- EU Directive's 2000/60 adjustment to the administrative level of the two states
- The integration of an agreement on the transboundary water management at Axios/Vardar river basin
- Creation and development of joint monitoring networks
- Permanent cooperation for the successful application of EU Directive 2000/60
- Creation of a common management plan for the period 2021-2027
- Cooperation during crisis situations and emergencies (floods, extreme droughts, pollution due to accidents, etc) at Axios/Vardar River basin.

The consultation has to be organized in a way, which will gratify and mobilize the two states at social, economical, scientific and political level. For this reason the methods of consultation should be the following:

- ❖ **Establishment of thematic working groups consisted of specialists and experts.** Their duty will be to control the species created by the pollution, to control and reduce the urban waste and the wastewater treatment, the reduction of environmental impacts due to irrigation and the construction of major projects management (dams), and finally encourage the information exchange, knowledge, experience and expertise among stakeholders.
- ❖ **Round table** with the participation of scientists, representatives of relevant organizations and representatives of social groups and enterprises from both countries.
- ❖ **Organize a campaign** with the contribution of social networks (facebook, twitter), the use of special editions, etc, in order to mobilize the citizens of both states.

- ❖ **Seminars and courses in schools**, in order to highlight the necessity and the benefits of transboundary cooperation and bring the subject to students' attention.
- ❖ **Organize meetings between governing organizations in the area of Axios/Vardar river basin.** Moreover the participation of experts and scientific institutions (universities and institutes) will contribute a lot to the understanding and solving of the river basin problems.
- ❖ **Organize scientific and technical meetings and conferences** which put the focus on crisis management, on actions, which promote the sustainable use of resources at transnational and local level and on the conservation and protection of biodiversity of Natura areas.

Chapter 4: Conclusions

This dissertation is about the challenges and the issues that have to be resolved in the transboundary river basins. It is also about the problems and the ways these problems can be resolved via consultation and contribution of diplomacy and international organizations.

The dissertation is focused on the case of Axios/Vardar river basin, which is an object of dispute between Greece and FYROM. A possible model of agreement and consultation is presented so as the two riparian states to proceed to a viable agreement.

However in Northern Greece the problem of transboundary rivers is still “open”. “Shared water resources constitute a major asset for the country and introduce high uncertainty for the country’s imported water due to the lack of integrated approach, administrative deficiencies and not efficient transboundary legal agreements” (Mylopoulos, Kolokytha, 2008). As it has been observed and analyzed the co-operation is limited only to “fragmented measures, ignorance of the local needs, giving emphasis on securing users’ rights rather than treating transboundary rivers as a unity which should be jointly protected and managed” (Mylopoulos, Kolokytha, 2008).

The EU Directive 2000/60 could act as a guideline for the resolving of transnational disputes and promote cooperation through the states (EU members or not). “Since almost all of the neighbor countries are in an era of transition, it is a great opportunity for Greece as an EU full member state to proceed to agreements for the benefit of all” (Mylopoulos-Kolokytha, 2008).

However as it was presented above Greece and FYROM are facing various difficulties in order to proceed to a mutual agreement for the integrated water management of Axios/Vardar river basin.

The main problem remains the political dimensions over the official name of FYROM, which was picked the last years. Moreover the Greek veto to FYROM’s candidacy to the international organizations (NATO, EU) complicates the situation over a possible consultation for “low-politics” issues.

For this reason the most appropriate solution in order to minimize the gap between the two sides, is to “delink” the issue of integrated water management of Axios/Vardar river basin from the issue of FYROM’s official name.

The next priority is the establishment of an independent organization, which will focus on the consultation and the necessary projects on the effective transnational river management, with the participation of an international institution (in Axios/Vardar case most appropriate is EU).

Having demonstrated such progress, the common will, the political willingness and the public participation could suggest a feasible and viable solution to the problematic issue of shared waters of the region. In this way the two riparian states could achieve a strong motivation for transboundary cooperation and confidence between. Moreover this cooperation has to be based on the principles of good neighborliness and reciprocity. In addition the existing legal framework, combined by possible legal agreements between the two parts could offer several tools in order to improve the existing situation of the river basin. The main issues that have to be regulated are “water protection and use, institutional arrangements ,management plans, harmonization of programs and measures, monitoring and research, transfer of know-how and technology as well as joint projects”(Mylopoulos, Kolokytha, 2008).

Taking everything into account, it is important that a transnational agreement could offer integration of qualitative and quantitative water aspects, water uses, water supply demands, improvement of the environment of the river and the exploitation of the river through initiatives taken by several sectors (tourism, organic farming, etc). The two states have to put aside their political differences and promote cooperation, show strong will for results and suggest a viable project for river basin exploitation respecting the international law and nature. If the two sides do not proceed to an agreement it is possible that the conditions of the river basin will deteriorate and it is highly probable that the consequences will be catastrophic for humans and nature in the future.

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