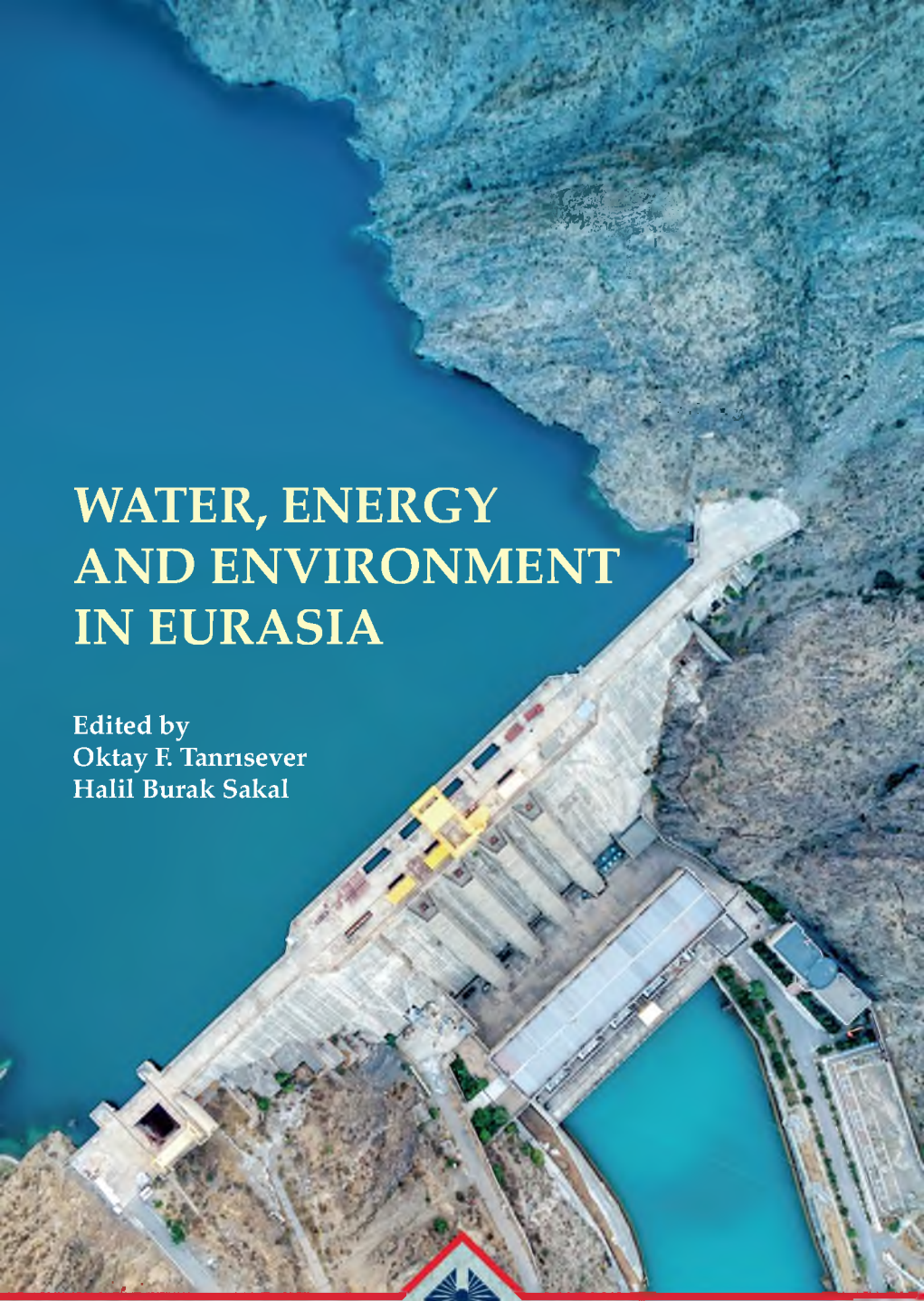
WATER, ENERGY AND ENVIRONMENT IN EURASIA

Edited by
Oktay F. Tanrısever
Halil Burak Sakal



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CAPPADOCIA
UNIVERSITY
PRESS
yayinevi@kapadokya.edu.tr
kapadokyayayinlari.kapadokya.edu.tr
+90-384-3535009
www.kapadokya.edu.tr

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Mayıs Kurt

Introduction

The Maritsa Basin is one of the main river systems in the eastern Balkans, and is shared by Bulgaria, Greece and Turkey. The conflicting needs for water for irrigation and flood control are the main disputed issues in the basin, particularly between Turkey and Bulgaria. In the past, political distrust between the three countries hampered cooperation, although the recent rapprochement between Turkey and Greece and the Bulgaria and Turkey are expected to have a positive influence on the management of transboundary water (Kibaroğlu et al., 2005).

The River Evros (Bulgarian: Марица, Greek: Έβρος, Turkish: Meriç), the catchment area of which is shared by Bulgaria, Turkey and Greece, at over 530 km in length, is the longest river on the Balkan Peninsula, forming a natural 240 km frontier between Greece and Turkey. Its origin is in the Rila Mountains in Western Bulgaria, from where it flows in a south-easterly direction between the Balkans and the Rhodope Mountains, turning south when it reaches the border of Greece and Turkey until it joins the Aegean Sea between Enez and Alexandroupolis at a delta with high ecological value. The total drainage area of Evros River is approximately 52,500 km^2, of which 66 percent is in Bulgaria, 27.5 percent is in Turkey and only 6.5 percent is in Greece (Eleftheriadou et al., 2015; Nikolaou et al., 2008).

Regional Characteristic of the Basin

The Meriç Basin has a drainage area of around 52,600 square kilometers, most of which (65 percent) lies in Bulgaria, while Turkey and Greece account for the remaining 28 and 7 percent, respectively (Erkal & Topgül, 2014). Around 218 km of the river is located in Greece (Yannis et al., 2008), and it runs for 16 km along the border in the region where Bulgaria, Greece and Turkey meet, and then forms another boundary between Greece and Turkey that runs for 187 kilometers. In total, the Meriç forms a 203 km border between the European Union and Turkey (Kibaroğlu, 2008).

Table 1. Drainage Area Distribution in terms of Countries

Country	Drainage Area	Percentage
Turkey	14,850 km^2	28 %
Greece	3,685 km^2	7 %
Bulgaria	34,067 km^2	65 %
Total	**52,600 km^2**	**100 %**

Source: Erkal & Topgül, 2014.

Figure 1. Map of Meriç River and its tributaries.
Source: Hidropolitik Akademi, 2014.

Water use in Turkey

The Meriç Basin area in Turkey is located in one of the most developed parts of the country, which is used for both agricultural and industrial activities in Turkey. The main use of water is irrigation, as the Ergene Basin is host to some of the most productive agricultural lands in the country and features the most important agricultural sites for paddy production. Other crops include sugar beet, sunflower, corn, vegetables and fruit. About 95 percent of the drainage area, i.e. 1,239,102 ha of land is arable and 395,194 ha, is irrigable, yet, only 328,039 ha of land is, technically and economically, categorized as irrigable (Kibaroğlu et al., 2005). There are seven dams operating in the Turkish part of the basin, providing irrigation to around 60,000 ha, as well as flood control and some drinking water. As of 2003, the total irrigated area based on surface and groundwater resources was 144,639 ha. During the summer irrigation season, about 436 MCM/year of water is required for pumped irrigation (Ozis et al., 2002).

Plans are in place to increase irrigation agriculture, with irrigation systems under construction for a further 54,879 ha of land, and 328,879 in the project and planning stage. When all the irrigation systems have been completed, 257,493 ha of land will be irrigated with 2.15 billion cubic meters of water per year (Yanik, 1997). Approximately 75 percent of the agricultural production value of the region is derived from plant production and 25 percent from animal production. These numbers show the importance of the Maritsa River for the Turkish agricultural economy (Öziş et al., 2002). On the other hand, flooding is a huge problem in the region, given the frequency, the damage inflicted on the agricultural area and the effect on productivity (Kibaroğlu et al., 2005).

After the 1990s, industry started to move to the Maritsa region in Turkey and, nowadays the region is popular for both industry

and trade due to its location (Trakyaka, 2009). The main urban centers are Edirne and Kırklareli, and the main activities providing income to the region are agriculture and stockbreeding, followed by the textile and garment sectors. The products of the textile and garment sectors account for 13 percent and 10 percent of Turkey's exports, respectively (Eşiyok et al., 2012). The textile and garment sectors require large quantities of water, but unfortunately surface water in the region is limited due to the geographical features of the basin. Despite this, high-density industrial activities develop rapidly, and this has led to an increase in the use of groundwater that has caused the groundwater to drop to -60 m (TUBİTAK, 2013). Industrial activity not only consumes a large amount of water, but also produces wastewater with high pollution load. Industrial pollution is concentrated around the cities of Lüleburgaz, Çorlu and Çerkezköy. The DSİ, followed by the Ministry of Environment, has identified the main sources of pollution in the region as domestic wastewater discharge, the discharge of organized industrial zones (textile, paper and cement factories), waste from slaughterhouses, and drainage waste containing salt and sodium from agricultural activities (Aktas, 1993). The Ergene River is contaminated with discharged untreated industrial wastewater, with high heavy metal concentrations (Hallı et al., 2014).

Figure 2. Development index of Turkey.
Source: Surgun & Zaraci, 2018.

Furthermore, the need for not only water, but also energy, has increased sharply in the region with the development of industry. Over the last 10 years, the energy requirement of the region has increased from 4,300 GWh to 8,000 GWh, being produced from both natural gas and wind, accounting for 4 percent of the total energy in Turkey in 2012. According to researchers, the energy demand is expected to increase by 8 percent each year (Trakyaka, 2012).

Table 2. Energy Production in the Thrace Region by Energy Plants

	Tekirdağ	Kırklareli	Edirne	Total
Solar Energy System	0.00 MW	0.00 MW	0.49 MW	0.49 MW
Wind Power Plant	152.60 MW	116.20 MW	167.20 MW	436.00 MW
Geothermal Energy Plant	0.00 MW	0.00 MW	0.00 MW	0.00 MW
Biogas Power Plant	6.00 MW	22.27 MW	0.00 MW	28.27 MW
Hydro Electric Power Plant	0.00 MW	0.00 MW	0.00 MW	0.00 MW
Natural Gas Power Plant	1.426.66 MW	1.621.21 MW	0.00 MW	3.047.87 MW
Coal-fired Thermal Power Plant	0.00 MW	0.00 MW	0.00 MW	0.00 MW
Others	4.20 MW	5.40 MW	0.00 MW	9.60 MW

Source: Trakyaka, 2009.

Water use in Bulgaria

In Bulgaria, the water resources of the Maritsa Basin are used for agriculture and hydropower production, as well as for domestic and industrial water supplies. There are 21 main dams in operation with a total storage capacity of more than 3,000 MCM (Arsov, 2004). The basin area (about 33,000 km^2) is home to around 2.5 million people (INWEB, 2004), with the main cities being Plovdiv, Stara Zagora, Haskovo, Sliven and Yambol.

The area suffers from water stress resulting from drought and a deterioration in water quality (Kibaroğlu et al., 2005).

The Maritsa region of Bulgaria contains several large water cascades: Cascade Vacha (2 dams with 5 hydropower stations), Cascade Batak (5 dams with 3 hydropower stations), and Cascade Belmeken-sestrimo (1 dam reservoir with 4 hydropower stations). These include those on the Rivers Ardas, Iyra, Provatonas, Ardanio and Komara (GWP-Med, 2012).

Table 3. Reservoirs and their capacities in Bulgaria

Reservoir	Useful storage (in M m^3)
Batak	310.0
Golyam Beglik	62.1
Shiroka Polyana	24.0
Pyasachnik	103.0
Vacha	226.12
Krichim	20.3
Belmeken	144.0
Chaira	4.4
Topolnitsa	137.0
Trakiets	90.0
Ovcharitsa	31.0
Domlian	25.0
Garvanovo	25.0
Rozov Kladenets	13.3

There is a lack of available comprehensive data on water use in the Maritsa Basin in Bulgaria, although it is known that the Maritsa Plain contains some of the most fertile agricultural lands in Bulgaria. Agricultural production particularly in the Plovdiv region is very intensive, with the main crops being fruit, vegetables and rice. The use of the Maritsa River for irrigation is, therefore, important for the region. Although the

water used for irrigation decreased drastically during the 1990s in Bulgaria, water use efficiency remains low, with average water losses from the irrigation systems reaching 57 percent, and as much as 75 percent in some regions (Kibaroğlu et al., 2005).

Agricultural and stock-breeding run-off and industrial and urban effluent are the main sources of pollution in the Bulgarian part of the Maritsa Basin. Only around 65 percent of the Bulgarian population are connected to a sewerage system, and only 20 percent to a wastewater treatment plant. The lead and zinc industry that has built up around the mining operations in Bulgaria and the processing operations near Plovdiv may also cause heavy metal pollution in the basin. While the river receives industrial waste from various areas, the quantity of pollutants reduced significantly with the economic decline of the country in the 1990s (Kibaroğlu et al., 2005).

Water use in Greece

The Greek portion of the Maritsa Basin is only 3,700 km^2, and is home to approximately 130,000 people. Alexandroupoli (36,000 inhabitants) is the largest city in the area, which contains almost no industrial activity. The main source of pollution in the region is domestic wastewater, from towns such as Orestiada and Didimoticho (Kibaroğlu et al., 2005).

There is a lack of concise data on water usage and irrigation in Greece, although the Hellenic Ministry of Environment in 1998 declared that clean water was being used increasingly for irrigation and noted that the other land uses in the delta were grazing, commercial fishery and some tourism. For this reason, a dam was built on the Arda River, close to the Bulgarian border, both for the irrigation of 30,000 ha of land and to regulate the discharge from the power plant belonging to the Ivailovgrad Dam in Bulgaria. Around 15,000 ha of land is used for agriculture, close to the river delta, although agricultural

activities are restricted in this location due to unfavorable soil conditions (Kibaroğlu et al., 2005).

Figure 3. Maritsa River Basin. Source: Legal and practical aspects of bilateral relations between Bulgaria and Greece in the cooperation of transboundary water management - by Vladimir Stratiev.

Water use in the Maritsa Basin

Flood problem

Flooding is a major problem in the Meric Basin for the downstream riparian Turkey and Greece. A series of severe floods were experienced in especially 2005, 2006 and 2007 during which settlements and agricultural areas in Turkey – the Turkish city of Edirne in particular – and Greece were heavily damaged. After the floods, although the main reason for the flooding was generally agreed to be exceptional meteorological conditions, Turkish and Greek downstream experts argued that poor water management in Bulgaria had also been influential. Bulgaria's

reservoirs were said to be inappropriate, and high-water levels in the reservoirs close to the border increase the risk of flooding. Greece and Turkey argue that Bulgaria's release of excess water during heavy rainfall and snowmelt to prevent its dams from breaking leads to floods downstream. In addition, the lack of an appropriate early warning system in the river basin intensifies the impact of the floods (Valvis, 2011).

"The diversion and storage of water for irrigation purposes, mainly in Bulgaria, has resulted in reduced flow downstream. Due to such water shortages, Turkey has on some occasions been deprived of Paddy irrigation" (Ozis et al., 2002). In addition, the low inflow of clean water increases the intrusion of saltwater into the river, with increased salt loads observable up to 35 km upstream of the mouth of the river, making the water inappropriate for irrigation. Furthermore, low clean water inflows lead to siltation problems in the Delta (Samsunlu, 1996).

Figure 4. Edirne, Turkey 2014. Source: Ensonhaber, 2014.

The Turkish media has accused Bulgaria of storing the bulk of the spring and winter flows for summer and early autumn irrigation purposes, which has led to a decline in the availability

of water on the Turkish side. On other occasions when there is excess winter flow, the articles state that Bulgaria did not hesitate to open the dam, leading to severe flooding in the paddy fields downstream in Turkey (Milliyet, 1996).

The Ivaylovgrad Dam, Kırcali Dam and Studen Kladenets Dam cause flooding in Turkey, and especially in the Edirne region. Figure 5 shows the locations of the dams in the Maritsa region in Bulgaria, Number 3 being Ivaylovgrad Dam, number 5 being Kırcali Dam and number 4 being Studen Kaldenets Dam, all of which are close to the Bulgaria-Turkey border. The capacities of these dams are very high, for instance, Ivaylovgrad Dam on the Arda River, which is the closest to the border, has a total reservoir capacity 157,000,000 m^3.

Figure 5. Dam map of Bulgaria. Source: Sunar et al., 2019.

In fact, flooding is a major problem in the Maritsa Basin in both Turkey and Greece. The most recent major flood, which occurred between February 17 and March 24, 2005, inundated

houses and farmland in Greece and caused damage estimated at US$50 million in the area around Edirne (DSİ, 2005a).

Measurements taken at the Kapıkule border quality monitoring stations between 1985 and 2001 reveal the Maritsa and Tundja water bodies in Turkey are heavily polluted, decreased water quality, and threaten the protected basin delta, and this low water quality in the basin is a matter of concern for Turkey (Kole, 2004).

The high sediment loads in the river lead to soil accumulation on the riverbed, especially near Edirne, and generate soil islets on both sides of the river. Many trees grow out of these soil islets and have developed into forests, and this contributes to coastal erosion linked to the increasing roughness coefficient of the riverbed (Yildiz, 1999).

Floods in the spring and summer of 2005 and the spring of 2006 laid waste to much of the low-lying areas in the northeast of the Evros prefecture and the Edirne area (5–10 km inland) – farmlands were flooded, the rail and road infrastructures were damaged, leading to disruptions in transportation, and the inhabitants of villages had to be evacuated. There are also reports that a number of people were killed in Bulgaria as a result of the flooding in the region.

The numerous floods have been linked to above-average rainfall combined with snowmelt, which leads to increased discharges (2000–2500 m^3/s) and the bursting of dikes. The lack of communication and information at an operational level between the three neighboring countries, as well as the inefficient management of the upstream reservoirs in flood-prone areas, contributed to increasing the extent of the damage. To protect the dams, controlled releases were made that increased the damage, and the authorities in Greece and Turkey tried to alleviate the damage through controlled flooding (Nikolaou et al., 2008).

The effects of flooding are not only economic, but also ecological. In 2015 April, many fish spilled onto farmland with the floods, and were stranded after the waters withdrew. Farmers collected them and released them into the Maritsa River (NTV Haber, 2015).

Turkey and Greece

Earlier agreements between Turkey and Greece related to the Maritsa River mainly cover the construction of facilities for flood protection, erosion control and water diversion, and the two countries recently signed a Memorandum of Understanding on Environmental issues. The first agreement on the Maritsa between Greece and Turkey – "The Agreement on the Installation of Hydraulic Systems on both sides of the Meric River" – was signed in 1934 and covered mainly the specifications of the infrastructures that both parties were allowed to build for flood protection and erosion control. The agreement also included provisions for the exchange of topographic data, notifications to the other party prior to construction, and for the settlement of disputes between the two parties (Kibaroğlu et al., 2005).

Another agreement relating to the construction of flood control measures on the Maritsa River was signed between Turkey and Greece in 1955, although the text of the agreement was not published. According to Bilen (2000), the agreement provided for the construction of flood control facilities in accordance with a master plan, and each government was to undertake the construction and financing of the work in its own territory. To determine the joint measures that needed to be taken against flooding of the river, Turkey and Greece awarded a contract to the Harza Engineering Company to prepare a master plan for the Maritsa Basin, although only some of the facilities envisaged by the master plan were realized

(Bilen, 2000). To resolve disputes arising from the master plan and to carry out hydraulic works on both sides of the Maritsa, Turkish-Greek technical teams convened in 1963 and agreed on the "Protocol on the Rehabilitation of the Meric River Basin Forming the Significant Part of Turkish-Greek Border in Thrace". This protocol encompassed articles on the modification of the border between the two parties, as an exchange of land was necessary for the building of infrastructure on the river. Any disputes arising out of this matter were to be dealt with by a General Engineer, appointed by the French Ministry of Agriculture (Kibaroğlu et al., 2005).

Turkey and Bulgaria

In 1968, Turkey and Bulgaria signed the "Agreement between the Republic of Turkey and the People's Republic of Bulgaria on Cooperation in the Use of the Waters in the Rivers Flowing in the Soils of the Two Countries", which refers to the principles of international law and good neighborly relations (Kibaroğlu et al., 2005).

The 1975 "Agreement on Long-Term Economic, Technical, Industrial and Scientific Cooperation" between the Government of the Republic of Turkey and the Government of the People's Republic of Bulgaria" stated that cooperation between the concerned Turkish and Bulgarian enterprises and organizations should be simplified in all fields of the economy, including "energy production and irrigation, including the joint use of the waters whose shores are in both countries, for energy production and irrigation purposes" (Kibaroğlu et al., 2005).

Recognizing the need for cooperation to alleviate the severe consequences of drought suffered by both parties, the Agreement on Assistance and Cooperation in the Field of Water to Reduce the Negative Effects of Drought of 1993 was signed (Kibaroğlu et al., 2005).

The Turkish-Bulgarian Joint Committee for Economic and Technical Cooperation then signed the "Agreement on the Approval of the 15th Term Protocol," in 2002 (Kibaroğlu et al., 2005).

Agreements of Beneficiaries:

- Energy-Electricity
- Water Usage
- Flood protection
- Irrigation
- Water quality and the environment

There are conflicting interests in water resource development in the Maritsa Basin between Bulgaria and Turkey, and Turkey's plans to increase the quantity of irrigated areas in the Maritsa Basin would aggravate the situation. To make more water available for irrigation in Turkey, it has been proposed the Turkey consider the possibility, despite the additional cost, of building off-stream storage facilities to collect the excess winter outflow from the Bulgarian and Greek dams (Ozis et al., 2002). Turkey has proposed joint dam projects with Bulgaria, which would also contribute to flood control, as one of the most urgent fields of action in the basin. Even though agreements are in place for cooperation in flood prevention and control, adherence has been unsatisfactory in the past. Following the severe floods of March 2005, Turkey is reported to have sent Bulgaria a note of protest due to its alleged failure to abide by the bilateral agreement, and Greece has also blamed Bulgaria for floods it has experienced (Kibaroğlu et al., 2005).

Subsequently, Ankara and Sofia agreed to cooperate in the construction of a dam on the river Tundja in order to mitigate Turkey's flooding problems. The two sides agreed to appoint experts to develop the project and to establish a Turkish-Bulgarian joint technical commission for its implementation. The dam is expected to not only provide flood protection, but also to bring

further benefits to the two countries, for example, it could also provide irrigation to the area around Edirne and Kirklareli in Turkey (Kibaroğlu et al., 2005). In April 2005, a technical delegation from Bulgaria paid a visit to the DSİ Regional Directorate in Edirne, leading to consensus being reached regarding the location of the dam and the signing of a protocol. In addition, during a visit of the DSİ Regional Director to Bulgaria in May 2005, the two sides agreed that the project development for the Suakacagi Dam in the Tundja River would be finalized with joint studies in June 2005 (DSİ, 2005b).

Edirne Channel Project

The project was designed by the DSİ (State Hydraulic Works) in Turkey and included a 6,000 m channel with the surrounding area of around 430 decares being developed for recreation. The 7,800-meter-long canal will operate as a tributary of the Meriç River, and the canal will be operated like another river flowing from the entrance of the city after Arda, Maritsa and Tunja.

Even if the flow of the Maritsa River exceeds 2000 m^3/s, the bypass channel will be sufficient to prevent flooding. The project, initiated in November 2015 with a budget of 45 million TL, was completed at the end of 2019.

Environmental and water pollution problems – Ergene River Region

Bilateral relations in the Maritsa Basin have improved over the last decade, providing a political context for negotiations and for the settling of major water-related conflicts. That said, collaboration in flood protection needs to be improved, and the conflicting claims to water by Turkey and Bulgaria for irrigation can be an impediment to the implementation of irrigation projects in Turkey. It remains to be seen whether the planned joint dam projects will be realized and whether they constitute an appropriate solution for conflicting water needs.

No agreements exist yet on water quality in the basin, although upstream water pollution is increasingly perceived as an issue for Turkey and Greece. EU membership of all three riparian countries would provide a good incentive to increase transboundary cooperation. The prospect of joint nature conservation activities and a legal framework for the protection of wetlands provide further incentives for collaboration in water resource management, and such collaborations could also contribute to good neighborly relations between the riparian countries and the communities living in the border regions (Kibaroğlu et al., 2005).

Good water quality brings mutual benefit to all riparian countries as nature protection and conservation in the basin area, especially the protection of the Ramsar Site. The Evros Delta is in need of action, and projects for the Lower Meric Valley Flood Plain – a biosphere reserve – are in place on the Turkish side. Several other initiatives have been taken as the first steps in transboundary conservation activities, although no concrete results have yet been achieved (Kibaroglu et al., 2005):

- The Turkish Ministry of Environment and Forestry, with support from the UNESCO Regional Bureau for Science in Europe, organized an international conference on "Biosphere Reserves and Transboundary Cooperation between Bulgaria, Greece and Turkey" which was planned place in Edirne in July 2005 (Kibaroglu et al., 2005). The conference "Bridging Science and Society" was conducted in 2007 in Antalya.
- In 2001, the Mediterranean Wetlands Initiative (MedWet) developed a project to foster transboundary collaboration in the management and protection of the Maritsa River and its wetlands. Unfortunately, internal reasons prevented the funding of the project from being approved (Kibaroglu et al., 2005).

- The European Green Belt initiative, under the leadership of the German Federal Agency for Nature Conservation (BfN) and IUCN, aims to transform the former Iron Curtain area along the east-west divide of Europe into a protected corridor, thus acting as a symbol of unity between East and West. One stretch of the European Green Belt route follows Bulgaria's borders with Turkey and Greece (Kibaroglu et al., 2005).

The Maritsa Basin has been identified as one of the priority sites for transboundary cooperation (IUCN, 2004). Water quality remains an unresolved issue in the basin, and any solution to the problem, arising, to a significant degree, from insufficient wastewater treatment, would need considerable investment in infrastructure. Ongoing EU-cooperation programs involving accession countries may lead to the partial alleviation of the problem. The high sediment load – a consequence of erosion in the basin – causes siltation problems in the River Delta and leads to the formation of sand islets. Turkey has launched a program to clear the sand islets in order to maintain a regular flow, although the technical cooperation of the other riparians is deemed necessary if the issue is to be fully addressed (Yildiz, 1999).

Data exchange and scientific cooperation

The exchange of hydrological data seems to be insufficient between the riparian countries, and it has been reported that no information is available from the Bulgarian side about the discharge of waste into the river or the retention of water (Mylopoulos et al., 2004). Establishing scientific exchange between the riparian countries may lead to further collaboration. In the Maritsa Basin, exchanges of this nature take place, to some extent, through the International Network of Water-Environment Centres for the Balkans (INWEB) that was established in 2000.

Funded by the UNESCO Regional Bureau for Science in Europe (UNESCOROSTE), INWEB organized an international workshop in 2004 with the objective of sharing the available data on transboundary watercourses in south-eastern Europe and to contribute to the compilation of an inventory in accordance with the UNECE framework document guidelines, and participants from all three riparian countries took part in the workshop and presented data and information on the Maritsa Basin. Furthermore, the World Hydrological Cycle Observing System (WHYCOS) offers a network for the exchange of data and has established a global network of national observatories with the objective of creating a relatively transparent database. Among these, the Mediterranean division (MED-HYCOS) has set up five Data Collection Platforms in the Maritsa Basin: four in Bulgaria and one in Turkey (Kibaroğlu et al., 2005).

Energy use in the Martisa Basin

The gradual increase in industrial activity increased not only water but also energy needs, and existing natural gas power plants and wind turbine power plants remained inadequate. To meet the demand, natural gas and electricity trade is on the agenda of the Maritsa region.

Hydropower plants on Maritsa River

A general analysis of the distribution of hydropower plants on the Maritsa region reveals that 24 of the 25 dams are in the Bulgarian section, indicating that energy production is more important than water for Bulgaria (Kimençe, 2015). The Greek part of the basin contains one dam, which was built to regulate water flow coming from the Ivailovgrad HPP in Bulgaria, and to irrigate 30,000 ha of farmland (Kibaroğlu, 2008).

In 1998, Bulgaria and Turkey signed an agreement to cooperate in the energy and infrastructure sectors, under which

Bulgaria agreed to employ Turkish companies to carry out two major infrastructure projects: The Gorna Arda hydropower project and the construction of a section of the Maritsa highway (Buechsenschuetz, 2003).

In 2000, however, the Turkish Ceylan Holding Company, which was chosen to participate in the two infrastructure projects, experienced financial difficulties and no alternative contractor was commissioned, meaning that the projects did not pass the planning stages. Turkey claimed that this constituted a non-fulfillment of the 1998 agreement and stopped purchasing electricity from Bulgaria in 2003 (Buechsenschuetz, 2003).

The two countries are expected to discuss the 1998 bilateral electricity-for-infrastructure deal that included the building of dams on the Arda River in Bulgaria, as one of the leading electricity exporters in the Balkan region, which is interested in resuming the export of electricity to Turkey. Turkey, on the other hand, is reported to be insisting on compliance with the agreement by Bulgaria to employ Turkish companies for the construction of infrastructure projects (Nenkova, 2005).

Natural gas lines passing through Maritsa Basin

The Maritsa region contains two natural gas lines that connect Europe and Russia, namely the Blue Stream line and TANAP line. Natural gas and electricity, exporting and importing between countries, supply in the region. Some 20 million m^3/year capacity of imported natural gas is stored in Silivri in the Maritsa region.

Although Maritsa region consists of 2 percent of Turkey land, it holds 17 percent of all-natural gas power in Turkey. It can be understood from this that the region is highly dependent on foreign sources for its energy requirements (Enerji Atlası, 2015).

Turkish Electric Grid: This is connected to the Bulgarian Electric Grid via two 400 kV transmission lines, and to the Greek Electric Grid via one 400 kV line. On 18 September, 2010, the synchronization of the Turkish electric grid with that of the European Union was completed, allowing the transmission of electricity between Turkey and other European Countries. Turkey will thus become a bridge between the East and West due to its strategic position, which will support not only the transfer of natural gas, but also electricity (TEİAŞ, 2015).

The trade of electricity between Turkey and Greece was launched on 2 June, 2011 with the signing of an agreement between the EU and Turkey. Under the agreement, 45 companies in Bulgaria and 28 companies in Greece are selling electricity to Turkey, while 11 Turkish companies are selling electricity to Bulgaria, and 23 companies are selling electricity to Greece (TEİAŞ, 2015). Moreover, many wind farms have been built in the Thrace region of Turkey, the total capacity of which has reached approximately 320 MW (Enerji Atlası, 2015). It can thus be understood that the Maritsa region is important not only for water, but also due to its energy potential for all three countries.

Figure 6. Pipelines passing through the Maritsa Region.
Source: Offlinepost, 2019.

Agreements

Transboundary water and WFD

Transboundary Rivers can be at the heart of potential conflict or political tension, and consequently affect relations between neighboring countries (Sadoff & Grey, 2002). International water relations are certainly complex, being rarely transparent or easily quantifiable. Particularly where water is thought to be scarce, water users and political leaders take strong and often conflicting positions and pursue policies that remedy water scarcity in the political economy beyond the water sector, while sustaining apparent confrontations over water resources (Zeitoun & Allan, 2008).

The EU WFD – until recently a driving force for cooperation in the management of shared water resources in Europe – aside from the difficulties related to geographical location and the existence of different national legislations, had also to address the void of international legislation in regard to the regulation of transboundary waters. Past transboundary cooperative efforts focused on specific water issues (economic, environmental etc.) rather than promoting integrated approaches. The WFD (European Water Framework Directive) 2000/60/EC, establishes a new institutional framework, promoting a common approach, common objectives, principals and definitions, and measures to support the management of waters in Europe. The new Water Framework Directive provides the conditions to support significant reform in European environmental legislation and administrative practice. The new Water Framework Directive calls for the application and implementation of basic principles in support of sustainable water resources management, ensuring specifically effectiveness, efficiency and equity. It is a prominent example of an integrated water policy based on a river basin approach. The WFD partly replaces and partly augments the

existing legislation, providing a comprehensive framework in which the member states must orient their efforts. The Directive integrates all water resources, ecological objectives, water uses and functions, interdisciplinary analyses and expertise within a common policy framework. The EU member states are bound to achieve a "good ecological status" for water bodies. Territorial management based on physical rather than administrative boundaries represents a major innovation in the procedure. Significant emphasis is placed on the joint resolution of transboundary water problems. The need to integrate qualitative and quantitative information and the inclusion of scientifically assessed risk in decision-making imposes planning processes leading to the inclusion of more complex, subjective and complicated choices (Transcat compendium, 2006). The WFD foresees increased public participation in the water resource management process and prescribes the economic assessment of potential measures to achieve good water status. To cope with the increasing complexity of such innovative policy, the traditional state-led approach to decision making is being replaced by new institutions, actors and levels of governance. Thus, the management of transboundary river basins emerges as one of the most challenging issues related to the WFD implementation process (Yannis et al., 2008).

International knowledge of the current status in water cooperation and unresolved disputes related to transboundary rivers in Turkey is lacking. To improve the body of information in preparation for intensified dialogue between Turkey and the EU (Kibaroğlu et al., 2005), the following are required:

- A comprehensive assessment of the current use and management of the Turkish transboundary waters, including, if available, bilateral or multilateral agreements and organizations,

- Identification of existing and/or potential disputes relating to infrastructure development and other forms of intensified water use,
- Identification of key elements of the EU strategy to support Turkey in further developing a cooperative approach to its transboundary waters,
- Identification of proposals for the integration of transboundary water issues into the German-Turkish Environmental Cooperation.

Turkish water policy, legislative, and institutional structures

Turkey, as an EU accession candidate, and a member of the OECD and G-20, has set sustainable development and environmental targets. In recent years, considerable progress has been made toward the conservation of the environment and natural resources, the prevention of pollution, the use of renewable energy, and the expansion of water and wastewater services. Although the full implementation of the legislation will require time and significant funding, many studies have been made and large investments have been carried out to ensure full alignment with the EU acquis and the transposition of the WFD concerning river basin management. The intensive planning activities and the construction of physical structures have been followed by considerable progress in improving the water supply, to achieve the realization of socio-economic development goals since the 1950s (Kibaroğlu, 2007). Policies related to water and natural resources in Turkey have witnessed continuous reforms in the second half of the 20th century, with significant changes occurring especially as part of the EU accession process. The need for a basin unit-based management concept, and coordination between institutions were highlighted in the Sixth Turkish Five-year Development

Plan (1989). Every subsequent development plan has increasingly emphasized the importance of the basin-based management approach for the planning and administration of natural resources, especially water and soil. Turkish environmental policies are directed toward satisfying the increasing demand for water supply and food security, the generation of energy, and conservation of the environment in accordance with international standards. The Turkish water policy has four main dimensions (Delipınar & Karpuzcu, 2017):

1. Improvement of water resources, increasing agricultural production through irrigation, domestic use, flood control power generation,
2. Water transfer from Turkey to water-stressed nations,
3. For EU accession, the adoption of the national environmental strategy and action plan, studies of new water legislation and institutional restructuring,
4. Transboundary water policy and its concepts, as follows: consistent and transparent, equitable and with optimum utilization, efficient use, sharing of benefits, cooperation among riparian states, and sharing of information and data.

In summary, whether to meet the ever-increasing water demand for sustainable management of water resources at basin level, or to adopt the EU Legislation, the IWRM has been gaining importance, and Turkish national and international efforts have been accelerated since 2009 (Delipınar & Karpuzcu, 2017).

Bilateral agreements

Up to now, only bilateral agreements exist related to water-related issues in the basin. Any cooperative initiative in the Maritsa Basin needs to be considered within the broader context of the political relations between the riparian countries. Greece-Turkey relations in particular have been far from friendly over the

years. Since the second Greco-Turkish war (1919–1922), the main issues have been the Cyprus dispute and the conflicting territorial claims in the Aegean Sea, including the 1996 "Kardak Crisis" that emerged over a deserted island in the Eastern Aegean that led to a serious diplomatic confrontation between the two countries. In addition, the Maritsa Basin is situated in Thrace, which is home to diverse communities and Turkish minorities living in both the Greek and Bulgarian parts, as well as Greek minorities living in Turkey. The minority conflict is the oldest issue between Turkey and Greece and has been the main problem affecting Bulgarian-Turkish relations since the end of World War II. Since 1999, however, Turkish-Greek relations have entered a new era of rapprochement, due largely to close co-operation between the Foreign Ministers of the two countries. Turkish-Greek joint committees have been established and several agreements promoting cooperation in fields ranging from the environment to combating terrorism have been reached. The only minor drawback was the European Council's decision of December 2002 to grant EU membership to the Greek part of Cyprus (Kibaroğlu et al., 2005).

Table 4. Bilateral Agreements between the three nations (Turkey, Greece and Bulgaria)

Bilateral Agreements		
Turkey – Bulgaria	Treaty on the Prevention and Treatment of Border Events and the Maintenance of Border Signs	Signed in Ankara on December 28, 1967 and accepted by the TGNA on March 27, 1969.
	Agreement on Cooperation to Benefit from the Waters of the Running Rivers from the Two Country Territories	The agreement, dated October 23, 1968, was accepted by the TGNA on November 25, 1969.
	Friendship Between the Republic of Turkey and the Republic of Bulgaria, Good Neighborly Relations, Cooperation and Security Agreement	The Agreement was signed on May 6, 1992 in Ankara, and was accepted by the TGNA on September 15, 1994.

	Boundary Determination of the Mutluere / Rezovska Deresi Downstream Region and the Agreement on the Restriction of Authority Areas in the Black Sea Between Two Countries	The agreement was signed on December 4, 1997 and was accepted by the Grand National Assembly on May 25, 1998.
	Trade and Economic, Industrial and Technical Cooperation Agreement between the Governments of the Republic of Turkey and the Republic of Bulgaria.	Signed on July 6, 1994 and entered into force on September 22, 1997.
	Economic Cooperation Agreement between the Republic of Turkey and the Republic of Bulgaria	The meeting was held in Sofia on January 24-25, 2007,"Economic Cooperation Agreement between the Republic of Turkey and the Republic of Bulgaria", which was prepared to ensure the continuation of the Turkey-Bulgaria Joint Economic Commission Meeting, was signed on the occasion of the first meeting of the Turkey-Bulgaria High Level Cooperation Council held in Ankara on 20 March 2012.
Turkey-Greece	Agreement regarding the arrangement of the hydraulic plant to be built on both sides of the Meriç-Evros river	Signed in Ankara on June 20, 1934
	Protocol Concerning the Border Allocation Due to the Improvement of the Meriç River Channel That Determines the Significant Part of the Turkish-Greek Thrace Border	Signed on January 19, 1967.
	Economic Cooperation Agreement Between the Republic of Turkey and Greece	Signed on February 4, 2000 in Athens.
	Greek-Turkish Protocol on the Establishment of a Joint Task Force Against Natural Disasters, Involving the Republic of Turkey and Greece	Signed in Athens on November 8, 2001.

	Republic of Turkey and the Hellenic Republic Ministry of Forestry and Water Affairs, Environment, Energy and Climate Change Memorandum of Understanding on Cooperation Between the Ministries in the Energy Field	Within the scope of the first meeting of the Turkey-Greece High Level Cooperation Council held in Athens on 14 May 2010, in order to further develop long-term comprehensive cooperation in the field of energy between the Ministry of Forestry and Water Affairs of the Republic of Turkey and the Ministry of Environment, Energy and Climate Change of the Hellenic Republic in the Field of Environment A Memorandum of Understanding on Cooperation was signed.
Bulgaria - Greece	Agreement on Cooperation in the Utilization of the Waters of the Rivers Between the Two Countries	The two countries signed a cooperation agreement in 1964 on the common use and management of surface water resources.
	Agreement for the Establishment of the Bulgarian-Greek Joint Committee for Cooperation in the Fields of Energy and Water Use, with a view to following the Implementation of the 1964 Treaty	Bulgarian-Greek Joint Committee responsible for energy production and management of joint waters established in 1971.
	Monitoring of the Nestos River and the Establishment of the Commission for the Control of the Implementation of the Agreement and the Resolution of Disputes	Under the "Mesta-Nestos Agreement" signed between the two countries in 1995, the parties reached an agreement that 29 percent of the Mesta River water in Bulgarian territory will be exported to Greece for 35 years (1995-2030)
	Memorandum of Understanding on Cooperation in the Field of Environmental Protection	The agreement entered into force in both states in 2005.

Source: Ministry of Forestry and Water Management (2017).

Turkey and Bulgaria

In 1968, Turkey and Bulgaria signed the "Agreement between the Republic of Turkey and the People's Republic of Bulgaria on Cooperation in the Use of the Waters in the Rivers Flowing in the Soils of the Two Countries", which refers to the principles

of international law and good neighborly relations. The main objective was to regularize the beneficial use of boundary and Transboundary Rivers and to provide for flood protection. The parties committed to cooperation in the research and study of ventures that would be beneficial to both, to not inflict serious damages on each other through the construction or operation of facilities on the rivers, to exchange information on floods and icing as rapidly as possible, and to exchange hydrological and meteorological data. A Turkish-Bulgarian Joint Commission composed of equal numbers of experts from both countries was given the responsibility of settling any disputes that may arise during the implementation of the agreement. The 1975 "Agreement on Long-Term Economic, Technical, Industrial and Scientific Cooperation" between the Government of the Republic of Turkey and the Government of the People's Republic of Bulgaria" states that cooperation between the concerned Turkish and Bulgarian enterprises and organizations shall be simplified in all the fields of the economy, including "energy production and irrigation, including the joint use of the waters with shores in both countries, for energy production and irrigation purposes" (Kibaroğlu et al., 2005).

The 1993 Agreement on Assistance and Cooperation in the Field of Water for Reducing the Negative Effects of Drought was signed in recognition of the requirement for cooperation to reduce the consequences of drought on both parties. According to the agreement, Bulgaria, on a one-off basis and limited to 1993, should supply additional water to Turkey from Tundja River, while Turkey should assign US$0.12 per m^3 for water provided by Bulgaria. Hence, Turkey bought 15,866,000 m^3 of irrigation water from Bulgaria at a cost of US$1,903,904 (Kibaroğlu et al., 2005).

In 1998, Bulgaria and Turkey signed an agreement to cooperate in the energy and infrastructure sectors, in which Bulgaria

agreed to employ Turkish companies to carry out two major infrastructure projects: The Gorna Arda hydropower project and the construction of a stretch of the Maritsa highway. In return, Turkey was to purchase a certain amount of electricity at a fixed price from Bulgaria. The Gorna Arda hydropower project was launched in 1999 and included the rehabilitation of existing dams as well as the construction and operation of three new dams on Arda River close to the Turkish border. (Kibaroğlu et al., 2005).

The Turkish-Bulgarian Joint Committee for Economic and Technical Cooperation signed the "Agreement on the Approval of the 15th Term Protocol" in 2002. Under the "Environment" subheading, both parties agreed to further their environmental cooperation in the protection of surface and groundwater resources and water-related environments. Under the "Energy and Environment" heading, the Turkish side repeated its request to establish a joint technical working group to investigate the conditions for the construction of Suakacagi Dam on Tundja River. The Bulgarian side stated that the issue would be addressed promptly, and both sides agreed further to continue their exchange of hydrological data to prevent flooding, and to exchange data on water levels and releases from the dams on the Maritsa, Arda and Tundja Rivers. They further agreed the Technical Working Group which was created under the 1968 Agreement should continue its regular activities (Kibaroğlu et al., 2005).

A protocol was signed between the DSİ and the National Institute of Meteorology & Hydrology (NIMH) of Bulgaria in 2002 related to the installation, operation and maintenance of a flow observation telemetry station on the Maritsa River in Svilengrad, Bulgaria to ensure improved monitoring of hydrometeorological data in periods of flooding. Joint studies are continuing into the installation of an early warning system for

flood protection on the Turkish-Bulgarian border (Kibaroğlu et al., 2005). The current project name is "Prevention and Minimization of the Risks for the Environment and Vision for Innovative Tools (PREVENT)" with the EU's Instrument for Pre-Accession Assistance (IPA) through the "CBC Bulgaria - Turkey" Operational Programme for the 2014-2020 programming period. The investment falls under the priority "Protecting the environment and promoting climate change adaptation and mitigation, risk prevention and management" (European Commission Projects, 2007).

Turkey and Greece

Earlier agreements between Turkey and Greece on the Maritsa River mainly covered the construction of facilities for flood protection, erosion control and water diversion, and the two countries have recently signed a Memorandum of Understanding related to environmental issues. The first agreement related to the Maritsa River between Greece and Turkey was signed in 1934. "The Agreement on the Installation of Hydraulic Systems on both Sides of the Meric River" covered mainly the specifications for the infrastructure allowed to be built by both parties for flood protection and erosion control. The agreement also included provisions for the exchange of topographic data, notifications to the other party prior to constructions and the approach to the settlement of disputes between the two parties (Kibaroğlu et al., 2005).

A "Memorandum of Understanding Concerning Cooperation in Environmental Protection" was signed between Greece and Turkey in 2001, stipulating that government bodies of the two parties "shall exchange scientific, technical and legal information and shall encourage such exchanges among academic institutions". "Coordination and cooperation in the different fields of activity shall be managed by a Joint Committee comprising

five representatives from each of the two countries." The fields of potential cooperation, however, do not include river management, although the areas mentioned include "combating marine pollution", "Environmental Impact Assessments" and "Land-based sources of pollution", provide options for cooperation relating to the management of the Maritsa River. There are also 26 joint development initiatives that offer opportunities for the fostering of transboundary cooperation in water resource management in the basin. The Community Initiative Programme INTERREG III A / Greece – Turkey is envisaged to support cross-border cooperation projects. The program, envisaged for the 2003–2006 period, seeks to support the maintenance of good neighborly relations and promoting the region as a nexus for consolidating peace and growth in the Eastern Balkan Peninsula and on the Aegean Sea. Under the environmental component of the program, priority will be given to the integrated management of the cross-border waters, in accordance with the WFD, and to the management of ecosystems of exceptional ecological significance (Kibaroğlu et al., 2005).

Outstanding issues and options for win-win solutions

The existing agreements and cooperation in the basin cover issues of flood protection and joint infrastructure projects, as well as general environmental issues, including the conservation of protected areas. Issues of water allocation, on the other hand, remain unsettled, and no legal provisions exist related to water quality standards within the basin. Likewise, arrangements on the exchange of data and information focus mainly on information on floods, while the crossborder availability of data on water quality is reputed to be a problem. In addition, no agreement exists that would provide for a minimum inflow of clean water into the delta to satisfy the water needs

of the ecosystems, and to prevent salt intrusion and siltation (Kibaroğlu et al., 2005).

Water framework directives and applications by countries

"Directive 2000/60/EC of the European Parliament and of the Council dated October 23, 2000" established a framework for Community action in the field of water policy and set the objectives for the prevention of a deterioration in status of all Community waters – both inland and coastal – to ensure the achievement and maintenance of their good status by 2015. The main objectives of the WFD are: to provide an integrated system of water management based on hydrological catchments rather than political or administrative boundaries (Art. 3); to set environmental objectives to ensure that all water bodies – rivers, lakes, coastal waters and groundwaters – achieve a "good status", and to prevent the deterioration of such waters (Art. 4); to introduce a "combined approach" to pollution control (Art. 10); to contribute in mitigating the effects of floods and droughts (Art. 1); and to ensure the involvement of active stakeholders and the public (Art. 14) (Nikolaou et al., 2008).

The WFD 2000/60/EC, establishes a new institutional framework, giving directions for the common approach, the common objectives, principals, definitions and measures for the management of waters in Europe. The new Water Framework Directive provides the conditions for important reform in the European environmental legislation and administrative practice. The objective of the new Water Framework Directive is the application and implementation of basic principles of sustainable water resources management, and specifically effectiveness, efficiency and equity. It is a prominent example of an integrated water policy based on river basin approach. The WFD partly replaces and partly augments existing legislation to provide a

comprehensive framework, in which member states will have to orient their efforts. The Directive integrates all water resources, ecological objectives, water uses and functions, interdisciplinary analyses and expertise within a common policy framework. EU member states are bound to achieve a "good ecological status" for water bodies. Territorial management based upon physical rather than administrative boundaries represents a major innovation in the procedure. Great emphasis is placed on jointly resolving transboundary water problems. The need to integrate qualitative and quantitative information and the inclusion of scientifically assessed risk in decision-making imposes planning processes aimed at including more complex, subjective and complicated choices (Transcat compendium, 2006). The WFD foresees increased public participation in the water resource management process and prescribes the economic assessment of potential measures to achieve good water status. To cope with the increasing complexity of such an innovative policy, the traditional state-led approach to decision making is being replaced by new institutions, actors and levels of governance. Thus the management of transboundary river basins emerges as one of the most challenging issues related to the WFD implementation process" (Yannis et al., 2008).

Transboundary corporation project in the Maritsa region

Comparison of ICPR, ISRBC and IJC Methods[1]

Resolving the transboundary water problems between the riparian nations requires negotiation on the basis of trust and goodwill. When the mutual trust environmental is created, relationships between riparian can improve gradually. On the other hand, agreements signed between riparian countries are

1 ICPR: International Commission for the Protection of the Rhine
ISRBC: International Sava River Basin Commission
IJC: International Joint Commission

in demand in terms of economic, political (acquiring EU membership) and environmental problems.

Both the ICPR and ISRBS methods advise, as a first step, identifying the most crucial problems related to the basin, which for the Maritsa Basin is flooding. The flood problem can be seen as a potential locomotive in the development of cooperation in the basin. First of all, a commission should be established, and common decisions should be taken, which would allow the sharing of experiences and the establishment of mutual trust between the riparian nations. The ISRBC, ICPR and IJC examples show that even in recent examples where the riparian nations are at war with each other, common economic interest can support cooperation in river basin management involving the two sides. For example, after the break-up of Yugoslavia, countries, despite being at war, were compelled to collaborate regarding Sava River and EU membership and led to the establishment of the ISRBC. The same example can be used for the ICPR. The considerable industrial pollution of Ren River forced the riparian countries to collaborate. The North American riparian in different geography signed the IJC agreement in 1909. The authority of the IJC has increased continuously and gradually in line with the changes in population, industry, farming and environmental contamination (Ministry of Forestry and Water Management, 2017).

Flooding, water shortages and water pollution are the main problems in the Maritsa Basin. Even though similar problems were examined for the Sava and Ren River Basins under the ISRBC, ICPR and IJC organizations, not all problems could be resolved. It is necessary, however, to make use of the studies that targeted the resolution of these problems.

The ICPR, ISRBC and IJC carried out several studies and developed action plans aimed at preventing and resolving the flooding problem. The ISBRC, in its action plan, recommended

separate precautionary programs to counter flooding in each riparian nation. It also drew up the Flood Protection Protocol, establishing the legal basis for the resolution of the flooding problem. The ICPR proposed the reactivation and reorganization of the former flood plains, and as a result, the riparian nations put many national precautions in place with a view to fulfilling the ICPR provisions for the enhancement of water quality in the Ren River Basin and ecological variety.

The condition of Sava River is the same as that of the Maritsa River. The countries downstream of Sava River are non-EU, and like Maritsa, suffer from flooding. The Maritsa region can benefit from the experiences of Sava River, and similar studies can be carried out for Maritsa region to resolve or reduce the flood problem. (Özdemir, 2015).

As a result, all three riparian should collaborate and enter into transboundary agreements to resolve the problems of the Maritsa River Basin. All collaborations and agreements take time and move step by step, but applications of agreements must be directed (Özdemir, 2015).

The transboundary water projects between Bulgaria and Greece for the Maritsa Basin

While agreements have been signed between Bulgaria and Turkey, and between Bulgaria and Greece, the exchange of information and the operation of dams in times of flooding have been unsatisfactory. Support could be provided to the three riparian countries to establish a joint flood warning and control program, and the same approach can be applied to the prevention of other hazards. A joint hazard prevention program in support of transboundary cooperation could be established within the scope of, for example, an EU Twinning project, for which the Germany-funded program in the Kura Aras Basin serves as a good example (Kibaroğlu et al., 2005).

Several initiatives touch on the issue of transboundary cooperation in the basin, and building on these initiatives or providing technical or financial support to them could improve the status of ecosystems and biodiversity in the basin area, while also encouraging cooperation between the riparian countries in issues of water management (Kibaroğlu et al., 2005).

Water quality in the basin suffers from the discharge of insufficiently treated domestic wastewater, mainly by Bulgaria and Turkey, and resolving this problem requires major investment. The financial support provided by EC programs and development banks could be supplemented by initiatives promoting cooperative approaches and the exchange of knowledge and know-how between riparian countries (Kibaroğlu et al., 2005).

Water in the basin is mainly employed in irrigated agriculture in both Bulgaria and Turkey. Promoting joint riparian efforts to increase the efficient use of water in irrigation would not only help reduce the pressure on the available water resources but would also foster cooperation in water resource management. The same applies to efforts to reduce the pollution associated with agricultural runoff. EU accession requires all riparian in the Maritsa River Basin to adopt the WFD and the UNECE Water Convention. Using the Maritsa River Basin as a pilot area, Bulgaria and Turkey could be assisted in implementing the relevant legislation, thus providing the grounds for transboundary cooperation, and an initiative could ultimately lead to the establishment of a trilateral river basin commission, similar to those that exist in other European transboundary basins (Kibaroğlu et al., 2005).

In 1991, the Bulgarian and Greece committees came together and signed a protocol related to the measurement and monitoring of quality and quantity values in the Maritsa, Nestos and Surma Rivers, and submitted an application to the EU. This led Bulgaria and Greece to set up hydro-meteorological

monitoring station on the rivers between 2000 and 2006 under the INTERREG program, the main aim of which was to overcome the flooding problems. However, Greece never activated the six monitoring stations under its responsibility and had caused many floods and economic damage since 2003 (Valvis, 2011).

Aside from the INTERREG program, the *"Technical Assistance Project on Water Quality Management in Arda River" (2007), "Flood Management in EVROS2010/2010 with Effective Precaution and Joint Operation Simulation in the European Union in Flood Threatened Regions" (2010) and "Flood Risk in the Cross-Border Region" Project of Establishment of Flood Warning System in Arda River Basin to Minimize" (2014)* are the other transboundary agreements in the Maritsa Basin.

Under the IPA program, Bulgaria and Turkey signed the "INTERREG IPA Cross-border Program Bulgaria and Turkey – CCI 2014TC16I5CB005" in 2015 (Bulgaria-Turkey IPA Cross-border Programme). Moreover, the NIMH (Bulgaria) and DSİ (Turkey) have also developed projects aimed at flood protection, including:

1. Risk Analysis for Flood and Flood Mitigation in the Maritsa River Basin and Sharing of Information with Assessment Project
2. Capacity Enhancement and Flood Control Project for Flood Forecasting

Conclusion

This chapter makes a holistic analysis of three main issues – water quality, agricultural activity and energy – and their influence on the countries of Turkey, Greece and Bulgaria. When these three issues are examined together, all riparian will benefit.

Maritsa Basin is very important for Turkey, in terms of its agricultural and industrial activities. The total area of the

Maritsa-Ergene Basin is 14,560 km^2. According to TUİK data, the population of the Maritsa-Ergene Basin is 1,768,368, and there is 11,357 km^2 of agricultural land, meaning that 80 percent of the area is suitable for agriculture. Furthermore, 75 percent of agricultural production is plant cultivation, while the remaining 25 percent comes from livestock. The agricultural land is used for the cultivation of 12 percent of the total wheat, 61 percent of the total sunflower and 54 percent of the total rice production in Turkey. As such, the irrigation provided by Maritsa River is of vital importance to Turkey (TUBİTAK, 2013). Additionally, there are 2,037 industrial plants in the area, 82 percent of which are in Tekirdağ, 10 percent are in Kırklareli and rest are in Edirne (Sağlam, 2014). The textile and clothing sectors are predominant in the area and are the industries that use the most water for production.

The main problem encountered in the Maritsa region of Turkey is flooding, which in the past has not only destroyed large agricultural areas, but also decreased the water quality in the rivers. Furthermore, floods cause considerable damage to the properties of those living in the Thrace region, at great cost. If these three riparian countries can reach an agreement by addressing the transboundary water problem holistically, everyone will be able to benefit from it.

Turkey can minimize the damage from flooding and will be able to irrigate its agricultural lands during the dry season, and can also benefit from the Maritsa River as a local and cheap source of energy, and these benefits are the same for Greece. As Greece's share of the Maritsa region is lower than that of Turkey, its benefit will be less. The benefit gained by Bulgaria is different to that of the other two countries. If Bulgaria complies with its duty to prevent flooding, it will no longer be under political pressure from Turkey and Greece and will fulfill the requirements of the EU and international agreements.

In addition, bilateral and multilateral agreements should be evaluated holistically, and the applied and non-applied articles should be examined. A solution to the problems should be proposed and evaluated.

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