



New basin institutions and legislative arrangements in integrated river basin management in Turkey: a case of the Nizip stream catchment area

Sermin Delipinar^{a,*}, Mehmet Karpuzcu^b, Meltem Celen^a

^aFaculty of Engineering, Environmental Engineering, Gebze Technical University, 41400 Gebze/Kocaeli, Turkey, Tel. +90-262-6780957; email: sdelipinar@gtu.edu.tr (S. Delipinar), Tel. +02626053200; email: mkocal@gtu.edu.tr (M. Celen)

^bFaculty of Engineering, Civil Engineering, Hasan Kalyoncu University, 27410 Gaziantep, Turkey, Tel. +90-342-2118080; email: mehmet.karpuzcu@hku.edu.tr

Received 15 December 2016; Accepted 16 March 2018

ABSTRACT

The integrated river basin management (IRBM) approach is widely used by the European Union members and candidate countries on account of the obligations of the European Commission (EC) Water Framework Directive (WFD) (2000/60/EC). Turkey, as a candidate country, is carrying out compliance activities that cover legislative and institutional arrangements in IRBM. The aim of this paper is to posit and assess the Turkish legislation and institutional structures related to water and environment in the context of the implementation of IRBM and WFD in the Nizip stream catchment area (NizCat), located in the south-west of the Euphrates and Tigris river basin in Turkey. After assessing the current policy, and legal and institutional structures, the revision of the structure of River Basin Committee and the foundation of new institutions (Association of NizCat at local level, and Ministry of Environment, Water and Forestry Affairs at the national level) was recommended. With respect to the legislative aspect, a proposal was forwarded, insisting that the existing discharge standards be reorganized as basin-based discharge standards for each basin instead of the sectoral ones, in order to improve the current situations qualitatively.

Keywords: Coordination; Institutional arrangements; Integrated River Basin Management; Legislation; Participation; Turkey

1. Introduction

The Integrated River Basin Management (IRBM) approach is widely used by the European Union (EU) members and candidate countries on account of the obligations of the European Commission (EC) Water Framework Directive (WFD) (2000/60/EC). Turkey, as a candidate country, is carrying out compliance activities that cover legislative and institutional arrangements in IRBM. The aim of this paper is to put forth and assess the Turkish legislation and institutional structures related to water and environment in the context of the implementation of IRBM and WFD in the Nizip stream catchment area (NizCat), located in the south-west of the Euphrates and Tigris river basin in Turkey. After assessing

of the current policy, and legal and institutional structures, the revision of the structure of River Basin Committee and the foundation of new institutions (Association of NizCat at local level, and Ministry of Environment, Water and Forestry Affairs at the national level) was recommended. With respect to the legislative aspect, a proposal was forwarded, insisting that the existing discharge standards be reorganized as basin-based discharge standards for each basin instead of the sectoral ones in order to improve the current situations qualitatively.

IRBM is defined by the Global Water Partnership as a process that 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 [1,2]. Some discussion over the meaning

* Corresponding author.

of IRBM and its implementation has existed even though it has significant support at the world stage. Many attempts to make the definition of IRBM by various groups have been done [3]. IRBM underlines the requirement for the management of the river basin as a system instead of administrative boundaries and some principles, namely, integration, decentralization, participation, cooperation, and coordination. It also covers the physical, ecological, and socioeconomic variables in managing basin units. Their implementation should be ensured and supported by appropriate legislation and basin institutions/organizations [2,4].

Integration in the implementation should combine management of land/soils, forests, and water. It requires the synchronization of their related institutions at the basin level. It should also involve a water policy goal. Jones et al. [2] indicated that water sector in many countries (both developing and industrialized) is fragmented, with multiple agencies working on water issues (water supply, irrigation, energy, transport, tourism, and so on) and often holding overlapping responsibilities. Similarly, many studies on Turkish water-related legal and institutional framework [5–8] indicate that multiple actors and fragmented administrative structure exist, and there was a need for new legal and institutional arrangements to allow the integration of all issues pertaining to water and environment.

Decentralization is defined as the management and decision-making process at the lowest appropriate level, and is also one of the internationally accepted principles of IRBM. According to World Bank Report, the “lowest appropriate level” in some functions of water management may be a sub-basin or local/regional unit of government, or a hybrid unit. The municipalities and other related administrative units may complicate or impede the activities of new river basin agencies, so selective delegation of functions is important to reduce this possibility [9].

WFD Article 14 indicates the requirement of public participation and its process of interpreting in the countries’ national context [10]. For effective IRBM, active stakeholder participation should be made a priority in a transparent decision-making process. Opportunities should be created for the participation of local community representatives, such as locally elected mayors, in the decision-making processes of basin management [2].

Turkish regulatory (policy and decision-making level) and operational institutions, as well as related legislation, have been in existence, but there are still some shortcomings in their implementation practices, especially with regard to transboundary issues. They could be developed for effective IRBM according to the experience to live. In Turkey, the newly established basin organizations are considered as a subset of institutions. In this study, the overall institutional and legal framework, which is related to water resources management in the river basin context, takes into account the following three broad categories: policies, laws, and institutions. Also, the assessment of the new basin institutions and their roles as well as legal reforms with regard to IRBM principles, as explained above, makes a case for the Nizip stream catchment area (NizCat). The Nizip stream is a small tributary of the Euphrates river is located in the south-west of the Euphrates–Tigris river basin (EuTiRB) boundary in Turkey, which is an important Turkish transboundary basin.

This paper analyzes the implementation of IRBM, including the created new river basin institutions, and seeks to answer the following main research questions: (1) What are the principles of IRBM? (2) How does the political context of water management change based on basin boundary? (3) How do the IRBM principles synchronize with the legislation and institutional structure for managing water in Turkey?

Eventually, this article puts forth the principles of IRBM, the synchronization of these principles with the institutional and legal arrangements for the implementation of IRBM in NizCat, and provides an overview of Turkish water policy, legislation, and institutional structures. It also assesses the newly created basin institutions. It is assumed that this research added value to the literature in the context of sharing of experiences, relating to the implementation of IRBM institutionally and legally with developing countries wishing to implement the same.

2. Study area

The Turkish country area and its population are 780,043 and 77.7 million people, respectively [11]. Turkey has 81 cities and 25 river basins. Turkish river basin boundaries do not comply with the administrative borders, like all over the world, and these borders are shown in Fig. 1. Five Turkish river basins are transboundary ones, and the rest are national. The transboundary waters constitute roughly 40% of the Turkey’s water potential [12]. Turkey is an upstream country on the Euphrates and Tigris, the Coruh, the Kura, and Arax, and a downstream country on the Maritza and the Orontes. Most rivers originate in Turkey and there are more than 120 natural lakes and 579 artificial lakes [6,13]. The currently available water resources’ utilization rate is 39% with about 1,500 m³ per capita water volume in 2013. According to the 10th Turkish Development Plan (2014–2018) in 2013, the amount of water available per person is predicted to be 1,100 m³ in 2030. Therefore, Turkey will be among the countries with water restrictions in the future [14].

NizCat is situated on the EuTiRB whose total area is 879,790 km². EuTiRB is distributed across Turkey, Iraq, Syria, and Iran. Jordan and Saudi Arabia are riparian only to the Euphrates and their size is ignorable. Iran is riparian only to the Tigris river [13]. The Euphrates and Tigris rivers join to form Shatt Al-Arab in Iraq 200 km before the Persian Gulf, so there are two rivers, but one basin according to WFD’s river basin definition. The Euphrates originates in the eastern highlands of Turkey and is 3,000 km long. It is divided between Turkey (1,230 km) and other riparian countries, for example, Syria (710 km) and Iraq (1,060 km). The Tigris, also originating in eastern Turkey, flows through the country until the border city of Cizre. It is 1,850 km long, with 400 km in Turkey, 32 km on the border between Turkey and Syria and 1,418 km in Iraq, but Turkey contributes 89% to the annual flow. Syria provides 11% and the remaining riparian countries contribute very little water. The combined average annual discharge of the Euphrates and Tigris rivers is difficult to determine due to the large yearly fluctuation. Such variation in annual discharge makes it difficult to develop an adequate water allocation plan for competing water demands from neighboring countries [13]. Water use in the basin in

Turkey, Iraq, and Syria focuses on irrigation, hydropower, and drinking water supply, with agriculture consuming the largest share of water [12].

As shown in Fig. 2, ArcGIS calculated the surface area of the EuTiRB in Turkey (EuTiRB-TR) to be 177,792 km² by EuTiRB-TR which includes 16 provinces, 161 towns, and 9,015 villages. The EuTiRB-TR is divided into two sub-basins:

Euphrates and Tigris. This basin is classified as dry and sub humid. The annual mean precipitation depth is 569 mm, 80% of which occurs from June through September. The annual rainfall variation is high. The uneven temporal and spatial distributions of precipitation cause frequent floods and droughts in the basin, which are considered major disasters when agricultural production is concerned [15].



Fig. 1. Turkish river basin boundaries and provincial borders (This map was produced by Arc GIS 10.3.1.).



Fig. 2. Map of EuTiRB-TR, Turkish provinces and NizCat boundary (This map was produced by Arc GIS 10.3.1.).

The average annual discharge of the Euphrates is 32 billion cubic meters (bcm). Approximately 90% of the water of the Euphrates is generated in Turkey, whereas the remaining 10% originates in Syria. Iraq makes no contribution to the runoff. As for the Tigris and its tributaries, the average annual discharge is 50 bcm. Turkey contributes approximately 40% of the total annual flow, whereas Iraq and Iran contribute 51% and 9%, respectively. No Syrian water drains into the Tigris. The amount of water carried by the Euphrates–Tigris river system can be said to be reasonably sufficient for various uses by the three riparian countries. However, the physical characteristics of the rivers, coupled with the initiation of major development projects by the riparian states, have put exceeding pressures on the supply of the river system. Hence, excessive demand for more water exacerbates tension in the relations of the riparian states relations with each other [16]

The Euphrates river is composed of two main tributaries: the Karasu and the Murat. Both Karasu and Murat originate in Eastern Anatolia and have numerous smaller tributaries, of which one is the Nizip stream. The study area of NizCat is located within the administrative border of the province of Gaziantep and situated south-west of the EuTiRB-TR (Fig. 3). NizCat is about 1,017 km² (calculated by ArcGIS) in size, and is shorter than the length of the Gaziantep provincial boundary (6,887 km²) [17]. Its water resources consist of Samozu creek, Nizip stream, and Hancagiz Dam. Its total annual rainfall is 380 mm. The total length of Samozu creek and the Nizip stream is approximately 80 km. The Nizip stream is the last major tributary that flows to Euphrates before leaving the border of Gaziantep and Turkey. Its average flow is 1.96 m³/s. Hancagiz Dam is used for irrigation purposes, and its irrigation capacity is 6,945 ha. NizCat comprises Nizip town and 24 villages, and its population is about 119,987 [17].

The general characteristics of NizCat, EuTiRB-TR, and Turkey are given in Table 1. NizCat's contribution to the Euphrates is an average of 61 hm³/y, which is a very low value. The drought and low flows are the problems of this catchment. The agricultural activities and industries here are much more developed. Two organized industrial zones (OIZs), namely, Gaziantep OIZ and Nizip OIZ, and some scattered industrial plants are located in NizCat. There is only one wastewater treatment plant within Gaziantep OIZ for industrial discharges, and many septic tanks for domestic discharges that are spread across rural areas. The phosphorus and nitrogen pollution is substantial. All discharges flow into the Nizip stream, and this situation causes a significant amount of pollution. It is designated as heavily modified water body. The Hancagiz Dam, which is fed by this stream, has been in eutrophic state level [17].

3. Materials and methods

The theoretical, empirical, and pragmatic data were gathered from the literature review and the numerous interviews that were conducted among water authorities, managers, and specialists at the local, provincial, and ministerial level. Representatives of the different water organizations, municipalities in both academic and policy circles were also interviewed. The list of interviewees and research questions are provided in Appendix with detail.

The literature review included peer-reviewed papers, thesis documents, government reports and programs, official documents and basin projects' output, as well as national and international surveys. Official documents covered the related regulations, directives, and action plans, while meeting reports and notes were used to analyze the legal and

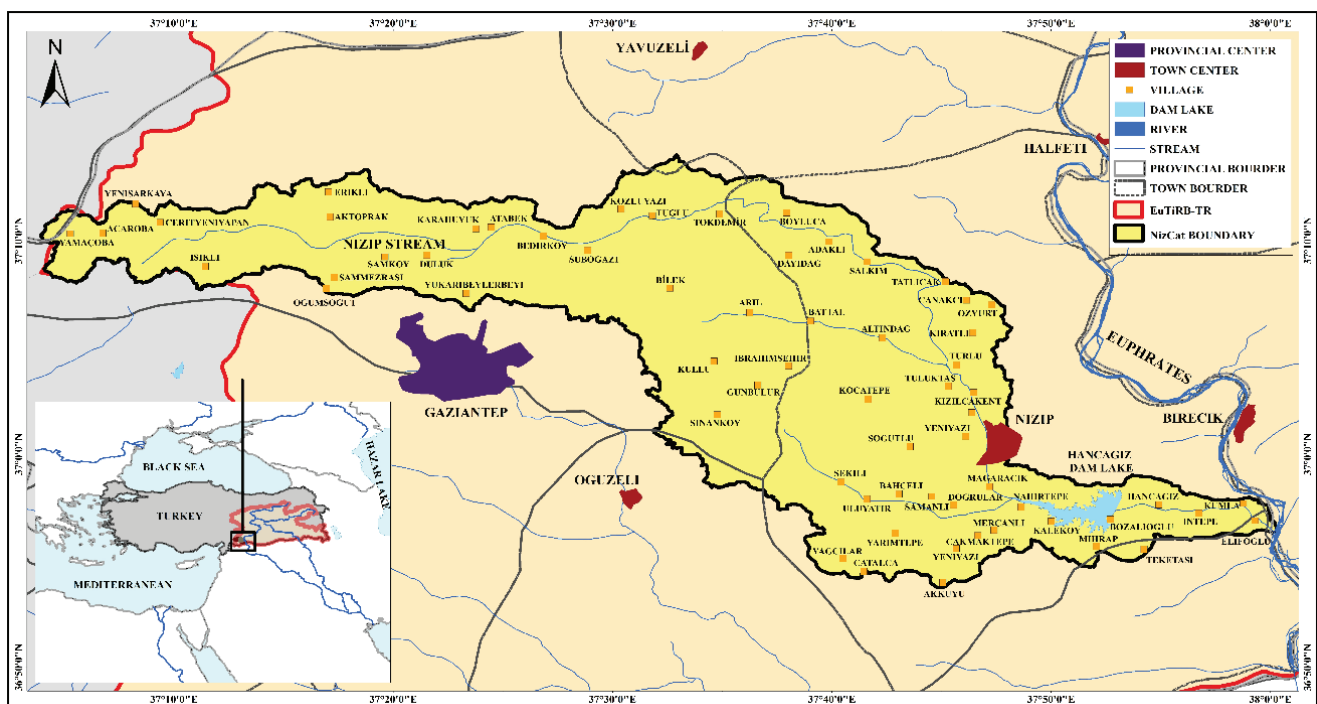


Fig. 3. Map of Nizip stream catchment area (NizCat) (This map was produced by Arc GIS 10.3.1.).

Table 1
The general characteristics of Turkey, EuTiRB-TR, and NizCat [3,4]

Parameters	Turkey	EuTiRB-TR	NizCat
Total population (inhabitants) (2015)	78.7 million	13.6 million	120,000
Surface area or drainage area (km ²)	780,043	177,792	1,017
River length (km)	6,835	1,630	80
Average annual precipitation (mm)	582	569	380
Annual runoff (km ³)	186.1	82	0,62
Water use area	Agricultural, industrial, domestic	Irrigation, hydropower, domestic	Irrigation, domestic

institutional structures and their implementation at the local, basin, and national level. The data collection covers the time period from the 2000s up to now, focusing on the period between 2011 and 2016.

This research examines the details of newly established basin institutions and the implementation of IRBM's principles in the small catchment area of the Nizip stream. It also legally and institutionally assesses the IRBM implementation process. It has benefitted from the output of the "Samozu Creek-Nizip Stream Catchment Area Waste Water Action Plan Project," which was prepared by TAGEM (Technology Research and Development Company) on behalf of the General Directorate of Water Management (GDoWM) under the Ministry of Forest and Water Affairs (MoFWA). After assessing the current policy, and legal and institutional structures, new basin institutions in accordance with WFD and IRBM principles were recommended. Also, new discharge standards within the boundary of the NizCat area, instead of sectoral discharge standards, were decided to propose according to the current ecological and chemical condition of NizCat.

4. The existing situation of Turkish water policy, legislative and institutional structures

4.1. Turkish policy

The Turkish water policy has undergone continuous reforms since the middle of the 20th century. The studies of harmonization with the EU started when Turkey was officially recognized as a candidate for full membership in 1999 at the Helsinki summit of the EC. It gained momentum when an environmental chapter was opened in the process of EU accession in 2009. The general principles and priorities in medium- and long-term policies are specified in the Turkish development plans.

Turkey has five transboundary basins and is both a down-riparian and the upper-riparian country. The fundamental principles of Turkish policy for transboundary waters, defined by the Ministry of Foreign Affairs (MoFA) and in accordance with EU policy, are equitable, rational, and efficient. They include the sharing of benefits through cooperation among riparian states, and not causing significant harm to downstream countries [12].

The EuTiRB-TR is accepted as "two rivers in one river basin boundary" in the context of transboundary water policy. It has been evaluated that the total water potential of these two river basins is sufficient for the needs of three riparian countries. Turkey has been ready to negotiate with all

the aspects of the Euphrates and Tigris Rivers, and devised a plan called the three-staged plan, for optimum, equitable, and reasonable utilization of the Euphrates–Tigris Basin since 1990. This plan aims to achieve a solution satisfactory to all parties [18].

4.2. Legislative and institutional structures in Turkey

Turkey has complicated legislative and institutional structures on water and environment areas. Many studies have been carried out with the purpose of strengthening them. The most important improvements were realized during the EU accession period in 2009 up to now. WFD for achieving the environmental objectives is the most relevant directive, which demands both the requirement for national water management and the obligation for EU members to internationally plan their activities according to IRBM principles.

Before the harmonization process of EU regulations, sectoral approaches to water and environment management dominated and are still prevailing. Moreover, the activities related with them are centrally planned and managed. This leads to fragmented and uncoordinated management of the resources. The concept of IRBM has changed gradually from centralization to decentralization, and brought about coordination and collaboration among the individual sectors. It has also led to stakeholder participation. These changes should be supported by laws and regulations [6].

The Turkish legislative structure in water and environment consists of a number of laws, regulations, communiqués, and circulars, which were listed by the study of Delipinar and Karpuzcu (2017) [19]. The most important act is Turkish Environmental Law which highlights the "Sustainable development and sustainable environment" concepts and "polluter pays" principle. As is widely known, these concepts are the main objectives of the IRBM approach. WFD has been transposed into Turkish legislation with the execution of the "Regulation on the Preparation of the River Basin Protection and Management Plans (RBPAPs) and River Basin Management Plans (RBMPs)" in 2012. After the RBPAPs for 25 river basins in Turkey were prepared in compliance with this directive, the preparation RBMPs was initiated. The basin institutions were established and their responsibilities/roles were defined in the "The Communiqué of River Basin Management Committees' Formation, Duties and Working Procedures and Principles" directive that was published in 2015. Furthermore, the "Regulation on the Protection of Drinking-Water Sewer Basins" prepared by the GDoWM was published in the Official Gazette dated on October 28, 2017 and numbered 30224. National Basin Management Strategy

(2014–2023), Strategic Plan (2017–2021), and National Drought Management Strategy Document and Action Plan (2017–2023) have been already prepared. These regulations and strategy documents were especially significant during the implementation period of IRBM.

The draft legislations are mentioned in Table 2. When the Water Act enters into force, one of the most important advancements will be ensured in the transposition of EU legislation. Studies based on the legislative and institutional aspects of river basins gained momentum in 2009, with the opening of the environment chapter in the process of EU accession. This new Water Law will provide for the following:

- Clarifying the entitlement and responsibilities of users and water providers;
- Clarifying the roles of the state in relation to other stakeholders;
- Formalizing the transfer of water allocations;
- Providing legal status to water management institutions of government and water user groups;
- Ensuring sustainable use of the resource. Bringing some of the principles of IRBM into a water sector policy and achieving political support may be challenging, as hard decisions have to be made.

The existing institutional framework in Turkey consists of three levels: decision-makers, the executive, and end users [6]. The prime ministry and related ministries are the decision-makers. Governmental institutions belong to the executive level, and their regional or provincial directorates across the country exist at the local level [20].

There are many governmental actors in the spheres of water and environment, namely, MoFWA, the Ministry of Environment and Urbanization (MoEU), MoFA, the Ministry of Food, Agriculture and Livestock, the Ministry of Energy and Natural Resources, the Ministry of Health (MoH), the Ministry of Interior Affairs, and the Ministry of Public Works and Settlement. The General Directorate of State Hydraulic Works (GDoSHW) and the Bank of Provinces also have specific water and environment management tasks [6,19,21].

MoFWA is the main governmental institution responsible for water management in Turkey. It organizes and coordinates national water management through several general directorates, departments, and services functioning within the system of the ministry. MoFWA, established on June 4, 2011, was appointed as the authority responsible for producing and coordinating RBMPs across the Turkish territories and reporting to the EC. Therefore, the studies that legally and institutionally assessed basin-based management gained momentum. It has been working to fulfill its responsibilities

in relation to water, forestry, nature protection, meteorology, erosion, and desertification control [19].

The ministry of environment was established in 1991. It was then combined with the Ministry of Public Works under MoEU, which has continued its activities on environment, public works, and urban planning since 2011. The GDoWM, as one of the main service units of MoFWA, is responsible for ensuring the coordination between institutions/organizations and water users in the basin boundary, preparation of RBMPs, establishment of the participated IRBM structures, and harmonization with EU legislation [22]. GDoSHW, as primary executive and investor institution under MoFWA, has 26 regional directorates [23]. Although its regional borders show similarity with the river basin boundaries of Turkey, they are not identical. Turkish Water Institution is a public institution established in the accession period. It is a think tank under the authority of MoFWA, whose vision is to develop national policies, and short- and long-term strategies. It also endeavors to achieve better water governance. Delipinar and Karpuzcu [19] elaborated the roles and responsibilities of other existing water- and environment-related organizations. According to this research, the multi-headed and fragmented structures regulating water and environment are still functioning.

4.3. New current basin organizational structure of the Nizip stream catchment area

As mentioned above, basin organizations were constituted and defined in a communique published on Official Gazette dated May 20, 2015, Nr.29361. According to this communique, the new basin current structure is schematized for the Nizip stream catchment area in Fig. 4.

As shown above, the new basin organizations have been structured at national, river basin, and provincial levels. These arrangements have provided for the participation of related public and private institutions, NGOs, universities, and water associations. At the national level, the Basin Management Central Board (BMCB) has been founded under MoFWA, and its president is the undersecretary of MoFWA. Its duties comprise coordination between the water-related institutions responsible for the preparation of RBMPs and drought/flooding plans; following improvements in the context of National Basin Management Strategy; and coordination between stakeholders in the studies of specific provisions determining drinking and tap water.

At the basin level, the Euphrates–Tigris River Basin Management Committee (EuTiRBMC) has been established and its responsibilities are defined as follows: to ensure and

Table 2
Draft legislation on water and environment

-
- Water Law (already sent to Prime Ministry for approval)
 - Draft Regulation on Control and Reduction of Loss of Water Use in Agricultural Operations
 - Draft Regulation on Irrigation Water Quality and Reuse of Used Water
 - Draft Regulation on Preparation of Water Tariff
 - Draft National Flood Management Strategy Document and Action Plan
 - Draft Directive of Protection of the Bathing Water
 - Draft Integrated Pollution Prevention and Control Regulation (96/61/EC)
-

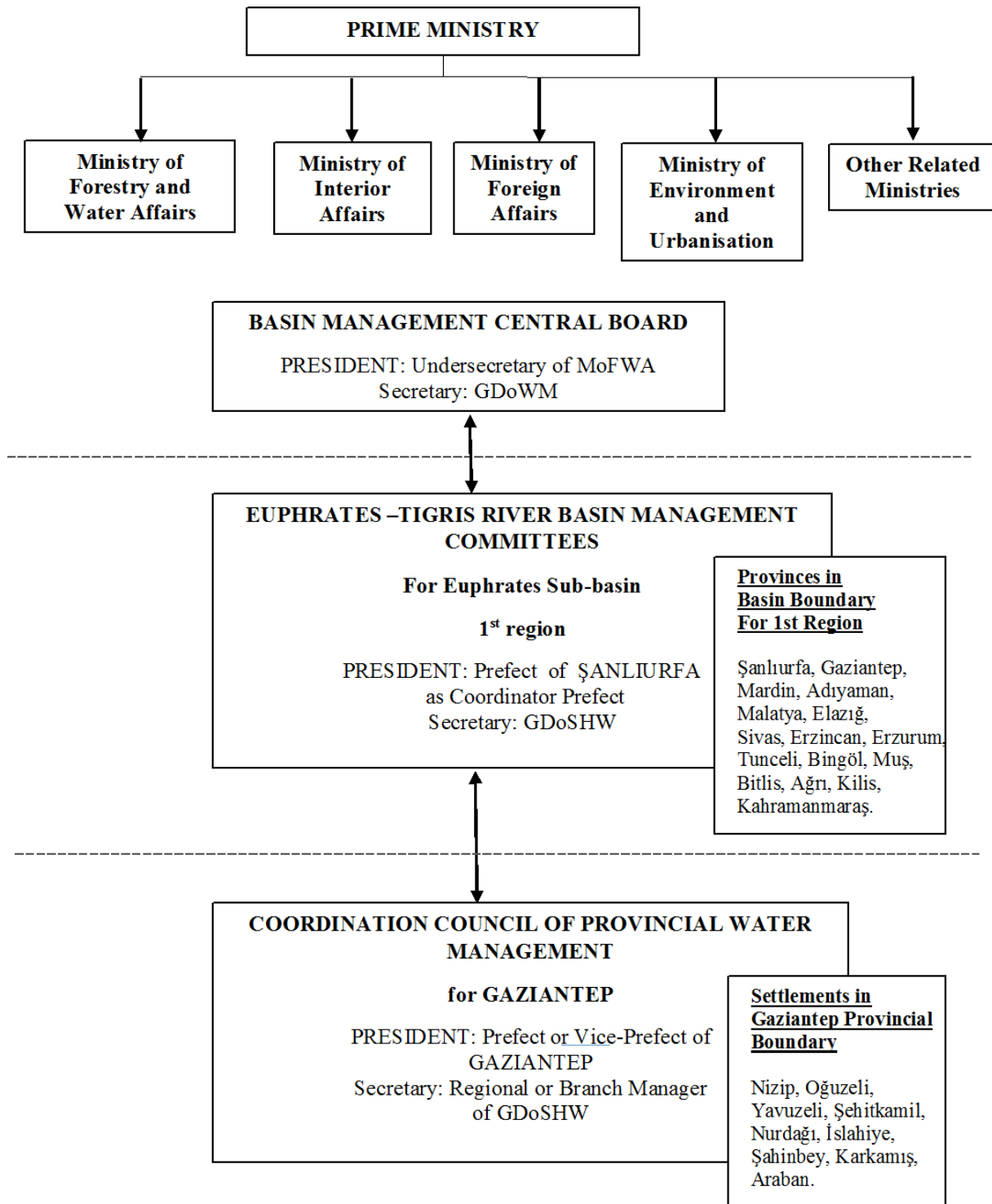


Fig. 4. Organizational structure of water management at the river basin scale in the example of Nizip stream catchment area (Account to Turkish Official Gazette dated on May 20, 2015, no. 29361).

coordinate related actions on the preparation of RBPAPs and RBMPs with drought and flooding management reports, monitor their implementation, and ensure active stakeholder participation within the boundary of EuTiRB. EuTiRB possesses a huge surface area. Therefore, the area of EuTiRB would be managed as two sub-basins. EuTiRBMC was

divided into two basin management committees, namely, Euphrates as 1st sub-basin and Tigris as 2nd sub-basin. NizCat is located at the Euphrates sub-basin side, which covers 16 eastern provinces including Gaziantep (Fig. 4). The prefect of Şanlı Urfa, defined as coordinator prefect, was appointed as president by MoFWA.

Because NizCat is located at the Gaziantep provincial boundary, it is managed by the Coordination Council of Provincial Water Management for Gaziantep (CCPWMGa) whose duties are to provide the implementation of above-mentioned plans and tasks in its province. This council meets on February, May, and October each year and presents its report to EuTiRBMCs whose meetings are scheduled twice a year, similar to BMCB. GDoSHWs' regional directorates have secretarial duties for meetings of Coordination Council at provincial level, and Basin Management Committee at river basin level.

NizCat's water resources are classified as "Heavily Modified Water Body" which stems from Gaziantep OIZ, Nizip OIZ, and agricultural and domestic discharges. There are some discharge standards for controlling water quality and pollution, and they are published by both MoFWA and MoEU. This situation causes confusion and a loss of control.

5. Results and discussion

In Turkey, there are many regulations and institutions handling water and environment management. Turkey is relatively large country, so it is only normal for it to have multiple institutions. But it should be ensured that organizations with similar functions and tasks operate under one roof. As mentioned above, some duties and responsibilities of the current institutions have overlapped. This causes duplication. For example, legislation harmonization studies in the field of water and environment are carried out by various organizations (MoFWA, MoEU, MoH, and GDoSHW).

Water and environment affairs are managed under different ministries in Turkey. This situation causes difficulties in the execution of water and environment works in terms of the complexity and duplication of duties and responsibilities. For instance, some legislations on water published by both MoFWA and MoEU led to chaos and loss of control. Case in point: the "Water pollution control regulation (OG. 2004/25687)" implemented by MoEU and the "Regulation of Surface Water Quality Management (OG. 2012/28483)" implemented by MoFWA. Their standards and values are different from each other. This and similar cases led to confusion and disputes in authority. These two ministerial affairs are in tight relationship with each other, because water is a component of the environment. In order to provide integration and coordination successfully, there should be a merger of water and environment affairs under the same ministry.

IRBM is mandatory for EU member states and recommended for non-EU countries. Turkey has already begun to implement IRBM approach for water resources since the 2000s for harmonization with EU as well as coming up with a solution for the abovementioned problems. GDoWM, under MoFWA, has been appointed for the execution and coordination of the basin wide legal and institutional studies since 2011.

Turkey has some cross-border and bordering rivers because it is located at a focal point of regional balance. The future will be shaped by these waters through regional balances. With the IRBM approach, the fair and rational use of transboundary waters should be provided by the riparian countries. The implementation of IRBM in transboundary waters, especially for EuTiRB, would be very critical and difficult for the riparians, keeping in mind their current

political, administrative, and socioeconomic conditions. NizCat has very small area in EuTiRB, however, so it has ignorable contribution to Euphrates and Tigris rivers, and its environmental activities caused minimal impact with respect to transboundary conditions. For these reasons, it has not been addressed in terms of transboundary river basin management in this article.

6. Conclusions and recommendations

Institutional arrangements based on river basins in Turkey were established for a period of 3 years and their structures were revised in 2015. In the context of these arrangements, three new organizations based on IRBM principles were established at national, river basin, and provincial levels. Their roles, power, and responsibilities were defined, and they began work. At the national level, BMCB is top executive and coordinator organization for all river basins. Its duty and responsibility areas should be extended to cover both water and environment affairs. The River Basin Management Committees for each of the 25 basins, and the Coordination Council of Provincial Water Management for 81 provinces, were founded in Turkey. These two organizations were examined for the case of NizCat. At river basin and provincial level, EuTiRBMC and CCWMGa, as indicated above, are generally formed from the representatives of public institutions, namely prefects, mayors, managers, and experts of related ministries. If required by the board of CCPWMGa, the representatives of the private sectors, irrigation cooperatives, universities, NGOs, and experts may be invited without voting rights. Although participation has been provided for, as defined in WFD, by these arrangements, there is no consensus on who will voice concerns focused on local problems at catchment level. EuTiRBMC, as a decision-making and a strong coordinator institution in river basin level, should be redefined as an autonomous and self-budgeted institution. It is proposed that its financial resources may be obtained from the penalty devolution of MoFWA.

When these new basin institutional arrangements, as mentioned above, are evaluated, the following findings are obtained:

- They have no human and financial resources,
- Their role is not clear,
- They have poor recognition between stakeholders,
- There is insufficient cross-sectoral coordination and cooperation, and
- There is short active involvement of private organizations, water users, other than public institutions.

Moreover, when these organizations are established, the principles of participation, coordination, and cooperation are provider for, but there still is a need to improve these organizations, for example, they should be legally strengthened; their functions (e.g., supervising, decision-making, and execution) should be separated; and institutional coordination and participation at all levels should be promoted.

NizCat is managed by only CCPWMGa at provincial level because it falls only under the purview of the Gaziantep Provincial Boundary, although provincial borders are generally different from basin, sub-basin, and catchment boundaries. In NizCat boundary, water resources are classified as

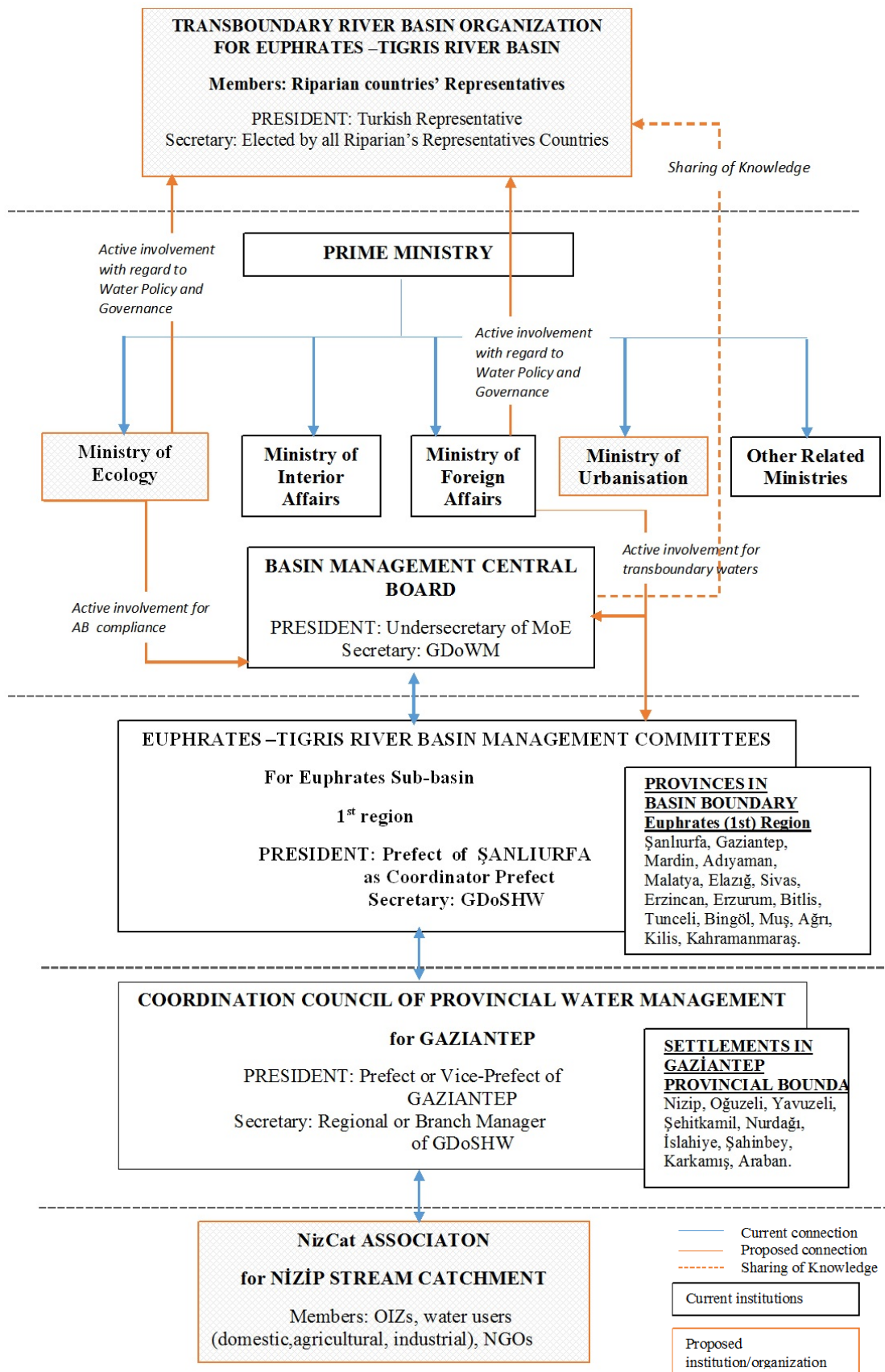


Fig. 5. Proposed organizational arrangements for IRBM in EUTiRB in Turkey.

“Heavily Modified Water Body”. In order to achieve the good status of water, there are some discharge standards published by both MoFWA and MoEU for controlling water quality and pollution. This situation causes disputes, confusion, and loss of control, at both legal and institutional levels. Since increase in water quality cannot be ensured by the existing discharge standards, so there is a need for “the specific receiving environment standards” at basin level.

Taking into account the intense agricultural and industrial activities in NizCat, a proposed new structure, called NizCat Association (NizCatAss), is required at the catchment level in order to minimize wastewater quantity, defend related stakeholders’ water use rights, protect environment and water pollution, and put forth new investment needs. It is recommended that the duties and responsibilities of NizCatAss should be defined as follows:

- It should have responsibility to take all preventive action in prevent-use balance, and prepare water use plan and water budget with respect to the development trends of sub-basin scale. It should audit the suitability of this sub-basin plan with municipalities’ reconstruction plans.
- It should coordinate water and wastewater infrastructural investment facilities and support the municipalities and have authority to make research and monitor.

In the light of above information, at national level in Turkey, the water and environment affairs should be merged under the same ministry, namely, the Ministry of Ecology. At the river basin level of Euphrates and Tigris level, the management of EuTiRB according to Turkish policy, WFD and IRBM principles, a top board representation at the ministerial level with the participation of riparian countries, namely, Syria, Iraq, and Iran, was proposed. For perspectives at all levels, the proposed new organizational arrangements are given in Fig. 5.

According to this perspective, the general conclusions are: IRBM in Turkey has focused on the integrated water resources management; there are, still, fragmented legal and institutional structures and many different actors who are responsible for performing the water management functions; and the execution process of IRBM is both time-consuming and ongoing.

It could be said that IRBM is a lengthy journey, not a result.

Acknowledgment

This study used some data that were obtained from the project, namely, “Project of Samozu Creek—Nizip Stream Catchment Area Waste Water Action Plan,” which was executed by TAGEM Co. on behalf of GDoWM, one of the affiliated organizations of MoFWA.

Abbreviations

BMCB	—	Basin Management Central Board
CCPWMGa	—	Coordination Council of Provincial Water Management for Gaziantep
EC	—	European Commission
EU	—	European Union
EuTiRB	—	Euphrates–Tigris River Basin

EuTiRB-TR	—	Euphrates–Tigris River Basin boundary in Turkey
EuTiRBM	—	Euphrates–Tigris River Basin Management Committee
GDoSHW	—	General Directorate of State Hydraulic Works
GDoWM	—	General Directorate of Water Management
IRBM	—	Integrated River Basin Management
MoEU	—	Ministry of Environment and Urbanization
MoFA	—	Ministry of Foreign Affairs
MoH	—	Ministry of Health
NizCat	—	Nizip Stream Catchment Area
NizCatAss	—	Nizip Stream Catchment Area Association
OIZ	—	Organized Industrial Zone
RBMPs	—	River Basin Management Plans
RBPAPs	—	River Basin Protection and Management Plans
WFD	—	Water Framework Directive

References

- [1] GWP, Integrated Water Resources Management TAC Background Paper, Global Water Partnership (GWP) Technical Advisory Committee (TAC), 2000. Available at: <https://www.gwp.org/globalassets/global/toolbox/publications/background-papers/04-integrated-water-resources-management-2000-english.pdf>.
- [2] T. Jones, P. Newborne, B. Phillips, Applying the Principles of Integrated Water Resource and River Basin Management—An Introduction, A Report to WWF_UK, 2006, pp. 1–36. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwiLhIS56zNAhVEzXQKHTkxDgkQFggiMAA&url=http%3A%2F%2Fassets.panda.org%2Fdownloads%2Fapplying_the_principles_of_integrated_water_resource_and_river_basin_management_.
- [3] A.K. Biswas, Integrated water resources management: a reassessment, *Water Int.*, 29 (2004) 248–256.
- [4] G.D. Gooch, P. Stålnacke, Integrated scenarios—the key for successful water and river basin management, *Proc. 7th International Water, Diffuse Pollution Conference, Dublin*, 2003, pp. 20–24. Available at: http://www.ucd.ie/dipcon/docs/theme02/theme02_05.PDF.
- [5] S. Sözen, E. Avcioglu, A. Ozabali, E. Görgun, D. Orhon, European Union Water Policy—Tasks for Implementing “Water Framework Directive” in Pre-accession Countries, *J. Environ. Sci. Health, Part A*, 38 (2003) 1401–1410.
- [6] M.E. Baris, A.A. Karadag, Water resources management issues in Turkey and recommendations, *J. Appl. Sci.*, 7 (2007) 3900–3908.
- [7] A. Kibaroglu, V. Sumer, Diverging water management paradigms between Turkey and the European union, *Water Int.*, 32 (2007) 739–749.
- [8] A. Kibaroglu, A. Kramer, W. Scheumann, *Turkey’s Water Policy*, Springer, 2011.
- [9] K. Kemper, A. Dinar, W. Blomquist, Institutional and Policy Analysis of River Basin Management Decentralization: The Principle of Managing Water Resources at the Lowest Appropriate Level—When and Why Does It (Not) Work in Practice?, *The World Bank*, Washington, USA, 2005.
- [10] European Community, Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, *Off. J. European Parliament*, L327 (2000) 1–82. doi:10.1039/ap9842100196.
- [11] TSI, Turkey in Statistics Report 2014, 2015. Available at: http://www.tuik.gov.tr/Kitap.do?metod=KitapDetay&KT_ID=0&KITAP_ID=5.

- [12] MoFA, Turkey's Policy on Water Issues, Ministry of Foreign Affairs, 2016. Available at: http://www.mfa.gov.tr/turkey_s-policy-on-water-issues.en.mfa (Accessed 9 May 2016).
- [13] FAO, Aquastat—Euphrates and Tigris River Basin, Food and Agriculture Organization of the United Nations (FAO), 2016 pp. 1–10. Available at: <http://www.fao.org/nr/water/aquastat/basins/euphrates-tigris/index.stm> (Accessed 10 December 2016).
- [14] Ministry of Development Turkey, Turkish The Tenth Development Plan 2014–2018, Ankara, 2014. Available at: [http://www.mod.gov.tr/Lists/RecentPublications/Attachments/75/The%20Tenth%20Development%20Plan%20\(2014-2018\).pdf](http://www.mod.gov.tr/Lists/RecentPublications/Attachments/75/The%20Tenth%20Development%20Plan%20(2014-2018).pdf).
- [15] O.D. Elvan, Integrated Water Resources Management work in the Euphrates and Tigris River-Basin, *Sci. Res. Essays*, 7 (2012) 4160–4169.
- [16] A. Kibaroglu, I.H.O. Ünver, An institutional framework for facilitating cooperation in the Euphrates-Tigris River Basin, *Int. Negot.: J. Theory Pract.*, 5 (2000) 311–330.
- [17] TAGEM, Samözü Creek-Nizip Stream Catchment Action Plan Report (Samözü Deresi-Nizip Çayı Havzası Atıksu Eylem Planı-Nihai Proje Raporu), 2015.
- [18] S. Yalcinkaya, The Euphrates and Tigris Rivers Basin, University of Texas Austin, Texas, 2010, pp. 1–13.
- [19] Ş. Delipinar, M. Karpuzcu, Policy, legislative and institutional assessments for integrated river basin management in Turkey, *Environ. Sci. Policy*, 72 (2017) 20–29.
- [20] A.A. Ünal, A.H. Sargin, H. Özlü, H. Gündoğdu, M. Köktaş, Ö. Şenol, S. Donma, S.Y. Özkaya, Turkey Water Report, General Directorate of State Hydraulic Works, 2009, p. 52.
- [21] M. Moroğlu, M.S. Yazgan, Implementation of EU Water Framework Directive in Turkey, *Desalination*, 226 (2008) 271–278.
- [22] MoFWA, Ministry of Forestry and Water Affairs, 2016. Available at: <http://www.ormansu.gov.tr/osb/AnaSayfa.aspx?sflang=tr> (Accessed 3 April 2016).
- [23] SHW, Organizational Schema of General Directorates of State Hydraulic Works, 2016. Available at: <http://www2.dsi.gov.tr/english/bolgelere.htm> (Accessed 10 May 2016).

Appendix

List of interviews; formal/informal communication.

- Prime Ministry; Chief Advisor, December 5, 2016
- Ministry of Forest and Water Affairs, General Directorate of Water Management; General Manager, December 5, 2016
- Ministry of Forest and Water Affairs, General Directorate of Water Management; Head of Basin Management Department and Branch Manager of Basin Planning, February 4, 2016
- Ministry of Environment and Urbanization; Undersecretary and General Manager of EIA (Environmental Impact Assessment), October 20, 2015
- Ministry of Science, Industry and Technology; Gaziantep Provincial Manager, November 27, 2015
- Village Reeves, November 3, 2015
- General Directorate of Gaziantep Meteorology; Provincial Manager, August 20, 2015
- Gaziantep Metropolitan Municipality; Vice President, September 1, 2015 and Head of Urban Planning Administration, August 19, 2015
- 20th Regional Directorate of State Hydraulic Works; Manager, August 19, 2015
- Gaziantep Peanut Research Institute; Manager, August 18, 2015
- Gaziantep Environment and Urban Provincial Offices; Provincial Manager, August 18, 2015 and October 15, 2015, Branch Manager EIA, August 6, 2015;
- Nizip Municipality; Branch Manager of Urban Planning, August 6, 2015
- Regional Directorate of Gaziantep Organized Industrial Zone (GAOIZ); Regional Manager, August 5, 2015
- Directorate of Gaziantep Water and Sewage Administration; General Manager, July 29, 2015 and August 5, 2015

Interview questions:

- We know that many studies have been conducted for the adaptation of the river basin management. Are the current studies sufficient and efficient during the transition process of basin management?
- What are the challenges that you face?
- What is the planning with regard to future studies on basin management with respect to institutional and legislation?
- What is your opinion on the evaluation of this process?
- Do you think that coordination and cooperation are carried out efficiently? What else could be done?