

INTEGRATED RIVER BASIN MANAGEMENT:
A CASE OF BÜYÜK MENDERES RIVER BASIN

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A CASE OF BÜYÜK MENDERES RIVER BASIN**

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ABSTRACT

INTEGRATED RIVER BASIN MANAGEMENT: A CASE OF BÜYÜK MENDERES RIVER BASIN

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The aim of the thesis is to examine the Integrated River Basin Management (IRBM) Planning approach and to evaluate the applicability of this approach in Turkey in terms of planning tools as well as legal and institutional aspects. As a particularly suitable form of implementation of Integrated Water Resource Management (IWRM) paradigm, IRBM is recognized as the most appropriate tool in the international arena for sustainable use of water resources through the integration of water planning and management with socio-economic development and environmental concerns. In this framework, the thesis is organized in two major parts. The first part focuses on the theoretical framework of IRBM with regards to its definitions, principles and implementation tools. The second part, meanwhile, examines the implementation of IRBM planning in Büyük Menderes River Basin within the scope of its success in the interpretation of the IRBM planning as well as the compatibility of national legal, institutional and planning framework to IRBM process. Despite the inadequacies in the water-related legal and institutional frameworks and ill-defined hierarchical position in planning system, the Büyük Menderes River Basin Management Plan can be regarded as one of the successful examples of IRBM implementations with its participation level and a new organizational structure. Since it is the first and only IRBM planning process in Turkey, it can offer an insight to prospective management and planning practices in other river basins.

Keywords: Sustainability, River Basin, Integrated Approach, Integrated River Basin Management, Büyük Menderes River Basin

ÖZ

ENTEĞRE NEHİR HAVZA YÖNETİMİ: BÜYÜK MENDERES NEHİR HAVZASI ÖRNEĞİ

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Tezin amacı, Entegre Nehir Havza Yönetimi Planlaması yaklaşımını incelemek ve bu yaklaşımın Türkiye'de uygulanabilirliğini planlama araçlarının yanı sıra yasal ve kurumsal yapı çerçevesinde değerlendirmektir. Entegre Su Kaynakları Yönetimi paradigmasının uygulanabilir şekli olan Entegre Nehir Havza Yönetimi, uluslararası ölçekte, su planlama ve yönetiminin sosyo-ekonomik kalkınma ve çevresel kaygılar ile entegrasyonu yoluyla su kaynaklarının sürdürülebilir kullanımını sağlayabilecek en uygun araç olarak kabul edilmektedir. Bu çerçevede, tez iki temel bölümde incelenmiştir. Birinci bölümde, Entegre Nehir Havza Yönetiminin teorik çerçevesi, yaklaşıma ilişkin tanımlar, prensipler ve uygulama araçları kapsamında ele alınmıştır. İkinci bölümde ise, Entegre Nehir Havza Yönetimi Planlamasının Büyük Menderes Nehir Havzasında uygulanışı, yaklaşımın yorumlanmasındaki başarı ölçüsü ile ülkemizin yasal, kurumsal ve planlama yapısının Entegre Nehir Havza Yönetimi Planlaması sürecine uyumu açısından incelenmiştir. Türkiye'de su ile ilgili yasal ve kurumsal çerçevenin yetersiz olmasına ve Entegre Nehir Havza Yönetimi Planlarının planlama hiyerarşisi içinde tanımsız olmasına karşılık, Büyük Menderes Nehir Havzası Yönetim Planı katılımcılık düzeyi ve oluşturduğu yeni bir teşkilat yapısı ile Entegre Nehir Havza Yönetimi uygulamalarının başarılı örneklerinden biri sayılabilir. Türkiye'deki ilk ve tek Entegre Nehir Havza Yönetimi planlaması süreci olması nedeniyle diğer nehir havzalarında yapılacak olası yönetim ve planlama uygulamaları için bir fikir sunabilir.

Anahtar Kelimeler: Sürdürülebilirlik, Nehir Havzası, Entegre Yaklaşım, Entegre Nehir Havza Yönetimi, Büyük Menderes Nehir Havzası

To my family

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LIST OF ABBREVIATIONS

BRB	Brantas River Basin
EU	European Union
DRB	Danube River Basin
ICPDR	International Commission for Protection of Danube River
IRBM	Integrated River Basin Management
IWRM	Integrated Water Resource Management
JPM	Joint Programme of Measures
MDRB	Murray-Darling River Basin
RBMP	River Basin Management Plan
SHW	State Hydraulic Works
WFD	Water Framework Directive

CHAPTER 1

INTRODUCTION

1.1. OBJECTIVE OF THE STUDY

Freshwater ecosystems provide numerous functions and uses to humans and other species. These ecosystems make water available to support human lives by providing the essential basis for key economic sectors. Additionally, the socio-economical importance of these aquatic systems is derived from their role in maintaining natural functions. However, freshwater ecosystems are under severe threat throughout the world due to the pressure of pollution, drainage, dam construction and other human activities. These pressures cause significant destruction and degradation, which leads to inability of these systems to function in natural way and to provide the goods and services upon which so many people depend. This situation becomes more serious since it is realized that freshwater is a scarce commodity. Therefore, it is crucial to find a way for wise use and protection of water resources in order to ensure the access of next generations to affordable and safe water. However, conventional water resources planning and management approaches based on point problem solving method remain insufficient to solve water-related problems due to the increasing interconnectedness of water issues with other economic, social, environmental, legal and political issues. This situation requires a new water management approach, which is more comprehensive and flexible to cope with complex water-related problems. Within this framework, Integrated Water Resource Management (IWRM) has been offered as a solution to these problems due to the fact that it is holistic approach in which all relevant issues are inclusively considered in decision making and planning processes. However, IWRM planning comes short of spatial emphasize, which leads to uncertainties in its implementation process. In this regard, Integrated River Basin Management (IRBM) has come to international agenda as a particularly applicable form of IWRM paradigm for delivering sustainable use of the world's limited freshwater resources since it is popular wisdom that river basins are the most appropriate scale for taking strategic decisions about water management.

This thesis aims at evaluating the legal, institutional and planning frameworks of river basin management in Turkey and assessing the regulations and structuring within EU harmonization process. The analyses of IRBM planning practices in the world follow the case study from Turkey. All of these IRBM projects are analyzed in terms of IRBM principles, tools and success levels. Within this scope, these two groups of questions should

be answered through examining the theory and processes of the IRBM planning, and exemplifying in “Büyük Menderes River Basin Management Planning” case study:

- IRBM is a process that involves evolutionary cycles, formed by the phases, i.e., assessment and problem identification, planning, implementation and evaluation. Are the evolution phases of international IRBM practices examples of IRBM processes?
- In each IRBM practice, what kind of aspects has contributed to the development of IRBM process?
- Is Büyük Menderes River Basin Management Plan also a IRBM process that develops under the regulations and restructuring of water-related laws and institutions as well as planning tools.
- Is Turkey in a position to develop new water-related policies to comply with the EU policies?
- What kind of regulations and adaptations have been addressed in water-related legislation and institutions after Turkey gained the EU candidate status?
- What are the effects of EU Water Framework Directive - integrated river basin management for Europe on Turkish legislative and institutional system?

In relation to these research questions, the case study hypotheses are as follows:

1) IRBM is an iterative, evolutionary and adaptive implementation process, shaped according to the changes in economic and social goals. Büyük Menderes River Basin Management Plan is a cycle of IRBM process in progressive attempt to adapt to changing demand and needs.

2) Turkish legislative and institutional frameworks related to water systems have been regulated and restructured under the effects of EU accession negotiations.

In order to scrutinize these research questions and test our hypotheses, the chapters of the thesis are organized as follows:

Chapter 2 examines why an integrated approach is needed for water resources management and how the water resources management has evolved throughout history until IWRM was suggested as the main management approach for achieving sustainable development. After analyzing the definitions, and principles of IWRM, we examine the evolution of river basin management and IRBM with its principles that are derived by the review of IRBM literature and by the conducted case studies.

Chapter 3. A theoretical framework is given about IRBM planning through explaining its basic tools, i.e. operational management, river basin planning and monitoring, legal and institutional framework. Additionally, it is examined within this chapter how IRBM planning approach is implemented in different parts of world and an evaluation of the practices is given in respect to their management and planning processes and their institutional and legislative mechanisms.

Chapter 4 analyzes water-related institutional and legal structures, planning tools and water resources planning experiences in Turkey. As a means of these analyses, this chapter aims at understanding whether the existing institutional, legal and planning structure of Turkey is adaptable for IRBM and EU Water Framework Directive; and whether Turkey has developed new water-related policies to comply with the EU policies. These evaluations will provide us a background for the case study of Turkey.

Chapter 5 deals with Büyük Menderes River Basin Management Planning as a case study in Turkey. Firstly, the overall features and general characteristics of river basin are presented in order to be closely acquainted with it. Secondly, the problems and the planning history of the basin are explained for justifying the need for implementation of IRBM. Finally, two pioneer projects, i.e. Büyük Menderes River Basin Management Plan- Implementation of the EU Water Framework Directive in Turkey; and Capacity Building Support to the Water Sector in Turkey. The objectives, main components, management and planning processes and public participation activities of both projects are evaluated in order to conceive the evolutionary process in Büyük Menderes River Basin. Therefore, the case study contributes to comprehend key successes and basic deficiencies in the implementation of IRBM Projects in Turkey and provides a basis for the comparison with international IRBM practices.

Finally, in the **Chapter 6**, certain concluding remarks and recommendations are determined under the light of case study questions and hypotheses.

1.2. METHOD OF THE STUDY

In order to answer the research questions and test the hypotheses of the thesis, following methodological steps have been taken. ‘Case study’ approach is used as a research methodology for the review of the tools used in river basin planning process. Data gathering and document analyzing are used as research methods within the thesis. In this context, variety of databases regarding to river basin planning and management are examined deeply. In other words, literature review has been done related to integrated river basin planning and management, IRBM practices from the world, water related institutions and legislation with planning tools of Turkey. Büyük Menderes River Basin Management Plans which was prepared within the projects of “Implementation of the EU Water Framework Directive in Turkey” and “Capacity Building Support to the Water Sector in Turkey” have provided great contribution to the study. Eventually, the evaluations and recommendations have been defined in view of the researches.

1.3. SELECTION CRITERIA FOR THE CASE STUDY

Büyük Menderes River Basin, one of the 25 river basins of Turkey, is an important water resource in the Aegean Region with a vast area of 24.873 km² and an irrigation area of 1.732 km². It covers some territories of ten cities and 185 municipalities. It hosts 2,5 million people representing three per cent of Turkey’s population. It matters high economic, social and

environmental value for the region. Furthermore, the Büyük Menderes river basin is home to many highly valuable ecosystems which support unique habitats for a rich flora and fauna. Due to their high biological diversity and significant hydrobiological characteristics, some of the basin areas designated as national park, natural park, specially protected environmental area, wildlife protection area have received protection status. Additionally, it provides broad diversity of economic activities and land use, which involves several settlements and a wide array of agricultural, industrial, forestry, mining, recreational and tourism activities. However, these sectors create severe pressure on the Büyük Menderes River Basin, which causes a dramatic reduction in the habitats and biodiversity as well as many of the environmental services. Additionally, this huge usage of the basin brings another basic problem of the basin which is the conflicts between stakeholders. Since the coordination, collaboration and communication between these stakeholders cannot be provided, the basin cannot be managed in a proper way. In order to eliminate these problems, an integrated river basin management planning process is conducted in Büyük Menderes river basin.

As a result, the planning process of Büyük Menderes River Basin Management is selected as a case study to be analyzed in order to review of the policy changes and new tools developed in river basin management and planning in the EU harmonization process. The main reason why basin management and planning in Büyük Menderes River Basin is chosen as a case study of thesis is that it is the first river basin management plan conducted in Turkey and developed under implementation process of the EU Water Framework Directive in Turkey. The results and evolutionary process of the project basin will be used as an example for the other basins and it shows a good example of social conflicts between participatory groups, which tries to resolve these conflicts through an integrated and participatory planning approach.

CHAPTER 2

INTEGRATED WATER RESOURCE AND RIVER BASIN MANAGEMENT

2.1. WATER RESOURCE MANAGEMENT

Freshwater ecosystems such as lakes, rivers, and groundwater aquifers are vital for the development and existence of human society. In addition to inholding a great variety of flora and fauna, they support human livelihoods through enabling basis for key economic sectors such as agriculture, industry, fisheries and tourism (WWF 2002). However, freshwater is a scarce commodity in the view of the fact that only one percent of all water on earth is available for human consumption. Nevertheless, the demand on the water supply has dramatically increased over the past few decades due to the population growth, high urbanization level, rapid industrialization, and water-intensive agricultural activities. Additionally, climate change has impacted the availability of water in a negative way. On the other hand, the water overuse and abuse have led to the condition of imbalance between water availability and water demand. The issues related to water quantity and quality results in water problems in several parts of the world (Al Radif 1999; TWAS 2002). As shown in Figure 1, over one billion people have limited access to clean drinking water and two billion people are without basic sanitary system. Moreover, deterioration of water quality has brought about diseases resulting in death of more than three million people each year. In short, water shortage problem have affected food availability, human health, environmental sustainability and economic development in the world (Water.org 2012).

The present world population of about seven billion is projected to grow almost 9,5 million by 2050. It is expected that most of the projected population growth will occur in Third World Countries that have already suffered from water, food, and sanitation problems. Population growth will result in growing demands on domestic and industrial water. Furthermore, more irrigation water will be required to meet growing demand for food. By 2030, it is estimated that at least 50% more food product, 45% more energy and 30% more water will be required. This situation bears in mind whether there will be enough water to support such a population growth. Additionally, the studies indicate that four billion people will experience severe water stress in 2025 (WWC 2000, UN 2012a).

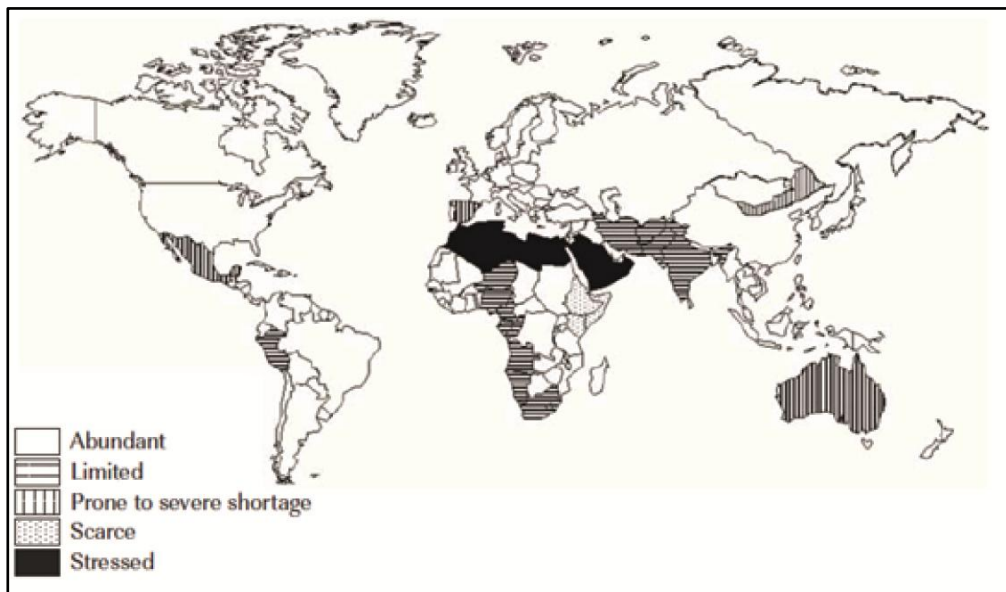


Figure 1. Water availability in the world (TWAS 2002)

As the global population continues to grow, wise use and protection of water resources have become essential in order to ensure that next generations will have access to affordable and safe water. It is discussed that conventional water resource planning and management are insufficient to solve complex water related problems. Due to the fact that the water problems are becoming more and more interconnected with other economic, social, environmental, legal and political issues at local, regional, national and even international levels, water management is difficult to be handled by one independent institution. This situation necessitates IWRM in which all relevant issues are considered in the decision making process. Such an integrated approach comprises not only supply management but also demand management, public participation, environmental, ecological, socio-economic aspects and sustainability (Bouwer 2000; Biswas 2004).

2.1.1. Evolution of Water Resources Management throughout History

Water management around the world has a long history going back to prehistoric ages because the availability of water resources has been a primary element of human beings' survival and well-being. Early agricultural civilizations were emerged along the river banks to benefit from water resources in their agricultural activities. The first irrigation canals allowed farming in dry seasons and dry regions. Although water management was important during the period of agrarian societies, it became more crucial with the emergence of cities and industrial towns. In order to meet the demands of growing populations, massive engineering projects for water supply and hydropower were carried out. However, the discussions about the negative impacts of these physical solutions on hydrologic cycle have

continued. Therefore, the need for changes in water management approach has been emerged (Hassan 2011).

By the developments in science and technology in the late 19th century, the West constructed many dams and irrigation canals in order to meet drinking water, food and energy needs of industrial societies. The belief was that "*the nature, including water resources, can be controlled*". After the second half of 20th century, this kind of water management approach was transferred to the developing countries of the East. In time, several criticisms had arisen by environmentalists, arguing that those water constructions had violated the nature rather than controlling it. Environmental conservation became an important issue on the political agenda of the West in the 1970s. In this period, environmental issues gained importance in water management policies but these policies couldn't be put into practice until the 1980s (Biswas & El-Habr 1993; Allan 2003).

In 1972, "the United Nations Conference on the Human Environment", the first major UN Conference on the environment, was held in Stockholm to discuss critical global environmental issues. The main emphasis of the Conference was the anthropogenic impacts on the environment. The Conference acknowledged the need for an integrated and coordinative approach to development-oriented planning in order to protect and improve environment. This Conference contributed to approach change in water management from a sectoral to a comprehensive one (UNEP 2012a).

In 1977, "the United Nations Conference on Water" was held in Mar del Plata. Main aim of the Conference was to raise awareness on the need for an immediate action to avoid water crisis at global dimensions. Basic principle of the Conference is that whatever development stage and socio-economic condition, all people have right to access adequate drinking water. Therefore, water access was recognized as a fundamental right for the first time. Additionally, the Conference suggested the 1980s as "the International Drinking Water Supply and Sanitation Decade" in order to ensure access to water and sanitary systems in developing countries and to stimulate political will and investment in the water sector. . As water management was discussed on a holistic and extensive basis, the Conference can be regarded as a major benchmark in the field of IWRM (Biswas 1988 and 2004; Rahaman & Varis 2005).

After 1980, the attempts to raise environmental awareness were succeeded. Water allocation and management priorities changed with the green movement. The focus on the environmental, the economical and social issues, and institutional structures was deepened. In the West, there was a shift from taking water out of the environment to meet human needs towards putting water back into the environment to rehabilitate environmental services. In 1987, "the Report of the World Commission on Environment and Development: Our Common Future", which introduced the concept of sustainable development for the first time, was released to provide a comprehensive overview of major environmental problems and proposals on how to eliminate these problems. The Report defined sustainable

development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*", and specified its pillars as environmental conservation, economic growth and social equality. According to the Report, sustainable development requires the minimization of the adverse impacts on water quality, the watershed protection and the adequate supply of good quality water (UN 2012b; Sneddon et al. 2006).

In the early 1990s, environmental issues such as global warming, desertification and water scarcity were brought to the international agenda with the assumption that "*water is a scarce resource and an economic good*". Economic tools such as water pricing, water markets and privatization was introduced as a solution to the control of the demand pressure on water and more effective use of the existing resources. The 1990s was marked with "the Global Consultation on Safe Water and Sanitation", in New Delhi. The Conference declared that "*some for all rather than more for some*". Main principles of the Conference are the environment protection, and health and sanitary controls with the IWRM. The outcomes of the Stockholm UN Conference were reinforced by the New Delhi Statement (IELRC 2012).

In 1992, "International Conference on Water and the Environment" was held in Dublin to draw attention to scarcity and misuse of freshwater and to guide the efforts for sustainable water management and development at all relevant scales. The four guiding principles for managing water resources were defined as follows:

- Acknowledging water as a vulnerable and finite source;
- Developing a participatory approach to water management and development;
- Emphasizing significant role of women in water related activities;
- Recognizing water as an economic good with its competing uses.

In the same year, "the United Nations Conference on Environment and Development" was organized in Rio de Janeiro. The resulting documents of the Conference, namely "Agenda 21, the Convention on Biological Diversity and the Ramsar Convention on Wetlands", repeated the need for carrying out IWRM at the level of river basin. Additionally, Agenda 21 set out the basis for river-based institutional arrangements declaring that "... *demand-driven management requires the development of water-related institutions at appropriate levels, taking into account the need for integration with land-use management*" (UNEP 2012b). After the Conference, the World Bank over again highlighted the need for institutional reform which emphasizes on river basins as the suitable unit for a coordinated water management (World Bank 1993).

By means of these international conferences, a new combined and holistic approach to water management was developed. The main outcomes of the international conferences on water resource management are summarized in Table 1.

Table 1. Main outcomes of international conferences on water resource management

Year	Conference	Main Outcome
1972	United Nations Conference on the Human Environment	Approach change in water management from sectoral to comprehensive
1977	United Nations Conferences on Water	Water was recognized as a human right for the first time; A major benchmark in the field of IWRM
1987	Our Common Future	Introduction of the concept of sustainable development for the first time
1990	Global Consultation on Safe Water and Sanitation	Outcomes of the UN Conference, 1972 were reinforced.
1992	International Conference on Water and the Environment	Four guiding principles for water management were defined.
1992	United Nations Conference on Environment and Development	Agenda 21

2.1.2. Integrated Water Resource Management

The IWRM has emerged as a means of dealing with complex water-related issues due to fact that traditional water resources planning and management failed to address interconnections, complexities, multiple perspectives, multiple uses and the resulting externalities. The Global Water Partnership (2000) described IWRM 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*". It develops a better insight into interactions between human and ecosystem needs (Wallace et al. 2003), and manages human activities in such a way that promotes sustainable development (Jonker 2002). Furthermore, it is a participatory planning and implementation process, which assembles multiple stakeholders to define society's long-term requirements (Xie 2006). These characteristics make IWRM different from other form of water management practices.

The first principle of IWRM creates linkage between natural protection and socio-economic development. The principle, *holistic approach* recalls the need for coordination between human activities that affect the water resources in a given basin. IWRM applies this principle through the focus on *integration* between all water-related sectors. In order to effectively facilitate coordination between different water sectors, IWRM supports the creation and empowerment of basin-level organizations. In addition to cross-sectoral integration, IWRM highlights the need for vertical integration between local, regional, national, and international water users and institutions. The second principle lays stress on *subsidiarity* for increasing participation. IWRM incorporates this principle into the concepts of *decentralization* and *participation*. The suitable level of decentralization is contingent upon the characteristics of the particular water management problem; therefore, IWRM pursues a

proper balance between a top-down and a bottom-up management. Additionally, it addresses the need for the creation of mechanisms to make participation possible at all spatial scales. Third principle emphasizes the close relation between sustainable water management and gender equity. Although women play a central role in water-related activities, they are excluded from decision-making and management processes in many societies. IWRM applies this principle through its emphasis on empowering women through *participatory approach* and *capacity building*. Last principle emphasizes the importance of economic instruments in determining the distribution of limited water resources in an efficient and equitable manner. IWRM embeds this principle into its strategies through the concept of *economic and financial sustainability*. IWRM pays great attention to economic value of water. To achieve financial sustainability of water provision, IWRM addresses the need for pricing of water at levels that ensure full cost recovery (GWP 2000, Xie 2006).

IWRM calls for a broader systemic approach to water management and a reform of existing institutions and regulatory systems. However, IWRM doesn't provide a one-size-fits-all prescription since there are large differences among countries in political, cultural, social, economic and environmental context. On the other hand, IWRM provides a practical framework which involves only essential elements for adopting a successful IWRM approach, and can adapt to different national, regional and local contexts. In other words, the implementation of IWRM process can vary from country to country and from region to region as there are no blueprints valid for all cases (GWP 2004). While the concept of IWRM is broadly accepted as the most appropriate management model to overcome those challenges and constraints, its applicability and validity has still been debated.

2.2. RIVER BASIN MANAGEMENT

The idea of using river basins as a planning unit for development and management of water resources dates back 19th century. In the late 19th century, the first conceptualizations were emerged with the progress in water science, the development in irrigation and hydraulic powers for industrial development. In 1933, the need for management at the scale of entire river basin forced the establishment of the US Tennessee Valley Authority (TVA), where the establishment of a river basin authority was regarded as a requirement for achieving regional development (Molle et al. 2007; Molle 2009). Within few years, the TVA model and similar river basin development plans spread throughout the world.

In a panel of the United Nations (1958), the integrated river basin development was defined as "*the orderly marshalling of water resources of river basins for multiple purposes to promote human welfare*". TVA and other organizations were criticized that they served as the enablers for building massive-scale dams and failed to achieve the unified planning and bottom-up development. Due to the increasing perception of environmental costs and decreasing availability of adequate dam sites, river basin development lost its significance in industrialized countries in the early 1970s (Molle et al. 2007). On the other hand, increasing demand and overexploitation of water resources led to the reduction in the capacity to meet

different social demands. This situation resulted in the conflicts between diversified water uses and between up-stream and downstream uses. In the early 1990s, it was understood that there was a need for an integrated approach to river basin management. In order to solve the conflicts, this approach should be much broader than traditional water management, and should give attention to temporal and spatial distribution of water resources; the relations between land and water resources; and the integration between socio-economic, legislative, administrative and political issues (Mostert et al. 1999).

2.2.1. The History of River Basin Management

A comprehensive reflection of river basin management was conducted at the “2nd World Water Forum”. A technical workshop was held in Hague in 1999 in order to make provision for Forum, and the proceedings of the workshop provided a summary of the current debate on river basin management. Having regard to regional differences, a prescription for river basin management was not provided; however, the results of the discussions related to sustainable river basin management were presented as recommendations and guidelines at the Forum in 2000 (Mostert 1999). These recommendations and guidelines focus on

- Basin-wide planning,
- Participation,
- Demand management,
- Compliance and
- Human and financial capacities (Hooper 2003).

In 2001, “International Conference on Freshwater” took place in Bonn. The recommendations of the Conference reaffirmed the need for understanding of river basins as the major frame of reference for water resources management, and for the creation of institutional and participatory mechanisms at river basin scale. Furthermore, the Conference put emphasize on the development of master plans for river basins which involve all dimensions of benefit-sharing, and the formulation of River Basin Law to improve legal system for water resource management (UN 2012c).

In 2002, “the World Summit on Sustainable Development” was organized in Johannesburg. The Conference repeated the necessity of developing and implementing integrated river basin plans and strategies for entire water bodies. Main aim of integrated river basin plans was stated as the interest optimization of the upstream and downstream uses through the development and efficient management of water resources and the conservation of water quality and hydro-ecosystems (UN 2012d).

In 2003, “3rd Water Forum” was held in Kyoto. In the session report of “Integrated water resource management and Basin Management”, river basin organizations were regarded as "*the basic institutional entities*" for implementing IWRM (WWC 2003). Additionally, the session on river management addressed some other elements for sustainable river basin management, including recognizing water as a common good; basin-wide management

systems; inter-sectoral management; explicit legislative frameworks; multiple-level participation; effective monitoring programmes; distribution of information; financial systems based upon the principles of users-pays and polluter-pays (JMLIT 2012).

In 2006, “the 4th World Water Forum” in Mexico City addressed "*integrated water resources management on the scale of the basins of rivers, lakes and aquifers*" as one of the main topics. The outcomes of the Forum can be listed as follows

- River basins should be managed within their natural boundaries through international cooperation,
- Legal basis for river basin management should be strengthened,
- Democratization and decentralization of governance systems should be promoted and
- Participation should be encouraged through river basin committees or councils (IISD 2006).

In 2009, “the 5th World Water Forum” was held in İstanbul. Within the Forum, it was agreed that IWRM needs to be practiced at river basin scale and river basin organizations offer IWRM for the cooperation among a range of partners. Additionally, a “*Handbook on Integrated Water Resources Management in Basins*” was introduced, which provided useful advice on effective implementation of the IWRM approach and improvement of governance in the management. Some other points mentioned in the Forum are:

- Strong political will and long-term commitment are essential,
- Adaptive strategies focused on river basin integrity should become the norm in national and international policies,
- The number of river basin organizations, their political power and capacity should be increased,
- Training and educational programmes should be enhanced in order to respond to the adaptation needs of basin management (WWC 2012).

In 2012, “the 6th World Water Forum” was organized in Marseilles. Within the Forum, there is a call for global leaders to adopt the principle of recognizing river basins as the suitable scale for water resources management; and to encourage the adoption of river basin management plans. Additionally, the session on river management addressed prerequisites for an effective river basin management planning, including solid basin organizations, the enhancement of public participation, the development of prospective medium- and long-term scenarios and a vision for the basin, information systems, and know-how development (WWF6 2012). Furthermore, “World Pact for Better Basin Management” was opened to signature in view of developing an integrated and joint approach to water resources management at all levels in order to meet the global challenges.

The recognition of the river basin as the relevant scale for water management has also been acknowledged by several international institutions and organizations. In especial, the European Union (EU) is promoting the river basin as the suitable unit for IWRM. Within the EU Water Framework Directive (WFD), IRBM has been used as a guiding framework in

order to promote a less wasteful and more equitable and sustainable use of resources within whole European river basins (Graefe 2011). The WFD prescribes EU member states to define river basin districts and to prepare river basin management plans till 2009, and to establish river basin management authorities for all their basins (EC 2000). In the following chapter, WFD is discussed in detail. Other governmental or non-governmental organizations have developed policies to generalize the implementation of IRBM. Asian Development Bank (2000) gave support to the decentralization of planning, development, and management of water to river basin boundaries. Additionally, it recommends the establishment of river basin organizations to facilitate stakeholder participation and consultation, and to assist local and national authorities in planning, data collection, monitoring, and advisory services. The OECD (2003) also emphasizes on the benefits of using a river basin approach to water management and empowering agencies at the basin level with specific delegated regulatory powers, and requires OECD countries to *“apply the ecosystem approach to the management of freshwater resources and associated watersheds, based on integrated river basin management.”* Besides international institutions, green NGOs have plumped for the idea of implementing IWRM at river basin scale. Particularly, the World Wild Fund for Nature (2001) gives full support to the usage of river basins as the main unit for all actions related to water planning and management.

Table 2. International conferences and documents on IRBM after 2000

Name Of Conference/ Document	Aim	Main Outcomes
2 nd World Water Forum (The Hague, 2000) "From Vision to Action"	Providing a set of recommendations based on best management practices for river basins	<ul style="list-style-type: none"> • Recommendations and guidelines on "Sustainable River Basin Management" are formulated; Need for effective public and stakeholder participation and local empowerment is highlighted; • Improvement of sufficient human and financial capacity is provided as a requirement.
EU WFD (2000)	Establishing a framework for the protection of surface and ground waters throughout the EU territory	<ul style="list-style-type: none"> • IRBM is announced as a guiding framework for sustainable use of resources within whole European river basins; • Definition of river basin districts, preparation of river basin management plans, and establishment of river basin organizations for all their basins are enjoined.

Table 2 (continued)

International Conference on Freshwater (Bonn, 2001)	Developing action programmes to put water-related policies into practice	<ul style="list-style-type: none"> • Creation of institutional and participatory mechanisms at river basin scale, development of river basin plans and improvement of legal system for water resource management are required.
World Summit on Sustainable Development (Johannesburg, 2002)	Identification of concrete targets for better implementation of principles set in Agenda21	<ul style="list-style-type: none"> • Necessity on development and implementation of integrated river basin plans and strategies for entire water bodies is reconfirmed.
3 rd World Water Forum (Kyoto, 2003) "A Forum with a Difference"	Calling for action to integrate adaptive management of land and water resources; and implementing an ecosystem approach to water management	<ul style="list-style-type: none"> • River basin organizations are introduced as the basic institutional entities for implementation of IWRM.
4 th World Water Forum (Mexico City, 2006) "Local Actions for a Global Challenge"	Promoting water governance through institutional arrangements at river-basin level	<ul style="list-style-type: none"> • Need for strengthening legal basis for river basin is elaborated; • Decentralization of governance systems and encouragement participation are required.
5 th World Water Forum (İstanbul, 2009) "Bridging Divides for Water"	Enforcement of river basin management Developing tools and mechanisms for reaching objectives of IRBM	<ul style="list-style-type: none"> • Need for increase in the number of river basin organizations, their strength and capacity is addressed • Enhancement of training and educational programmes is required • "Handbook on Integrated Water Resources Management in Basins" is presented
6 th World Water Forum (Marseilles, 2012) "Solutions for Water"	Promotion of IRBM as a prerequisite for good governance	<ul style="list-style-type: none"> • The principle of recognition of river basins as the appropriate scale for water resources management is reinforced • "World Pact for Better Basin Management" was opened to signature.

2.2.2. Integrated River Basin Management

As the idea of using river basins as a planning and management unit is agreed as a proper approach in many international conferences and documents, integrated river basin

management (IRBM) has become a strategy in the water sector and the most appropriate tool at the basin scale. WWF (2003) provides perhaps the most quoted definition of IRBM as *"the process of coordinating conservation, management and development of water, land and related resources across sectors within a given river basin, in order to maximise the economic and social benefits derived from water resources in an equitable manner while preserving and, where necessary, restoring freshwater ecosystems"*. This definition reflects the central aim of IRBM, which can be formulated as assuring the multiple-purpose utilization of rivers basins for the present and next generations through integration of water planning and management with environmental concerns and socio-economic development. Another aim of the IRBM is to ensure water governance at river basin scale through a collaborative management, which is highlighted with the description of the concept as *"an integrated and coordinated approach to the planning and management of natural resources of a river basin, one that encourages stakeholders to consider a wide array of social and environmental interconnections, in a catchment/watershed context"* (Hooper 2005). Another definition that captures the common focus on ecological approach is *"Integrated basin-wide management means that informed decision-makers take into account all uses and resources of the watershed, following an ecosystem approach"* (Burton&Boisvert 1991).

Within this context, IRBM can be seen as a subset of IWRM. However, the main difference between IRBM and IWRM is the ecosystem and spatial emphasize of IRBM, which depends on river basins as the natural hydrologic units where water resources management might be organized in a sustainable way. Although IWRM and IRBM differ with regard to their definitions and philosophy, they propose similar approaches that comprise the principles of integration of water and land planning, environmental sustainability, economic effectivity, social equality, inter-sectoral cooperation, and multiple-level participation (Jones et al. 2006).

Since all river basins have particular characteristics, the priorities of each IRBM planning process should bound up with the natural and socio-economic situation of the relevant river basin and the values and benefits of its inhabitants. Still, there are general principles that can be derived by the material reviews and the case studies related to IRBM.

- **Principle 1: Holistic and strategic approach.** IRBM should be holistic to achieve the broadest management of all physical characteristics of water resources together with socio-economic and political factors across whole river basin. Additionally, IRBM should be strategic rather than all-embracing. Since it is impossible to address all constraints and changing social priorities, they should be targeted and selective about actions and prioritize work programs (WWF 2003; Hooper 2006).
- **Principle 2: Proactive approach.** IRBM should follow a proactive rather than reactive planning approach. Since the planners and managers look out the problem identification before they occur, they are able to predict unexpected events such as a pollution incident or a serious flood (WWF 2003).

- **Principle 3: Political will and high-level commitment of relevant decision-makers.** Where there is political will, it is more likely to materialize policies, legislative arrangements and financial regulations. Thus, the water-related legislation and institutions are more likely to function effectively. For this reason, it is important that related decision makers embrace the process and give their high-level support and commitment (GWP & INBO 2009).
- **Principle 4: Strong river basin advocacy.** As river basin management is characterized by conflicting interests and compelling problems, a strong leadership is essential to achieve the progress. Individual proponents and organizations with a strong river basin advocacy can have an important role in the development and implementation of policies that are in favor of river basin management (WWF 2003; Hooper 2006).
- **Principle 5: Local empowerment and effective participation.** It is important to empower local and regional decision-making rather than to centralize the decisions. Local empowerment can be facilitated if participation is a high priority. Therefore, IRBM planning and implementation process should follow a participatory approach. Establishment of a common vision for the river basin and voluntariness to coordinate, cooperate, and jointly manage should be set as a starting point. This necessitates clear definition of the partners' jurisdictions and liabilities in any participative action (Mostert 1999; UNESCO et al. 2009a).
- **Principle 6: Application of diverse institutional arrangements.** It is more appropriate to start with existing institutions but to redefine their roles. As water-related responsibilities are shared by a wide variety of institutions, it is essential to make institutional arrangements in a way that enables stakeholder engagement at the very beginning, and creates a platform for negotiation and conflict resolution (Burton 1999; Tognetti 2002).
- **Principle 7: Establishment of river basin organizations.** River basin organizations should be established for river basins in order to provide a platform for inter-institutional coordination and negotiation. These organizations are important for providing the stability needed for IRBM to succeed. On the other hand, it is critical to define their role and structure in a clear way. Giving autonomous narrow-scoped decision-making powers to these organizations may be a good option (Mostert 1999; WWF 2003).
- **Principle 8: Effective partnership.** Forming partnership and its maintenance is a key element for an IRBM planning process due to the fact that effective implementation of IRBM is not possible without additional organizational supports. Since giving all functions to one institution may result in conflicting interest and loss of transparency, it is rational to work with partners in a co-operative environment rather than use confrontational and mandatory management (Hooper 2006).
- **Principle 9: Strong informational and science base.** Sound scientific information is essential for effective IRBM. Data gathering should start as early as possible, and should include the description of water condition and trend, the reasons of water degradation, the identification of stakeholder groups, the assessment of existing official structures and processes, and potential impacts of water management options (WWF 2003; Hooper 2006).
- **Principle 10: Long-term investment.** As river basin-scale objectives cannot be tackled in a short term, IRBM planning process requires reliable and sustained financial and technical investment. Therefore, clear and long-term support from government and other partners is necessary for sustaining the planning process in an effective way (WWF 2003).

To conclude, the IRBM concept differentiates from traditional multi-purpose resource management since it addresses a wide array of complex natural resource management issues, including economic development, social values and ecosystem functioning. IRBM planning introduces new major approaches for policy makers and spatial planners. It brings about changes such as the shift from sectoral to integrated management; from top-down management to local responsive management; from centralized type of management to local empowerment; from command-and-control management styles to more cooperative of distributive forms of governance; from rigid inflexible structures to flexible organizations; from linear to adaptive approaches; from fragmented programmes of action to coordinated activities; and from prescriptive financial management mechanisms to cost-effective mechanisms.

CHAPTER 3

INTEGRATED RIVER BASIN MANAGEMENT TOOLS AND PRACTICES

3.1. KEY TOOLS OF INTEGRATED RIVER BASIN MANAGEMENT

Integrated River Basin Management is a process that has analytical support tools. Four basic tools are defined in the literature to perform IRBM. These tools are:

1. Operational Management
2. River Basin Planning
3. River Basin Monitoring
4. Legal and Institutional Framework (Mostert et al.1999).

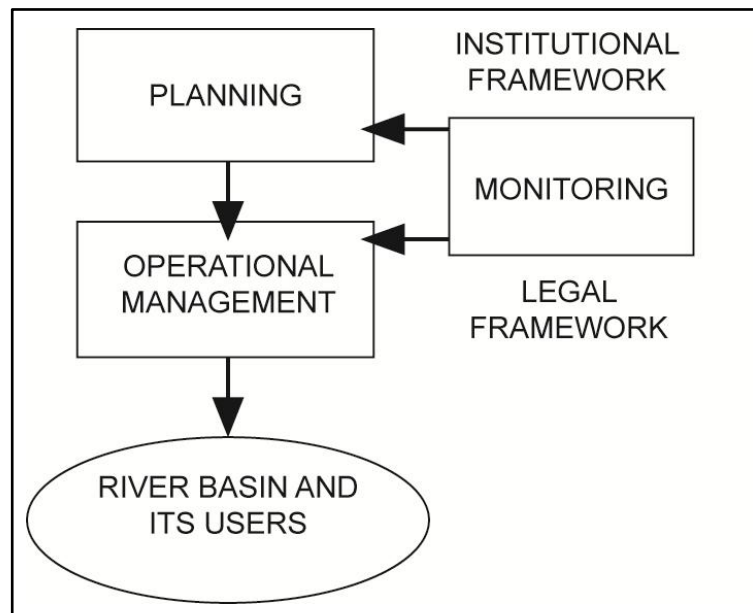


Figure 2. Key tools of integrated river basin management (derived from Mostert et.al 1999)

Operational management is a tool that affects the river basins directly. Planning is a tool for developing and supporting operational management. Monitoring is utilized for supporting both planning process and operational management. All these three tools are influenced by the legal and institutional framework. There is a feedback mechanism among these tools.

3.1.1. Operational Management

Operational management is by far the most important tool in IRBM because it has a direct impact on the river basin since the decisions taken in the planning process are transformed into actions. In other words, operational management deals with putting the plans and programs into action to improve the state of the river basins ecosystem. It takes place in organizational and institutional settings. The instruments, shown in Table 3, should be supported by financing and capacity-building. Any effective river basin management system requires a mix of these instruments. Table 3 shows an overview of the different types of instruments for operational management (Mostert et al. 1999).

Table 3. Instruments of operational management (Mostert et al. 1999)

TYPE	CHARACTERISTICS	INSTRUMENTS
Direct actions	Direct inference by the local managers	Water supply and sanitary systems Constructional flood mitigation River regulation Afforestation
Legal actions	Impinging on other local managers or users through prohibition of activities or their explicit allowance	Rules and regulations Standard setting Water rights and permits Penalties
Economic instruments	Impinging on other local managers or users through fiscal incentives or disincentives	Subsidies Charges
Awareness raising activities	Impinging on other local managers or users through supplying information	Voluntary agreements Public information Communication plans
Financing	Supplementing former instruments by supplying necessary financial resources	Obligations Funding required activities
Capacity building	Supplementing former instruments by supplying other necessary instruments	Extension services Training of local staff

3.1.2. River Basin Planning

IRBM planning involves four phases (Davenport 2003):

1. Assessment and problem identification
2. Planning
3. Implementation
4. Evaluation

The iterative, evolutionary and adaptive implementation of IRBM process is illustrated by the spiral model in Figure 3. The reason of conceptualizing the phases of IRBM planning process as a spiral is to adapt to changing demands, needs, circumstances and societal goals. The model provides a practical framework for the evolution of river basin management over time, and promotes the pursuit of innovative solutions that adjust to new circumstances and values. For an effective IRBM planning process, this model needs to be based on stakeholder involvement, effective partnership and adequate monitoring (UNESCO et al. 2009a).

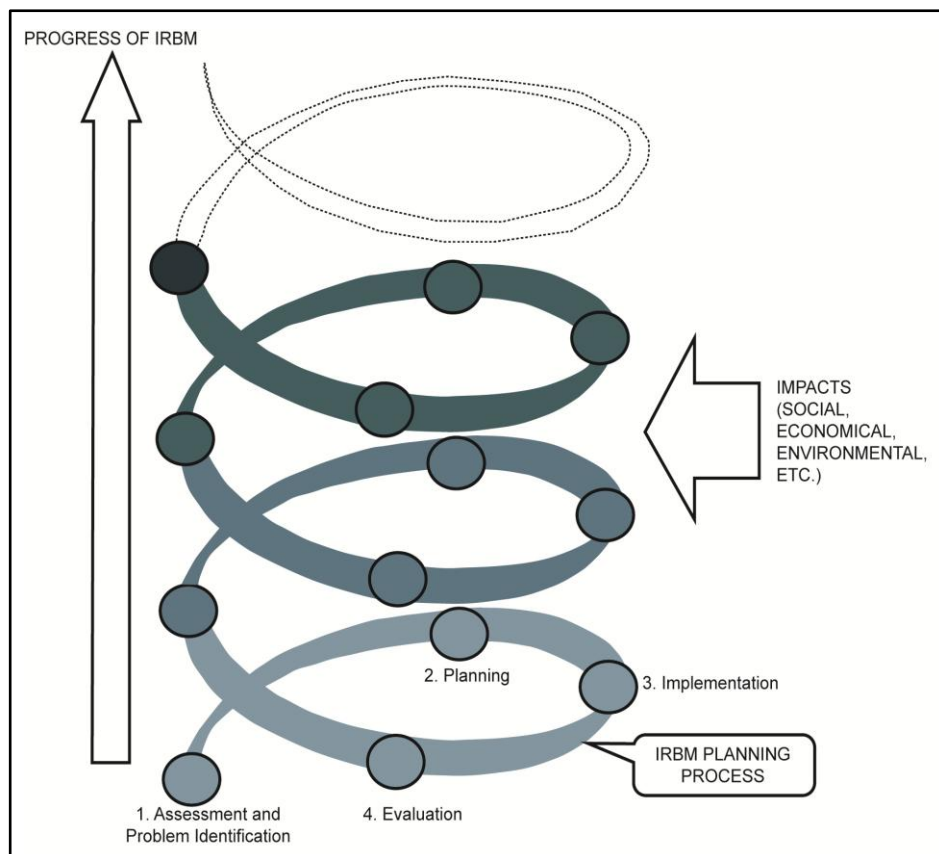


Figure 3. Spiral process of IRBM Planning

3.1.2.1. Assessment and Problem Identification Phase (Initiation)

The objective of this phase is to provide an understanding of the biophysical, economic and social processes and interactions in and around the river basin, including concerns and interests of stakeholders, concerns and constraints of institutions, and socio-economic characteristics of the basin (Shi 2008). The initiation phase is subdivided into four parts that include: 1) mapping and inventory, 2) data analysis; 3) problem identification; and 4) goal determination (Davenport 2003).

- Mapping and Inventory: The first is to define the boundaries of the river basin in order to provide a spatial context for the assessment. When the boundaries are identified, it should be regarded that the area within the boundaries of river basin covers not only the water resource but also all the land that drains into the resource. Additionally, developing a base map is a prerequisite of river basin management planning process. This map should include the boundaries of river basin and sub-basins, local political jurisdictions, the stream network, existing infrastructure and infrastructure plans, existing land-uses, natural features and protected areas (Davenport 2003).

After defining the river basin and mapping it, second step is the creation of an inventory, including a number of different aspects of river basin. Inventory is a key step within initiation phase; however, it is necessary to consider data availability, time scale, and management costs during data collection. Therefore, it is rational to begin with collecting and examining the existing or easily available data. When we examine these data, appropriateness, reliability, collection frequency and obtaining cost of data should be addressed (Davenport 2003; UNESCO et al. 2009a).

- Data Analysis: This step involves many analyses related to main ecosystem processes of water resources which are a complex interaction of several different physical, chemical and biological factors. These analyses should also include the influences of human activities on the ecosystem processes, human health and functions. Within this step, The DPSIR and three-tier analysis are the most commonly used methods (Davenport 2003).

- Problem Identification: Based on the data analysis, the problem categories, their geographic distribution and causes are identified. This step should involve the identification of issues and currently occurring in the basin as well as potential future issues. Due to technical and financial constraints, implementation of IRBM in the entire basin is impossible. Therefore, it is rational to identify primarily the potential priority areas in order to achieve effective implementation of IRBM. The reason of identifying these areas is to narrow geographic scope and to focus management on the part of river basin that needs urgent actions (Davenport 2003; UNESCO et al. 2009a).

- Goal Determination: IRBM addresses multiple issues in an integrated manner. It is crucial to set priorities among problems to be solved, considering time and financial

constraints. Another important thing to consider when determining goals is whether the goals would be acceptable to stakeholders. Thus, it is essential to determine goals through intensive discussions among stakeholders (UNESCO et al. 2009a).

3.1.2.2. Planning Phase (Plan Development)

Planning refers to the development of an implementation plan based on the analysis that uses information from inventory assessments and stakeholder inputs. While the initiation phase procures overall goals, the plan development phase develops a course of action by choosing the best management options, approaches and techniques, identifying challenges and opportunities, and defining how to measure improvements and achievements (Davenport 2003).

The river basin management plans should be adopted more bottom-up approach than top-down one. Additionally, the process of planning should be outcome-oriented. Plans should emphasize on reaching outcomes instead of becoming a collection of strategies or means. In other words, it should include actions and directions. On the other hand, the plans are usually reactive to existing problems rather than proactive to future risks. The plans should find the balance between being reactive and proactive to prevent future problems while addressing the existing ones. Moreover, planning process should adopt a strategic approach. Strategic type of planning sets an overall aims and goals, and provides a framework for all implementation activities through building consensus among stakeholders. In order to achieve strategic plan, it is required to set short and medium-run goals, strategies and guidelines for operational management. In addition to these, planning process needs to be flexible and dynamic to meet changing conditions and needs. However, it should be paid attention not to lose essential stability which is required by successful long-term management when modifying plans to changing conditions and needs (Mostert et al. 1999; Davenport 2003).

3.1.2.3. Implementation Phase

Implementation phase represents the outcome of the initial assessment and planning efforts, and information and education activities. This phase should address all necessary activities to achieve the goals and objectives identified in the IRBM plan (Davenport 2003). Coordination and cooperation among stakeholders is a key to success for implementation. Even though a plan is agreed upon by stakeholders, additional challenges may occur as implementation proceeds. Continuous information sharing will increase the interest of public and stakeholders while encouraging their involvement. Continuity of participatory scheme makes it possible to modify the plan or implementation mechanisms in an appropriate manner. Human and financial resources are other important elements to attain an effective implementation. In other words, success in the implementation of a river basin management plan depends not only on stakeholder support but also on temporal and financial commitment of participative institutions (Davenport 2003; UNESCO et al. 2009a).

In fact, there are many practical challenges of implementing IRBM. One of the key challenges in implementing IRBM planning is the division of management responsibilities between several administrative authorities, which results in fragmented planning and management activities. Due to these fragmented approaches, the implementation remains inefficient. Weak financial support becomes another key challenge since the success of IRBM mainly depends on adequate financial resources. The lack of recognition of decision-makers and partners on the importance of IRBM results in insufficient funds, which then delays in implementation of IRBM. Another challenge that greatly damages the implementation process is the absence of legal basis for implementing management plans at river basin scale. Without a legislative framework, it isn't possible to provide binding for IRBM implementation. Weaknesses in consultation, consensus-seeking and decision-making can be regarded as another important challenge. Additionally, it becomes difficult to move from theory to action since there aren't a sufficient knowledge base, sufficient skilled human resources, and adequate and reliable data (Ramsar 2007; UNESCO et al. 2009a)

3.1.2.4. Evaluation Phase

The aim of evaluation phase is to evaluate the efficiency of river basin management plan to assure that the implementation efforts are operating as planned, and to specify causes of deficiencies in the implementation process. Evaluation formulation should start at the beginning of river basin management process, and it should continue after the implementation phase is completed (Davenport 2003).

There are two distinct types of problems that can be associated with evaluation process. First one is inappropriate evaluation, which occurs when the focus is just on implementation activities rather than the environmental impacts of these activities. This results in the failure of providing visible results to stakeholders, funders and public. Second problem is incomprehensive evaluation, which means that evaluation effort addresses what the situation of the resource is at the end of process; however cannot answer why it is in that situation or whether it is improving or regressing. This situation results from the lack of an adequate baseline, an incomplete monitoring scheme, lack of financial resources, and inadequate data collection and analysis.

3.1.3. River Basin Monitoring

Monitoring refers to a process of collecting data and making measurements about numerous characteristics of the water body and its basin with accordance to quality surveillance and specific control protocols. Developing a monitoring programme is a crucial element in the adaptive management of a river basin. It enables progress measurement with regards to whether administrative and environmental goals and objectives are met. Additionally, it provides information for orienting management decisions through iterative process of IRBM planning. Since the monitoring actuarially analyzes the relationship between the management activities and their impacts on environmental situation, it provides the most

defensible measure of performance of IRBM effort (Davenport 2003; UNESCO et al. 2009a).

Monitoring should be undertaken over the course of IRBM planning process. There are four major types of monitoring approaches, which can be utilized in different phases of IRBM planning process. These approaches can be listed as condition monitoring, problem investigation, compliance monitoring and effectiveness monitoring, each of which serves to answer different questions (Davenport 2003):

3.1.4. Institutional Framework

As mentioned in Chapter 2, the river basins serve multiple sector interests, such as drinking water, agriculture, hydropower production, transportation and recreation. Besides, different elements of the river basin management are implemented by different institutions, which have their own priorities and understandings about river basin. At this point, the central problem faced in the river basin management process can be regarded as institutional structure and low degree of collaboration between the existing institutional structures and practices, which causes spatial externalities, benefiting for free riders and giving harm on others beyond the spatial access of the related institution. In other words, institutional factors are among the roughest obstacles limiting the shift of IRBM from policy into action (Moss 2004).

Development of inter-organizational collaboration between government and non-government actors can provide an interactive, open-ended and dynamic approach to IRBM, which enables unsteady conditions and bad management issues to be addressed in a more effective, efficient and fair way. Shortly, effectiveness of river basin management depends on regulating mechanisms which manage to narrow the gaps between the related institutions. However, it is also clear that cooperation between institutions can be troublesome in practice. The achievement of any cooperative approach to IRBM is eventually contingent upon the the institutional arrangements and the ability of stakeholders to arrive at a consensus by means of efficient debates (Moss 2004).

It has become evident that water resource planning without the stakeholder participation is quite inefficient. In order to provide effective stakeholder participation, there is a need for appropriate design of institutional arrangements. Institutional arrangements can be understood as *“the sets of working rules that are used to determine who is eligible to make decisions in some arena, and what actions are allowed or constrained”* (Ostrom 1990). These rules can be regarded as constitutional, collective choice and operational rules. Constitutional rules specify which institution is authorized with making collective choice rules; therefore, they establish the institutional structure for river basin management. Collective choice rules deal with how the operational rules should be reformed. Operational rules determine a framework for operational management. (Mostert et al. 1999).

Although it is widely argued that there is a need for establishing an institutional structure in such a way that decisions are taken at lowest appropriate level, there is not one significant institutional structure that can be implementable to all circumstances. Nevertheless, institutional structures can be grouped into three categories in general manner. There are three main institutional models as following:

- River basin coordinating committee or council: They are negotiatory decision-making bodies that incorporate public and private stakeholders and integrate the policies and strategies of different sectors. They can have a variety of roles, such as conflict resolution, coordination, and inspect of water allocation and management. They can also perform activities related to awareness raising, education and stimulation of ownership and promotion of information exchange. While this type of institutional model is generally preferred in countries that have a stable water resources environment, it can also be used as the first phase in the basin coordination to review existing and future needs and to propose alternatives for long-term coordination (Millington et al. 2006; Molle et al. 2007; GWP & INBO 2009).
- River basin commission: They can be consisted of a management board or group of commissioners that focus on basin-wide planning, policy determination, allocation of water resources, and information management. Unlike the coordinating committee/council, the commissions have a legal basis, and limited but well-defined executive power and management authorization. They have also authority to plan and give consent for developments; however, they do not concern with construction or operation. The strengths of the commission model can be specified as coordinate partnership among relevant institutions and organizations; stakeholder participation in planning and decision-making process; and comprehensive information related to the resources of basin (World Bank 2006; Molle et al. 2007; GWP & INBO 2009).
- River basin authority: This type of institutional model can be used in two different forms. They may be large, multi-disciplinary organizations that are endowed with authority to undertake specific development tasks. The TVA is the concrete representation of this type of model and has been exported as a model to many parts of the world. Alternatively, they may have autonomous executive powers, absorbing all the water-related tasks of other agencies. While this model was more widespread 50 years ago while there was a need for development of large-scale water infrastructures, it is still used in some developing countries. On the other hand, they are established with a more participative approach than the previous models and involve stakeholder cooperation and involvement, public participation, and principle of environmental protection (World Bank 2006; Molle et al. 2007).

From a governance perspective, institutional arrangements for river basin management may be distinguished in two basic patterns. The first is the *centralized (unicentric) model*, in which a single unified institution is empowered to take decisions related to river basin management. This model strengthens the control of state and overrides the integration of the stakeholders' values and benefits. Therefore, the governance of a centralized institution raises questions regarding broad stakeholder representation and accountability (Svendsen et al. 2005). The second is the *decentralized model*, in which the authority for decision-making

and implementation is shifted from central or regional to lower level governments or agencies (Kemper et al. 2005).

Decentralization is given as one of the most appropriate strategy for IRBM to create transparency and to promote community accountability through participation. An idea behind decentralization is to give mandate of decision making to people who are knowledgeable about local circumstances, accessible for individual citizens and capable of making basic decisions in due time. Further, it is brought government as close as possible to the users in order to facilitate direct stakeholder participation. Moreover, decentralization is considered as a more democratic process, in which the understanding and acceptance of conflicting interests are stimulated due to a considerable increase in transparency (Mostert et al. 1999; Jaspers 2003).

3.1.5. Legal Framework

National, regional and local water laws can be regarded as the rules of the game which define how the stakeholders perform their relevant tasks in water development, planning and management. In other words, water laws provide the frame for river basin management as part of the existing governmental system. In order to achieve IRBM in a successful way, water-related laws should

- specify the structure, responsibilities and financial resources of river basin institutions and management,
- identify management powers and liabilities,
- insure equity and accountability in decision-making,
- avert from fragmentation and overlapping of liabilities,
- define regulating and sanction rules for ecosystem protection, water-sharing and risk avoidance (GWP & INBO 2009).

In this framework, the EU adopted the WFD in order to solve water-related problems through a territorially integrated and more holistic approach. The WFD can be given as a good example for establishing a transparent, effective and coherent water-related legislative.

3.1.5.1. EU Water Framework Directive

The issue of water has generally been addressed within the context of the EU environmental legislation. Since the 1970s, a large number of directives related to water management has been published and updated according to the needs. In literature, evolution of the EU water policies has been examined in terms of three waves, which is reviewed in Figure 4.

- In the first wave (1973-1986), environmental quality standards and emission limit values were determined. The first wave of directives mainly emphasized on quality standards and goals for drinking water, bathing waters, fish waters and ground waters.

- The second wave (1987-1995) of European water policies came in 1987 with the enactment of Single European Act which introduced special provisions for the protection of the environment, and covered the review and improvement of existing legislation with the purpose of pollution prevention at its source. The new legislation included “the Urban Wastewater Treatment Directive, the Nitrates Directive, the Directive for Integrated Pollution and Prevention Control, and the Drinking Water Directive”.
- The third wave started in mid-1995 as the need for EU common water policy. This is mainly due to the fact that the existence of several different kinds of directives results in a lack of consistency. European Commission initiated a consultation process in order to develop an integrated community water policy instead of fragmented and incoherent one. Within this process, a communication environment was created not only for member states and European Parliament, but also for all stakeholders comprising local and regional institutions, water users and providers, NGOs, and environmentalists. After a long process of preparation consisted of debates and meetings among many stakeholders, the WFD was finally adopted in October 2000 and came into force on December 22, 2000 (Kaika 2003; Bilen 2008; ORSAM 2011; Sümer & Muluk 2011).

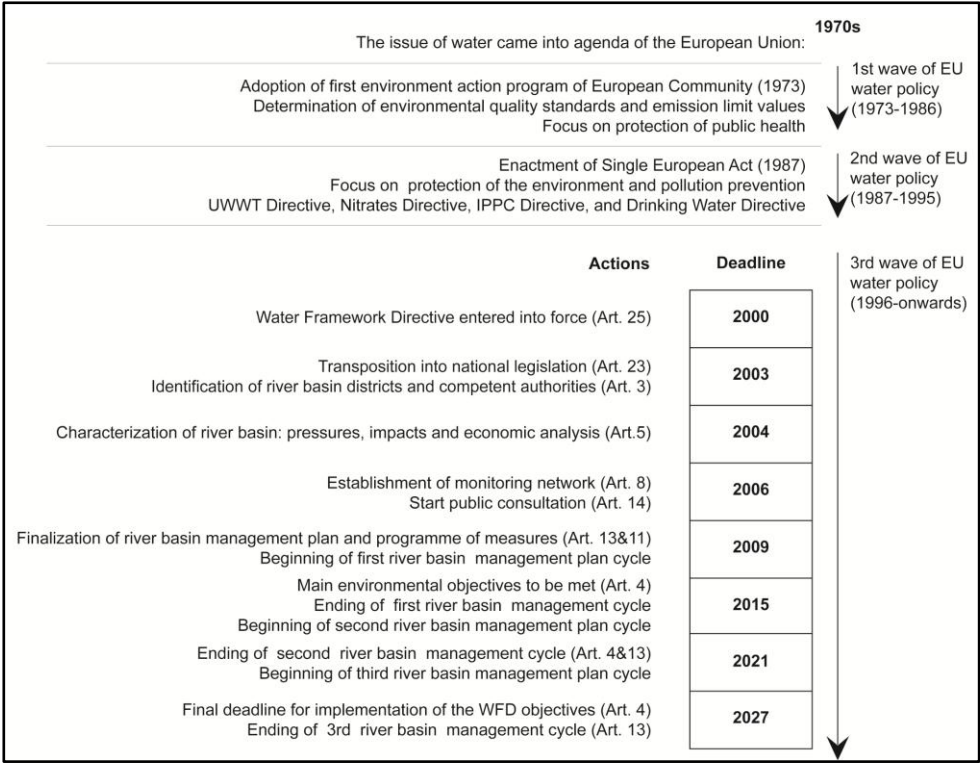


Figure 4. Timetable of EU water policies and Water Framework Directive

The WFD, which is regarded as the “constitution” of EU water legislation (Çiçek 2010), introduces a new framework for EU water policy aimed at establishing an integrated approach to the conservation, enhancement and sustainable utilization of all types of water bodies throughout Europe. Therefore, the Directive creates a single legal framework instead of developing separate policies for different water-related sectors. Main concepts of the Directive are integrated water management, river basin district approach, river basin planning, integrated approach of quality standards and emission limit values, sustainable water resources management, ecologic quality, public participation, information and consultation, economic analysis, financial instruments, and cost-recovery approach. (Kibaroglu et al. 2006)

Main objectives of the Directive are:

- to prevent farther degradation of water resources,
- to conserve and enhance the aquatic environment,
- to support sustainable water utilization dependent upon the long-term water protection,
- to reduce groundwater pollution,
- to diminish the impacts of droughts and floods.

More specifically, it is targeted to reach ‘good status’ for all EU inland and coastal waters by 2015 through the implementation of the Directive. In order to reach these objectives, the Directive defines a rigid timetable for each of its requirements (See Figure 4).

In addition, the WFD introduces a new approach to water management based on *river basin districts*, which are natural geographic and hydrologic units with no relevance to political or administrative borders. In order to define objectives and necessary measures for each river basin district, the Directive requires the preparation of ‘*River Basin Management Plans*’ (RBMP) and ‘*Programme of Measures*’ (PoM). In the preparation of RBMPs, the integration of rural development, agricultural, industrial, forestry and nature conservation projects will be required at the river basin level. In this way, spatial planning is linked with water resource planning for the first time. Furthermore, a river basin cycle was introduced by the Directive, in which RBMPs are prepared for every six years. Assessment, review and action are the pillars of each cycle, which is a continuous and iterative process resulting in the production and implementation of RBMP for meeting the requirements of WFD. Within this planning cycle, the public participation is regarded as a key principle of the WFD. According to Directive, the active stakeholder involvement and the public consultation in the preparation, review and update of the RBMPs are crucial for the general acceptance and applicability of the WFD.

In each planning cycle, the Directive suggests a three-phase process. In the first phase, the characteristic features of each river basin will be analysed. In the second phase, the programs containing measures for each river basin district will be determined. In the last phase, the "River Basin Management Plans" will be created (Kibaroglu et al. 2006).

According to the WFD, the components of a RBMP can be listed as follows:

- Characteristics of river basin district
- Summary of significant pressure and impact of human activity
- Identification and mapping of protected areas
- Map of monitoring networks
- List of environmental objectives
- Summary of economic analysis
- Summary of programme of measures
- Register of more detailed programmes including summary
- Summary of public information and consultation measures
- List of competent authorities
- Contact points and procedures for obtaining background info and comments from the public

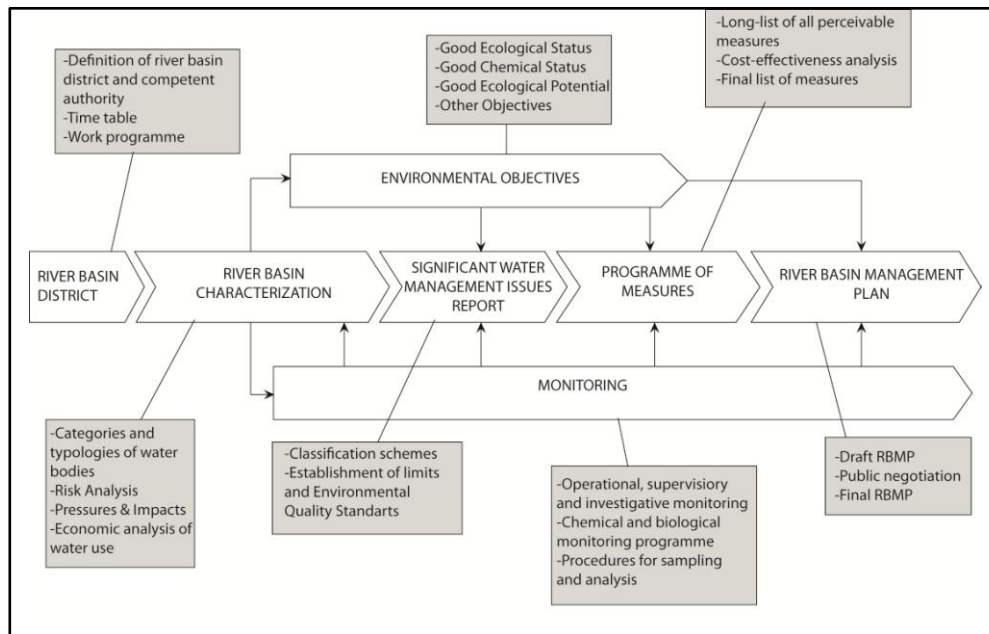


Figure 5.The fundamental steps of IRBM defined in WFD (Çiçek 2011)

In summary, an approach of ecosystem-based integrated water management is introduced with the WFD, and the River Basin Management Plans are chosen as a tool for the implementation of the Directive. Furthermore, it is required to raise institutional interaction via information sharing and inter-institutional cooperation, to harmonize the policies established by different institutions, and to shift decision-making mechanism from centralized structure to participatory one for reaching the WFD objectives.

3.2. INTEGRATED RIVER BASIN MANAGEMENT PLANNING PRACTICES IN THE WORLD

This section of the thesis aims at displaying some best practices of the IRBM planning from the world; and the reflection of the “lesson learnt” on the theory of the IRBM planning. From this point of view, this section examines the integrated river basin management planning processes of Danube River Basin, Brantas River Basin and Murray-Darling River Basin because it is acknowledged that they reach many key successes in terms of general principles and tools of IRBM.

3.2.1. Danube River Basin Management Planning

3.2.1.1. Characteristics of the River Basin

The Danube River Basin (DRB) is the second largest river basin of Europe after the Volga with a vast area of 801,463 km² (See Figure 6). It occupies ten per cent of the European continent, flowing over 2857 km from Black Forest Region in Germany to Danube Delta on the shores of the Black Sea. Additionally, the DRB is the most international hydrographical basin, covering territories of nineteen countries, which includes Austria, Bosnia-Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Montenegro, Serbia, Slovakia, Slovenia, Romania, Ukraine as well as Albania, Italy, Macedonia Poland and Switzerland (McKinley 2008). The European Commission describes the Danube River as the “single most important non-oceanic body of water in Europe” and a “future central axis for the European Union” (WWF 2012).



Figure 6. Map of Danube River Basin (McKinley 2008)

The DRB has a high economic, social and environmental value. It hosts 83 million people and serves as a source of drinking water for more than 20 million people. It provides broad diversity of economic activities and land use, which involves several settlements and a wide array of agricultural, industrial, forestry, mining, recreational and tourism activities. Besides, it is used as a major navigation and commerce route especially due to the Europa-Kanal which makes available transport from the Black Sea to the North Sea via the connection between Danube and Rhine Rivers. The basin also offers other significant economic benefits through hydroelectric power production.

Furthermore, the DRB is home to many highly valuable ecosystems which support unique habitats for a rich and in many cases globally important flora and fauna. It provides spawning areas for more than 100 fish species, including six endangered species of sturgeon and provides breeding, staging and wintering areas for about 300 bird species, including internationally important numbers of white pelicans and pygmy cormorant. Additionally, there are approximately 500 species of plants, 90 freshwater molluscs, over 30 amphibian species and 22 mammal species such as European mink, the wildcat, the freshwater otter and the monk seal. Due to their high biological diversity and significant hydrobiological characteristics, some of the basin areas such as Danube Delta -designated as both Ramsar World Heritage Site and UNESCO Biosphere Reserve in 1991- have received protection status.

However, the DRB has been under severe pressure since centuries because of human activities on land and water resources. As shown in “the Danube River Basin Analysis Report 2004”, nutrient pollution, organic pollution, pollution resulted from hazardous materials and hydromorphological modifications are the four main issues that have negative impacts on aquatic ecosystems in the basin. Especially extensive river regulations have resulted in the loss of more than 80 per cent of floodplain area, which causes a dramatic reduction in the habitats and biodiversity (ICPDR 2012).

3.2.1.2. Management and Planning Process of the River Basin

Hence the DRB has been shared by nineteen countries which have diverse landscapes and major socio-economic differences; it shows several particular challenges with compared to other European river basins. Consequently, it was quite obvious that one overall realistic perspective was required for the sustainable and integrated management of Danube Basin. However, only in last 25 years has the importance of conserving the basin been recognized by the riparian countries and they have begun to allocate their resources and to improve policies for restoration of the DRB back to its original condition. Especially after 1990, ‘integrated river basin management’ was accepted as the main approach to meet the existing challenges.

In 1985, eight riparian countries had signed the ‘Bucharest Declaration’ to cooperate on the water management activities. The Declaration aimed at improving the water quality of the

Danube and establishing a network for standardized water quality measurements. However, objectives of the Declaration could not be implemented in an effective way because of the political and economic situation in the region at that time. Shortly after the political changes in the political system of Central and Eastern Europe, “the Environmental Programme for the Danube River Basin” (EPDRB) was created in 1991 by the 24 Danubian countries, GEF/UNDP, European Commission and NGOs. The programme was performed as a framework for enhanced regional cooperation in the strategic and integrated management of Danube Basin. The programme particularly focused on the river conservation and restoration through promoting monitoring, collection and evaluation of all available data, establishment of emergency response systems, organization of networks for cooperation and conduct of institutional strengthening and capacity building activities. In order to guide the programme and to coordinate the administrative, financial, scientific and technical advisory support, a Task Force which was comprised of representatives from countries, international organizations and NGOs was established. The European Commission, which was seen as an impartial party by all riparian countries, was called upon presidency over the Task Force in order to hold the balance between the interests of highly developed upstream countries and economically and technologically modest downstream ones. Additionally, the Programme Coordination Unit (PCU), which was jointly managed and funded by GEF/UNDP and the EU, was created to coordinate and implement the EPDRB and support the Task Force. In June 1994, 13 Danube countries and the EU signed “the Convention on Cooperation for the Protection and Sustainable Use of the River Danube” (the Danube River Protection Convention) to assure the legal basis for protection and sustainable use of water and other ecological resources in the DRB. Furthermore, a “Strategic Action Plan” (SAP) was accepted by Danube ministers and the EC in December 1994 with a view to move from planning stage to implementation one. Four strategic goals were defined within the Plan, which were the improvement of ecosystem and biodiversity through reducing pollution loads; the maintenance and improvement of the water quantity and quality; the control of damages resulting from accidental spills; and the enhancement of regional cooperation in water management. In order to meet these goals, construction of drainage systems and treatment plants for municipal and industrial wastewater; reduction of agricultural pollution; restoration of wetlands and floodplains; and integrated and sustainable water management were specified as the necessary measures. This plan contributed to the fulfillment of the objectives defined within the Convention. Other issue stressed in the Convention was the co-operation in the field of monitoring and assessment. Consequently, Trans-National Monitoring Network (TNMN), which was set as a crucial tool under DRPC, was launched in 1996 with an aim of evaluating the water quality of the Danube (Nachtnebel 1997).

In October 1998, “the International Commission for the Protection of the Danube River” (ICPDR) was mandated to implement “the Danube River Protection Convention”. In December 2000, the WFD entered into force, which requires all EU water bodies to achieve "good status" or “good ecological potential” by 2015. In return, the contracting parties to the DRPC, including non-EU members, committed to fulfill the requirements of the WFD

throughout the entire Danube River Basin District and assigned the ICPDR as a coordination body for promoting the implementation of the WFD using IRBM as the guiding framework.

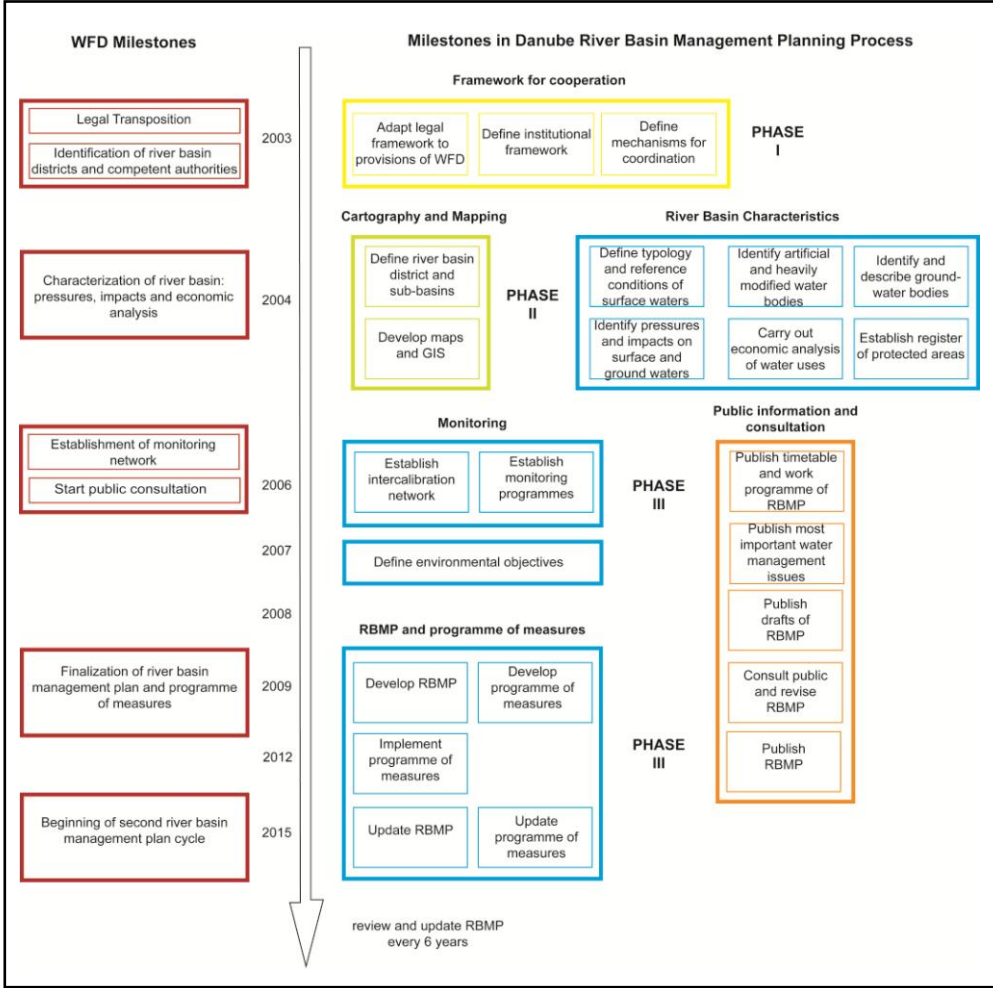


Figure 7. Comparison between the milestones of the WFD and the DRBM planning process

In order to implement the DRPC properly, an organizational structure was determined under ICPDR. The ICPDR tasked the Ordinary Meeting Group with making the policy decisions, the Standing Working Group with giving politic guidelines and Technical Expert Groups with organizing technical documents. Among these different bodies, the Technical Expert Groups are essential for the proper functioning of the ICPDR. National experts from Contracting Parties have been represented in these Expert Groups, which gives all stakeholders chance to agree jointly on the necessary actions throughout the whole process

of the development of the Danube River Basin Management Plan. Additionally, the ICPDR established a framework for other organizations to participate in the meetings of the ICPDR and Expert Groups for increasing active cooperation. By this way, the organizations including non-governmental organizations, organizations representing private industry and intergovernmental organizations have become official observers to the ICPDR. Immediately after putting the organizational structure in order, the ICPDR determined the schedule for Danube IRBM in order to meet EU deadlines for environmental objectives of the WFD (See Figure 7).

In 2000, the results obtained from the SAP were used by ICPDR for preparing “Joint Action Programme” (JAP). The JAP defines the comprehensive measures to be taken over the period of 2001-2005 in order to satisfy the environmental objectives specified in the DRPC. The implementation of the JAP provided the integrated and sustainable management of Danube Basin by governments and the private sector in riparian countries. In 2001, ICPDR initiated “Joint Danube Survey” (JDS1) in order to evaluate the accuracy and comparativeness of quality data set obtained from TNMN. The results of JDS1 showed the need for improvement of TNMN and it raised public awareness about the Danube and necessity for pollution reduction measures.

Other issue emphasized within DRPC was that environmental protection is a “*community responsibility*” and the participation of the interested parties is crucial for the success of IRBM. The approach of public involvement has even been enlarged by the WFD requirements. In 2003, the ICPDR approved “the Danube River Basin Strategy for Public Participation 2003-2009” with accordance to the WFD. The strategy stressed that public participation must start promptly in order to create a common ground for future management planning process. One of the crucial elements of the “Danube River Basin Strategy for Public Participation in River Basin Management Planning 2003-2009” was the recognition of having public participation organized at four geographical levels (international or roof level, national level, sub-basin level and local level) to secure valuable comprehensive inputs into RBMP.

In 2004, the first requirement of the WFD was met through the completion of ‘Danube River Basin Analysis’ which built upon the ICPDR’s JAP prepared in 2000. The whole process was managed by the Technical Expert Groups and about 200 national experts from 13 countries were involved in the preparation of this report. The report provides the first extensive characterization of water bodies, establishment of protected areas inventory, description of significant pressures and its impacts, economic analysis of water uses and public participation activities. Additionally, it represents basis for developing the “Danube River Basin Management Plan” (DRBMP) and its “Joint Programme of Measures” (JPM). Its key conclusion was nutrient pollution, organic pollution, pollution resulted from hazardous materials and hydromorphologic modifications are the four major water management problems affecting aquatic ecosystems in the basin. Based on the results of “the Danube River Basin Analysis” and JDS1, the TNMN is revised in 2006. Monitoring

upgrades through broadening the scope and increasing the number of water quality monitoring stations help ensure compatibility of TNMN with the requirements of the WFD.

Finally, in 2009, the DRBMP and the JPM were prepared in order to follow the WFD requirements. In February 2010, they were presented and adopted at the Ministerial meeting. The Plan focused on the significant water management issues; and defined the visions for each issue. On the grounds of these visions and the national programme of measures of each riparian country, the JPM determined specific actions and scenarios and their likely outcomes by 2015 and beyond (Weller and Liska 2011).

Since the IRBM plan and the programme of measures should be revised and updated every six years with respect to requirements of the WFD, the revision and updating of the DRBMP and the JPM should be done until December 2015.

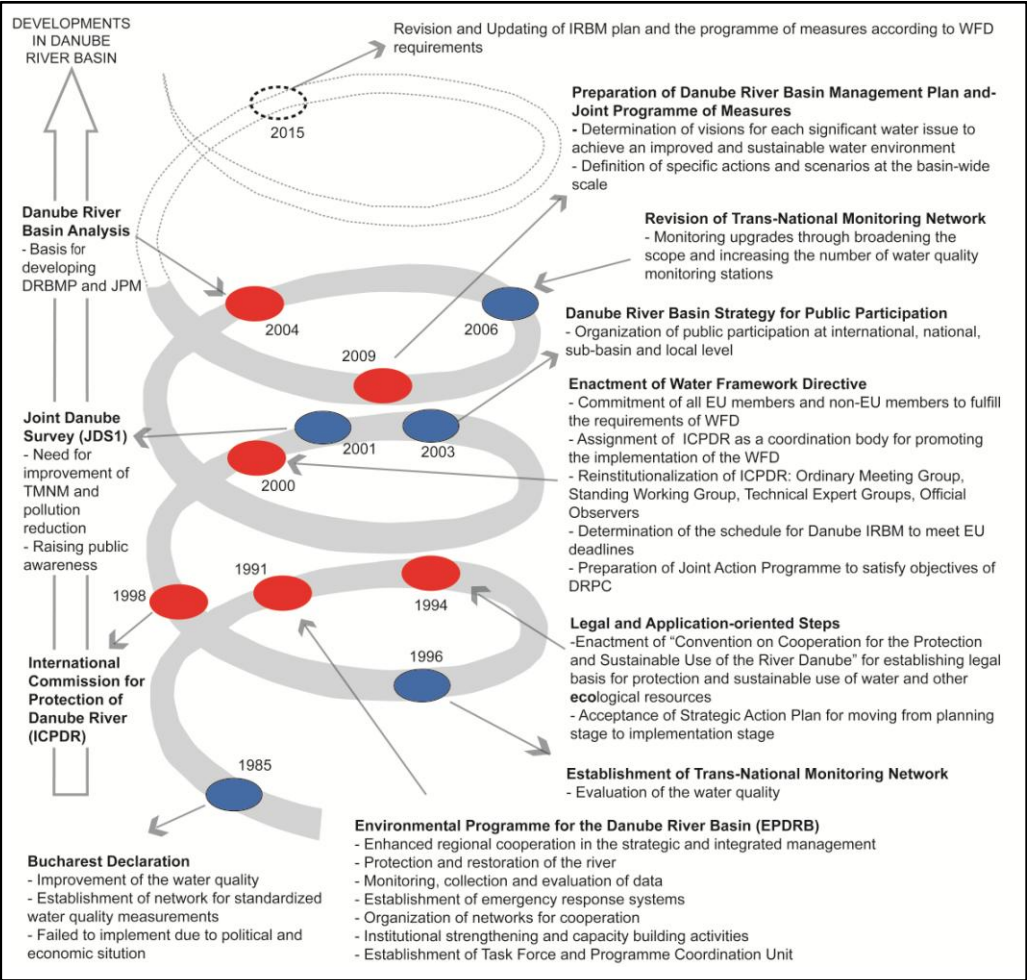


Figure 8. IRBM planning process of Danube River Basin

To conclude, the planning process of DRBM (See Figure 8) has achieved success due to a certain number of factors. First and above all, the riparian countries have been cooperating together in the framework of the DRPC since 1994; and the institutional structure, namely the ICPDR, has already been formed to enable cooperation and transboundary water management in the DRB. A central element of this cooperation has mainly been centered upon reliable and organized information related to water quality. In this framework, monitoring activities have been conducted since 1996 in order to provide an agreed and organized data set for the whole basin. These monitoring activities have not only scientifically contributed to the IRBM process but also generated the political will for taking actions. Additionally, the EU WFD has provided a logical scientific approach for defining the water status and organizing information for political decisions as well as a legal basis for promoting IRBM planning process. Finally, the success in the IRBM planning process is only possible due to the high-level commitment of the countries to cooperate. Throughout the planning process of DRB, there has been a considerable joint planning at the basin level and a strong impact of this on the actions and measures taken at the national level.

3.2.2. Brantas River Basin Management Planning

3.2.2.1. Characteristics of the River Basin

The Brantas River Basin (BRB) is one of the largest and most developed basins in Indonesia with an area of approximately 11,800 km² (see Figure 9). It covers 25% of the Province of East Java; and it hosts nearly 15 million people, which makes up 42.4% of East Java's population.

The basin is regarded as one of the most productive granaries in Indonesia; and it stands chance of further agricultural development. Furthermore, industry located in Surabaya port shows a lot of promising for future growth. Therefore, the BRB contributes some 8% of national GDP of Indonesia. Since the promising socio-economic situation of the BRB is expected to provide significant contribution to East Java's and Indonesia's development, central government designates the BRB as "nationally strategic" (Usman 2000; Bhat et al. 2005; Hidayet 2009).

The basin comprises a wide variety of water users, including millions of urban users, farmers and industries, all of which place dependence on access to safe water. On the other hand, population growth, agricultural development, and intense industrialization over past three decades have caused many water-related problems, which includes pollution and irregular water regime (Bhat et al. 2005).

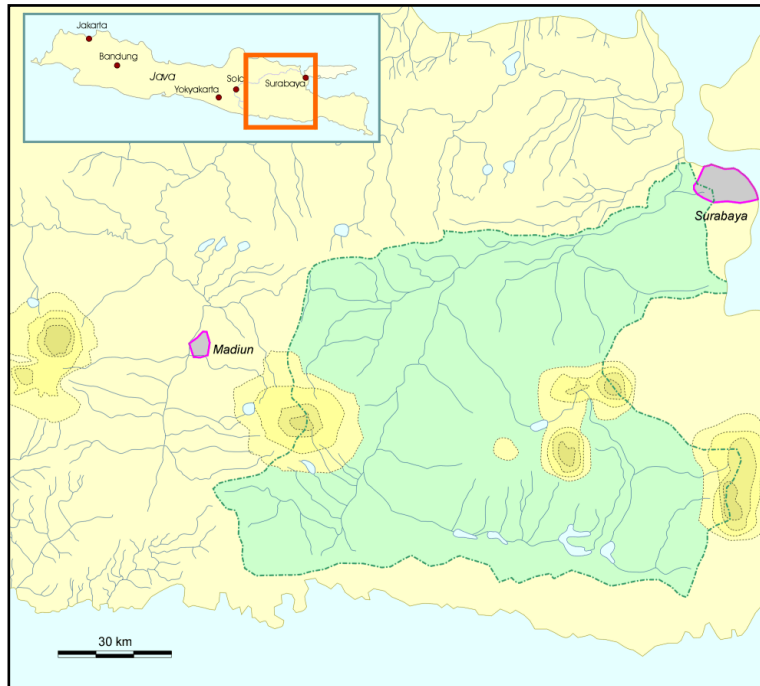


Figure 9. Map of Brantas River Basin (Hidayet 2009)

3.2.2.2. Management and Planning Process of the River Basin

The development of the BRB started in 1958 with an inclusive multi-purpose project based upon the principle of ‘One River, One Plan’. Although flood prevention had first priority, severe food shortage also posed a national problem and power generation was required for regional development. Therefore, it was decided that the planning process had been designed as the sequence of master plans in accordance with national and regional development requirements. As a result, main priorities were selected for each stage of development, which has led to the subsequent plans.

Considering the destructive impacts of flooding in the basin, flood control was selected as the main priority of Master Plan I (1961). The plan consisted of large technical developments such as dam structures, river diversions, flood retarding systems, and riverbed channels. In the same year, “the Brantas River Basin Development Project” was created as a temporary body under the authority of Ministry of Public Works in order to plan and construct these infrastructures. After majority of the first plan’s goals had been succeeded, Master Plan II was prepared in 1973. It emphasized on irrigation development with accordance to the government policy on food security. In 1985, Master Plan III was prepared after irrigation schemes had inclusively been developed and cultivation had intensified within the basin. The plan aimed at fulfilling the demand for domestic and industrial water supplies as a response

to national policy on ongoing urbanization and industrialization. However, in the course of time, it was recognized that the sustainability of infrastructure investments could not be ensured merely by Brantas River Basin Development Project owing to a lack of incentives for operation and maintenance activities. This situation had led to the establishment of Jasa Tirta Public Corporation 1 (JTP1) in 1990 as a state-owned permanent organization in order to operate and maintain major water infrastructure and to manage water resources in Brantas Basin. Additionally, the Water Resources Management Committee (WRMC) was established in 1994 as a coordinating body where all aspects of water management were decided. In conjunction with the establishment of the JTP1 and WRMC, it was initiated to put importance on the basin-wide integrated management of water resources, rather than predominantly on the water development activities. Therefore, conservation, pollution reduction and effective water management became the main priority of Master Plan 4; and the JTP1 prepared the plan in 1998 in consultation with local government and water users. In 2004, a new Water Law was enacted in order to address the institutional deficiencies in the achievement of integrated river basin management. This Law has ensured to expand the direct participation of stakeholders and interest groups in the whole planning process. In accordance with the requirements of 2004 Water Law, in 2007, the Brantas River Basin Development Project, the Provincial Water Resources Services, and the Jasa Tirta Public Corporation 1 joined their forces within the Water Resources Management Committee to collaborate, manage, monitor and evaluate river basin management. Therefore, the principle of the Brantas River Basin Development Plan has finally become 'One River, One Plan, One Integrated Management'. This planning cycle has provided the frame for the construction of 8 reservoirs, 4 river improvement schemes, 4 barrages, and 3 rubber dams. These structures have contributed to an improved flood control, and a significant increase in cropping intensity, domestic and industrial supplies, and hydropower generation (Bhat et al. 2005; Hidayet 2009; UNESCO et al. 2009b).

To conclude, the planning process of BRB Management clearly appears as a 'spiral' (See Figure 10); and several aspects have contributed to its success. These aspects can be summarized as following (Hidayet 2009):

- The step-wise approach in planning process has paved the way for the continuous development of water potentials within the basin.
- The thematic delineation of each master plan has provided a well-marked emphasize, which has allowed politic and community support, cooperation between institutions, and synergy among different sectors.
- The problems are prioritized throughout the planning process, considering constraints such as time and funds, which makes the planning process of BRB comprehensive.
- The effectiveness of IRBM activities in the basin is continuously monitored and evaluated, which give chance to respond to incidents in time.
- The institutional structure has changed in parallel to planning and implementation, from a temporary to a permanent body which gathers all stakeholders to receive their support to policy-setting and river basin management.

- The importance of the basin-based management has advocated in legislation (2004 Water Law); which has ensured coordination among all stakeholders and public participation in each phase of river basin management.

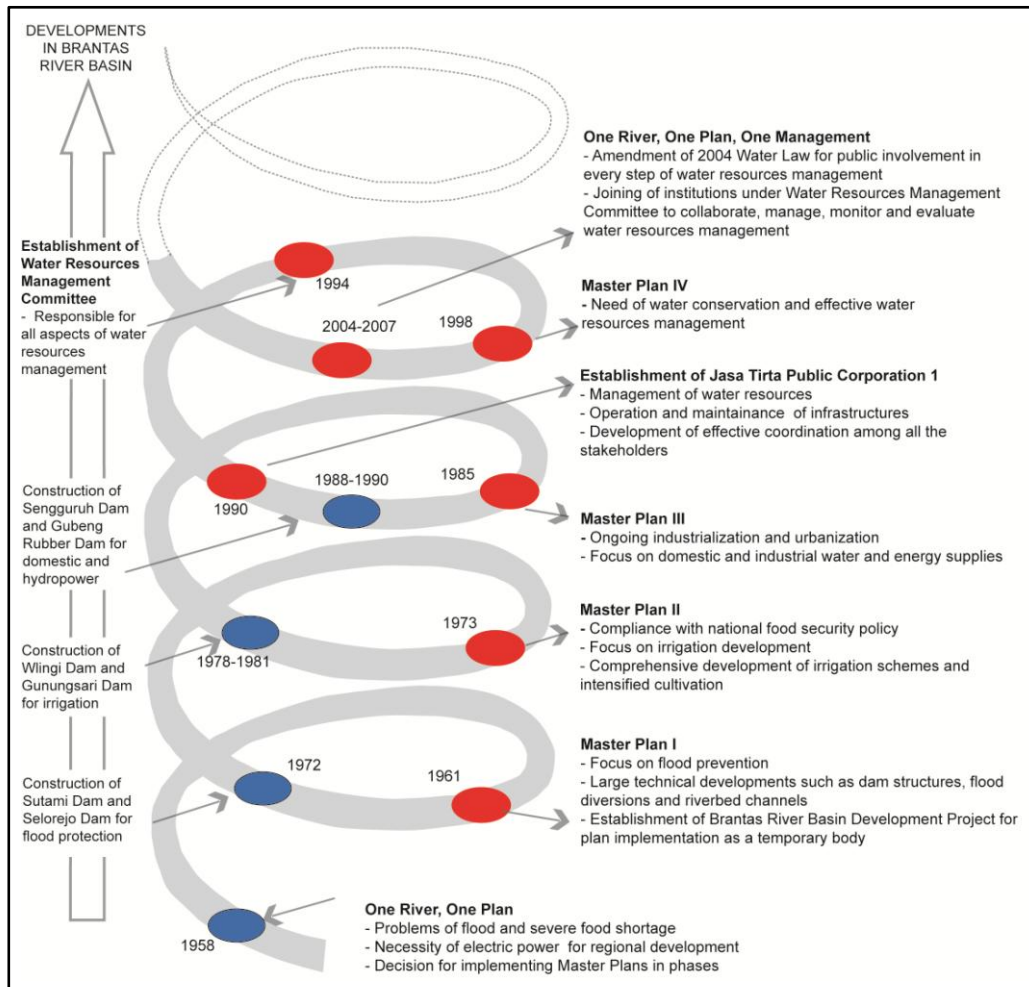


Figure 10. IRBM planning process of Brantas River Basin Management

3.2.3. Murray-Darling River Basin Management Planning

3.2.3.1. Characteristics of the River Basin

The Murray-Darling River Basin (MDRB) is located in Australia, shared out amongst the “States of New South Wales, Victoria, South Australia, Queensland, and the Australian

Capital Territory” (See Figure 11). It is the sixth largest river basin in the world, with an area of nearly 1 million km². It supports a population of almost two million, which comprises 11% of Australia’s total population. In spite of its vast area, mean annual run-off is very limited and extremely unstable. In other words, the greater part of the basin is arid or semi-arid with evaporation generally exceeding rainfall, which makes the system more vulnerable to water quality issues (Bhat 2008; UNESCO et al 2009b).

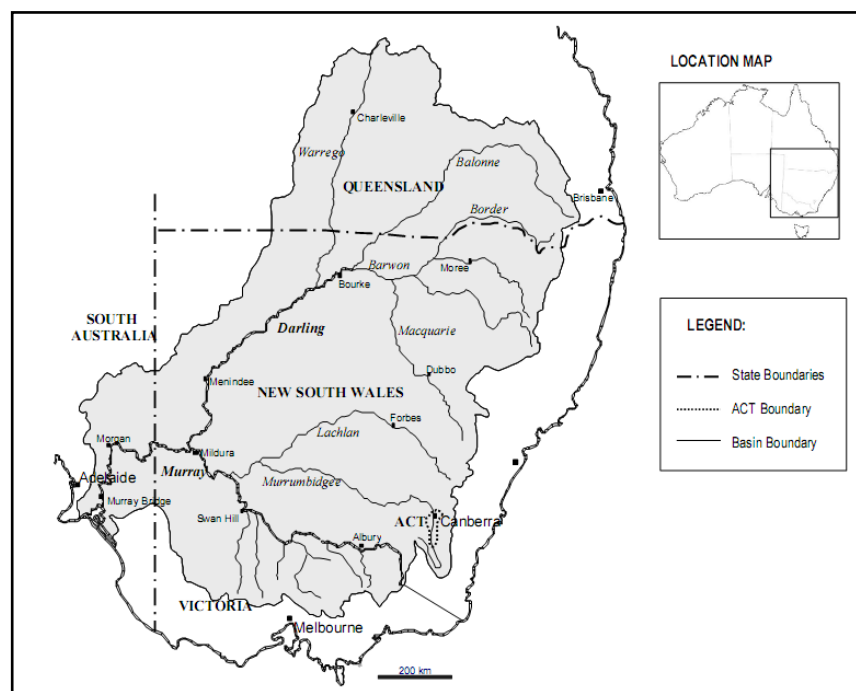


Figure 11. Map of Murray-Darling River Basin (Bhat 2008)

As the most important agricultural region in Australia, the MDRB produces approximately 40% of Australia’s food supply and national agricultural income. Although agricultural production is crucial for Australia’s economy, the river basin matters much more than just being a food basket. It plays an important role in the Australian cultural heritage. Additionally, it has an important role in supporting biodiversity for several different animals and plants. It has at least 46 different native fish species, 16 endangered species of mammals and 35 species of endangered birds. It has over 30,000 wetlands, some of which listed as internationally important for migratory birds (MDBA 2013a).

However, the ecology of the MDRB is under severe pressure due to the issues such as dried wetlands, poor water quality, salinity and endangered native species. This drastic decline in

ecological health of river basin has resulted from bad water management including water diversions and over-use of water resources. Bad agricultural practices such as native vegetation clearing and deforestation have also a major role in the ecological disaster (Australian Human Rights Commission 2009).

3.2.3.2. Management and Planning Process of the River Basin

The management of the MDRB has evolved following a spiral of planning process as a response to new economic, social, political, and environmental pressures. The first planning phase of the MDRB had begun over a century ago due to the conflicts over the water use between the States of “New South Wales, Victoria and South Australia”. Each state desired securing the right to use the water for its own citizens. While Victoria and New South Wales desired the river development for irrigation, South Australia desired the river development for navigation. After long-lasting negotiations, “the Murray Waters Agreement” was produced in 1914 which included a package of water and cost sharing rules, and legal provisions for joint funding of infrastructure development. The Agreement was signed by the governments of three riparian States as well as the Commonwealth Government. The Agreement required consensus-based decision-making and provided a legal basis for the establishment of “River Murray Commission”. The Commission was only dealt with the issues related to water quantity until salinity problem had arisen within the MDRB. This problem led to minor legal reforms in 1982, which extended the Commission's responsibilities to concern with water quality. On the other hand, it was eventually recognized that the Murray Waters Agreement and River Murray Commission failed to satisfy governance needs of the river basin. Therefore, the Murray Waters Agreement was replaced by “the Murray-Darling Basin Agreement” in 1992, which was gained full legal status in 1993 through the ratification of all jurisdictions. The Agreement aimed at coordinating and promoting effective planning and management in MDRB through the creation of water-sharing arrangements and water management process. In order to support the implementation of the Agreement, three institutions were created (Haisman 2004; UNESCO et al. 2009b):

- “The Murray-Darling Basin Ministerial Council” which was the decision-making body
- “The Murray-Darling Basin Commission” which was the executive and advisory body of the Council
- “The Community Advisory Committee” which gave the Council advice from a public perspective

Additionally, “the Natural Resources Management Strategy” was developed in order to achieve the aim of the Murray-Darling Agreement. The strategy acknowledged that partnership between government and community was essential for achieving sustainable water management and these partnerships reinforced the community to overcome local problems in an integrated and coordinated manner. Public education was regarded as a crucial part of this process. Therefore, educational programs were conducted to raise public

awareness regarding the significance of environmental conservation and integrated river basin management.

Between 1993 and 1995, “An Audit of Water Use in the Murray-Darling Basin” was conducted, which revealed that increase in water diversions caused decline in ecological health of river system and threatened the ability of river basin to support the region’s economic and social sustainability. Based on these findings, an upper limit on water diversions, which was referred as the Cap, was agreed in 1996. In the same year, “the Basin Sustainability Plan” was prepared in order to accelerate the implementation of programmes defined within the Natural Resource Management Strategy. In 2007, Murray-Darling Agreement was replaced by “the Water Act”, which required the Basin Plan to include information on all aspects of the water resources of the MDRB. In order to meet the requirements of Water Act, in 2008, the Murray-Darling Basin Commission was replaced by “the Murray-Darling Basin Authority” which had stronger and centralized powers. The Authority was charged with the preparation of a Basin Plan; the assessment and monitoring of water resources; the data collection and conduction of researches; and involvement of the community in the management process. In 2010, the Authority released a draft plan to secure the long-term ecological health of the MDRB. This plan was revised and became law in 2012. The Plan included (UNESCO et al. 2009b; MDBA 2013b):

- an environmental watering plan for the optimization of environmental outcomes for the MDRB;
- a water quality and salinity management plan;
- a mechanism to manage critical human water requirements; and
- requirements for monitoring and evaluating the effectiveness of the implementation of the Basin Plan.

To conclude, a spiral planning process (See Figure 12) can explicitly be seen in the progression of the management system of the MDRB. The management of the basin was initially state-based, which was emphasized on water-sharing and navigation issues. In the course of time, the decline in the ecological health of the river system as well as the increase in the awareness of the environmental issues led to the gradual evolution of management system to an integrated and basin-wide one. Throughout this process, a certain number of factors have led to success which can be summarized as following:

- The political will and ongoing support of Commonwealth Government has provided the sustainability of the MDRB planning process and its programmes.
- Top-down governmental and institutional mechanisms and legal tools have been created, which has facilitated enduring spirit of multi-jurisdiction cooperation.
- Community interest, involvement and support can be maintained due to bottom-up, participatory and consensus-based policy development.
- Educational activities on water and IRBM have been introduced in order to enhance public awareness and to gain their support.
- Several mitigation strategies and innovative policy initiatives have developed, which has secured water supply at extreme events.

- Basin-wide natural resource management policies and action programmes have been implementing through Murray-Darling 2001 funding programme, which has provided to sustain the planning process in an effective way.

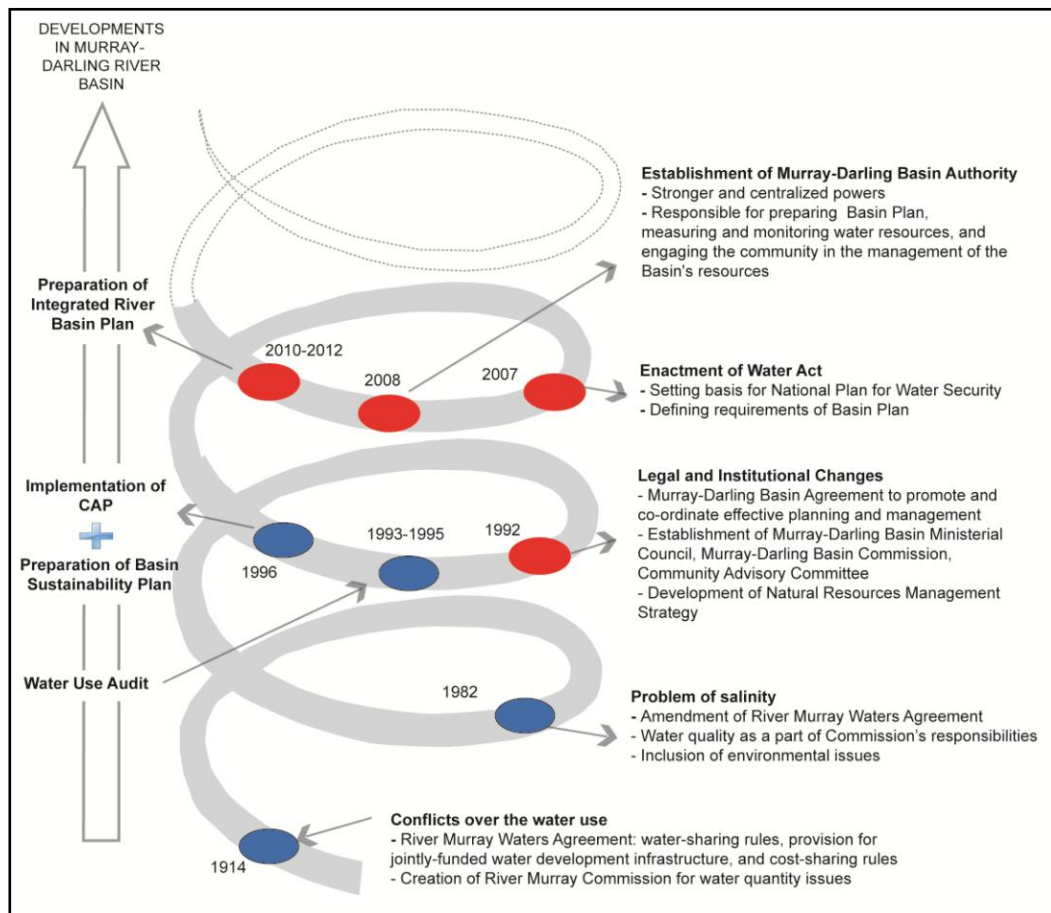


Figure 12. IRBM planning process of Murray-Darling river basin management

3.2.4. Evaluation of Different Integrated River Basin Management Examples

According to reach the final target of the thesis, which is to integrate IRBM studies into national planning and management system, IRBM studies of different foreign countries are evaluated in the view of their management and planning processes and their institutional and legislative mechanisms.

In order to evaluate achievements of the IRBM planning processes, Danube River Basin, Brantas River Basin and Murray-Darling River Basin are compared with each other in terms of key success factors and fully attained IRBM principles by the help of Table 4.

Table 4. Comparisons between different integrated river basin management practices

River Basin	Keys to Success	IRBM Principles to be Fully Achieved
Danube River Basin	<ul style="list-style-type: none"> • High political commitment of the countries to cooperate • Joint planning and organization of actions • Public Participation • Stakeholder Involvement 	<ul style="list-style-type: none"> • <u>Principles related to institutional issue</u>: River Basin Organization; Effective partnership • <u>Principles related to administrative issue</u>: High-level commitment; Effective participation • <u>Principle related to implementation issue</u>: Strong informational and science base
Brantas River Basin	<ul style="list-style-type: none"> • Positioning as a national priority and as a river-basin wide priority • Operational management of water resources and infrastructure • Coordination among sectors and all stakeholders • Continuous monitoring and evaluation 	<ul style="list-style-type: none"> • <u>Principles related to planning issue</u>: Holistic, strategic and proactive approach • <u>Principles related to institutional issue</u>: River Basin Organization • <u>Principles related to administrative issue</u>: Effective participation
Murray Darling River Basin	<ul style="list-style-type: none"> • Contingency measures to secure critical water demands • Reducing the economic impacts of severe water shortages • Enhancing public awareness • Community consultation and participation in decision-making 	<ul style="list-style-type: none"> • <u>Principles related to administrative issue</u>: Local empowerment and effective participation • <u>Principles related to institutional issue</u>: River Basin Organization; Effective partnership • <u>Principle related to implementation issue</u>: Long-term investment

To conclude, these IRBM planning practices can be regarded as successful examples of IRBM planning process that includes evolutionary cycles, formed by the phases, i.e., assessment and problem identification, planning, implementation and evaluation. Although each planning practice has its own strength, they meet on some common points. Within all of these planning practices, an institutional structure is established at the river basin level. The roles and responsibilities of these institutional structures are identified with legislative tools. The planning processes are realized with the participation of all related stakeholders. These characteristics of the planning processes make them holistic, participatory, and strategic; therefore, they can satisfy the important principles of IRBM.

CHAPTER 4

WATER MANAGEMENT AND THE IRBM IN TURKEY

4.1. LEGAL FRAMEWORK AND INSTITUTIONAL STRUCTURE

4.1.1. Water Related National Legislation

In Turkey, since 1920s, a great many of laws and regulations have been adopted by many related institutions and organizations in order to protect water resources and prevent environmental pollution. Additionally, Turkey has signed several international conventions, agreements and declarations related to water issues, which have a binding force on Turkish Legislation System.

Process of Turkish water related national legislation can be discussed under three periods according to implemented approaches. A broad discussion is given in Salmaner (2008) and Altay (2012).

First Period (1923-1950): In this period, covering first thirty years of Turkish Republic, framework laws related to water had enacted with the intent to putting water management in a legal grounds. The construction of individual projects and taking measures to protect the public health were the determining priorities of this period. “**Water Law No.831**” was enacted in 1926. The aim of the Law is to organize the provision and management of water for public good. The Law confers all the responsibilities to municipalities. “**Public Sanitation Law No.1593**” in 1930 was promulgated to determine the sanitation rules for improvement of hygienic conditions, protection of public against epidemic diseases, protection and improvement of quality of mineral waters, spring waters and drinking waters, and establishment of wastewater and drinking water infrastructure systems. This Law gives responsibilities to the Ministry of Health and municipalities for the protection of public health.

Second Period (1950-1980): In second period, systematic development of water resources had gained a priority. The establishment of the Directorate General of State Hydraulic Works (SHW) in 1954 can be seen as a milestone of this period. “**State Hydraulic Works Organizational Law No.6200**” gives an ultimate authority to the General Directorate for coordinating water use at national level. Some of the duties and authorities assigned to the institution are: 1) establishment of facilities for flood protection, 2) construction of irrigation systems, 3) draining the marshes, 4) hydro-power generation, 5) designing the projects of

drinking water and sewerage systems, 6) river rehabilitation, 7) provision of the operation, maintenance and repair of the facilities, and 8) doing all kinds of research and projects related with assigned jobs.

“**Underground Water Law No.167**”, enacted in 1960 gives broad authority to General Directorate of SHW about ground water. In this Law, it is specified that ground waters are public waters and they are under the State’s authority and possession. All forms of research, utilization, protection and registration are subject to the provisions of the Law. In 1971, “**Water Products Law No.1380**” to determine the provisions about protection, production and controlling of water products in seas and inlands were promulgated.

Until 1980s, a water management oriented approach had been adopted and an ultimate attention had been paid to optimum use of water resources and public good. In 1981, “**Law on the Establishment and Duties of General Directorate of Istanbul Water and Sewerage Administration No.2560**” was put into effect in order to associate the conduct of water supply and sewerage services, and establishment and to operate of all necessary facilities for these services. Some of the duties and authorities assigned to the institution are specified as follows: 1) establishment, operation, maintenance and repair of facilities for the water supply and water distribution for those in drinking, domestic and industrial water need, 2) establishment, operation, maintenance and repair of facilities for collection, removal, discharge and reuse of waste water and storm water, and 3) carrying out the water supply and sewerage services. Later, this law enabled greater municipalities implement the Law in their metropolitan areas.

Third Period (1980-2000s): In the third period, the issue of water quality was gradually brought to the agenda because of serious increase in water pollution in parallel with rapid urbanization and industrialization. In addition to water quality issue, nature protection and sustainability concepts came into prominence with the impact of the Brundtland Report. These concepts have become the norm during the preparation of the laws and regulations in order to provide a balance between development and protection (ORSAM 2012). In this respect, “**Environment Law No. 2872**” was enacted in 1983. It is the fundamental frame within the Turkish Legal System in accordance with the environmental protection and the sustainable development approaches. General principles of the Law related to environmental protection, improvement and pollution prevention can be summarized as follows:

- Institutional cooperation,
- Sustainable development,
- Public participation rights,
- Environment-friendly technologies,
- Polluter-pays principle,
- International conventions on environment,
- Market-based mechanisms, economic instruments and incentives,
- Protection and improvement of water resources as well as protection of biodiversity
- Environmental plans at the basin scale,

In 1990s, one of the important water related legislative policies is the “**Coastal Law No.3621**”. The purpose of this Law is to set out the principles for protection of the sea, natural and artificial lakes, river shores and the shore strips with regards to the natural and cultural characteristics, and for their utilization towards the public interest. The Law describes the permits and prohibitions for land use development on coastal areas.

In the context of the analysis of water related national legislation, the first finding can be expressed as the lack of framework law on water that introduces general principles and procedures of protection and management of water resources. Besides, there are approximately 30 laws and regulations related to water resources, which lack an integrated and holistic approach but adopt a sectoral one. Moreover, the incoherence of legislations results in institutional conflicts and overlaps. As a result, coordination and authority problems have arisen in water management, which makes the implementation process difficult, which is summarized in Figure 13.

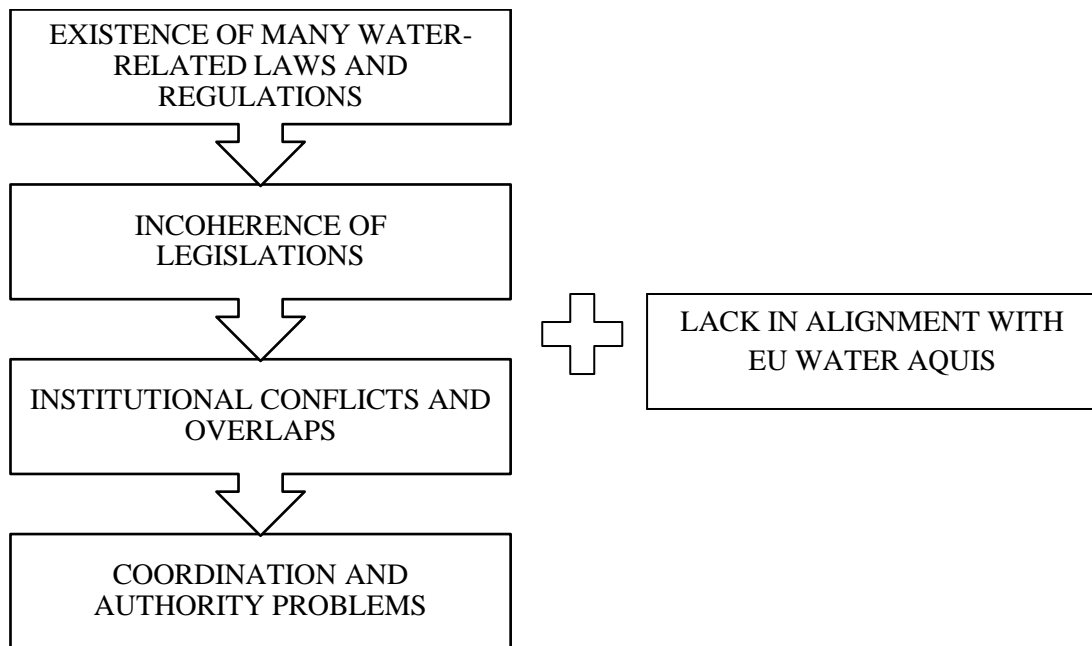


Figure 13. Analysis of water related national legislation

4.1.1.2. Draft Law on Water

Turkey has stimulated many efforts in changing its national water policy in harmony with the European water acquis. However, water related national legislation has still not comprised relevant regulations on the main provisions of WFD (2000/60/EC) such as

integrated water management approach, basin-based water management model, environmental objectives, management plans, and program of measures, administrative measures, public participation and cost-recovery principles (Güneş 2010).

With the purpose of the transposition of the provisions of the WFD into Turkish legislation, the studies related to the preparation of Framework Law on Water have proceeded. While the draft Law on Water is scrutinized, it is clearly seen that the main target of the Law is the protection and utilization of water resources in a sustainable way, and a holistic approach is adopted in order to achieve this target. Additionally, it covers whole surface, ground and coastal water resources with a holistic view. The Law includes nine main principles (OSİB 2012a):

- primarily utilization of water potential in its own basin,
- consideration of public interest as the prior criteria in the use of water resources,
- creation of water information system,
- pollution prevention at its source,
- achievement of environmental objectives for preventing pollution and improving the quality of polluted waters,
- cost-recovery through the principles of polluter-pays and user-pays,
- reaching whole surface and ground waters to specified good water status and protecting this status,
- consideration of "national water plan" and "river basin management plans" as basic documents in all activities related to water resources, and
- management of water resources through a single authority.

Integrated basin management plan is identified in the Law as a plan which is prepared on river basin basis with aim of protection, improvement and deterioration prevention of water resources and its habitat by pursuing the sustainable balance between protection and utilization. Adopting a participatory approach, these plans will be prepared in line with National Water Plan in the coordination of the Ministry of Forestry and Water Affairs. Furthermore, this is an attempt to overcome the problems of coordination and overlapping authority. The competent body to facilitate coordination in water management as well as the authorization and responsibility of relevant institutions are clearly stated in the Law.

In the view of evaluation of the draft Law on Water, it can be said that the Law can be considered as the preview of a new era in water resources management of Turkey. It is supposed that Turkish water policy will accommodate to sustainable and environmental friendly approach and the standards of the WFD with the inurement of the Law. However, enduring political will, ever-developing institutional capacity, well-designed control, monitoring and enforcement processes, and active participation and support of public are required in order that legal change makes significant differences in practice.

In addition to studies related to Draft Law on Water, General Directorate of Water Management prepared Regulation on Protection of Basins and Preparation of Management

Plans. The aim of this Regulation is the determination of procedures and principles of planning and protection of quantity and quality of groundwater and surface water in a holistic approach. The Regulation also includes principles of preparation of river basin management plans. According to Regulation, the Ministry of Forestry and Water Affairs enables the active participation of all related agencies and institutes by in the process of preparation of river basin management plans. Furthermore, it is stated that basin management committees, which are comprised from provincial directorates of Ministry of Forestry and Water Affairs, Ministry of Environment and Urbanization, Ministry of Internal Affairs, Ministry of Foreign Affairs, Ministry of Health, Ministry of Food, Agriculture and Livestock, Ministry of Science, Industry and Technology, Ministry of Energy and Natural Resources, Ministry of Culture and Tourism, Ministry of Development, Ministry of European Union and local authorities, universities and NGOs, will be established in each basin for providing the coordination and participation of stakeholders.

In conclusion, although some problems have still experienced in water resource management and planning activities, there is an effort via Draft Law on Water and Regulation on Protection of Basins and Preparation of Management Plans to resolve the these problems by making arrangements on integrated water management, coordination and cooperation between public institutions, consultancy of public opinion and stakeholder participation

4.1.2. Water Related National Institutions

"Article No. 168 of Turkish Constitution on Exploration and Management of Natural Wealth and Resources" indicates that natural wealth and resources are under the State's authority and possession and that the right to explore and manage them is belonged to the State. According to this Article, the management and utilization of water resources is under the rule and disposal of the state in Turkey. Protection and provision of water resources with the aim of human consumption, energy generation, mariculture, agricultural, industrial and recreational activities are identified as one of the most important duties of the State.

According to this article, activities related to water supply and protection are managed through a wide variety of public institutions and organizations in Turkey. These institutions perform activities related to water management within the framework of their institutional responsibilities. Due to the fact that these activities are shared among more than one institution, water management takes a fragmented and complicated form.

Ministry of Forestry and Water Affairs (Abrogated Ministry of Environment and Forestry) is the main competent authority for Turkey's overall water resources management. The Ministry has a general coordination duty in terms of the development and implementation of water policy including the adaptation of Turkish Water Legislation with the EU acquis as well as water management and protection. One of the main duties of the Ministry is defined as preparation of integrated river basin management plans with the aim of not only protecting and improving ecological and chemical quality of aquatic environment

but also pursuing the balance between protection and utilization. The Ministry is in cooperation with other Ministries, public bodies and other stakeholders related with water management issues.

There are three affiliate institutions of the Ministry which are involved in water resource management:

- **General Directorate of State Hydraulic Works:** It is responsible for planning, management, execution and operation of Turkey's overall water resources. In this framework, it is empowered to construct and operate dams and hydroelectric power plants, irrigation and drainage systems, domestic water supply systems for large cities, and facilities for flood protection. Additionally, it is in charge of performing all studies for investigation, conservation and utilization of ground water as well as allocating and registering them.
- **General Directorate of State Meteorological Service:** Its main duty is to monitor the water resources and to provide climatological data including temperature and rain fall data.
- **Turkish Water Institute:** The main task of this institute is to produce knowledge related to the development of short and long term water management strategy for Turkey, the insurance of coordination between institution and organizations responsible for water management, and the determination of principles for utilization of water resources with the purpose of sustainable development and renewable energy generation.

At the central level, **Ministry of Environment and Urbanization** (Abrogated Ministry of Public Works) is the other institution related to the spatial planning of water related issues. One of the main duties of the Ministry is the preparation, implementation and auditing of environmental and territorial development plans in the regional and basin level, the preparation of sectoral plans compatible with the regional and basin-level spatial strategy plans and environmental plans, and the preparation and approval of studies related to integrated coastal zone management and planning. Furthermore, the Ministry is responsible for the control, inspection and sanction of waste water discharges in order to protect surface and underground waters, seas and soil.

There is an affiliate institution of the Ministry that is involved in water resource management:

- **The Bank of Provinces:** It is a development and investment bank in a status of special budgeted incorporation which provides loans for infrastructure systems including water distribution networks, water treatment plants, sewerage systems and wastewater treatment plants.

At the provincial level, special provincial administrations, greater municipalities and municipalities are responsible to supply water and sewerage services in the provinces and city centers.

Special Provincial Administrations: Their responsibilities related to water issues include supplying potable water and sewerage services to settlements less than 30.000 population and sewage solid waste disposal within the provincial boundaries. Additionally, implementation of water legislation at level of local administrations is under the responsibility of special provincial administrations.

Greater Municipalities: Greater Municipalities implement water-related issues through their General Directorates of Water and Sewerage Administration. These General Directorates are responsible for control of the discharge of industrial waste water, conduct of water supply and sewerage services, and establishment, operation, and maintenance of facilities for the water distribution, water and wastewater treatment.

Municipalities: They are responsible for managing some water infrastructure systems such as drinking water distribution networks, sewerage systems, water and wastewater treatment plants.

There are many local, national and international NGOs, and professional organizations that perform water related studies in Turkey. The functions of professional organizations and non-governmental organizations include raising the public awareness regarding the protection and improvement of soil and water resources, and playing a functional role related to their expertise area between decision-makers and public within the scope of implementation projects. Additionally, universities perform scientific researches related to water resources. World Wild Fund for Nature (WWF Turkey), Water Foundation, TEMA Foundation and Nature and Environment Foundation (DOÇEV) are some of the NGOs. “**WWF-Turkey**” was established in 1996. Main aim of the foundation is to prevent the human-induced threats such as unsustainable consumption of natural resources and global climate change which results in the loss of natural habitats and species (WWF-Turkey, 2012a). “**Water Foundation**” was established in 1995 with purpose of performing studies related to ensuring optimal use and protection of water resources, raising consciousness about water utilization in the most efficient manner, researching new water resources and putting them into the service, and contributing to the problem solving related to water issues (Su Vakfi, 2012). “**The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats**” was established in 1992 aiming at creating conscious and effective public opinion on environmental issues, especially soil erosion, deforestation, climate change and biodiversity loss (TEMA, 2012). **DOÇEV** was established in 1996 in order to carry out studies on the protection and enhancement of natural and environmental values, and raising environmental awareness (DOÇEV, 2012).

In the light of the information on water related national institutional structure, it can be said that the existence of a vast number of central and provincial organization within water resources management leads to a complex hierarchical structure in Turkey. The fragmented and complex form of water management, and strongly centralized structure of decision-making process result in various problems and contradictions such that (Figure 14):

- an integrated approach to the management of water resources becomes impossible.
- inter-institutional coordination, collaboration and communication cannot be provided.
- lack of institutional relationship causes not only slow-down of operations but also waste of resources due to the duplication of actions by different institutions.
- pacification of local governments, non-governmental organizations and the public in such a centralized structure results in decisions taken to be unhealthy.

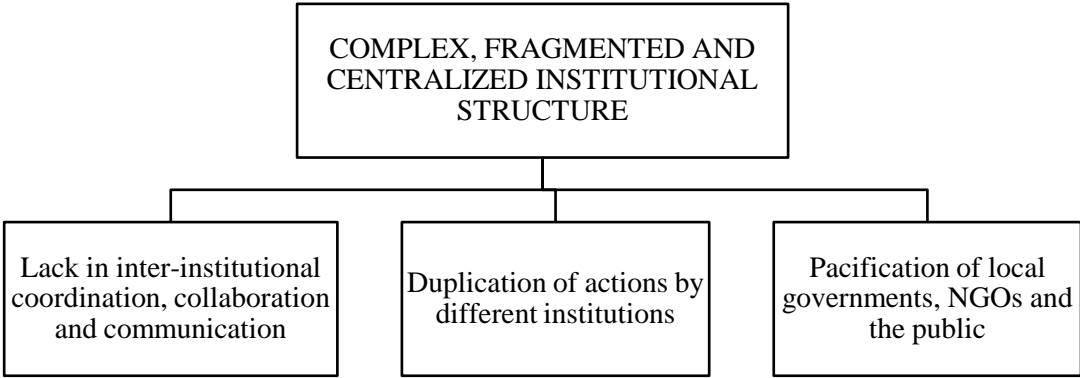


Figure 14. Analysis of water related national legislation

Within the EU harmonization process of Turkey, some water related institutional changes have been experienced (Table 5). Water Management Coordination Committee is established according to Prime Ministerial Notice published in the Official Gazette dated 20 March 2012 with no 28239 in order to overcome problems and contradictions experienced in water management. The Committee is responsible for determination of necessary measures to protect water resources within the framework of an integrated basin management approach, achievement of inter-sectoral coordination and collaboration for an effective water management, enhancement of water investments, development of strategies, plans and policies to attain the goals stated in national and international documents, and evaluation of the implementations of relevant institutions stated in the river basin management plans. The Committee is formed from Ministry of Forestry and Water Affairs, Ministry of Environment and Urbanization, Ministry of Internal Affairs, Ministry of Foreign Affairs, Ministry of Health, Ministry of Food, Agriculture and Livestock, Ministry of Science, Industry and Technology, Ministry of Energy and Natural Resources, Ministry of Culture and Tourism,

Ministry of Development, Ministry of EU Affairs, and Turkish Water Institute. In addition to related institutions and organizations, universities, non-governmental organizations, employee associations and private sector representatives can be called to plenary sessions and they can participate to sub-committee and committee works. As a result, Water Management Coordination Committee can be regarded as a high-level structure in terms of its duties, authorities and organization. The establishment of the Committee can be seen as an important step to reach an integrated coordination between all stakeholders in water resources management.

In addition to Water Management Coordination Committee, Basin Steering Committee and Basin Management Committees are established with accordance to the Communiqué on Organization, Duties, Operating Procedures and Principles of Basin Management Communities. According to the Communiqué, Basin Steering Committee, which consists of general managers of relevant public institutions, is established at central level in order to provide inter-institutional coordination throughout the studies on conversion of basin protection action plans to river basin management plans. Besides, basin management committees, which are comprised from provincial directorates of relevant public institutions, local authorities, universities and NGOs, are established in each river basin district in order to support studies related to preparation of river basin management plans, and implementation, monitoring and evaluation of these plans.

Table 5. Basin-based institutional structuring in Turkey in EU accession process

Committee	Main tasks and responsibilities	Coordinator	Legal Basis
Water Management Coordination Committee	Determination of measures to protect water resources, achievement of inter-sectoral coordination and collaboration, enhancement of water investments, development of strategies, plans and policies to attain the goals stated in national and international documents, and evaluation of the plan implementation	Minister of Forestry and Water Affairs	2012/17 numbered Prime Ministerial Notice
Basin Steering Committee	Achievement of coordination and collaboration among institutions, realization of short, medium and long-term goals for river basins that have a completed Basin Protection Action Plans.	Undersecretary of Forestry and Water Affairs	Communiqué on Organization, Duties, Operating Procedures and Principles of Basin Management Communities

Table 5 (continued)

Basin Management Committee	Supporting studies related to preparation of river basin management plans, and implementation, monitoring and evaluation of these plans	Coordinator Governor of related river basin	Communiqué on Organization, Duties, Operating Procedures and Principles of Basin Management Communities
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4.2. PLANNING TOOLS

"Article No. 166 of Turkish Constitution on Planning" indicates that planning of the economic, social and cultural development, the rapid development of especially industrial and agricultural activities in a balanced and harmonious way throughout the country, the efficient use of national resources are under the State's authority and possession.

4.2.1. Upper Scale Plans

National Development Plans are the five-year development plans which have been prepared by State Planning Organization since 1963. The aim of these plans is to assure the most appropriate distribution of activities for economic and social development throughout the country (DPT 2000). Due to the fact that sustainable development approach addresses natural resources management, environment protection and next generations' needs as well as economic and social policies (Çondur&Cömertler 2010), "development and management of water resources" have become prominent in these plans recently.

In Turkey, nine Five-Year Development Plans have been implemented. In the first two plans, policies regarding environment issues were not established in detail, only the issue of "environmental health" was discussed in broad sense. Legal and administrative assessment of environmental issues had started with the 3th Five-Year Development Plan, reflecting the Stockholm Conference in 1972. Although environmental problems were introduced as a part of development issues, the Plan gave priority to economic development via industrialization. The Plan did not contain any principles that could provide balance between environment and socio-economic development.

In the 4th Five-Year Development Plan which includes preventive environmental policies, the necessity of considering environmental problems in the process of industrialization, agricultural modernization and urbanization was emphasized. In this period, Turkey's first public environmental organization, Prime Ministry Undersecretariat of Environment, which is the first public environmental organization of Turkey, was established; "Environment Law, Natural Parks Law, Law on Protection of Cultural and Natural Properties" entered into

force; “UN World Charter for Nature” was adopted; “Barcelona Convention” (Convention for the Protection of the Mediterranean Sea against Pollution) was signed in order to pursue the environmental policies. In the 5th Five-Year Development Plan, the basic approach related to environment issue is defined not only as pollution prevention but also as optimal utilization, conservation and improvement of natural resources in such a way that next generations can make benefit of these resources. Additionally, the issue of taking measures related to environmental problems in planning stage of land-use and investment decisions was brought to agenda for the first time with this Plan.

In the 6th Five-Year Development Plan which is in full compliance with the definition of sustainable development identified in Brundtland Report, main principle regarding environmental issue is defined as "providing management of natural resources in a way that would allow a continuous economic development, and leaving a decent natural, physical and social environment to next generations by protecting human health and natural balance". In this period, Coastal Law was enacted; specially protected environment areas were designated; Ministry of Environment was established; “Rio Declaration on Environment and Development, Convention on Biological Diversity, and Agenda 21” was signed in order to pursue the environmental policies. Unlike former plans, 7th Five-Year Development Plan included legal and administrative arrangements for the implementation of environmental policies. In this period, the principles of "sustainable development" and "polluter-pays" gained importance in the formulation of environmental policies owing to realization of negative impacts of economic activities on environment. Moreover, utilization of economic and fiscal instruments (tax, incentives, penalties etc.) against who creates a negative impact on the environment was encouraged for the solution of environmental problems. In this period, the some concrete implementation instruments, namely "National Environmental Strategy and Action Plan", "National Agenda 21" and "Local Agenda 21" was created in order to implement the principles stipulated by Agenda 21 in Turkey. As for planning, it is stated in the Plan that existing zoning planning system is limited to settlement regulation, and does not cover modern environment and ecologic elements, which leads to the emergence of a single type of cities and towns. In order to avoid this kind of problems, the Plan emphasized the necessity of making changes in existing urban development regulation that gives prominence differential features of cities and towns.

In 8th Five-Year Development Plan, main principle related to environmental issue is determined as "to ensure economic and social development by protecting human health, ecological balance, and cultural, historic and aesthetic values". Environmental policies developed in this Plan are intended at putting National Environmental Strategy and Action Plan into legal framework, and enforcement of “Natural Biodiversity Law”. During the period of 8th Five-Year Development Plan, the most significant development on the environment in Turkey is the accession to “the Convention on Climate Change”. In the case of water resources and their catchment basins, the Plan specified some principles such as the integrated management and development of water resources in order to ensure healthy, adequate and safe drinking water to public, prevent floods, and reduce the impacts of

droughts; the development of national sustainable water policy that adopts protecting functions and values of wetlands and their ecosystems as a principle; effective implementation and monitoring of existing legislation in order to prevent water pollution. 9th Five-Year Development Plan was prepared with a vision of "to create a country which grows in stability, shares its income more equitably, becomes globally competitive, returns to an information society and completes the EU harmonization process". In line with vision of the Plan, environmental policies were formulated in harmony with EU policies. In concern with water resources management, the Plan signifies that studies related to development of water resources should be conducted on basin level in an integrated manner that provides a strong and structural coordination between relevant institutions, and efficient use of water resources should be encouraged (Sencar 2007; Torun 2008).

National Spatial Strategy Plans¹ are the plans which are prepared at 1/1.000.000 or upper scales with accordance to the national development policies, the global and regional developments, and the socio-economic objectives and strategies of existing regional plans in order to define the settlement patterns, the growth centers and corridors, the functional cities and regions; to designate the sensitive areas and the natural resources; and to guide the site selection and resource utilization of sectoral investments. Like National development Plans, these plan are regarded as the highest-level plans; on the other hand, these plans introduce spatial dimension into protection, utilization and infrastructure decisions of National Development Plans. Additionally, long-term policies and spatial strategies defined in these plans guide the plans which are prepared at regional scale.

National Spatial Strategy Plans have not been prepared yet; however, the Ministry of Environment and Urbanization initiates the studies for defining the principles and procedures of these plans. It is believed that these plans will be remedy the deficiency in the upper scale planning hierarchy (ÇŞB 2012).

Regional Plans are the plans which are prepared with an aim of defining the socio-economic development trends, development potential of settlements, sectoral goals, and distribution of infrastructure. Main theme of regional plans is the elimination of inter-regional economic and social imbalances. The regional plans can be examined into two categories with regard to adopted approaches to upper scale planning and regional development: 1) Regional Development Plans² and 2) Regional Development Programs³ (Beyhan 2009).

Although Article No. 6 of Urban Development Law on "Planning Hierarchy" mentions about Regional Plans which are prepared within the framework of National Development Plans and are supposed to guide physical planning on region scale, they have not yet implemented in a widespread manner in Turkey. The plans, which were prepared before planned development period, had considered only physical planning aspect. After the year 1963,

¹ Ülke Mekânsal Strateji Planları

² Bölgesel Kalkınma Planları

³ Bölgesel Gelişim Programları

these plans have been prepared in compliance with the national development plans. The spread of economic planning concept provides the improvement of regional planning understanding; therefore, development planning gained importance in regional planning in addition to physical dimension of planning. Nowadays, regional plans are prepared by regional development agencies at NUTS2 regions; however, these plans are seen as insufficient in terms of spatial dimension (DPT 2000; Ersoy 2000; Hanazay 2006; Demirel 2009; K rođlu 2012).

Additionally, water-basin scale was adopted in some of regional plans, namely Keban Plan, South East Anatolian Project, East Black Sea Development Plan, East Anatolian Development Plan and Yeřilirmak Basin Development Project. However, the boundaries of these plans did not match up with the exact boundaries of water basins. The reason is that the main purpose of these plans was to ensure social and economic development in the regions. Therefore, it can be said that the reason of using water basins as a planning scale was only for social and economic purposes (Uzun et. al 2009).

Regional Spatial Strategy Plans⁴ are the 1/200.000 or upper-scale plans which are prepared with accordance to the socio-economic objectives and strategies of regional development plans in order to define settlement patterns, the hierarchy of settlements, the spatial development trends, the site selection for new settlements and large-scale investments, the technical and social infrastructure; and to determine spatial conditions for protection and improvement of natural resources and the historical and cultural heritage. With their long-term regional policies and spatial strategies, these plans orientate the regional development plans and the sub-scale plans (ÇŞB 2012).

Like National Spatial Strategy Plans, Regional Spatial Strategy Plans have not been prepared yet. However, there are discussions about hierarchical status of these plans in the planning system because it could not be clearly understood at what points Regional Spatial Strategy Plans and Regional Development Plans will differentiate from each other. If these plans are introduced with the perception which acknowledges regional development plans as sectoral plans, this perception will result in the creation of sectoral and spatial plans separately. On the other hand, if the Ministry of Environment and Urbanization and the Ministry of Development work in a coordinated manner during the preparation of these two plans, spatial focus in Regional Spatial Strategy Plans can be transferred into the Regional Development Plans (K rođlu 2012).

Rural Development Plans are the small scale plans which have been prepared since 1970s in order to increase living standards of rural areas through diversification of economic activities and income increase, and to utilize natural resources efficiently. The implementation areas of these plans are determined with accordance to the principles specified in national development plans about priority regions for development. Rural development plans cover the development of agriculture and animal husbandry, increase in agricultural and livestock production, irrigation, irrigated area rehabilitation, construction of

⁴ B lge Mek nsal Strateji Planları

village and forest roads, drinking water supply, afforestation activities. Since main means of livelihood are agriculture and animal husbandry in rural areas, economic development of these areas mainly depends on agricultural and livestock activities. Therefore, water resources management for irrigation and irrigated area rehabilitation becomes one of the crucial purposes of these plans. Consequently, the projects of water resources management were prepared as a part of these plans in order to define the capacity of water resources for agricultural activities. However, rural development plans and water resource management practices unfortunately failed to serve people's needs and protect water resources because the water management efforts were based only on technical calculations and inferences (Çelik 2005; DPT 2006).

Environmental Plans⁵ are the upper-scale plans which are prepared at the scales of 1/100.000, 1/50.000 or 1/25,000 with accordance to national development plans and regional plans in order to determine the housing, industry, agriculture, tourism, transportation, settlement and land-use decisions. These plans cover measures that prevent environmental pollution at region and basin level and favor the protection-utilization balance with respect to sustainability principle, and main decisions related to land use such as industrial, tourism and agricultural areas; urban or rural settlements; and catchment basin protection zones. The boundaries of environmental plans are determined in such a way that covers the whole or part of one or more province that presents an administrative, spatial and functional integrity (Ersoy 2000; Yılmaz 2007).

In Turkey, environmental plans began to implement with the aim of organizing unplanned developments which was caused by orientation of large investments beyond the boundaries of the municipality, and settlement increase particularly in coastal areas. 'Marmaris Environment Plan', which became effective in the late 1960s, is the first environmental plan of Turkey that was prepared for this purpose (Beyhan 2009).

Some of the environmental plans were prepared at water basin scale, namely Ergene Basin, Gediz Delta, and Zonguldak, Karabük ve Bartın Region Environmental Plans. The aim of preparing these plans at water basin scale can be summarized as follows:

- the use of these resources in the most rational and economic way due to remaining limited of fresh water resources and increasing the need for water;
- the need to acquaint with utilization areas of water resources that is determined a pre-prepared Basin Plan in order to benefit from these resources efficiently;
- the need to take precautions in headwaters for the protection of coastal areas from pollution;
- the need to detect compliance of existing quality of water resources with the quality criteria required for different utilization areas of these resources, and to improve them if possible;

⁵ Çevre Düzeni Planları

- the protection of forests, agricultural land and biodiversity in a more healthy way through the planning decisions taken on the basis of water basins.

Although these plans aimed at the provision of sustainable development by ensuring economic and urban development without damaging the ecological environment, they could not achieve their aims in the strict sense. One of the reasons of these plans' failure can be regarded as non-production of regional plans which are considered as the upper scale of environmental plans in planning hierarchy (Girgin 2008; ÇOB 2009a).

4.2.2. Land Development Plans

Urban Development Plans⁶ are the whole plans with a detailed explanatory report which intend to meet social and cultural needs of inhabitants, to create a healthy and safe environment, to increase living standards; and consist land use, protection, restriction decisions, the organization and implementation principles. Due to its physical planning structure, these plans are the most important planning level in the implementation phase for implementing institutions such as municipalities and governorships. However, these plans are insufficient to create a livable and sustainable space with regards to ecological, social, spatial and environmental aspects due to the fact that the approach and implementation of urban development planning are only limited to physical arrangements without considering the natural and cultural values of the region. Urban Development Plans consists of two phases, namely Master Plan and Implementation Plan (Demirel 2009; Bayındırlık ve İskan Bakanlığı 2009).

Master Plans are the 1/2000 or 1/5000 scale plans which are prepared with accordance to regional plans and environmental plans in order to define the general usage form of plots, major zoning types, prospective population and building densities of the zones, development direction, magnitude and principles of various settlement areas, transport systems and solutions to transport problems.

Implementation Plans are the 1/1000 scale plans are prepared with accordance to master plans in order to signify the building blocks of various zones, their densities and order, roads and implementation phases to form the basis for land development implementation programmes.

In addition to these plans, **Revision Development Plans**⁷, **Additional Development Plans**⁸ and **Localized Development Plans**⁹ can be prepared where existing plans are insufficient to meet needs of inhabitants or where implementation of these plans is not possible (Demirel 2009).

⁶ İmar Planları

⁷ Revizyon İmar Planları

⁸ İlave İmar Planları

⁹ Mevzii İmar Planları

Additionally, there are some sort of 'special-purpose plans' are prepared in Turkey for areas which are subject to special purpose and different planning regime. These plans (Protection-Purpose Master Plan, Tourism Master Plan, Rehabilitation Master Plan, National Park Development Plan, Specially Protected Environment Area Plan...etc) are defined by various laws and invalidate provisions of urban development plans. In special-purpose planning, the failure to establish a clear link between these plans and becoming controversial of the plans' hierarchical structure result in problems related to coordination between administrations, relevant laws and competent authorities.

4.2.3. Evaluation of Planning Tools

In the view of evaluation of planning tools used in Turkish spatial planning system; encountered bottlenecks in the system can be summarized as follow (Bayındırlık ve İskan Bakanlığı 2009):

- The absence of a spatial planning system and its strategies which is associated with national development planning;
- The absence of a planning vision and strategy which is arrived at agreement;
- The absence of vertical and horizontal functional integrity and consistency in the planning system;
- The presence of fragmented implementations, and authorization paradox;
- The existence of more than one planning authority in same spatial level;
- The existence of more than one plan in same spatial level, which results in creation of plan decisions that conflict with each other;
- The lack of cooperation and coordination between institutions;
- The issue of failing to satisfy the requirements of fast-growing social structure through traditional and stable planning approaches.

In addition to such a complex situation of Turkish spatial planning system; a new planning level, namely **River Basin Management Plan** will come into the planning system with EU harmonization process. Therefore, these plans will seek a place and legal status in this complexity.

River Basin Management Plans are the plans which are prepared at river basin scale in order to provide the protection, improvement and incorruption of water resources and ecosystem within the frame of sustainable protection-utilization balance. The integrated approach in these plans enables overall development of society through decreasing the negative impacts of different land uses on ecosystems and biodiversity. In this way, these plans provide the balance between cross purposes of socio-economic development and environmental protection. Nevertheless, it is important to prepare River Basin Management Plans in line with the national, regional and local planning processes in order to provide social, economical and environmental sustainability (OSİB 2013a).

Although it is a necessity to integrate River Basin Management Plans into all types and sizes of spatial and strategic plans, their place in planning hierarchy has not been clearly defined yet. Since river basin management plans are dealt with physical, social and economic structures as well as ecological and environmental issues, these plans should be seen as detailed, comprehensive and upper-scale planning tools. Based upon the information on river basin management plans' being regarded as upper-scale plans, it can be made inferences that these plans will be prepared on regional level and will define abstract principles that become more concrete through sub-scale plans such as environmental plans and urban development plans. In this system, river basin management plans will provide input for other plans but also establish control over them.

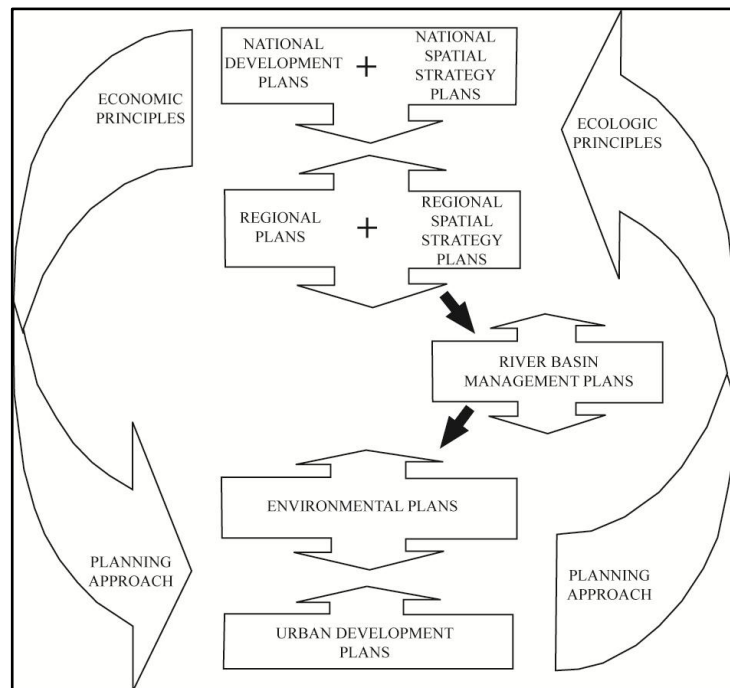


Figure 15. River basin management plans in the planning hierarchy (derived upon the work of Coşkun 2010)

As a result, the integration of river basin management plans with the national and regional spatial strategy plans, regional development plans, environmental plans, special purpose plans, urban development plans will provide integrated management of water resources. Additionally, an integrated planning system is achieved, in which decisions and principles of sub-scale plans are filtered on basin-scale and utilized on the region level. Therefore, upper scale plans are supplied with the sub-scale ones, upper-scale plans are integrated with the

sub-plan groups, and the planning system gets rid of its fragmented structure. Consequently, determined economic and ecologic principles will become dominant throughout entire planning system (Coşkun 2010).

4.3. RIVER BASIN PLANNING AND MANAGEMENT

In Turkey, first studies regarding identification of the quantity and quality of water resources were started in 1930s with the limited technical and economical possibilities. On the other hand, scientific studies on determination of water resources at basin level, and on collection of rainfall, temperature and such other meteorological data in a regular manner and then evaluation and dissemination of these data started in 1950s (Kulga & Akkaya 2001). The river-basin management plans have been prepared but could not be fully implemented. The list and evaluation of management plans are given in Salmaner, 2008. The EU accession period of Turkey accelerates the studies on river-basin management plans.

Within the EU harmonization process, the concepts of ‘sustainable development and nature conservation’ came into the agenda of Turkey in addition to the regional policy principles of ‘division of responsibilities’, ‘decentralization’ and ‘subsidiary’. These concepts imply a new planning approach that can be regarded as *‘integrated river basin management planning’*. This approach has a sustainability-oriented, holistic and participatory characteristic to provide a balance between development and protection. In this context, the WFD which has developed a method to integrate water resource management with the principles of ecological sustainability becomes an important guide for the EU full membership process for Turkey. In the direction of the WFD, Turkey has strived a great deal of effort in adopting and exercising an integrated approach to water resources management.

As an EU candidate country, some water-related studies have been conducted within the framework of obligations under the “National Program for Adopting the European Union Aquis”. First water-related study of this period is the MATRA Project, which was carried out between 2002-2003 via the financial support from the Dutch government in order to initiate the process of implementation of the WFD in Turkey and to provide a road map for further actions and decisions to be taken within the WFD. Within the scope of the Project, the gap analysis of legislations and institutions for water sector was performed. As a result, a framework for Water Law was shaped in order to provide adoption of EU legislation and the suggestions about establishing a new institutional structure at the regional scale were put forward. Additionally, a decision for conducting river basin management studies in Büyük Menderes River Basin was taken. In this direction, “Draft Büyük Menderes River Basin Management Plan” was prepared as an output of the Twinning Project of “Capacity Building Support to the Water Sector in Turkey”. Another study related to water resources management is the projects of “Preparing River Basin Protection Action Plans”. Since the year 2008, these projects have been carried out incrementally for the river basins that were identified as a part of MATRA Project and the last stage of the project will be completed in the year 2013. As the Basin Protection Action Plans are to be completed, “Conversion of

River Basin Protection Action Plans to River Basin Management Plans Project” will start. Moreover, several small scale water-basin management plans such as special provision determination studies and wetland management plans have been prepared with the participation of governmental institutions and non-governmental institutions in this period. Finally, the National Basin Management Strategy was prepared in 2012 in order to inform Turkey’s long-term investment programme in water management and to procure that such investments meet key objectives related to income generation, protection and sustainability of natural resources, reduced vulnerability to climate change, and fiscal efficiency. The National Basin Management Strategy can be regarded as a substantial component of an IRBM policy framework that prioritizes the needs of the country, which are in compatible with EU water management standards, and strengthens Turkey’s sustainable development agenda. These studies can be regarded as concrete steps for the EU Accession Process and for EU requirements related to water resources management.

4.3.1. Projects within the EU Harmonization Process

MATRA Project - Implementation of Water Framework Directive in Turkey: The Project was conducted between the years 2002-2003 with a purpose of developing an integrated and participatory planning of water management in Turkey through facilitating cooperation and assistance between responsible water management institutions and organizations. The project consisted of three phases: 1) harmonization studies related to “2000/60/EC Water Framework Directive”, 2) river basin management studies in pilot project area, 3) implementation studies in pilot project area chosen as Büyük Menderes River Basin (Çiçek 2007).

The project includes some important proposals regarding legal and institutional regulations and alterations in water management system of Turkey to meet the EU requirements. The proposed regulations and alterations cover the following issues (Wijk et al. 2003):

- Cooperation and coordination between public institutions,
- Transfer of jurisdictions and liabilities to the region level (River Basin Districts),
- Integrated water management approach emphasizing on water users and water bodies,
- Knowledge sharing and distribution,
- Stakeholder participation and community consultation,
- Economic measures and incentives.

Within the scope of the Project, “the National Platform of Water Management” was established under the presidency of former Secretariat General for European Union Affairs and with the participation of all relevant institutions in order to eliminate the lack of inter-institutional coordination and cooperation. Additionally, the establishment of several working groups¹⁰ was proposed to ensure the maintenance of the activities of National

¹⁰ The proposed working groups within MATRA Project: 1. Administrative Organization Working Group, 2. Public Awareness Working Group, 3. Economic Analysis Working Group, 4. Information Dissemination and Monitoring Working Group, 5. River Basin Districts and International Coordination Working Group

Platform. In addition to legal and institutional proposals, a new organization for water management planning, in which coordination of policies and activities would be provided through the National Platform, was proposed.

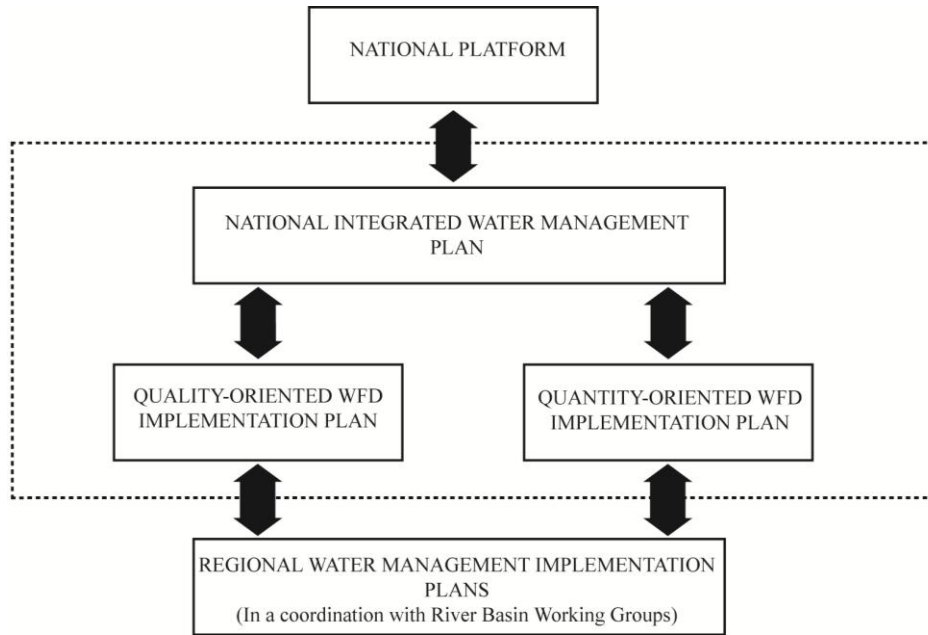


Figure 16. Proposed structure for water management planning in Turkey (Wijk et al. 2003)

In accordance to need for transfer of jurisdictions and liabilities to the region scale, the river basin districts of Turkey was determined as a part of the Project and was accepted by the National Platform in October 2003. Thus, Turkey was divided into 6 river basin districts and 25 river basins. These river basin districts are as following (Wijk et al. 2003):

- Marmara River Basin District: Marmara and Susurluk
- Black Sea River Basin District: Western Black Sea, Kızılırmak, Yeşilirmak, Eastern Black Sea and Sakarya
- Mediterranean Sea River Basin District: Western Mediterranean, Antalya, Seyhan, Ceyhan and Eastern Mediterranean
- Aegean Sea River Basin District: Büyük Menderes, Gediz, Küçük Menderes and North Aegean
- Closed Basins: Akarçay, Burdur, Konya and Van
- International Basins: Asi, Euphrates-Tigris, Aras, Çoruh and Maritza-Ergene



Figure 17. River basin districts in Turkey (Wijk et al. 2003)

The project emphasized the need for establishment of decision-making mechanism and water management organization structure at the scale of river basin district for an efficient and sustainable integrated water management. In this framework, river basin study groups or regional platforms were offered as the most appropriate environment to enhance regional coordination and cooperation between the institutions.

Twinning Project - Capacity Building Support to the Water Sector in Turkey: The project, which was financed by the Pre-accession Assistance of EU, was developed to strengthen Turkey’s capacity to implement WFD and to provide necessary data about the status of the surface water bodies in its river basins. It helped to make river basin management plans for its twenty five river basins. Additionally, it gave support to purchase equipment for monitoring. The Draft National Implementation Plan was the main output of this Project, which was prepared with regards to the requirements of the WFD. The general objective of the project was to reach the good ecological and chemical water status for each Turkish surface water bodies. On the other hand, the Plan illustrated that only 22 to 30% of them comply with the good status standard (ORSAM 2011).

Draft National Implementation Plan includes three Chapters of actions, i.e. Actions to get ready for the implementation of WFD; Actions for planning at river basin scale; Actions to supplement river basin management planning. The first Chapter of actions covers transposition of Directives, the designation of competent authority and River Basin Districts, and preparation of the Draft Plan. The laws and regulations, partially or fully transposed are shown in Table 6.

Table 6. Water-related laws and regulations in Turkey after EU accession process

Year	Laws and Regulations	Focused Issues	Corresponding European Directive	Progress
2004	Regulation on the Water Protection against Nitrates Pollution Caused by Agricultural Sources	Detection, reduction and prevention of water pollution caused by nitrate run-off	Nitrate Directive (91/676/EEC)	Partially transposed in 2004, full transposition after 2013
2005	Regulation on the Pollution Control Caused by Hazardous Substances in the Aquatic Environment	Detection, prevention and gradual reduction of water pollution caused by hazardous substances	Discharges of Dangerous Substances Directive (2006/11/EC)	Partially transposed in 2004, full transposition after 2013
2005	Regulation on Water Intended for Human Consumption	Definition of principles of sanitary quality standards for water resources used for human consumption	Directive on the Quality of Water Intended for Human Consumption (98/83/EC)	Fully transposed
2005	Protection of Wetlands Regulation	Definition of the principles for protection and improvement of whole wetlands based on Ramsar Convention	Habitat Directive (92/43/EEC) and Birds Directive (79/409/EEC)	Partially transposed, full transposition after 2013
2006	Urban Wastewater Treatment Regulation	Protection of environment against the adverse effects of industrial wastewater discharges	Urban Wastewater Treatment Directive (91/271/EEC)	Fully transposed, with a period of implementation until 2023

Table 6 (continued)

2008	Environmental Impact Assessment Regulation	Definition of administrative and technical principles for the process of environmental impact assessment	Environmental Impact Assessment Directive (2011/92/EU)	Majorly transposed
2012	Regulation on Quality of Surface Waters Used or Planned to Use for Drinking Water Supply	Determination of quality criteria and treatment principles for surface waters used or planned to use for drinking water supply	Drinking Water Abstraction Directive, (75/440/EEC)	Fully transposed
2012	Regulation of Quality of Surface Waters	Determination of biological, chemical, physico-chemical and hydromorphological quality of surface waters and definition of measures for reaching good water status	Environmental Quality Standards Directive (2008/105/EC)	Fully transposed
2012	Regulation on Protection of Groundwater against Pollution and Deterioration	Definition of principles for prevention from pollution and deterioration, and protection of groundwater	Daughter Directive on Groundwater (2006/118/EC)	Fully transposed
2012	Regulation on Protection of Basins and Preparation of Management Plans	Determination of procedures and principles of planning and protection of quantity and quality of groundwater and surface water in a holistic approach	Water Framework Directive (2000/60/EC)	Fully transposed

With respect to the action of designation of Competent Authority and River Basin Districts, the Draft Plan regarded the Ministry of Forestry and Water Affairs as the competent authority. The main focus of second chapter was on the WFD implementation. This chapter

listed 26 matters under 10 items. Turkey can have a sufficient progress only in two matters, which are the designation of river basin districts' boundaries and delineation of water bodies for surface waters (Table 7). River Basin Master Plans, providing information about water usage and investment programmes for each of the 25 river basins, were presented in this chapter of the Draft Plan. Preparation of Basin Protection Action Plans was defined as the first action of the Chapter 2. River Basin Protection Action Plans and River Basin Master Plans are discussed in the following section in more detail.

Table 7. Progress summary of Turkey in WFD (ÇOB&DSI 2010)

Fact	Limited Progress/ No Progress	Partial Progress	Sufficient Progress
Designation of river basin regions			Boundaries
		Designation of competent authority	
Method for typology		Rivers, Lakes, Transitional waters, Coastal wates	
Delineation of water bodies in national level	Surface water (national)		Surface water (11 river basin region)
	Underground water (national)	Underground water (11 river basin region)	
Pressures and impacts	Pressure and impact analysis (national)	Pressure and impact analysis (11 river basin region)	
Economic analysis		Water utilization Cost application Cost-efficiency analysis	
	Cost-benefit analysis		
Monitoring		Chemical	
	Biological	Physico-chemical	
Environmental targets	Draft environmental targets Reference conditions Ultimate environmental targets		
Protected areas	Targets and data		
Public participation		Informing Counseling	
	Active participation		

Table 7 (continued)

WFD outputs		Characterization	
	Communication Water Management Issues Draft and first generation river basin management plans		

4.3.2. River Basin Plans

National Basin Management Strategy and Action Plan: The studies for National Basin Management Strategy were initiated in 2010 with "Workshop on National Basin Management Strategy Scoping" and finished in 2012. The preparation of the strategy built on several basin management projects including "Eastern Anatolia Watershed Rehabilitation Project, Anatolia Watershed Rehabilitation Project, Büyük Menderes River Basin Project, and Çoruh Watershed Integrated Development Project". It is prepared particularly by the Ministry of Forestry and Water Affairs, and with the participation of the Ministry of Environment and Urbanization, the Ministry of Food, Agriculture and Livestock, the Ministry of Development, the Undersecretariat of Treasury, the Prime Ministry Disaster and Emergency Management Presidency, local governments, education and research institutions, and non-governmental institutions (OSİB 2012b).

The aim of "National Basin Management Strategy" is to provide guidance for medium and long-term decisions and investment programmes related to the livelihood support and income generation, and the protection, development and sustainable use of river basins and natural resources. Its vision is to stop the longstanding environmental deterioration in river basins, to protect and enhance the efficiency and quality of land, water and forest resources, to protect and ameliorate the fauna and flora in the basins, to maximize basin services offered to sub-basin users without damaging the integrity of ecosystem, and to increase the welfare and life quality of low-income rural population. Sustainability, participation, cooperation, effectiveness, efficiency, environmental consciousness, transparency, accountability, accessibility, compliance with national development policies and other national strategy documents, fulfillment of obligations arising from international agreements, and fair sharing of costs and benefits are adopted as the main principles. In the framework of these principles, the objectives for the realization of the vision are defined as follows (OSİB 2012b):

- the reinforcement of legal and institutional capacities and the assurance of participation, coordination and cooperation between stakeholders and institutions,
- the sustainable management and use of water resources in the basins,

- the prevention from destruction and erosion in basins, and the improvement and sustainable use of damaged areas
- the assurance of sustainability of ecosystem services through the conservation and management of biological diversity, natural and cultural landscape assets,
- the assurance of raising the public awareness, increasing the life quality and welfare of basin community, and reducing pressures on natural resources,
- the integration, improvement and activation of measure and control mechanisms against natural disasters and hazards,
- the inclusion of likely effects of climate change into basin management, and the development of adaptation and control mechanisms.

The document includes the recommendations for actions to achieve objectives, the roles and responsibilities of institutions related to monitoring, evaluating and supporting the implementation of strategy, and the schedules for actions. Within the framework of specified responsibilities, each institution will prepare and implement a detailed action plan for relevant institutional targets. In this scope, the Ministry of Forestry and Water Affairs is charged with preparing national water plan, revising whole water-basin master plans, and completing whole basin protection action plans and converting them to river basin management plans until 2023 (OSİB 2013a).

Water-Basin Master Plans: These plans were prepared for all 25 hydrologic basins by the General Directorate of SHW between the years 1956-1982 in order to investigate the potential and quality of water resources, the land resources, and the utilization and demand of water in a basin with the aim of meeting different water demands required for social and economic development. These plans included project formulations for determination of methods to meet different water demands of the society such as domestic, industrial, irrigation, and energy production activities. They also consisted of land-use decisions that orient water consumption level by precluding activities which consume water in excessive terms (OSİB 2012b).

Although these plans were prepared with accordance to upper-scale plans, it has become a necessity to revise them considering the changing conditions. Therefore, the studies for updating the water-basin master plans for 10 basins (Sakarya, Susurluk, Konya, Van, Seyhan, Maritza-Ergene, Akarçay, Ceyhan, Büyük Menderes and Antalya) are initiated with accordance to “Strategic Plan of General Directorate of State Hydraulic Works for the years 2010-2014”. It is planned to update the water-basin master plans for the rest of 15 basins in the subsequent strategic plan period. With the completion of these master plans, they will provide significant data and information for the preparation and implementation process of River Basin Management Plans (OSİB 2013b).

River Basin Protection Action Plans: The studies related to basin protection was initiated by former Ministry of Environment and Forestry in 2008 with the aim of protection of the water resources potential for all manner of utilization, provision of best use of water

resources, prevention of pollution, and improvement of water quality in polluted resources. In this context, 25 hydrologic basins were prioritized with accordance to water quality, pollution sources, protected areas and drinking water resources, and Basin Protection Action Plans were prepared for 5 river basins (Akarçay, Maritza-Ergene, Gediz, Sakarya and Van) that had the highest priority over other basins. As a second step, the Project of Preparing Basin Protection Action Plans for 11 basins (Marmara, Susurluk, North Aegean, Küçük Menderes, Büyük Menderes, Burdur, Konya, Ceyhan, Seyhan, Kızılırmak, Yeşilirmak) was conducted between the years 2009-2010. Finally, the studies for preparing Basin Protection Action Plans for 9 basins (Antalya, Eastern Mediterranean, West Black Sea, Euphrates-Tigris, Eastern Black Sea, Western Mediterranean, Çoruh, and Aras) and for revision of Basin Protection Action Plans for 5 basins started in 2011 by the coordination of General Directorate of Water Management and will be ended in December 2013 (havzakoruma.com 2012).

In the scope of these plans, it is aimed at determining quantities, characteristics and pollution level of surface, groundwater and coastal water as well as pressure and impacts on these resources as a result of industrial, agricultural and economical activities; creating water quality maps; and preparing programmes of measures in the short, medium and long term for the protection of river basins and reduction of pollution. The content of Basin Protection Action Plans is given as below (havzakoruma.com 2012):

- Determination of existing condition of the river basin district,
- Determination of water resources,
- Field surveys and determination of environmental infrastructure,
- Water quality classification,
- Calculation of pollution loads,
- Determination of prominent environmental problems and their solutions,
- Planning of urban wastewater plants and feasibility studies,
- Integration of other planning studies into Basin Protection Action plans,
- Organization of stakeholder meetings,
- Preparation of Basin Protection Action plans,
- Submission of data to GIS.

In the year 2013, the Basin Protection Action Plans will be completed for all river basins of Turkey. With the completion of these action plans, the basis will be comprised for the preparation process of River Basin Management Plans. Additionally, high priority measures, which are defined in these action plans, can be implemented in the advance of and in parallel to the river basin management planning process. On the other hand, these plans should be approved by the Higher Planning Council in order to legitimate the plan provisions, to activate the sanction power of these provisions and to ensure the implementation of the priority measures.



Figure 18. Basin protection action plans prepared in Turkey

River Basin Management Plans: Although Basin Protection Action Plans have been tried to be developed at the same vision of WFD, River Basin Management Plans differ from Basin Protection Action Plans in their more comprehensive consideration of ecological and biological issues, as well as chemical and hydromorphological ones. Additionally, Basin Protection Action Plans are lacking in some other issues such as objective setting, economic analysis and continuous monitoring. In order to remedy these deficiencies, completed Basin Protection Action Plans are planned to be converted into River Basin Management Plans by the Ministry of Forestry and Water Affairs (IPA 2012).

In Turkish strategy document for the Environment acquis of the EU, it is stipulated that all action plans will have been converted into River Basin Management Plans by the year 2023. In this way, the EU requirement related to preparation of RBMPs will be satisfied and the Chapter on Environment will be closed. As a first step, “Conversion of Basin Protection Action Plans to River Basin Management Plans Project” will be started in 2014. Within this project, it is aimed at updating draft RBMP for the Büyük Menderes River Basin, and preparing three more RBMPs for Maritza/Ergene, Konya, and Susurluk River Basins in accordance with the WFD. The project will set a precedent for other basins of Turkey with regards to the objectives of holistic and integrated approach. Additionally, the project will provide a basis for sustainable management of local authorities and particularly of basin protection unions (IPA 2012).

Studies of Special Provision Determination: Within the Turkish Legal System, the basic framework regarding the protection of drinking water resources is the Water Pollution

Control Regulation. The Regulation prescribes general provisions and protection zones for whole drinking water reservoirs until special provisions are to be made for each drinking water source and its basin. However, the implementation of same provisions and protection zones for whole drinking water resources without considering their different characteristics leads serious problems. In order to prevent such problems, studies related to Special Provision Determination have been conducted by the Ministry of Forestry and Water Affairs with a broad participation of non-governmental organizations, local governments and local people. These studies propose to determine the most appropriate land use for each drinking water basin through evaluation of technical and physical characteristics of the basin with the aim of not only protecting and improving the existing water quality but also pursuing the balance between protection and utilization of the drinking water resource and its basin.

Although there is a need for conducting this type of studies for each drinking water source and its basin, the priority is given to the basins where the water quality gets worsen although the provisions of the Water Pollution Control Regulation are implemented or where these provisions could not be implemented properly. In this framework, the special provisions have been determined for seven drinking water basins up to the present and studies are still continuing for other five basins. First one of these studies was conducted in 1998 for Birecik Dam at Euphrates-Tigris River Basin by the former Ministry of Environment in order to preclude overlapping of the alternative settlement areas defined within the “Project on Planning and Implementation for the Resettlement, Employment and Socio-Economic Investments of People Affected by Birecik Dam”, and the land-use restrictions defined for protection zones within the Water Pollution Control Regulation. As a result of this study, special provisions were determined in compliance with the socio-economical, demographical and ecological characteristics of the basin and they were taken as a basis for 1/25.000-scale Sub-Regional Development Plan for Birecik Dam. The other studies are listed below in chronological order:

- Study of Special Provision Determination for Sapanca Lake/Sakarya River Basin (2003)
- Study of Special Provision Determination for Kartalkaya Dam/Ceyhan River Basin (2009)
- Study of Special Provision Determination for Gökçe Dam/Marmara River Basin (2009)
- Study of Special Provision Determination for Eğridir Lake/Antalya River Basin (2012)
- Study of Special Provision Determination for Porsuk Dam/Sakarya River Basin (2013)
- Study of Special Provision Determination for Atatürk Dam/Euphrates-Tigris River Basin (2013)
- Studies of Special Provision Determination for Beyşehir Lake/Konya Closed Basin, Karacaören Dam/Antalya River Basin, and Yuvacık Dam, Akçay Dam, Namazgah Dam/Marmara River Basin (continued)

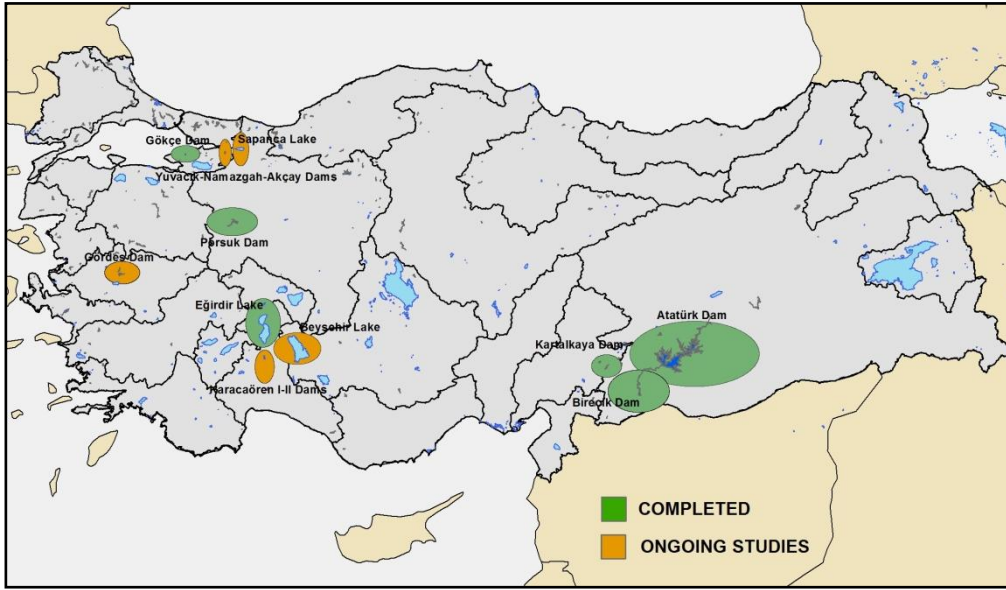


Figure 19. Studies of special provision determination in Turkey

These studies will be of capital importance for the preparation process of RBMPs in terms of providing input since the measures for the protection and improvement of drinking water resources are set in the WFD as one of the important measures specified within RBMPs.

Although these plans are not realized at river basin scale, they serve as a model for implementation of integrated and holistic planning approach in water-related planning activities. All these plans have a sustainability-oriented and participatory characteristic. Ensuring the 'sustainability' of local economic activities within the frame of protection-utilization balance is the main aim of these plans. 'Active participation' and 'capacity-building activities' are other strongly emphasized issues throughout the planning and implementation processes. In other words, these plans have acquired remarkable achievements in terms of increasing the awareness and capacity of local people and decision makers related to problems and management of planning areas; stakeholder participation in management and planning processes; and ensuring inter-sectoral coordination and cooperation. Additionally, the success of local wetland committees in providing a more efficient and decentralized management of wetlands sets a precedent for river basin committees.

4.4. EVALUATION AND SUGGESTIONS ON WATER MANAGEMENT AND THE IRBM IN TURKEY

As it is known, Turkey is situated in a semi-arid region of the world, namely Middle East Region, where water shortage has become a crucial problem. Although there is a general

perception that Turkey is more advantageous in terms of water potential by comparison with other countries in the region, the scientific studies reveal reverse situation. For the last two decades, annual water amount per capita in Turkey has decreased from 4000 m³ to 1430 m³. Based upon the renewable water resources potential and population projections, it is predicted that this number will decrease about 1000 m³ and Turkey will become a water-poor country beyond 2030. Inappropriate water management policies and practices, growing population, increasing water demands and global climate change can be shown as the underlying reasons of the decreasing water amount. In order to avoid this situation and to ensure water for future generations, better protection and rational use of the water resources have become a necessity. In this context, "effective management of water resources" has gained importance (TÜSİAD 2008; Ardiçlioğlu et al 2011).

From past to present, Turkey has developed its water policy in order to eliminate energy import dependence, to raise production level in agriculture sector, to meet increasing water demand, and to solve issues related to inter-regional imbalances for raising the living standard of the population. While major focus of Turkey's water policy is on pursuing socio-economic development, the importance of protecting water resources and reducing water pollution are increasingly recognized. Although Turkey still pursues a hydraulic mission which is mainly dealt with water quantity and supply management, she also starts to adopt methods like demand management and environmental impact assessment (Kibaroglu et al.2005; Kibaroglu & Sümer 2007).

The perception change in Turkish water policy can be seen as a reflection of the on-going EU accession and adaptation process. Within this process, Turkey has undertaken various obligations to harmonize its water policy with that of the EU. In this context, significant steps were taken about the IWRM. Although Turkey has been in an endeavor to adopt and exercise an integrated approach to water resources management, legal and institutional framework in Turkey have created barriers for water basin management plans to attain expected results. The institutional framework of Turkey is based on a centralized structure in which a wide variety of governmental institutions make a decision on water uses. Plurality and fragmentation of the institutional structure ends up with lack in coordination between these institutions. Additionally, different laws and regulations entitle these institutions with managing the same water bodies, which results in overlapping and conflicting tasks and responsibilities in water sector. Moreover, there is no adequate delegation of tasks and responsibilities to competent authorities at river basin scale to facilitate sustainable water management. Although a great number of laws and regulations have been enacted for water resources management issues, there is not a single wide-scoped water law in Turkey. Furthermore, deficiencies are observed in monitoring and enforcement capabilities although the main preconditions for effective water management can be regarded as extensive monitoring and enforcement. Even though monitoring and evaluation studies are conducted by the governmental institutions, there is a lack of a common database and information flow between these institutions. This situation hampers effective management and efficient plan development. Another major problem of Turkish system is that basin-based natural resource

planning is not mentioned in national legislation. Therefore, natural resource planning approach is not concerned seriously in the planning system. As a part of natural resource planning approach, the water resource management is only used as a tool in the plans to ensure socio-economic development. However, socio-economic structure of the plans prevented ecological dimension from gaining enough attention. All these issues make the IWRM nearly impossible. In order to implement an IRBM planning approach in Turkey, there is a significant need for the formulation of a “National Water Policy” and the reorganization of legal and institutional structure. Besides, it is a necessity to achieve integration of River Basin Management Plans into all types and sizes of spatial and strategic plans in order to guarantee the effectiveness in the implementation of plan decisions.

As it is well known, IRBM planning approach requires legal identification of a river basin districts and the establishment of regional platforms at the scale of river basin district for an efficient and sustainable integrated water management. However, it is nearly impossible to shift from highly centralized water management structure to basin-based management structure in a while. On the other hand, there is an institutional restructuring process at central level for the elimination of fragmented and complex form of water management. As a first step, the Ministry of Forestry was established in 2011 to coordinate the national water management; and General Directorate of State Hydraulic Works, which has a considerable extent of archives, information and experience related to water management, was incorporated under this Ministry. Secondly, Water Management Coordination Committee was established in 2012 to achieve inter-sectoral coordination and collaboration between all stakeholders in water resources management. These efforts can be seen as the most viable and reasonable option in the short term; however they will become insufficient in the long term. In order to eliminate these insufficiencies, more fundamental changes should be done in institutional and planning structure. Therefore, there is an immediate need for enactment of water framework law which renders such changes possible. As it is mentioned earlier, the studies related to the preparation of Framework Law on Water have proceeded. Adoption of this Law will enable to overcome problems such as inter-institutional coordination, overlapping authority, fragmentation in national water legislation; to realize integrated water management; to monitor water and to establish the basis of forming a data base; and to integrate all water quality directives. Additionally, this Law will set up a legal substructure for the preparation of river basin management plans as well as the establishment of regional platforms at the scale of river basin district. However, enactment of Framework Law on Water has taken a long time. For this reason, “Regulation on Protection of Basins and Preparation of Management Plans” and “Communiqué on Organization, Duties, Operating Procedures and Principles of Basin Management Communities” entered into force with the aim of accelerating the process of transition to basin-based management and fulfilling the EU requirement. The main purpose of the Regulation can be summarized as enabling water management at basin scale instead of the scale of administrative boundaries. The Regulation not only explains the principles of preparation of river basin management plans but also paves the way for the establishment of basin management committees. In order to clarify the organization, duties, operating procedures and principles of these communities,

aforementioned Communiqué published in the Official Gazette dated 18 June 2013 with no 28681. With the enactment of these regulations, the WFD harmonization process finished and one of closure criteria of the Chapter on Environment was fulfilled.

These attempts for the reorganization of legal and institutional structure have an importance for remedying the deficiencies in river basin management planning; however, it will not be sufficient without enabling the implementation of plan decisions. In order to raise the efficiency in implementation of river basin management plans, it is a necessity to integrate River Basin Management Plans into all types and sizes of spatial and strategic plans. Taking account this necessity, the issue of integration of IRBM into other plans is adopted as a principle in ‘Regulation on Protection of Basins and Preparation of Management Plans’. Herein, it should be discussed that which position could be appropriate for IRBM plans within the planning hierarchy of Turkey and how these plans could be integrated into regional and other plans. As discussed earlier, these plans should be seen as comprehensive and upper-scale plans and prepared on regional level. However, the borders of the planning areas don't match with the borders of NUTS2 regions due to the fact that river basin districts are natural geographical and hydrological units with no relevance to administrative borders. Therefore, IRBM plans could serve as a reference for the regional plans. If regional plans are prepared with the reference to ecological decisions and principles of their related IRBM plans, not only socio-economic issues but also ecologic dimension will gain importance in the regional plans. With integration of these socio-economic and ecological principles into operative sub-scale plans, the implementation of IRBM plan decisions will be achieved. In order to restrain possible implementation difficulties and to reach joint planning vision and strategy, representatives of regional development agencies can be affiliated with basin management committee in their river basin district.

To conclude, although there are still legislative, institutional, managerial and financial constraints on effective and integrated water management, it is clearly seen that Turkey has strived various efforts on the harmonization of legislation, the reorganization of institutional structure, the enhancement of institutional capacity, the definition of management models for treatment and disposal, and the determination of economic instruments. If reorganization of related institutional and legal frameworks is satisfied, the IRBM plans can give direction to planning and water management system, and solve the issues related to development and natural conservation. At this point, it should not be forgotten that it is essential to establish a consensus on what is the suitable balance between economic and environmental objectives in order to achieve consistency in plan decisions taken at basin level.

CHAPTER 5

INTEGRATED RIVER BASIN MANAGEMENT PLANNING FOR BÜYÜK MENDERES RIVER BASIN

5.1. GENERAL CHARACTERISTICS OF THE BASIN

5.1.1. Overall Features of the Basin

Büyük Menderes River Basin, one of the 25 river basins of Turkey, is an important river system of the Aegean region with a vast area of 24.873 km² and an irrigation area of 1.732 km². It occupies three per cent of Turkey, which covers some territories of ten cities including Afyon, Uşak, Denizli, Aydın, Muğla, Burdur, Isparta, İzmir, Kütahya and Manisa (TÜBİTAK 2010; WWF-Turkey 2011).

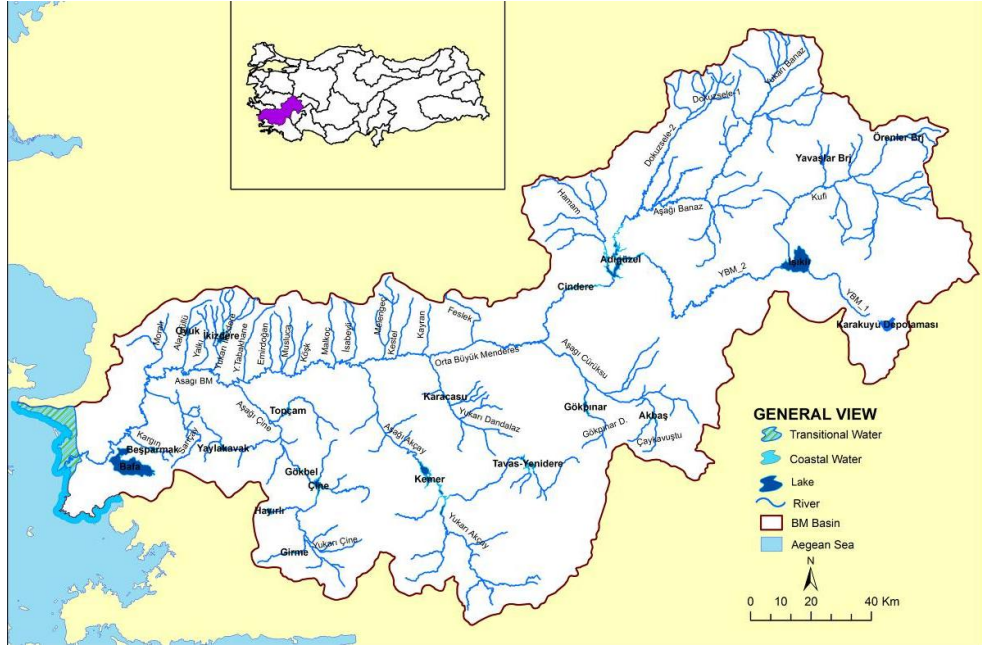


Figure 20. Büyük Menderes River Basin and its location in Turkey (ÇOB 2009b)

Due to Büyük Menderes Basin features as a gateway between Aegean, Central Anatolia and Mediterranean regions, the climate of the basin varies from place to place. Because the evaporation exceeds the rainfall in the summer time, rivers of the basin have little or no runoff. On the other hand, severe and frequent floods are experienced in the basin with the rainfall increase during the winter period, which damages great numbers of farm lands and wildlife. This situation is resulted from climate change as well as significant changes made in river course for specified purposes such as canalization, bank defense, flood protection (ÇOB 2009b; Durdu 2009).

Main rivers of the basin are Büyük Menderes River and its tributaries (Çine, Akçay, Emir, Banaz, Kufi, Dandalaz ve Madran). Büyük Menderes River stands out as the longest river in the Aegean region with its length of 584 km, which is well known for many meanders along its course. The river matters a high economic, social and environmental value for the region. There are also ten lakes and reservoirs in the basin, involving Çapalı Lake, Işıklı Lake, Bafa Lake and Kemer Dam. Additionally, the basin contains 4 groundwater bodies, two of which are directly connected to the Büyük Menderes River covering an area of 8.426 km² in total and the remaining of which are smaller and both indirectly connected to the downstream part of the Büyük Menderes River (ÇOB 2009b).

5.1.2. Administrative Structure of the Basin

The territory of the basin includes parts of Aydın, Uşak, Denizli, Muğla, Afyon, Isparta, Burdur and İzmir provinces. 41 district centers and parts of 3 district centers are included within the basin boundary. There are 185 municipalities bounded to these districts. As the areal distribution of provinces is analyzed, it is seen that large part of the basin is covered by the provinces of Denizli, Aydın, Uşak, Muğla and Afyonkarahisar.

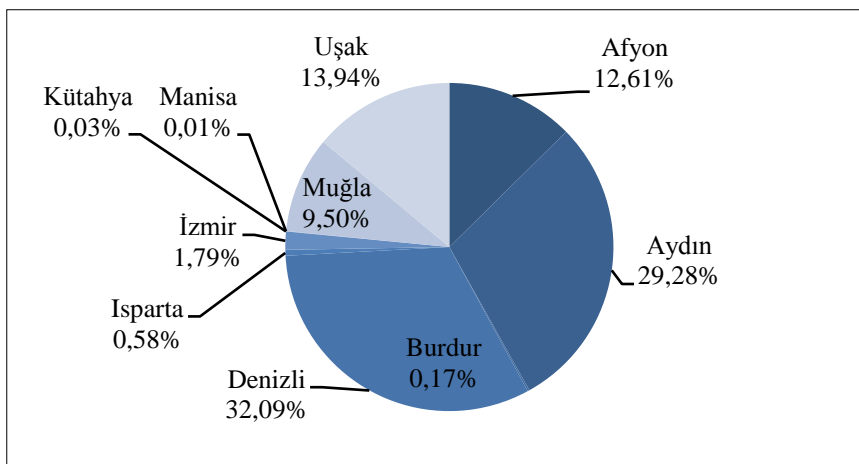


Figure 21. Areal distribution of provinces in the Büyük Menderes River Basin

According to Address-Based Population Registration System (2011), Büyük Menderes River Basin hosts 2.133.694 people representing three per cent of Turkey's population. Aydın is the most populated province in the basin with a population of 876.528. The population is mainly concentrated in the city centers. Due to the rapid industrialization and urbanization in the basin, the population of the rural areas has decreased year by year. 65% of the total population lives in urban areas while the rest live in rural ones.

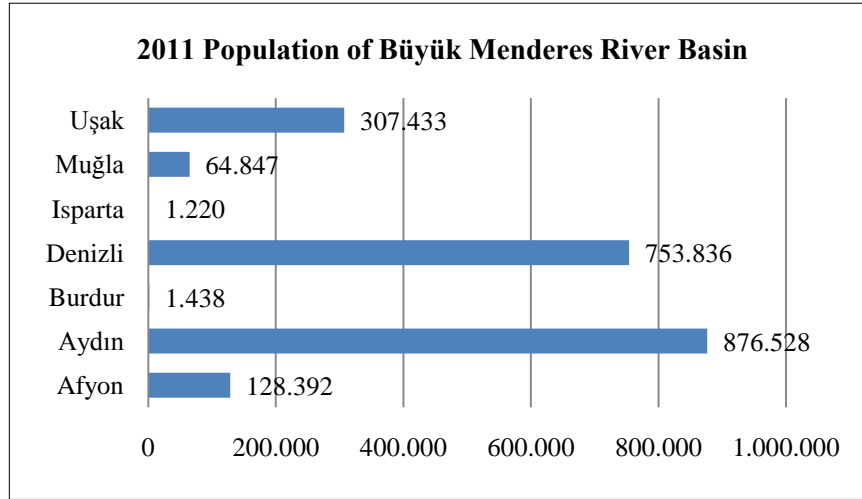


Figure 22.Total population of Büyük Menderes River Basin in 2011 (TÜİK 2012)

5.1.3. Economic Structure of the Basin

In the Büyük Menderes Basin, 53% of the land is covered by semi-natural and forest areas, 44% is covered by agriculture, 2% is covered by urban and rural areas and 1% is covered by inland waters (ÇOB 2009b).

Although the economy of the basin has mainly concentrated on the agriculture sector, the employment share of agriculture sector has decreased year by year while the share of service and industry sectors has shown a significant increase. The main economic sectors in the basin are agriculture, livestock, industry and tourism.

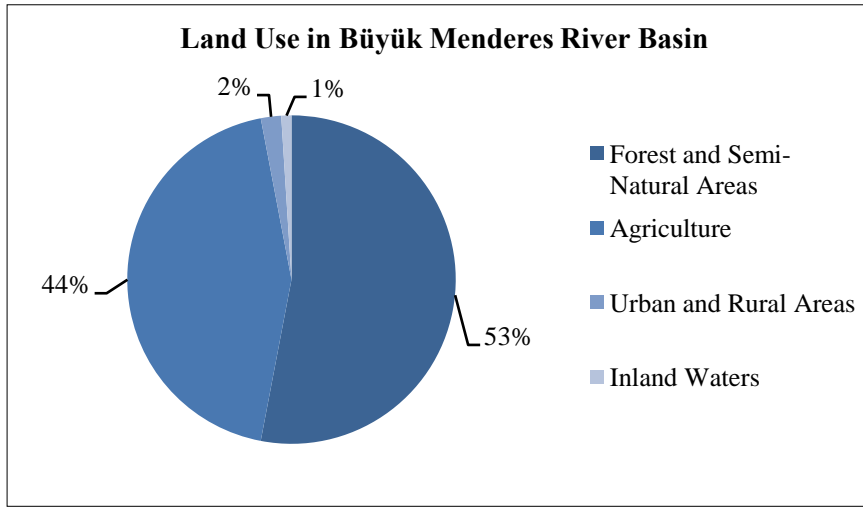


Figure 23. The distribution of land use in Büyük Menderes River Basin (TÜBİTAK 2010)

Agriculture sector has an important place in the basin's economy due to the convenient climate conditions, rich land and water resources. Büyük Menderes River Basin covers great numbers of wide plains, namely Aydın, Söke, Yenipazar, Koçarlı, Karpuzlu, Çerkez and Çine Plains which are extremely important in terms of agricultural production. The total area of irrigated land is 180.000 hectares which is about 50% of the total economically irrigable area in the river basin. Since the Basin has large fertile agricultural lands, water plays an important role in the region's development (Çondur&Cömertler 2010, TÜBİTAK 2010).

Livestock activities have importance for the rural economy and rural income source of the basin. Since the basin is situated close to big cities, livestock activities mainly concentrate on animal production in order to meet the demand for dairy and meat products. Pasture and meadow areas are of great importance for livestock activities; however, these areas represent only %0,52 of the basin's total area (ÇOB 2009b; TÜBİTAK 2010).

Industry sector has maintained its importance over years for the employment share as well as gross national product. The main industrial activities in the basin are leather, textile, agricultural and mining industries. Food industries, which are mainly dependent on figs and cotton processing, olive oil production, concentrate on the Province of Aydın; textile and ready-made clothing sectors predominantly center around the Province of Denizli; and leather and ceramic business firms are common in the Province of Uşak. Additionally, there are 4 actively operating organized industrial zones and 32 small industrial sites in the basin (TÜBİTAK 2010).

Tourism is also an important economic activity for the basin. Touristic activities of the basin become varied such as sea tourism, health tourism and eco-tourism. These activities mainly

concentrate on the coastal town of Didim, thermal town of Pamukkale and Dilek Peninsula - Büyük Menderes Delta (Bekdemir& Sezer 2008; TÜBİTAK 2010).

5.1.4. Ecological Features of the Basin

The Büyük Menderes River Basin is home to many highly valuable ecosystems which support unique habitats for a rich flora and fauna. Due to their high biological diversity and significant hydrobiological characteristics, some of the basin areas are designated as national park, natural park, special environmental protection area and wildlife protection area. Their names, locations and characteristics are given in Table 8.

Table 8. Protected areas of Büyük Menderes River Basin

Natural Conservation Areas	Location	Conservation Status and Designation Date	Resource Value	Conservation Planning Studies
Dilek Peninsula - Büyük Menderes Delta	Aydın	National Park, 1966-1994; Class A Wetland; Important Bird Area	Geological structure Wetlands Bird species Vegetation	No conservation plan
Bafa Lake	Aydın	Natural Protected Area, 1989; Nature Park, 1994	Ecosystem Aquatic plants Zoo-plankton Cultural values	Bafa Lake Long-Term Development Plan (2008); Bafa Lake Action Plan
Akdağ	Afyon, Denizli	Nature Park, 2000; Wildlife Protection Area, 2005	Geological structure Wildlife Bird species Vegetation Landscape values	Akdağ Wildlife Protection Area Management Plan (Continued)
Honaz Mountain	Denizli	National Park, 1995	Geological structure Vegetation Wildlife Cultural value Nature sports	Honaz Mountain National Park Long-Term Development Plan (2009)
Pamukkale	Denizli	Special Environmental Protection Area, 1990	Geological structure Historical Value Travertines Health Tourism	Pamukkale Special Environmental Protection Area Management Plan (2009)

Table 8 (continued)

Karakuyu Marshes	Afyon	Wildlife Protection Area, 1994	Wetland Bird species	Karakuyu Marshes Wetland Management Plan (2010)
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5.2. PROBLEMS OF THE BASIN

The main problem in the Büyük Menderes River Basin comes up due to the conflict between economic development and nature protection. Local economic activities deteriorate the natural balances in the river basin. On the other hand, the deterioration of ecosystem, in return, negatively affects the socio-economic structure of basin. The problems of the basin can be examined under two sub-titles: 1) environmental issues and 2) administrative and legal issues.

5.2.1. Environmental Issues in the Basin

As mentioned before, the Basin provides broad diversity of economic activities and land use, which involves several settlements and a wide array of agricultural, industrial, forestry, mining, recreational and tourism activities. However, these sectors create severe pressure on the Büyük Menderes River Basin, which causes a dramatic reduction in the biodiversity as well as many environmental services. Major environmental problems of the Basin can be listed as pollution and decreasing water level.

Pollution: The pollution problem of the basin predominantly derives from intensive and unconscious agricultural and livestock activities, discharge of untreated domestic and industrial wastewater, geothermal facilities and irregular landfills.

Point source pressures carry an important risk for the basin. Although approximately 70% of the municipal population is connected to a sewage system, there are only 20 wastewater treatment plants (WWTP) serving 26 municipalities. The households in the basin produce approximately 350.000 m³ wastewater per day and more than half of which is treated. This situation results in direct discharge of untreated wastewater to dry or running streams, large majority of which reaches to Büyük Menderes River. However, it is supposed that almost 90% of the municipal population will be served by a WWTP by 2015. Moreover, textile, leather and olive oil production are the major industrial sectors that pose pollution loads in the basin. The industrial sources produce approximately 150.000 m³ wastewater per day, 70% of which is treated. Only olive oil facilities produce approximately 1000 population equivalent of pollution for each ton of olive oil. It is also difficult and expensive to treat wastewater resulting from olive oil production with traditional methods. Another point source pressures in the basin are the geothermal facilities that are located mainly in the north

of Lower and Middle Büyük Menderes water bodies. These facilities discharge sodium and boron to Büyük Menderes River Basin, which results in significant decrease in the quality of citrus and many other types of plants (ÇOB 2009b; TÜBİTAK 2010).

Besides point source pressures, diffuse source pressures pose an important threat for ecology of the basin. Unconscious use of fertilizers and pesticides in agricultural activities creates serious diffuse source pollution. This pressure has negative impact on the chemical quality of water as well as the soil characteristics of the basin. Nitrate pollution in surface waters generally cause eutrophication, which causes reduction in biodiversity, the value of water body for recreational activities and water supply. Additionally, negative change in soil characteristics results in loss of yield and quality of agricultural products (ÇOB 2009b; TÜBİTAK 2010).

Decreasing water level: In Büyük Menderes River Basin, many rivers, lakes and groundwater bodies are at risk due to the water abstraction, flow regulation and effects of climate change. A significant decrease in water level has been observed during recent years as a result of hydro-morphological pressures and competing effects of changing temperature and precipitation.

Water abstraction from surface and ground waters for urban, agricultural, industrial and other purposes is the most significant reason of decreasing water level in the basin. Total quantity of surface water allocated to irrigation, domestic and industrial uses is approximately 2200 hm³ per year. 70% of this amount is used by the agricultural sector. The increasing agricultural activities, shift of crop pattern from cotton planting to corn planting, and application of unsuitable irrigation systems such as flooding method and other open irrigation systems have caused the water level to decrease. In some areas where surface water is insufficient, groundwater wells are drilled in the basin. Besides registered groundwater wells drilled by municipalities for drinking water supply, there are many unregistered ones in the basin. There isn't any comprehensive study on the actual groundwater use in the basin. However, it is not hard to predict negative effects of water abstraction on groundwater level as considering intensive use of groundwater by farmers with the purpose of irrigated agriculture. In order to prevent improper agricultural practices in the basin, operation and maintenance responsibilities of the irrigation projects have been transferred to the irrigation unions and cooperatives. Thus, it is aimed at prevention of over-use of water resources and its negative impacts on water levels (ÇOB 2009b; Durdu 2010).

In the basin, there are a great number of flow regulations such as dams, weirs, flood embankments for the purpose of irrigation, domestic and industrial water supply, energy production and flood protection. However, these regulations affect bio-diversity in negative terms. Especially, the lack of fish passages and small amount of water to be released from the dams damage aquatic ecosystem of the basin (ÇOB 2009b). Bafa Lake is a good example for water bodies negatively affected by flow regulations. While the lake was a part of Büyük Menderes Delta, it is sometimes separated from the delta when the flow of Büyük Menderes

River decreases. Additionally, the lake was isolated from the main river with the construction of flood embankment in 1985. Thus, main source of the lake had lost. In 1990, the water level of the lake reached its lowest level; its salinity rate increased; and most parts of it dried out. With the initiatives of many NGOs, General Directorate of SHW set up a system to pump water from river into lake in 1993 (TÜBİTAK 2010). However, sufficient water could not be transferred to the lake as a result of the decrease in the river's flow. This situation has resulted in 2 meters decline in the water level in the last 20 years, which has negatively impacted not only biodiversity of the lake but also income-generating activities of the basin such as agriculture, fisheries and tourism (WWF-Turkey 2012b).

Another pressure on the water availability of the basin is the climate change. Depending on the climate change research to be conducted by “Dokuz Eylül University - Research and Application Center of Water Resources Management” in 2006, the discharge in the Büyük Menderes River is estimated to reduce by about 10% by 2030, about 20% by 2050 and about 40% by 2100 (TÜBİTAK 2010). The rise in temperature and the decrease in precipitation will lead to a reduction in river discharge, which results in lower flow velocities, diminishing water levels and dried streambeds. Climate change will also have serious effects on the water quality as well as the water availability. As agriculture sector is excessively dependent on water, it will be one of the sectors most damaged by climate change. Additionally, demands for agricultural, industrial, and domestic use can raise a conflict over water availability and prioritization of water use. Therefore, effective management for water demands becomes more of an issue in Büyük Menderes River Basin (Durdu 2010).

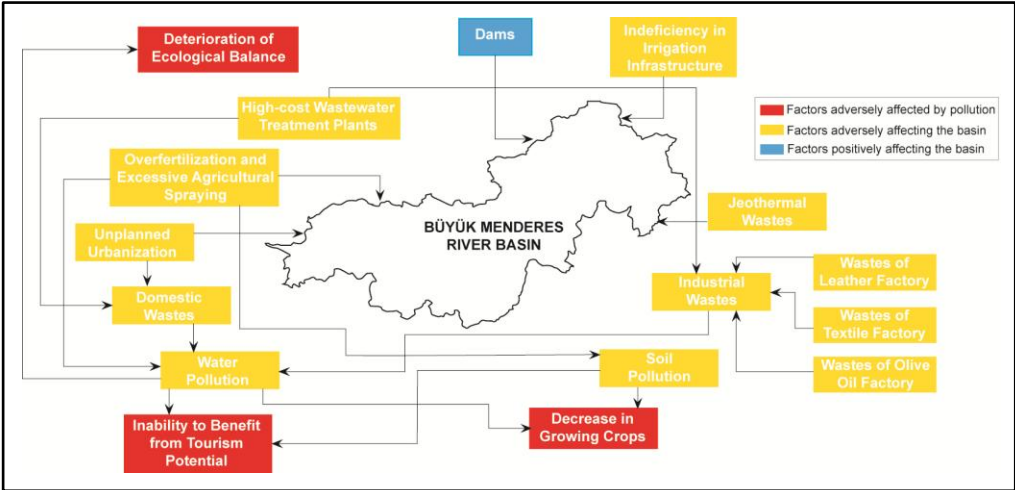


Figure 24. Problem analysis map

5.2.2. Administrative and Legal Issues in the Basin

The basin is used by a huge region and many people as a resource. However, this huge usage of the basin brings the basic problem of the basin which is the conflicts between stakeholders. Besides 185 municipalities situated in the basin, there are other institutions have responsibility regarding management and planning. Due to the existence of a vast number of central and provincial organization as well as non-governmental organizations within the basin, an integrated approach to the management of water resources becomes impossible. Since the coordination, collaboration and communication between these stakeholders cannot be provided, the management of basin cannot be done in a proper way. Lack of institutional relationships results not only in the slow-down of operations but also in the waste of resources due to the duplication of actions by different stakeholders. In addition to this, the plans prepared by different institutions cannot be applied due to the disagreements among stakeholders. As a result of these disagreements, the development and management of the basin has been hampered.

Another important problem that makes an obstacle in development of the basin is legal structure. According to legislative framework, there are many laws and regulations related to conservation of water and other resources. The incoherence of legislations results in institutional conflicts and overlaps, which causes coordination and authority problems within the basin. Due to the legal aspects and multi-headed management structure, many difficulties have been experienced through the development and implementation of a management plan for the entire basin until today.

5.3. RIVER BASIN MANAGEMENT ACTIVITIES IN THE BASIN

5.3.1. Background

In the 1960s, the economy of Büyük Menderes river basin depended on agriculture in excessive terms. In order to maintain agricultural activities, the optimum use of land and water resources had importance for the basin. However, the basin experienced difficulties due to irregular water regime, which resulted in droughts as well as flood events. In this period, not only droughts but also floods caused serious damage to agriculture. Therefore, the construction of dams and reservoirs became inevitable in order to provide adequate and regular water for irrigation and other purposes as well as protection from extreme water events (UNESCO et al. 2009b).

In order to tackle with these issues, the General Directorate of SHW initiated projects for the land and water resources development in the Büyük Menderes River Basin in the late 1960s. Firstly, master plan studies were conducted in 1967 to define the potential of land and water resources in the basin. In order to initiate a comprehensive feasibility study at the river basin level, the hydrometric network was promoted, and the surveys were conducted for the evaluation of irrigable land. Based on these studies, the Adıgüzel Dam, the Işıklı Lake and

the Kemer Dam were designed for irrigation, hydropower and flood control purposes. The construction of the Adıgüzel Dam, the first dam of the basin, commenced in 1976 and finished in 1989. After the construction of the dams was completed, irrigation became more efficient within the basin. (UNESCO et al. 2009b).

In the 1990s, the leather and textile industry started to use a considerable part of the water; however, this situation resulted in water pollution in the basin. In order to address this issue, the river basin was splitted into three parts with regards to pressures and impacts. First section was specified as the upstream part of the Adıgüzel Dam. This part of the basin was prominently polluted, which resulted from domestic and industrial waste water discharges of Uşak province. Second section was the middle part of the downstream of the Adıgüzel Dam, where the situation was getting worse because of agricultural, industrial and domestic pollution as well as discharges of the thermal power plant located in Denizli province. The last section was identified as the downstream part of the river. The environmental condition of this part deteriorated due to domestic and agricultural pollution as well as the wastewater discharges from the leather, textile and olive oil industries. Additionally, the problem of water pollution grew worse at the downstream section during the summer season due to low precipitation, decreasing stream flow, and increasing pollutant concentration.



Figure 25. Rubber dam in Bafa Lake

Continuous monitoring and evaluation of activities in upstream and midstream of the river basin revealed that the ecosystem of Bafa Lake had negatively affected from these activities. In addition to water development activities and pollution, flooding led to some problems in the Lake. Sedimentation resulted from flood events caused the declining depth of lake, which had an adverse impact on the ecosystem especially on fish habitats. Floods also caused damages in agricultural and residential areas next to the lake. In order to address problems related to flooding, the SHW constructed a flood embankment on the left side of the riverbank in 1985. However, the construction of flood embankment led to the isolation of

lake from the main river. This situation resulted in the decrease in water level of the lake, increase in its salinity rate, and consequently degradation of agricultural land. With the purpose of overcoming these problems, environmental studies were conducted with regards to water quality and fish habitats. Based on the results of environmental studies, technical and feasibility studies were carried out. These studies recommended that the water level of the lake should be kept at 2 m above the sea level in order to conserve the ecosystem. To achieve this, SHW constructed a Rubber Dam in 1993 (UNESCO et al. 2009b).

In addition to the construction of dams and reservoirs for overcoming problems regarding water scarcity, extreme water events and environmental concerns, all the stakeholders in the basin made attempts to solve these problems. For example

- Industrial facilities, particularly leather industries, which had dispersedly situated throughout the Uşak Province at one time, were relocated to the organized industrial site which had a common waste water treatment plant.
- An urban wastewater treatment plant was set into operation, and a common wastewater treatment plant was constructed by the textile factories in the Denizli Province.
- Existing irrigation systems was replaced with modern ones for efficiency insurance and water-saving.
- Non-governmental organizations started several environment-oriented projects throughout the basin (UNESCO et al. 2009b).

However, it became clear that the problems of the basin could not be solved through singular means, and there is a need for more comprehensive basin-based measures. This can only be accomplished through an integrated approach.

5.3.2. Approach for Integrated River Basin Management

5.3.2.1. Büyük Menderes River Basin Management Plan - Implementation of the Water Framework Directive in Turkey

The first project carried out in the basin with the integrated approach was the “Implementation of the Water Framework Directive in Turkey”. Between the years 2002 and 2003, the project was supported by the Dutch Government under the Dutch MATRA pre-accession programme. The project was conducted in close cooperation between the Turkish governmental institutions, Dutch partners and external consultants, and in the spirit of a two-way learning process. Several Turkish governmental institutions were involved as the project’s beneficiaries. The Dutch partners consisted of two government agencies, an academic institute and two consultants, who provided short-term training for Turkish government officers. Additionally, the Turkish consultant, namely Kentkur Consultancy, managed day-to-day contacts with the Turkish governmental institutions at both the national and regional scale (Hermans 2005).

Objectives of the Project

The main objectives of the project can be listed as follows (Kibaroglu&Sümer 2007):

- to make EU harmonization process less problematical by the knowledge improvement of the water management institutions related to the EU water legislation;
- to support the WFD implementation at national and regional levels;
- to achieve consensus between the competent authorities of water management;
- to inform policy makers and public related to the eventualities of the WFD;
- to prepare a River Basin Management Plan for a pilot River Basin District and
- to spread the additional values of the pilot project to all other basins in Turkey.

The project had three key components: “institutional affairs”, “development of a river basin management plan in a pilot area”, and “transfer of knowledge”. In order to deal with the first component, it was expected that the project would result in the establishment of a national platform. The second component included the preparation of a river basin management plan in a pilot river basin. It was anticipated that the experiences gained from the pilot plan would be converted to a methodology handbook in order to support the implementation of the WFD in Turkey. Knowledge transfer was the third component. The project was anticipated to improve the WFD knowledge in the water-related institutions, and the project results were expected to be made accessible to stakeholders and to community (Hermans 2005; Kibaroglu&Sümer 2007).

In this framework, a national platform was established at the beginning of the project. Within the scope of the project, the National Platform acted as a consultative board which discussed issues such as improvement of water management, determination of issues that might prevent the WFD implementation, the designation of the main river basins, and the preparation of a national integrated water management plan. Within the context of second component, the Büyük Menderes river basin was selected as the pilot region for the River Basin Management Plan by the agreement of all water related organizations in Turkey. The main factor of selecting the pilot region as Büyük Menderes Basin is the different activities that are being accommodated at the large area of the basin, and their corresponding effects on the water quantity and quality in the basin. In order to execute the regional aspects of WFD in Büyük Menderes River Basin, a regional platform was established by the participation of wide variety of stakeholders. Since Turkish government did not prefer to create a new institutional structure that had a regulatory power to undertake tasks including all water issues, *river basin coordinating council* was chosen as the appropriate type of institutional model for Büyük Menderes River Basin (Kibaroglu&Sümer 2007).

Management and Planning Process of the Project

The studies for preparation of IRBM plan in Büyük Menderes River Basin started with a ‘stakeholder analysis.’ The main aim of conducting the stakeholder analysis was to provide

the development of problem identification from the perspectives of multiple actors. In order to support the development of problem identification from a multi-actor perspective, the utilization of perception-oriented model were considered to be the most appropriate one. In this respect, open interviews with the individual stakeholders were chosen as the data collection strategy because it was a good way for the introduction of the project to the stakeholders, the initiation of awareness building process and the creation of support among stakeholders for the project. Dynamic Actor Network Analysis (DANA) was used in order to analyze collected data regarding the perceptions of the various local actors.

The interviews were carried out by using a short list of open questions which asks the actors about their thoughts related to water management in the Büyük Menderes river basin (Herman 2005&2008). The questions designed by the project team are as follows (Wijk et al. 2003):

- 1- What are the main problems in the basin and their underlying causes?
- 2- What are the priorities of these issues to be addressed within the river basin planning activities?
- 3- What are the potential solutions for these problems? What is the role of different actors in the creation of these problems?
- 4- Which local actors should participate in river basin management process? How should their participation be structured within this process?

According to stakeholder analysis, pollution (domestic, agricultural, industrial pollution, and boron pollution from the geothermal power plant) was identified as the most important problems in the basin. The chamber of agriculture remarked the negative impacts of pollution on agricultural activities since bad water quality affects the soil and the crop production. Administrative and institutional issues were also defined as one of the main problems, addressing issues such as the lack of inter-institutional coordination, limited personnel, budget and facilities of governmental institutions and the influence of politicians on water management. Since agriculture was the most water-consuming activity in the basin, a majority of actors counted agriculture and irrigation as one of the major problem for the basin. Other problem that was mentioned by actors the water quantity issues, such as water shortages, water losses, groundwater abstractions and floodings.

The solutions that were offered most often were the financial support for the construction of municipal and industrial wastewater treatment plants; the enhanced monitoring and inspection of the law practices, and the agricultural improvements through land reconsolidation, limitation in agro-chemical use and usage of modern irrigation systems. The idea of establishing an institutional mechanism on river basin level for cooperation and coordination was supported at a great extent. However, this idea was found appropriate for the long-term while the use of existing institutional entities was seen as a better option for the short-term. Furthermore, the stakeholders suggested the need for legal basis that would give implementation power to the entity at the regional level, and the need for an umbrella organization at the national level. Some respondents favoured large-scale participation

including a wide range of actors; while others advocated a narrow-scoped selection comprising only the water-related governmental institutions in order to keep the size of the river basin organization manageable. As for the competent authority, the local representatives of the Directorate for SHW, the Ministry of Environment, and the Governor were suggested by the local actors (Hermans 2005; Hermans&Muluk 2008).

Main conclusions which were derived from stakeholder analysis are summarized below:

- Consensus on major problems of basin and needs: Pollution, agricultural issues and institutional development are defined as leading problems of the basin. This indicated that these three issues should be particularly addressed in the farther analysis.
- General agreement among upstream and downstream actors: The results of stakeholder analysis was important with regards to seeing if the perceptions of the downstream and upstream actors are differentiated since the upstream and downstream regions of the river basin showed different characteristics. While there was a large number of polluting industrial activities in the upstream part of the basin, there were blue flagged beaches and some internationally recognized wetland areas and so touristic activities played an important role in downstream part. This situation forces the cooperation in basin.
- Focus on technical and practical instruments: The overview of the proposed instruments showed that the actors focused mainly on technical interventions and legal sanctions, which indicated that the main constraints in water management according to the stakeholders were arised from the operational issues rather than from institutional ones.
- Awareness of actors on water management: The stakeholder analysis showed that the actors had a good level of knowledge and awareness related to IRBM. This indicated that ‘transfer of knowledge’ component of the MATRA project should focus on concepts related to development, implementation and enforcement of RBMPs rather than on technical capacity building.

The result of these analyses provided a good basis for the project team to make a problem formulation and to develop a training program, which was built upon the inputs from the different actors. In order to present and validate the result of stakeholder analysis, first regional stakeholder workshop was organized in September 2002. At this workshop, a “River Basin Working Group” (RBWG), which was nucleus and daily executive board of the regional platform, was established in order to assemble all local stakeholders (Hermans 2005; Alpaslan et al. 2007). After the establishment of RBWG, a protocol was signed by contracting parties. The protocol of Büyük Menderes RBWG included background, objectives, members and operating procedure of RBWG (Wijk et al. 2003).

The specific objective of RBGW was defined as “the development of an enabling environment and improvement of skills in terms of IRBM”. Other tasks of RBWG was specified as discussing and determining measures for improving water quality and ecological status in line with the IRBM principles; and preparing a draft RBMP for Büyük Menderes River Basin in conjunction with relevant government and non-governmental organizations with accordance to proposals of the WFD. The creation of a Secretariat for preparing

meeting documents and distributing them to the relevant institutions; and chairing of Provincial Directorate of Environment and Forestry or 21st Regional Directorate of SHW to RBWG was suggested. With accordance to this protocol, the several public and local organizations in the basin became members of RBWG. Additionally, the technical expert teams for "characterization", "pressure and impact", "ecology" and "measures" were set up in order to make detail analysis on sub-basin level.

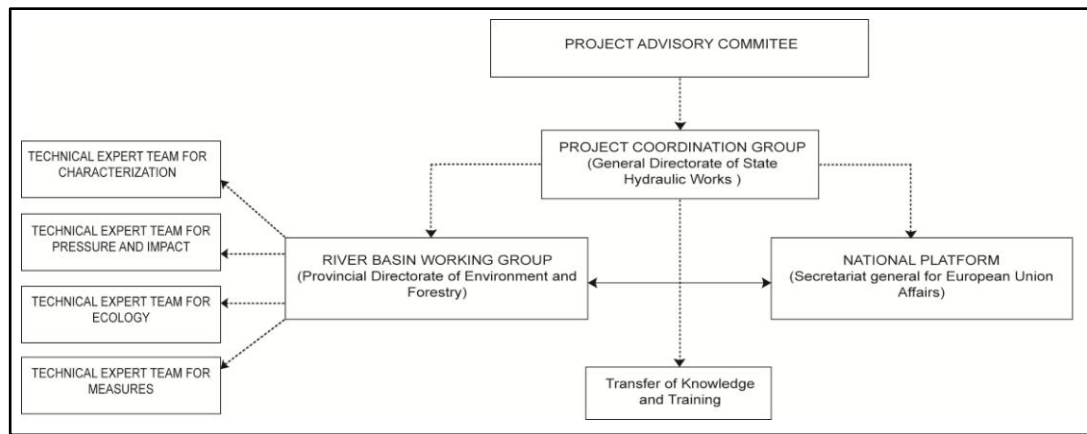


Figure 26. Institutional structure of Büyük Menderes river basin management(Çiçek 2007)

RBWG worked on preparing the several parts of the RBMP during several meetings. As a result, analysis reports were prepared based on the findings of the RBWG. Since these analysis reports enlarged upon the situation of Büyük Menderes Basin, the main points in these reports constituted the first draft River Basin Management Plan of the Büyük Menderes River. This draft RBMP stayed focus on the short-term requirements of WFD (Wijk et al. 2004a):

- Characterization of the river basin,
- Identification and mapping of protected areas,
- Definition of reference conditions,
- Analysis of pressures and impacts,
- Mapping of monitoring network,
- Execution of economic analysis of water use,
- Formulation of environmental objectives

Characterization of the river basin: Firstly, the boundaries of the Büyük Menderes river basin were defined by the technical expert team in order to provide a spatial context for the assessment. Secondly, a general description of basin was given, which included natural issues (climate, topography, geology, ecology, etc.), social issues (demographics, social

state, land use characteristics, etc.), and economic issues (working population, industrial activities, agricultural activities, etc.). Thirdly, water bodies were defined and characterized according to the guidelines of the WFD. The water bodies in the Büyük Menderes basin were first divided into natural, heavily modified and artificial water bodies (Figure 27). Then, the water bodies were categorized as river, lake, transitional water or coastal water. As a final step, the typologies of each water body were identified in order to make a refinement of the categorization (Wijk et al. 2004a&2004b).

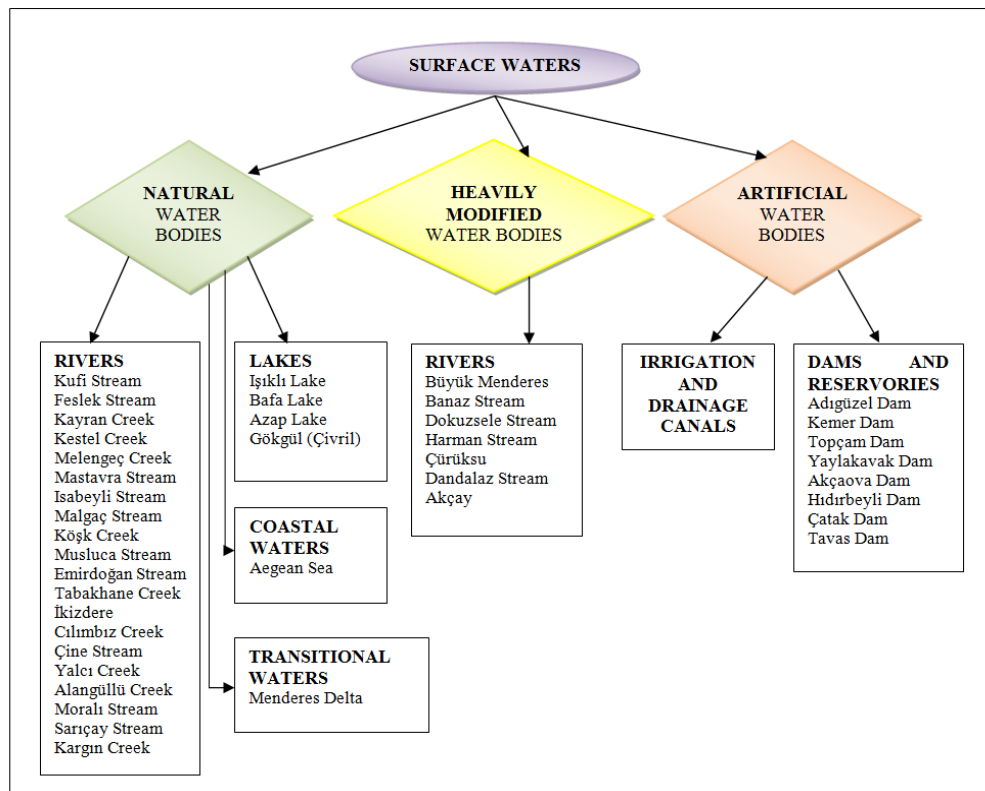


Figure 27. Categorization of water bodies in the Büyük Menderes river basin (Wijk et al. 2004a)

Identification and mapping of protected areas: According to the WFD, a register of protected areas is required, including the waters used for the abstraction of drinking water, natural protected areas, bathing water locations, nutrient-sensitive areas, shellfish waters, and Bird or Habitat directive areas. However, no areas in the basin have been designated as protected with accordance to EU regulations since Turkey has not been an EU Member State yet. For this reason, the technical expert team listed the areas that are protected under the one

of the regional, national or international law and presented their general characteristics and importance for the basin (Wijk et al. 2004a).

Definition of reference conditions: Reference conditions, which form the basis for ecological scaling to define the environmental objectives, should be identified for each type of water body. Some pilot studies were conducted in the upper section of the Büyük Menderes River, the mid section of the Büyük Menderes River, the lower part of the Çürüksu Creek, Bafa Lake, and the Büyük Menderes Delta. Within these studies, the technical expert team used the historical data and the interpretations of local people to describe the reference conditions and recent data to describe the actual conditions of water bodies; and then made a comparison between reference and actual conditions to develop an ecological scale and to set environmental objectives (Wijk et al. 2004a).

Analysis of pressures and impacts: According to the WFD, this analysis is regarded as an effective way to evaluate the main threats and problems of the basin and to prioritize them for the selection of most effective measures. In Büyük Menderes Basin, the DPSIR method was preferred by the technical expert team. First, relevant drivers influencing the water bodies in the Büyük Menderes river basin were identified and described as industry, tourism, agriculture, domestic use, energy production, transportation, commercial and hydromorphological alterations (Wijk et al. 2004a&2004b). Second, each driver was analyzed in terms of pressures. Then, the changes in the physical, chemical and biological characteristics resulting from these pressures were defined. Finally, the impact of these pressures on the water ecosystem was identified (Table 9).

Table 9. Overview of main pressures and impacts in Büyük Menderes River Basin (Wijk et al. 2004a)

Driving Force	Pressure	Change in state or impact
Domestic wastewater	Discharge of untreated wastewater	<ul style="list-style-type: none"> • Organic load => anoxicity => fish deaths • Turbidity => change in light conditions • Nutrients (NH3) => eutrophication
Industrial wastewater	Discharge of untreated wastewater	<ul style="list-style-type: none"> • Organic load => anoxicity => fish deaths • Turbidity => change in light conditions • Toxicity (direct effect)
Energy production	Geothermal power plants	<ul style="list-style-type: none"> • Hot and boron contaminated water
Agriculture	Leakage of salty water from irrigation canals to ground and surface water	<ul style="list-style-type: none"> • Increase in the salinity of ground and surface water => infertility => decrease in products
	Nutrients from fertilisers and manure	<ul style="list-style-type: none"> • Eutrophication => change of ecosystem

Table 9 (continued)

	Pesticides	<ul style="list-style-type: none"> • Toxicity, contaminated potable water
Abstraction from surface waters	Reduction in flow	<ul style="list-style-type: none"> • Reduced dilution of chemical fluxes • Modified flow and ecological regimes • Change in water level • Change in fresh/salt ratio
Abstraction from ground waters	Reduction in aquifer storage	<ul style="list-style-type: none"> • Decrease in water amount • Modified dependent terrestrial ecosystem
Irrigation canals	Change in flow characteristics	Altered flow regime and habitat
Dams and reservoirs	<ul style="list-style-type: none"> • Physical barriers • Change in flow characteristics 	Altered flow regime and habitat

Mapping of monitoring network: Monitoring programmes should be developed for surface water, groundwater and protected areas in order to evaluate the status of water bodies and the effectiveness of the programs of measures to improve their status. In this framework, an analysis for monitoring network was done and RBWG reached to some results such as

- *Ecological monitoring:* Studies related to ecological monitoring in the Büyük Menderes River Basin was very sparse and scattered. The existing data were generally just from one water body and measured in a single year or a single season. There was not an ecological monitoring network within the basin.

- *Hydrological monitoring:* Studies related to flow monitoring in the basin was conducted by SHW and EIE with 55 stations. The flow data were stored in a digital environment using the HYDRO program.

- *Chemical monitoring:* Water quality was monitored regularly by SHW. Depending on the sampling area, quality measurements were performed between two and six times a year. However, quality data showed that the monitoring parameter set differed from one location to another. Additionally, the existing monitoring network was mainly focused on irrigation and not on ecological aspects.

- *Monitoring activities for groundwater:* There were piezometric networks, which were managed by SHW. These networks included about 100 observation wells for the Büyük Menderes river basin (Wijk et al. 2004).

Shortly, RBWG realized that existing monitoring network were insufficient to meet the requirements of WFD.

Execution of economic analysis of water use: According to WFD, the aim of conducting economic analysis is to provide insight in the importance of water for the economy and socio-economic development of the river basin. Since conducting economic analysis was a

time-consuming and complex process, the RBWG could only present an overview of economic water uses and their corresponding importance; main water services; and existing cost recovery mechanism (Wijk et al. 2004a).

Formulation of environmental objectives: RBWG proposed some possible measures, which were based on the objectives, pressure and impact analysis, monitoring results and economic analysis, in order to improve the water quality and to achieve a sustainable water ecosystem in the Büyük Menderes River Basin. These measures included proposals for planning and organization, institutional and legal arrangements, monitoring and evaluation, agricultural measures, measures related to geothermal waters, measures related to coastal and transitional waters, waste removal, flood and erosion control, water pricing, and educational and publication works. Furthermore, these measures were elaborated in terms of scale, responsibilities, funding sources, implementation schedule and their expected effects (Wijk et al. 2004a).

Public Participation and Raising Awareness Activities of Project

Besides preparing a draft river basin plan, a very important part of the project was to transfer knowledge and to raise public awareness about the significance of IRBM. In this perspective, in various training events, seminars and workshops, consultants of the consortium partners worked together with the RBWG in order to expand their knowledge and let them design the river basin management plans themselves. Operational goals within the frame of this objective were

- to raise public awareness and knowledge about the studies in Turkey related to the **introduction of the WFD** in general and about the pilot activities in the Büyük Menderes river basin in particular;
- to stimulate **public participation in decision making** on issues of water and wetland protection as well as prevention of water pollution on the river basin level;
- to disseminate information, on national as well as on regional and local levels, about the **complex activities** regarding the implementation of the WFD;
- to improve **information sharing** between all parties involved in the introduction of the WFD in Turkey, including the various international water commissions in which Turkey participates (Wijk et al 2004a).

In the scope of the project, ‘website’ and ‘newsletter’ were preferred as the channels of communication to implement this strategy.

5.3.2.2. Büyük Menderes River Basin Management Plan - Capacity Building Support to the Water Sector in Turkey

The second project conducted in the basin with an integrated approach was the “Capacity Building Support to the Water Sector in Turkey”. The project was carried out between the years 2007 and 2009, and supported by the EU under the pre-accession programme as a twinning project. The Netherlands, the United Kingdom and the Slovak Republic were

closely cooperated with Turkey. The Directorate General of SHW and the Ministry of Environment and Forestry were main beneficiaries of the project and they were liable for the executing the activities of project. Member State Consortium provided assistance for Turkish governmental institutions in the process of adoption of the WFD. Two Project Leaders were liable for the overall coordination of the project. Turkey and the three EU member states organized their activities through the joint Working Groups established for each component of the project (ÇOB 2013).

Objectives of the Project

The overall objective of the Project was to promote the introduction of a water management system at river basin level in Turkey through strengthening institutions and water management instruments, and to facilitate the design of a frame for action in the field of water policy. In this perspective, the project aims at supporting Turkey to bring its water management system into conformity with EU water and environment legislation in order to ensure the full implementation of the EU water acquis by the accession date of Turkey to the EU. Within the context of the project, it was focused on the WFD and subsequent daughter directives, namely “the Urban Wastewater Treatment Directive” (UWWTD) and “the Dangerous Substances Directive” (DSD) (EC 2006).

The project had four main components (EC 2006):

- **Legal analysis of the WFD, the UWWTD and the DSD:** First component of the project included a detailed gap analysis that consisted of the options for transposing WFD, UWWTD and DSD into legislation system and the alternatives for reinforcing the institutional system
- **Development of implementation plans for the WFD, UWWTD and DSD:** Second component aimed at developing a course of actions to implement the three directives through drafting a detailed national implementation plan which included estimated costs for compliance and necessary steps for achieving compliance.
- **Implementation of the principles of the WFD, UWWTD and DSD in a pilot basin:** Third component included the development of a draft river basin management plan in accordance with the WFD and a draft pollution reduction programme in accordance with the DSD. Additionally, it was proposed to define future investment requirements for monitoring and laboratory infrastructure; to determine treatment requirements for domestic wastewater considering socio-economic and geological information; and to develop a real-time river basin information management system.
- **Communication strategy for the implementation of the project:** Fourth component aimed at developing a comprehensive communication strategy including internal and external communication during and after the project.

In general, the project was designed to provide basic tools for integrated and sustainable management of river basins in Turkey. Within the project, the development of a river basin management plan was of capital importance for Turkey since it was the first example for the

full implementation of the WFD at a river basin level, which could set a precedent for other basins and contribute to the drafting of the National Implementation Plan. In this perspective, Büyük Menderes river basin was selected as a pilot basin in order to benefit from the results of already finished MATRA project. The overall objective of the river basin management plan was to determine precautions for Büyük Menderes in order to reach good water status by the year 2027. Within this context, the plan aimed at (UNESCO et al. 2009b):

- stimulating sustainable of water use through the water protection at the long term;
- decreasing pollution;
- preventing farther degradation in aquatic ecosystems;
- enhancing the aquatic environment;
- raising awareness and stakeholder participation.

Within the project duration, a steering committee was established in order to provide guidance, direction and control on key issues of twinning project. Throughout the project, the Steering Committee met four times a year in order to discuss the project progress, to affirm the success of the outputs and mandatory results and to discuss following actions to be undertaken. All relevant stakeholders were involved in the Committee, including the Project Leaders, the Resident Twinning Adviser and its counterpart as well as the representatives from several governmental institutions (EC 2006).

Management and Planning Process of the Project

The project started with a kick-off meeting in February 2008 with the participation of representatives from relevant governmental and non-governmental agencies from the entire basin. At this meeting, it was agreed to set up a new consortium in order to form a platform for stakeholder participation. In this framework, *Büyük Menderes Environmental Protection Union* was established by the participation of wide variety of stakeholders from the provinces of Uşak, Aydın and Denizli in order to provide guidance, direction and control on the regional aspects of the project in Büyük Menderes River Basin. Additionally, it was decided that the governor of Uşak Province, who actively led water quality improvement activities in Büyük Menderes, was appointed as chairperson of the Union and as representative of the Union in the Steering Committee (UNESCO et al. 2009b). Furthermore, a working group, which consisted of MS experts and Turkish experts, was created in order to prepare the several parts of the RBMP. The studies of the working group resulted in drafting of Büyük Menderes RBMP, which included complete steps of WFD guidelines (ÇOB 2009b)

The preparation of RBMP was initiated with drawing up a “characterization report”. The working group prepared this report based on the results of already finished MATRA project as well as the further analysis conducted in the basin. Based on the information derived from the characterization report, the working group prepared the final version of the Büyük Menderes RBMP. Within this RBMP, not only a new monitoring system was proposed but also the programme of measures was created. Since four significant water management

issues were identified in the characterization report, namely *point sources pollution, diffuse sources pollution, hydro-morphology and climate change*, the measures to achieve good status in the water bodies in the basin aimed at these four issues. In this perspective 17 measures for point source pollution, 15 measures for diffuse sources pollution, 3 measures for hydromorphological pressures and 12 measures for climate change were defined to improve water quality in a direct manner. Additionally 17 measures were identified as part of the cost of compliance. Provided that these measures would be implemented, it was anticipated that ‘good water status’ would be achieved in the period from 2027 until 2033 (ÇOB 2009b).

In order to assess whether improvement in the water status would be achieved as a result of implementation of measures, the establishment of a new monitoring network was proposed. It was decided that the Ministry of Environment and Forestry would be responsible institution for conducting monitoring activities with accordance to the WFD. In this framework, 13 sampling points were selected for surveillance monitoring in order to make a long term detection of natural and anthropogenic trends and to confirm the risk assessments in terms of domestic, industrial, agricultural and hydro-morphological pressures by taking into consideration the environmental quality standards; and 27 points were agreed as operational monitoring points in order to take a control on more specific pressures (ÇOB 2009b).

Furthermore, the working group calculated total implementation costs of measures, which consisted of two cost categories, namely direct costs of the Programme of Measures and indirect costs of compliance (ÇOB 2009b).

As a final step, the cost recovery assessment was conducted by working group in order to find out financial source that would cover some part of total implementation cost. This assessment not only ensured transparency on cost, prices, subsidies and cross-subsidies but also formed a significant step towards implementation of the economic principles of user-pays and polluter-pays for the water resources they use and the damage they create.

Public Participation and Raising Awareness Activities of Project

Besides preparing a river basin management plan, a key objective of the project was to raise public awareness and stakeholder participation. In this framework, a communication plan was formulated to inform and engage stakeholders in river basin management; thus, active dialogue and exchange of information was taking place with all stakeholders throughout the project.

In order to communicate all the activities carried out in the basin to all stakeholders, to coordinate the activities and to create public awareness, several meetings were taken place in 2008 and 2009. These meetings were held under the coordination of the Büyük Menderes Environmental Protection Union, and they were attended by a wide range of stakeholders

such as municipalities, governorates, the Ministry of Agriculture and Rural Affairs, individual farmers and industrialists, managers of treatment plants, irrigation unions, chambers of industry and commerce and several NGOs. The information supply and consultation of the stakeholders led to the many changes within the plan. Additionally, a website about the twinning project “Capacity Building Support to the Water Sector in Turkey” was launched (www.tr-suyonetimi.cevreorman.gov.tr). It provides information about the project, its mandatory results and benchmarks, and the basin of the Büyük Menderes River. The draft river basin management plan was also published on this website for information supply and consultation. Moreover, several newspapers, both on the national and the regional level paid attention to the project, especially when important stakeholders’ events in the Büyük Menderes River Basin took place. Furthermore, in March 2009, a side event was organized by project team within the frame of the 5th World Water Forum in order to present the project of “Capacity Building Support to the Water Sector in Turkey”. Thus, the project was introduced at international level.

5.3.3.3. Follow-up Studies in Büyük Menderes River Basin

Monitoring Activities - Capacity Building on Water Quality Monitoring in Büyük Menderes

In Büyük Menderes river basin, regular monitoring activities were initiated by the Ministry of Environment and Forestry in 2011. Within these activities, sampling points, which were determined within the project of “Capacity Building Support to the Water Sector in Turkey”, were used as monitoring stations, and samples were taken once in every two months. However, these monitoring activities didn’t cover biological monitoring (Sümer 2012). For this reason, a follow-up project on monitoring, namely “Capacity Building on Water Quality Monitoring”, started in September 2011 and was scheduled to end two years later. The project was a twinning partnership between the Netherland, France, Spain and Turkey, and was financed by the EU with a national contribution by Turkish Government. The Ministry of Forestry and Water Affairs was the main beneficiary of the project. The overall objective of the project was to design a monitoring network in Büyük Menderes River Basin within the framework of WFD and daughter directives. In this framework, many activities were executed by both civil servants of Turkey and experts from the Netherlands, France and Spain (OSİB 2013c).

Therefore, the measure, which was determined as “*Improved monitoring for inland waters, transitional waters, coastal waters and groundwater in accordance with WFD*” in Büyük Menderes RBMP, has partially been fulfilled. The measure will be fully satisfied with the continued monitoring activities as specified in the monitoring plan and programme for Büyük Menderes river basin.

Activities Related to Reduce Point Pollution

Since point pollution is regarded as one of most significant water management issues of Büyük Menderes river basin, many measures were defined within Büyük Menderes RBMP to tackle with this issue. In order to follow the activities related to reduce point pollution, a “*Basin Measures Strategy Paper for Büyük Menderes*” was prepared by the Ministry of Forestry and Water Affairs. During the field work stage of the Basin Measures Strategy Paper, general condition and problems of waste water treatment plants and landfills were inspected and all of these observations were inserted in the paper. By this paper, urgent actions were defined as ‘establishment of municipal wastewater treatment plants for settlements above 2000 population’, ‘establishment of wastewater treatment plants for individual industries and organized industrial zones’ and ‘establishment of hazardous waste handling, recycling and disposal facilities’. Additionally, investment schedule and the responsibilities of the institutions for the implementation of the actions were identified within the strategy paper. The progresses related to implementation of these actions are followed up by means of ‘*Büyük Menderes Follow-up Commission*’, which is formed with representatives of all stakeholder institutions.

Since Büyük Menderes river basin covers a vast area, it will take time to implement all measures related to point pollution reduction throughout the basin. On the other hand, the implementation of urgent actions can be seen as an important step.

Activities Related to Raising Awareness and Training of Local Population

One of the main measures specified within Büyük Menderes RBMP is to “*train farmers on good agricultural practices (water, fertiliser & manure, pesticides)*” with the aim of decreasing over-use of water in agricultural activities and preventing diffuse pollution. Within this context, two important studies were conducted in Büyük Menderes River Basin, which were led by non-governmental organizations.

The first project named “Expanding the Rational Use of Agricultural Chemicals in Büyük Menderes River Basin” was executed in close cooperation between Nature and Environment Foundation and Denizli Chamber of Agriculture, and supported by EU environment fund. The project was aimed at raising awareness of farmers about the use of agricultural chemicals and so contributing to the reduction of soil and water pollution in Büyük Menderes river basin. The main target group of the project was defined as the local farming population; and Sarayköy was selected as a pilot project area since it was one of main settlements in upper part of river basin where an intensive agricultural practice was conducted (REC-Turkey 2013).The second project titled “Water to Bafa, Crops to Aegean” was conducted with the support of WWF-Turkey and Coca-Cola Turkey. The objective of the project was to ensure the health of Bafa Lake while still maintaining agricultural activities in the region by promoting and spreading the use of drip irrigation. The aim was to install drip irrigation systems on nearly 360,000 square meters of agricultural area

surrounding the lake. With the installation of these systems, the project targeted to save approximately 60 million tons of water per year. Additionally, the project aimed at raising awareness among 3000 farmers in 12 villages around the lake basin. Within this context, a series of events, preparing reports, training, technical trips were carried out (WWF-Turkey 2013).

These studies set a good example for training of farmers on good agricultural practices. However, these trainings should be spread to basin-wide in order to fulfill the measure.

5.4. EVALUATION OF STUDIES ON BÜYÜK MENDERES RIVER BASIN MANAGEMENT PLANNING

Büyük Menderes River Basin is one of the most important basins of Turkey since it is rich in terms of water resources, natural, cultural and archeological values, mineral deposits, productive farm lands and geothermal sources. On the other hand, Büyük Menderes River Basin has experienced many problems, which have dated back to 1960s and generally resulted from conflicts between nature protection and economic development. In order to tackle with these problems, many water-related planning studies have been conducted within the river basin. These studies can be divided into two periods, namely ‘studies of conventional water management’ and ‘studies of modern IRBM’.

Within the first period, point problem solving method was used to formulate an immediate development objective, which reflected a priority theme of that time. Since the river basin experienced problems arised from irregular water regime and its negative impact on agriculture in 1960s, the first master plan focused on solving problems of extreme water events and meeting the water demand of agricultural sector by developing dams. As a result of this planning study, Adıgüzel Dam, the Işıklı Lake and the Kemer Dam were constructed in the basin and their constructions contributed to the increase in the efficiency of irrigation. In 1990s, second planning study was carried out as a response to ongoing industrialization and problem of water pollution. Within this planning study, a continous monitoring and evaluation was conducted in order to recognize the socio-economic and environmental effects of upstream and midstream activities. The environmental study revealed that these activities had a negative impact on the ecosystem of Bafa Lake. Based on the results of the environmental study, technical and feasibility study was conducted and the rubber dam project was planned to protect the ecosystem of the Lake. Additionally, in this period, the stakeholders tried to solve the problems for which they’re responsible. However, it became evident that the point problem solving method remained insufficient to solve complex water-related problems of the river basin, and there was a need for more comprehensive and flexible management approach to cope with these problems. Therefore, it was experienced a shift from the conventional water management to modern IRBM in Büyük Menderes river basin in 2000s.

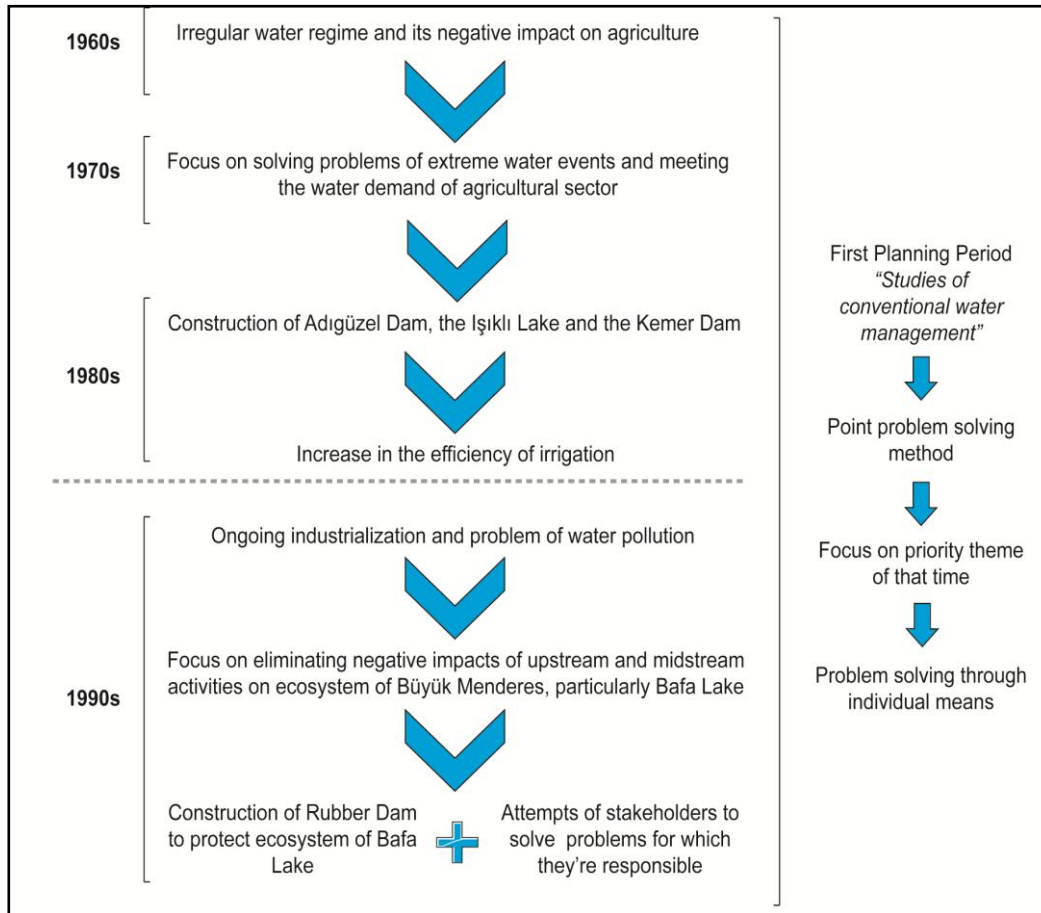


Figure 28. First planning period of river basin management

The EU harmonization process has an enormous effect on the second planning period; and consequently the studies of this period have been conducted with accordance to the WFD requirements. The first project related with EU WFD was called as “Implementation of the Water Framework Directive in Turkey”. In the project, a report for legal and institutional analysis, a draft Büyük Menderes RBMP, a handbook for the WFD implementation, and some practical guidelines for some basic sub-topics of the WFD were developed. However, due to the restrictions both in time and budget, the project could not serve the anticipated results to the beneficiaries for all parts of the Directive in detail. On the other hand, the project is a good introductory activity in perception of the WFD phenomenon during the harmonization process. As a result of this project, all related stakeholders in the water sector in Turkey became aware of the EU implementation in the water sector and WFD. In order to complete the missing and weak parts of the draft river basin management plan and to improve studies about WFD one step further, it became necessary to propose a new project.

In this framework, the second project titled “Capacity building support to the water sector in Turkey” was initiated in 2007. Within the project, a draft National Implementation Plan, a draft river basin management plan and a draft pollution reduction programme were produced. One of the most important outcomes of the project is the drafting of Büyük Menderes RBMP since it is the first example for the full implementation of the WFD at a river basin level. The project concluded that, in order to achieve an integrated approach to water management in Turkey, there is an apparent need for enactment of a “Framework Water Law” and need for an upgrading this monitoring system to the standards of the WFD. In order to meet these requirements and to achieve successful river basin management, the follow-up studies still continue in Büyük Menderes river basin. Additionally, a study for the revision of Büyük Menderes river basin management plan will be initiated in 2014.

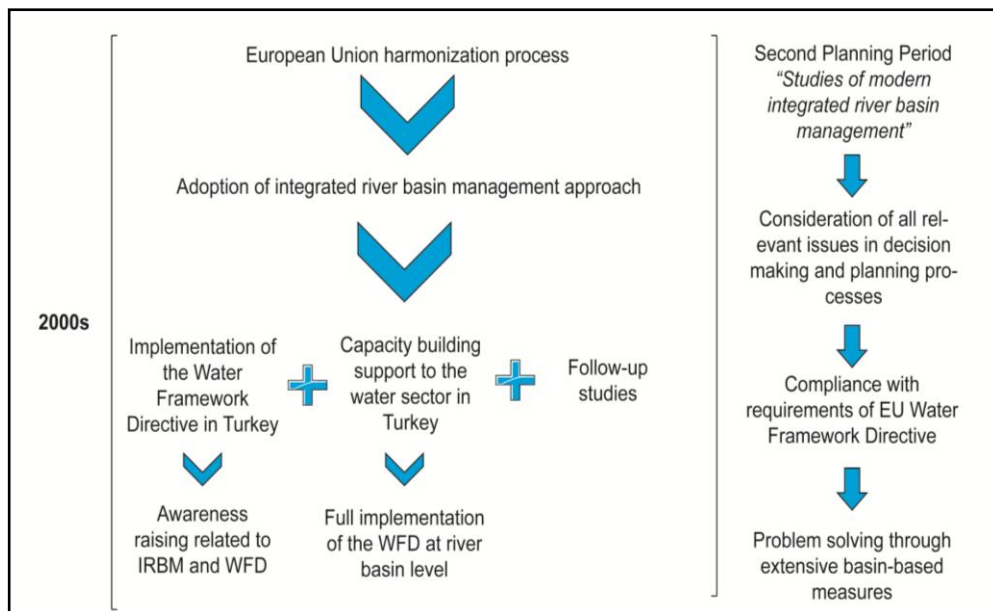


Figure 29. Second planning period of river basin management

In the light of the information on the planning process of Büyük Menderes river basin, it can be said that these planning studies have attempted to adapt to changing demands, needs, circumstances and societal goals in Büyük Menderes river basin. For this reason, the planning process of Büyük Menderes River basin can be regarded as a ‘spiral’ as illustrated in Figure 30. In this perspective, it can be said that the planning process of Büyük Menderes river basin corresponds to the iterative, evolutionary and adaptive nature of IRBM process.

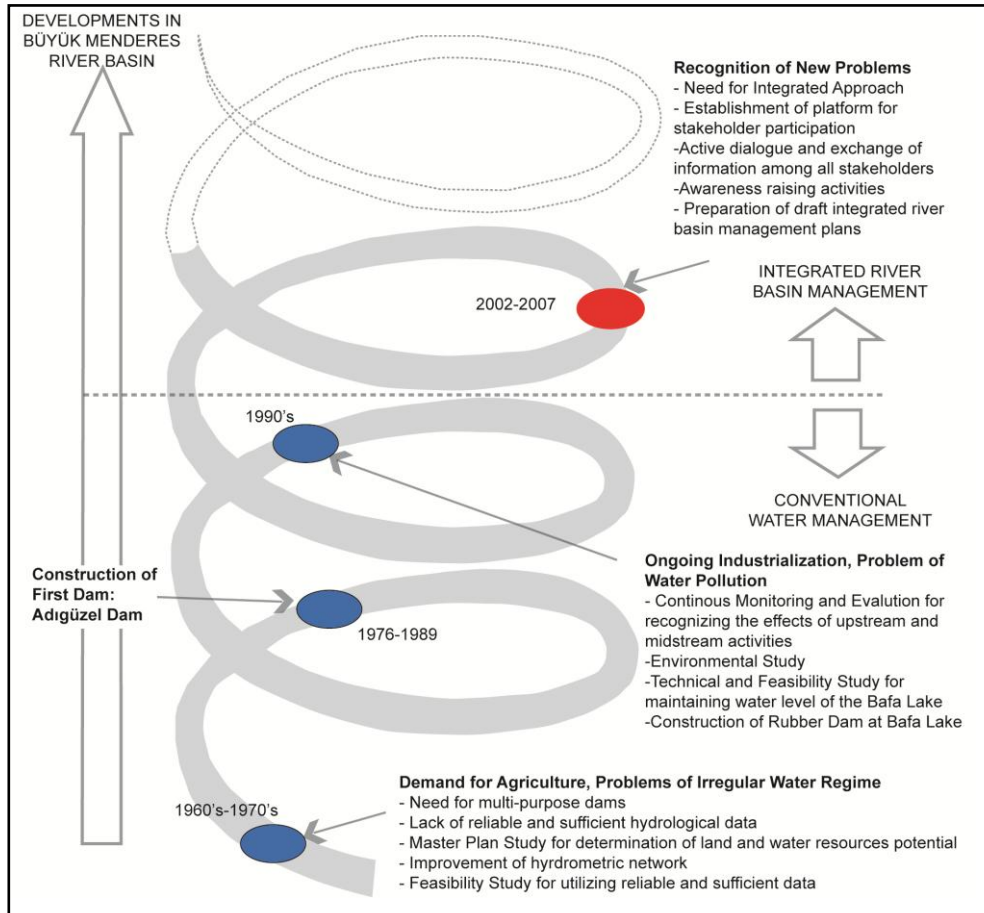


Figure 30. The planning process of Büyük Menderes River Basin

In this framework, the planning process of Büyük Menderes river basin can be seen as a progressive IRBM planning example since most of the general principles of IRBM planning approach have tried to be fulfilled with both projects (MATRA Project – Implementation of WFD in Turkey and Capacity Building Support to Water Sector in Turkey) and follow-up studies. River basin based organizations were established and they followed many activities and completed many stages of WFD in the preparation and implementation of RBMP. Additionally, public participation and public awareness activities during the projects have been held. However, some deficiencies are also observed during this planning process due to inadequacies in our national legislative and institutional systems. A competent authority could not be appointed during the planning process at river basin level to conduct implementation and evaluation activities because river basin organizations are not legally identified within national legislative system. This situation results in some difficulties in implementation and evaluation stages; nonetheless, governmental and non-governmental institutions still maintain their activities in order to fulfill the measures and to achieve the

sustainable management of Büyük Menderes River Basin. Although it takes time to decide whether Büyük Menderes IRBM planning process succeed in establishing economic efficiency, environmental integrity and social development in the river basin, it can readily be concluded that Büyük Menderes IRBM planning case set a precedent for future IRBM planning studies in terms of public participation, capacity building and intersectoral coordination as well as the realization of WFD phenomenon. Key success factors and fully attained IRBM principles within the planning process of Büyük Menderes Integrated River Basin Management are given in Table 10.

Table 10. Key success factors and fully attained principles within Büyük Menderes IRBM planning process

Period	Keys to Success	IRBM Principles to be Fully Achieved
First Planning Period (1960s-1990s)	<ul style="list-style-type: none"> • Being selective when collecting data by setting priorities based on the problems • Continuous monitoring and evaluation of the effectiveness of river basin development and management activities 	Since the point problem solving method is used, none of the principles can be satisfied. Additionally, there is no institutional framework at basin level or wide-scope legal basis.
Second Planning Period (2000s beyond)	<ul style="list-style-type: none"> • Preparing a framework for participation to build consensus among stakeholders and water users • Capacity building and awareness raising activities • Providing inter-institutional and inter-sectoral coordination 	<ul style="list-style-type: none"> • <u>Principles related to planning issue:</u> Strategic approach (based on the WFD steps) • <u>Principles related to administrative issue:</u> Local empowerment and effective participation • <u>Principles related to institutional issue:</u> Effective partnership

On the other other hand, it is an unavoidable fact that there is an urgent need for revising our national institutional and legislative system in order to achieve a more efficient river basin planning process

CHAPTER 6

CONCLUSION

River basins are regarded as the one of the most significant ecosystems, which has a crucial role in procuring unique habitat for a broad array of fauna and flora. Additionally, many goods and services are provided by these ecosystems, which have contribution in public welfare as well as poverty reduction. However, river basins suffer permanent losses due to the intense use and pressures. For this reason, effective and sustainable management of river basin has become an important issue throughout the world. In this context, IRBM has been largely accepted as the most suitable approach for ensuring the wise usage of the water resources since it introduces a basin-wide frame to make strategical judgements in favor of water management which is environmentally, socially and economically sustainable. Along with the global tendency, several countries have moved toward introducing and establishing IRBM in their river basins. The European Union has also used IRBM as a guiding framework within the Water Framework Directive in order to promote a less wasteful and more equitable and sustainable use of resources within whole European river basins.

6.1. GENERAL EVALUATION FOR WATER MANAGEMENT IN TURKEY

As a result of the harmonization process to European Union, the perception change in Turkish water policy is realized from traditional water management to integrated water management. Within this process, Turkey, as being an accession country to European Union, becomes compulsory to transpose its national water legislation to the Water Framework Directive. However, it is very clear that Turkey will be faced with some main difficulties in the implementation of EU Water Framework Directive and specifically the integrated river basin management plans which are prepared according to the principles of this Directive in the following years. These problematic areas and relevant recommendations are summarized as below:

Legal Framework

In Turkey, there is a great deal of institutions related to water management with contradictory and overlapping duties. Since different laws and regulations impowers several different governmental bodies for managing the same water resource, conflicts increase over the jurisdictions and liabilities in the water management and planning. In order to address the fragmentation of national water legislation, there is an urgent need for a “Framework Law on Water” which introduces general principles and procedures of protection and management of

water resources. Additionally, the harmonization of Turkish water legislation with EU *acquis communautaire* has become compulsory with the opening of the environment chapter, which requires the enactment of a “Framework Law on Water” in line with 2000/60/EC Water Framework Directive.

In order to meet the need for a Framework Law on Water within national legal system as well as to transpose the provisions of the WFD into Turkish legislation, the studies related to the preparation of Draft Law on Water have proceeded. In the view of evaluation of the draft Law on Water, it can be said that the Law is considerably parallel to the EU WFD with regards to its systematic and thematic structure as well as its scope. Additionally, the Law involves relevant regulations on the main provisions of the WFD, such as integrated water management approach, basin-based water management model, river basin management plans, programme of measures, administrative measures, monitoring programmes and cost-recovery principles. Furthermore, the Law explicitly specifies the competent authority to facilitate coordination as well as the jurisdictions and liabilities of relevant institutions, which can overcome the problems of coordination and overlapping authority. Moreover, the Law purposes to bring a systematic and strategic approach to water management with the perception of "planning logic" and "plan-based actions", which can partially fill the gap related to basin-based natural resource planning within the national legislation. In addition to these, the Law consists of provisions related to water pricing, which shows parallelism with the main principles of the WFD such as user-pays, polluter-pays and cost-recovery.

On the other hand, there are some inconsistencies with the WFD and deficiencies within the Law. First of all, it will be appropriate to integrate the statement such as “Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such.” into the Law in order to reflect its general philosophy definitively. Secondly, the “participation” issue is not sufficiently emphasized within the Law in comparison to the WFD. However, it is of capital importance to ensure the public participation since the decisions on water planning and management are a particular concern to the public. Therefore, there is need for integrating a detailed regulation into the Law, which proposes the public participation not only within the planning process, but also within the decision-making, execution and implementation, monitoring, control and inspection processes. Thirdly, the provisions related to “access to information” could not precisely meet the requirements of the WFD. Although there are regulations for the access of institutions to water-related information and data, there is no provision related to access of public and interested parties. However, the access to information is a right as well as a tool to increase transparency and accountability. Thus, there is a necessity to integrate provisions which ease the access of public and interested parties, especially environmentalist organizations to water-related information and data. Finally, the Law has deficiencies related to concrete financial instruments. Although there are provisions related to water pricing, they aren’t sufficient for meeting financial requirements of water and wastewater investment as well as monitoring studies. For this reason, it will be useful to integrate provisions related to direct

financial instruments such as “basin protection taxes”, which can set a budget for high-cost services, operations and studies.

As a result, it can be said that the enactment of “Law on Water” can be considered as the inception of a new period in water resources management, which adopt an integrated, sustainable and environmental friendly approach. In this framework, the Law should promptly be legislated following the correction of its inconsistencies and deficiencies. Apart from this, enduring political will, high-level commitment of executives, ever-developing institutional capacity, well-designed control, monitoring and enforcement processes, and active participation and support of public are required in order that legal change makes significant differences in practice.

Institutional Framework

Insufficient coordination is a major weakness on the institutional structure for IRBM in Turkey. Different institutions carry out water-related activities with accordance to their own planning studies. This causes redundant duplications of studies, waste of money and time for the same water bodies. In order to overcome the problems and contradictions experienced in water management, Water Management Coordination Committee is established. The Committee is particularly responsible for the achievement of coordination and collaboration between different institutions and sectors. The establishment of the Committee can be seen as an important step to reach an integrated coordination between all stakeholders in water resources management. On the other hand, Ministry of Environment and Forestry went through an institutional structuring in 2011; as a result, the Ministry has split into two different ministries, namely the Ministry of Forestry and Water Affairs, and the Ministry of Environment and Urbanization. Following the separation of the water sector from the Ministry of Environment and Urbanization, institutional coordination has become somewhat problematic. In order to eliminate this problem, it will be appropriate to restructure the institutional framework at central level in such a way that main water issues such as water quality, water quantity and, control, inspection and sanction will be gathered under the roof of a single ministry.

The deficiencies in common database and information flow between different institutions can be regarded as another weakness of the institutional structure. In order to prevent these communicative problems, a convenient database should be created in line with integrated river basin approach and the WFD. Therefore, water-related information can be shared between interested parties as fast as possible, which will strengthen the inter-institutional and inter-sectoral communication and coordination.

Another problem of national water-related institutional structure is that the institutional framework for water management is still not fully organized at river basin level. Although “basin management committees” are established in each river basin district in order to support studies related to preparation of river basin management plans, and implementation,

monitoring and evaluation of these plans, they have not become functional yet. Even the establishment of basin management committees can be seen as an important step, it is not singly sufficient as well as it doesn't quite correspond to the river basin organizations of EU-member countries. For this reason, it will be appropriate to organize institutional framework at river basin level by making use of the experiences of the EU countries. In this respect, the institutional structure should be organized in a way to involve the basin management committees as well as basin water agencies, water polices, and water and sewerage administrations. Within this structure, the basin management committees should be responsible for managing river basins with an integrated approach, approving the RBMPs and water tariffs, and providing active participation of all stakeholders and water users. At first, the governor of the largest province in the river basin can preside over the committees. When the system is put on right track, the committees should gain an autonomous structure. "Basin water agencies" should be established in a way to be affiliated with the Ministry of Forestry and Water Affairs. They should be in charge of protecting river basins against pollution, improving the status of water quality, preparing RBMPs, defining water tariffs, and conducting monitoring studies. Additionally, local government reorganization should be realized in such a manner that water supply and wastewater management services will be carried out under the umbrella of the "Provincial Water and Sewerage Administrations". These administrations should be charged with collecting fees for water and wastewater as well as making water and wastewater investments and operating them. Finally, "water policies" should be responsible for imposing penal sanctions related to water issues.

To conclude, if the institutional reorganization at central, river-basin and local level is fulfilled as mentioned above, the deficiencies in the institutional structure for implementing IRBM will be resolved. In addition to this, enduring political will, high-level commitment of executives, ever-developing institutional capacity can lead IRBM practices to success.

Planning Framework

The neglect of natural resource planning approach is a major weakness of the spatial planning structure in Turkey. Although the water resource management is used as a tool in our spatial plans, their socio-economic structure prevents ecological dimension from gaining enough attention. On the other hand, river basin management approach of the WFD requires not only improving water quality but also to integrate environmental, socio-economic, and land use aspects of water policy. This necessitates a strong linkage between water management and spatial planning. In order to forge such a linkage, it is required to make changes in interaction patterns of water and spatial policies. Additionally, there is a need for developing collaboration between water managers and spatial planners during the strategic policy making, planning and decision making processes.

First of all, water management issues should be incorporated in the "National Spatial Strategy" in order to emphasize the need for considering water resources as a crucial structuring principle for spatial planning. In other words, it should be underlined that spatial

choices are made by taking into account the needs and the characteristics of water systems. Thus, the plans can be prepared with the principle of “room for the river”. Secondly, the strategy should be supported by new regulatory instruments such as “water assessment”. The regulatory instruments should be applied to all scales of spatial plans and spatial decisions related to water, and they should describe how the plans influence water quality and quantity. This kind of instruments will be useful to guarantee that water concerns are considered in spatial planning; therefore, adverse impacts on the water resources are compensated, mitigated or prevented. In such a system, water authorities and spatial planning authorities should collaborate in the spatial plan development with regard to their own liabilities. The sooner the water managers are involved in the preparation process of the spatial plan the easier the integration of water policies into the plan will be succeeded. The early interaction will provide a shift of the position of water authorities from a traditional monitoring function at a final stage to a more proactive role at earlier stages of the spatial planning process. Since they inform each other about their plans, relevant policies and important issues, a mutual agreement will be reached in each other's perspective.

As a result, spatial planners can help promote changes within the planning structure in Turkey by emphasizing water concerns more strongly in spatial planning, and using integrated river basin management as a tool for integrating economic and environmental interests. IRBM plans could serve as a reference for the regional plans. If regional plans are prepared with the reference to ecological decisions and principles of their related IRBM plans, not only socio-economic issues but also ecologic dimension will gain importance in the regional plans. With integration of these socio-economic and ecological principles into operative sub-scale plans, the implementation of IRBM plan decisions will be achieved. In order to restrain possible implementation difficulties and to reach joint planning vision and strategy, representatives of regional development agencies can be affiliated with basin management committee in their river basin district. Within this process, creating political and public support, and increasing the institutional capacities are required in order that planning attempts succeed.

6.2. GENERAL EVALUATION FOR THE PLANNING PROCESS OF BÜYÜK MENDERES RIVER BASIN

IRBM planning process of Büyük Menderes river basin is evaluated with respect to general principles and key tools of IRBM. Following conclusions are deduced:

- The planning of the Büyük Menderes River Basin has evolved through time following a spiral of management, which corresponds to the iterative, evolutionary and adaptive nature of IRBM process.
- The planning process follows a participatory approach.
- There is a strong river basin advocacy among both governmental and non-governmental organizations.
- Political will and high-level commitment have not been fully achieved among all stakeholders yet.

- A river basin organization could not be established in Büyük Menderes river basin within planning process. On the other hand, some institutional arrangements are applied, which enable the creation of effective partnerships among inter-national, national and local stakeholders.
- There are deficiencies in informational and science base of the planning process.
- It is hard to comment about whether the Büyük Menderes IRBM planning process will get long-term financial investment since implementation and evaluation activities have been just launched.

In the light of above information, the planning process of Büyük Menderes river basin can be seen as a successful IRBM planning example. Although it takes time to decide whether Büyük Menderes IRBM planning process succeed in establishing economic efficiency, environmental integrity and social development in the river basin, it can readily be concluded that Büyük Menderes IRBM planning case set a precedent for future IRBM planning studies in terms of public participation, capacity building and intersectoral coordination as well as the realization of WFD phenomenon. On the other hand, it is an unavoidable fact that there is an urgent need for revising our national institutional and legislative system in order to achieve a more efficient river basin planning process.

To conclude, if reorganization of related institutional and legal frameworks is satisfied, the IRBM plans can give direction to planning and water management system, and solve the issues related to development and natural conservation. At this point, it should not forgotten that it is essential to establish a consensus on what is the suitable balance between environmental and economic objectives in order to achieve consistency in plan decisions taken at basin level.

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