

POLITICAL ECOLOGY OF POLLUTION CONTROL FAILURE
IN ERGENE BASIN OF THRACE, TURKEY

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ABSTRACT

POLITICAL ECOLOGY OF POLLUTION CONTROL FAILURE IN ERGENE BASIN OF THRACE, TURKEY

This thesis analyzes the pollution control failure in the Ergene Basin as a specific example of environmental conservation failure. Taking the political ecology literature as a starting point, the power and politics influencing the pollution control efforts and their failure are addressed. Rapid industrialization in Ergene has started in the 1980s to relocate industrial facilities from Istanbul to Thrace. Thus, industrial density areas were generated. The neglect on water pollution control has resulted in increasing pollution levels. However, there have been public response and professional efforts to control pollution. In response to the reactions against heavy pollution, various steps have been taken to prevent pollution, but they have been insufficient leading to pollution control failure. To understand the causes of this pollution control failure, we investigated pollution control efforts of the local professionals and the central authorities starting from the plan making process to the implementation phase. Through desktop research of environmental plans and reports, site visits to the pollution havens and in-depth interviews with experts, academics, NGOs representatives, it is observed that: The neglect of environmental problems in the context of neoliberal development, the reluctance of the state to ensure environmental conservation policies, devolution of power from local to central authorities have played a crucial role in pollution. Thus, these factors point towards an environmental governance problem arising from the lack of participation mechanisms which lead to shifting the cost of pollution from polluters to the public and the nature through integrated treatment plants and deep sea discharge projects.

ÖZET

TÜRKİYE, TRAKYA ERGENE HAVZASI'NDAKİ KİRLİLİK KONTROLÜ BAŞARISIZLIĞININ POLİTİK EKOLOJİSİ

Bu tez, Ergene Havzası'ndaki kirlilik kontrol başarısızlığını, çevre koruma başarısızlığının özel bir örneği olarak analiz etmektedir. Politik ekoloji literatürü bir başlangıç noktası olarak kullanılarak, kirlilik kontrolü çabaları ve başarısızlıklarını etkileyen güç ve politikalar ele alınmaktadır. Ergene'deki hızlı sanayileşme, sanayi tesislerinin İstanbul'dan Trakya'ya taşınması politikasının bir parçası olarak, 1980'lerde başlamıştır. Böylece, endüstri yoğunluklu bölgeler oluşmuştur. Su kirliliği konusundaki ihmal ise kirlilik düzeyinin artmasına neden olmuştur. Öte yandan, kirliliği kontrol altına almak için halk tepkisi ve profesyonel çabalar ortaya konulmuştur. Ağır kirliliğe karşı gelişen tepkiler üzerine, kirliliğin önlenmesi için çeşitli adımlar atılmış, ancak bu çabalar yetersiz kalarak kirlilik kontrolü başarısızlığına yol açmıştır. Bu kirlilik kontrolü başarısızlığının nedenlerini anlamak için, yerel uzmanların ve merkezi yetkililerin, plan oluşturma sürecinden başlayarak uygulama aşamasına kadar olan kirlilik kontrol çabalarını araştırdık. Çevresel planların ve raporların masa üstü çalışması, kirlilik bölgelerine yapılan saha ziyaretleri ve uzmanlar, akademisyenler ve STK temsilcileri ile yapılan derinlemesine görüşmeler sonucunda şunlar gözlemlenmiştir: Çevre sorunlarının neo-liberal kalkınma bağlamında ihmal edilmesi, devletin çevre koruma politikalarını güvence altına alma konusundaki isteksizliği, iktidarın yerel makamlardan merkezi otoritelere devredilmesi kirliliğin oluşumunda çok önemli bir rol oynamıştır. Bu nedenle, bu faktörler, katılım mekanizmalarının olmamasından doğan ve entegre arıtma tesisleri ve derin deniz deşarjı projeleri üzerinden, kirliliğin maliyetinin kirleticilerden halka ve doğaya kaydırılmasına yol açan bir çevre yönetişimi sorununa işaret etmektedir.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS.....	iii
ABSTRACT.....	iv
ÖZET.....	v
TABLE OF CONTENTS.....	vi
LIST OF FIGURES.....	viii
LIST OF TABLES.....	ix
LIST OF SYMBOLS/ ABBREVIATIONS.....	x
1. INTRODUCTION.....	1
2. LITERATURE REVIEW.....	8
2.1. Understanding Pollution Control Failure Through Political Ecology.....	8
2.2. Environmental Governance and Power Relations.....	9
2.3. Development Process and Environmental Degradation.....	12
3. METHODOLOGY.....	14
4. AN OVERVIEW OF THE BASIN AND POLLUTION.....	16
4.1. General Outlook.....	16
4.1.1. Physical Properties.....	16
4.1.2. Population and Industrialization.....	17
4.1.3. Means of Livelihood.....	19
4.1.4. Agriculture.....	19
4.1.5. Industrial development in the basin.....	20
4.2. Pollution Processes and Parameters.....	25
4.2.1. From Development to Tragedy: Pollution in the Ergene River.....	25
4.2.2. Pollution Parameters.....	30
4.2.2.1. Industrial Wastewater.....	30
4.2.2.2. Domestic Wastewater.....	32
4.2.2.3. Agricultural Residues.....	33
4.2.2.4. Leachate.....	34
4.2.3. Evaluation of Parameters.....	34
5. POLLUTION CONTROL EFFORTS IN ERGENE.....	35
5.1. An Overview of the Plan Making Processes.....	35
5.2. Planning Processes and Institutional Conflicts.....	47

5.3. The Ergene Basin Environmental Plans.....	48
5.3.1. The Thrace Sub-region Ergene Basin Environmental Plan – 1999-2004.....	48
5.3.2. The Thrace Sub-Region Ergene Basin Revision Environment Plan - 2006-2009.....	49
5.3.3. The Ergene Basin Environmental Management Master Plan – 2008.....	52
5.3.4. The Meriç-Ergene Basin Protection Action Plan – 2008	53
5.3.5. The Meriç-Ergene Basin Industrial Wastewater Management Master Plan Final Report – 2010	54
5.3.6. The Ergene Basin Protection Action Plan – 2011	59
5.4. Evaluation of Projects and Plans	65
6. RESULTS AND DISCUSSION	67
7. CONCLUSION	71
REFERENCES.....	74
APPENDIX A: SURFACE WATER QUALITY MANAGEMENT REGULATION, QUALITY CRITERIA OF SURFACE WATER RESOURCES CLASSIFICATION.....	85

LIST OF FIGURES

Figure 1.1. The Ergene River	2
Figure 4.1. The location of the Ergene Basin.....	16
Figure 4.2. Population distribution in provinces	18
Figure 4.3. Çorlu Brook and shanty houses	19
Figure 4.4. Sectorial distribution in the region.....	20
Figure 4.5. The share of industrial facilities in Thrace region provinces.....	22
Figure 4.6. The location of Muratlı, Çorlu and Çerkezköy.....	23
Figure 4.7. Industrial facilities in Çorlu, 2017	25
Figure 4.8. Love Canal and Ajka Alumina plant disasters.....	27
Figure 4.9. Pollution in the Ergene River.....	29
Figure 4.10. Contaminated river water in Karamusul village, 2017	29
Figure 4.11. Industrial wastewater allocation in provinces.....	31
Figure 4.12. Domestic and industrial wastewater flow rates allocation in provinces	32
Figure 5.1. The locations of WWTPs planned to be established	58
Figure 5.2. Possible locations of Reclamation Organized Industrial Zones	61
Figure 5.3. The Ergene Basin, OIZs, joint WWTPs, tunnels, deep sea discharge line	62

Figure 5.4. The Ergene Basin, OIZs, joint WWTPs, tunnels, deep sea discharge line 2 63

LIST OF TABLES

Table 4.1. Population statistics in Thrace region	18
Table 4.2. Population changes in the region	21
Table 4.3. Number of operations in Thrace region	21
Table 4.4. The number of water based companies and quantity of wastewater in the Ergene Basin	31
Table 5.1. Plan making and implementation processes in Ergene	36
Table 5.2. Meetings on the Ergene River pollution before the protocol	42
Table 5.3. Chronology of events after the protocol	43
Table 5.4. Target analysis	54
Table 5.5. Comparison of current pollutant loads and target loads discharged from industrial wastes to the Ergene River	55

LIST OF SYMBOLS/ABBREVIATIONS

Symbol	Explanation	Unit
BİMTAŞ	Boğaziçi İnşaat Müşavirlik	
BOD	Biochemical Oxygen Demand	mg/L
BOD ₅	5-day Biochemical Oxygen Demand	mg/L
C ₆ H ₆ O	Phenol	
Cd	Cadmium	
CH ₄	Methane	
CN-	Cyanide	
CO ₂	Carbon Dioxide	
COD	Chemical Oxygen Demand	mg/L
Cr	Chromium	
DO	Dissolved Oxygen	mg/L
EIA	Environmental Impact Assessment	
EFZ	European Free Zone	
EU	European Union	
H ₂ S	Hydrogen Sulfide	
HPP	Hydropower Plants	
IBB	Istanbul Metropolitan Municipality	
IMF	The International Monetary Fund	
IMP	Istanbul Metropolitan Planning Center	
ITU	Istanbul Technical University	
MBR	Membrane Bioreactor	
N	Nitrogen	
NH ₃	Ammonia	
NGO	Non-Governmental Organization	
OIZ	Organized Industrial Zone	
P	Phosphorus	
Pb	Lead	
ROIZ	Reclamation Organized Industrial Zone	
S ²⁻	Sulfide	
SHW	State Hydraulic Works	
SKKY	Water Pollution Control Regulations	
TBMM	The Grand National Assembly of Turkey	

TKN	Total Kjeldahl Nitrogen	mg/L N
TMMOB	Union of Chambers of Turkish Engineers and Architects	
TPP	Thermal Power Plant	
TRAKAB	Thrace Development Association	
TÜBİTAK	The Scientific and Technological Research Council of Turkey	
TURKSTAT	Turkish Statistical Institute	
VAT	Value-Added Tax	
WTO	The World Trade Organization	
WWTP	Wastewater Treatment Plant	
Zn	Zinc	

1. INTRODUCTION

Great developments have led to tragedies with great costs for humanity throughout history. The promise of development has caused damage to people's living conditions and the environment, especially in the less developed world (Giarracca, 2007). The heavy consequences of development processes have been experienced as inequality, famine and environmental degradation. Similarly, the Ergene Basin is experiencing environmental degradation as a result of rapid industrialization. On the other hand, locals and central authorities often respond to ascending pollution parameters through various means. Over the past two decades, there have been various efforts in Ergene to control the increasing pollution in the river. However so far, these efforts have been futile. In this thesis, the underlying causes of this failure in pollution control in the Ergene Basin are investigated.

The Ergene Basin is a sub-region of Thrace which is a part of Marmara Region and has arable land with wheat, rice, sunflower production (Metin, 2011). The main water resource of the basin is the Ergene River which arises from Istranca Mountains, flows 282 km in length and flows into the Meriç River (Figure 1.1). The Ergene River is an important water supply for the region to meet the demand of both drinking and irrigation water. The basin comprised of fertile agricultural lands, groundwater and surface water resources. However, pollution loads in the basin have been increasing since the 1980s in parallel with industrial development.

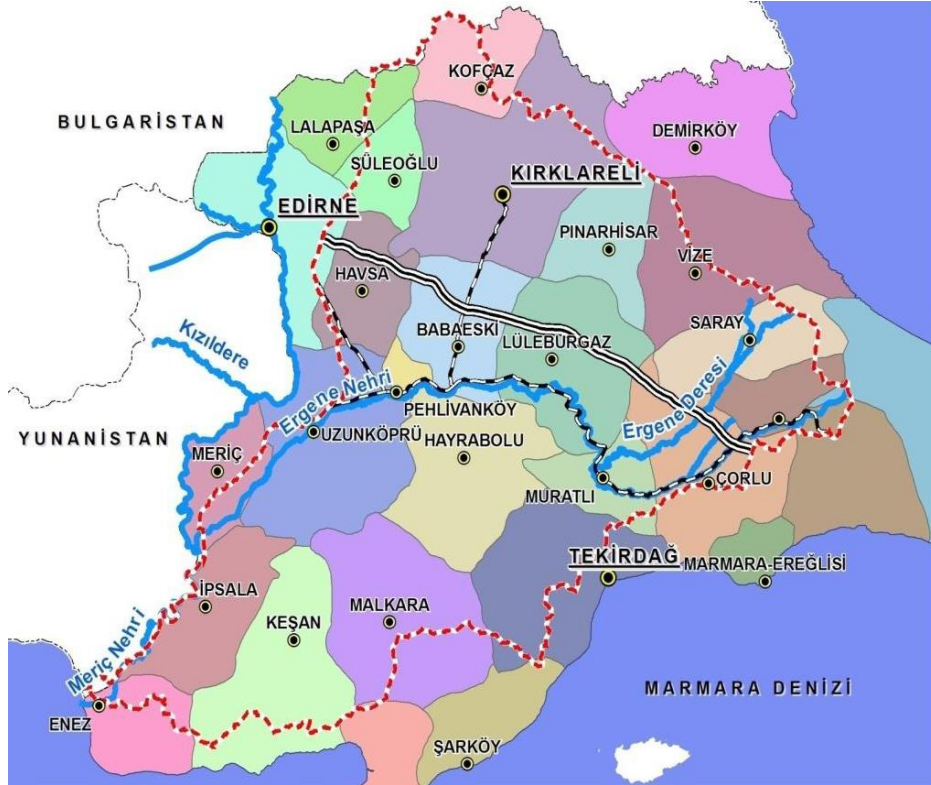


Figure 1.1. The Ergene River.

Industrialization has developed in the Ergene Basin since the mid-1980s in line with the decentralization of Istanbul's industry. Since groundwater resources are abundant, industrial companies settled in the basin, especially in agricultural lands. Furthermore, closeness to Istanbul and the presence of highways were the other factors that led to industrial development in the basin. Moreover, the state provided prerogatives to Organized Industrial Zones (OIZ) such as land acquisitions without paying Value-Added Tax (VAT), lower costs for natural gas, telecommunication and water, exemption from real estate duty for five years and the municipality taxes if the OIZ does not receive municipality service. These incentives encouraged industrialists to operate their facilities in the basin and migration of industry has started from Istanbul to the region. Thus, mostly water-based industry especially textile, leather and chemical industry concentrated in the Thrace region, nearby the large and small brooks. Tekirdağ has become the promising industrial area over the years due to its locational and transportation advantages. The TEM and D-100 highways pass through its provincial borders (Çevre ve Orman Bakanlığı, 2010). Çorlu, Muratlı and Çerkezköy districts are the significant areas in attracting industrial investments (Çevre ve Orman Bakanlığı, 2008). Big textile and leather factories moved to these districts while their headquarters remained in Istanbul (Gezici, 1997). The dirty parts of textile and leather production such as dyeing processes have been operated in the region. Locals claimed that dirty industries moved to the basin on purpose and it transformed the river bed to "the sewage of Thrace".

Development processes have gained acceleration in accordance with the neoliberal policies. Neoliberal economic policies have dominated underdeveloped world economies since the 1970s by means of foreign direct investments and international organizations such as The International Monetary Fund (IMF), The World Trade Organization (WTO). Liberalization of foreign direct investments, financial movements and privatization of public services such as education and health (Şenses, 2004) have been put into effect as part of neoliberal policies. Privatization, economic austerity policies, reduction of the state's investments and deregulation are neoliberal policies, which led to domination of private sector. In that sense, the state has become a regulator of social income distribution in favor of capital (Yeldan, 2004). Brenner and Theodore (2007) define neoliberalism as market-oriented institutional shift, which dictates "free market" doctrines at institutional, political and ideological scale. As Harvey (2006) noted that the state must "set up those military, defense, police and juridical functions required to secure private property rights to support freely functioning markets" (Harvey, 2006, p.145) in neoliberal context.

In Turkey, after implementation of neoliberal policies as of 1980, aggressive development processes were carried out. The state both follows developmental policy and provides advantages to the capital for maximization of its profit. Control measures and environmental concerns have been ignored in line with industrialization and its needs (Acar and Tekce, 2014). Industrialization in the Ergene Basin has developed in a context favoring the private business. Since that time, industrial companies settled in agricultural areas, used groundwater resources illegally.

As development agenda dominates environmental policies, the state ignores environmental destructive activities. Adaman and Arsel (2010) claim that "the consumption of natural resources, especially in relation to development efforts is another notable heading under which environmental problems appear". Agricultural lands, the Ergene River and groundwater resources have been exposed to pollution discharge for the sake of neoliberal development processes. Acara (2015) states that pollution occurs as a result of neoliberal processes due to "the lessening powers of state control over natural resources and domination of the market mechanism with increasing exploitation". In the Ergene Basin, the lack of public auditing services provides an opportunity for the industry to reduce their treatment costs. Industrial companies discharge their wastewaters into the river, yet ministry or municipalities have avoided fining them for illegal discharging activities or excessive groundwater extraction. It shows the state's unwillingness to halt polluting activities prioritizing aggressive development policies that should proceed. The state provides advantages to industry for economic growth instead of regulating industrial activities.

In the Ergene Basin, rapid industrialization in the absence of pollution control measures caused pollution processes, with heavy consequences such as river pollution, decreased groundwater level, soil contamination, deforestation and loss of biodiversity. Industrial companies have discharged their wastewaters into the brooks over the years (İnci, 2010, p.35). Thus, pollution hotspots have been generated, particularly in Çorlu-Çerkezköy line in relation to concentration of industrialization. According to the State Hydraulic Works (SHW) (*Devlet Su İşleri, DSİ*), in 1995, while the flow rate of the river was 2 m³/s, in the following years, it has reached up to 8 m³/s due to wastewater discharge, which means ¾ of river flow is wastewater (Türkiye Barolar Birliği, 2015). Today, the Ergene River has the IV. grade of water (low quality, it cannot be used for any purpose). Industrial wastewater is the main polluter in the basin in terms of both polluter parameters and flow rate. Particularly, textile, leather, chemical, food, and metal industries generate a vast amount of wastewater. Chemical and pharmaceutical industries have high capacity in Çorlu and Çerkezköy (Çevre ve Orman Bakanlığı, 2010). River pollution also causes the loss of self-cleaning capacity (Kocaman et al., 2015) and contamination of soil. Furthermore, the use of polluted water for drinking and agricultural purposes threatens public health and food security in Ergene risking 54% of Turkey's rice demand, which is met by the basin (Orman ve Su İşleri Bakanlığı, 2011b).

On the other hand, pollution problem has drawn public attention since the 1990s as the river became a dirty canal. Pollution problem started to appear in the local and national newspapers. Different stakeholders responded to pollution problem and showed their reactions. Locals, academics and NGOs have gathered in order to protest pollution in the region, to organize meetings and scientific workshops, to communicate with authorities. In response to the increasing pollution loads and its wider impacts on the environment and economics in the region, pollution control steps have been put into practice. These pollution control efforts have been implemented in the form of basin protection plans, joint wastewater treatment plants, and amendments in order to reduce pollution load. Firstly, an environmental plan prepared by the Trakya University. This plan was revised by the ministry and then canceled. Since that time, the Ministry authorized other institutions to prepare other environmental plans and reports. In addition, local professions and NGOs continued to struggle and take an action to draw public attention to pollution problem.

In the mid-1990s, Trakya University prepared a plan in accordance with the protocol signed between the Ministry of Environment and Trakya University. 1/100000 Scale "the Thrace Sub-region Ergene Basin Environmental Plan" (*Trakya Alt Bölgesi Ergene Havzası Çevre Düzeni Planı*) was prepared by Trakya University under the guidance of the Ministry of Environment with participation of multiple stakeholders and it was approved in 2004 by the ministry. However, the ministry cancelled

this plan and Istanbul Metropolitan Planning and Center of City Design (*İstanbul Metropolitan Planlama ve Kentsel Tasarım Merkezi, İMP*) was granted authorization to prepare a new plan. It can be considered as devolution of authority as local authorities and experts were excluded from planning process. Rather, central authorities determined the pollution control programs.

After the first plan was cancelled, new plans have been created by the ministry. However, new plans did not prioritize the needs of the regional planning in relation to auditing polluting activities, settling of industrial companies in agricultural areas and illegal use of groundwater use. Authorities implemented some elements of environmental plans on the basis of neoliberal development context. Besides, unlike the first plan, ministries prepared other environmental plans and reports with limited participation of local and the state organizations, companies, employers' organizations.

Moreover, either regulations have not been sufficient or implementation steps have not been carried out. Wastewater treatment plants have not been operated, authorities did not restrain illegal wastewater discharge or groundwater extraction. The lack of public auditing to restrain polluting activities and noncompliance with the regulations led to higher pollution load in the river. National authorities denied to take urgent measures to halt increasing pollution activities, instead ignored environmental concerns arising from local people and other regions of Turkey until public awareness has arisen about pollution problem. Interviews with experts, academics and NGO representatives from the region and desktop study support this idea. The lack of enforcement mechanisms to ensure pollution control measures have aggravated current pollution in the basin. To unravel these driving factors, pollution control efforts namely plan making processes, projects, the policy-regulatory framework and the institutional responses to this framework are discussed throughout this thesis.

The lack of participation in plan and project making and decision making steps led to top-down environmental governance in neoliberal context. Contradictions between neoliberal development and environmental concerns have resulted in the domination of industry over environmental conservation steps. In this sense, top-down decisions were taken in preparation steps of these plans in accordance with the industry's needs. Besides, devolution of power from locals to central authorities caused top-down governance as industrial needs and central authorities dominated the basin plans. Thus, this type of governance caused pollution control failure in the basin. In this sense, power relationships between national and local authorities in planning processes are examined in order to understand environmental governance leading to pollution control failure in the basin.

This thesis aims to examine a set of related questions as follows: Investigating the chronology of events and actions for pollution control through documents and in depth interviews with major actors who have been active in these efforts, what are the milestones and their alternative approaches towards the Ergene problem in a wider context of Thrace? Based on these observations, what are the defining characteristics of the environmental governance in practice in Ergene? Based on the answers to these questions, this research aims at unraveling the causes of enduring pollution problem in the Ergene Basin. To this end, a political ecology approach is adopted to be able to understand the role of asymmetric power relationship between the local professionals and authorities and the politicians and policymakers in Ankara. Political ecology offers an understanding of power politics in relation to environmental degradation arising from not only ecological but also complex social, economic and political processes (Robbins, 2003; Walker, 2005). As Robbins (2004) claims that political ecology is a set of “empirical, research-based explorations to explain linkages in the condition and change of social/environmental systems, with explicit considerations of relations of power” (Robbins, 2004; p.12). The literature on political ecology argues that power politics is crucial in order to examine environmental destructive activities.

In order to understand the causes and outcomes of enduring pollution problem a desktop study and in-depth interviews were carried out. A fieldwork was conducted through qualitative research (semi-structured in-depth interviews and discussions) with experts and academics so as to understand the relationship between national and local authorities and between industry and public. Discussions and in-depth interviews with these actors helped to elicit information about pollution control efforts and outcomes. Interviews were crucial to understand actual problems of the region and the history of pollution processes. In addition, pollution problem and pollution control policies were analyzed with the help of reports, articles, news and websites.

The structure of the thesis is as the following: The next chapter is a literature review on pollution control failure in relation to power relations. In addition, contradictions between economic growth and environmental protection are discussed so as to understand the emergence of the pollution problem. Following this chapter, methodology of the study is given. After this chapter, a general information about the Ergene Basin and the pollution processes are provided. This chapter describes the demographic, geographical, economic, social, ecological features of the region by focusing on the industrialization and urbanization processes. In addition, pollution processes and pollution parameters are examined to give an idea on how the pollution has arisen in the region and how the state’s policies have affected pollution processes. In the fourth chapter, pollution control efforts are discussed. In this chapter, pollution control in the basin and its technical and political weaknesses are analyzed with the

help of both desktop study and interviews. Moreover, the characteristic of environmental governance which was implemented in the basin is discussed to understand the pollution control failure. Analyzing reports prepared by ministries, NGOs and experts, news, websites helped to understand pollution control efforts, their aims, focuses and outcomes. After elaborating pollution processes and pollution control efforts, in the sixth chapter the discussion of the study is provided. The final chapter is the conclusion.

2. LITERATURE REVIEW

Environmental problems in the Ergene Basin manifest themselves as heavy pollution arising from rapid industrialization. Enduring pollution in the basin can be defined as a conservation failure example, more specifically “pollution control failure”. In this sense, pollution control programs and enforcement mechanisms to ensure these programs can be discussed through political ecology literature. Pollution control policies have been ignored for the sake of industrialization based on neoliberal development context. Within this context, political ecology gives us an understanding of the underlying causes of pollution control failure in relation to environmental governance. In this chapter, the relationship between environmental governance and pollution problem is discussed.

As Adaman et al. (2009) note, political ecology enables us to understand the power politics along with the underlying causes of environmental degradation. Thus, political ecology framework attempts to explore the link between politics of environmental activities and its ecological consequences. Before discussing relationship between policy making processes, it is necessary to look into the possibilities that political ecological perspective gives us.

2.1. Understanding Pollution Control Failure Through Political Ecology

Political ecology first emerged in the 1970s to define intersections between human society and the environment. It claims that environmental changes and ecological conditions are the results of political processes, apart from natural conditions (Robbins, 2003; Walker, 2005). Considering political ecology’s areas in which many disciplines are involved, thereby different definitions have been unavoidably made by many researchers. Robbins (2003) states that there are many different definitions of political ecology, while one may stress political economy, some point out environmental changes, others refer formal political institutions. Although political ecology has different definitions, main arguments focus on knowledge and power relations, collective action, differences of environmental perceptions.

According to Rodríguez-Labajos and Martínez-Alier (2015), political ecology promotes to understand how the distribution of power takes place and how society and the environment affect each other. Robbins (2004) claims that political ecology is a set of “empirical, research-based explorations to explain linkages in the condition and change of social/environmental systems, with

explicit considerations of relations of power” (Robbins, 2004; p.12). Moreover, Watts (2015) states that environment is not a given context, on the contrary, it is an entity that can be shaped within human and society relations through different ways in different cultures and communities. To this end, political ecology provides a theoretical framework that encompasses relations of production, access to natural resources, and power relations within society (Watts, 2015). Within this context, power relations, environmental governance, policy regulatory mechanisms become prominent terms in understanding how the pollution processes emerge, how to control pollution and how to support environmental conservation efforts.

2.2. Environmental Governance and Power Relations

Industrialization leads to environmental changes. As the concerns arise about environmental degradation, thereby regulations and enforcement mechanisms to ensure pollution control steps have been increasingly discussed along with the relationship between economic development and environmental degradation. According to Benson and Jordan (2015) enforcement of regulations creates conflicts between the state and the interests groups as the state force polluters to comply with pollution control steps. On the other hand, as Acar and Tekce (2014) note, the majority of pollution control measures and environmental concerns may be ignored in line with industrialization and its needs. For instance, industrialization leads to environmental degradation in the nature due to weak environmental regulation system and the lack of enforcement mechanisms. In the Ergene Basin, the lack of auditing mechanisms over pollution and *laissez-faire* policies point out a neoliberal environmental governance in relation to development agenda of the state. In addition, the state’s unwillingness to protect nature and to restrain industry’s polluting activities causes environmental problems. For instance, industrial companies have discharged their wastewater without treatment to the Ergene River over the years, yet they have not been imposed upon by punitive sanctions by the national or local authorities.

The concept of environmental governance has emerged in response to enduring environmental problems. It refers to “the set of regulatory processes, mechanisms and organizations through which political actors influence environmental actions and outcomes” (Lemos and Agrawal, 2006; p.31). The term can be evaluated ranging from government to non-governmental actors (Jänicke and Jörgens, 2006), including local communities, industrial companies, scientists. As Lemos and Agrawal state (2006), national legislation, international treaties, local decision-making processes, NGOs, institutions can be considered as part of environmental governance.

Environmental conservation failures may stem from top-down, non-participatory governance. To this end, environmental governance addresses the solutions of how to deal with global/local environmental problems in a given society, policy, and industry considering different interest, perceptions and motivations (Jänicke and Jörgens, 2006; Paavola, 2007). Akbulut and Soylu (2012) point out the main idea of participation mechanisms which create a “win-win” situation and are claimed to produce more effective conservation policies by cooperation between stakeholders. This view has gained importance since the 1990s as a new conservation policy in which different actors involve to protect natural resources (Bixler et al., 2015). Benson and Jordan (2015) claim that environmental groups and scientists can work together at all levels, thereby state-guided dominated environmental policy shift to multilevel system of governance. Lemos and Agrawal (2006) argue that decentralized environmental governance creates opportunities such as bridging the gaps between local and central decision-making actors, promoting effective participation of all stakeholders which leads to accountability.

However, participation is a complex issue when considering the variety of stakeholders due to its multi-level structure (state, market and civil society) which may cause coordination and communication problems between actors. As policy shifts from traditional government towards (participatory) governance, new authority relations are established between actors which may generate power struggles, disagreements between different policy discourses, interests and values, unclear rules and thus conflicts emerge (Arnouts and Arts, 2009; Marothia, 2010). Nonetheless, de-concentration of power is considered as the best option that would improve resource allocation, efficiency, democratization of resource management or pollution control efforts. Enhancing local participation may increase the possibility of success in terms of decentralization (Marothia, 2010). For instance, early on construction or dam projects, Environmental Impact Assessment (EIA) meetings have been held as a legal obligation to get consent from local people. Despite these meetings have generally been perfunctorily organized by the state, yet local people have organized meetings to protest the projects which are destructive for the environment. Enduring pollution in the Ergene Basin have also created vocal oppositions and local environmental movement. In this sense, the first environmental plan was prepared by Trakya University with the participation of all stakeholders (local people, NGOs, academics, etc.) by the direction of the Ministry of Environment.

Kofinas (2009) argues that top-down policies may not be effective. In environmental failure cases, top-down conservation policies may lead to bureaucracy, controversial decisions, lip service, and corruption. Besides, the complexity of regulations, poor control mechanisms, ineffective punitive sanctions, inert administration generate environmental failure. Crowley and Walker (2012) point out

that environmental success or failure are dependent on “the principles of holism, connectivity, and complexity; an awareness of ecological threshold or tipping points; and precaution in the face of uncertainty, ignorance and irreversibility”. Environmental problems, as Holley (2013) claims, change environmental governance. Holley’s assertion lies on the thought that the new environmental governance dated back to the end of the 1990s, points out collaboration, participation, adaptation and learning which affect each other. According to Holley (2013), this relationship between different actors may improve the “effectiveness, efficiency and legitimacy of responses to environmental problems” (Holley, 2013, p. 742).

Despite optimistic views about governance, Arnouts and Arts (2009) claim that governance is not always a guarantee for solving environmental problems. They define governance as a new management mechanism with the help of public-private cooperation, removing boundaries between states, market and civil society, transformation of politics towards international level, and evaluation of the states. The latter is discussed as an issue associated with globalization and neo-liberalization which bring diffusion of power and authority from the state to private sector. That is to say, while non-state actors become more important, the state also transforms itself in line with global trends which leads to the emergence of new institutions and mechanisms such as public-private cooperation and market instruments. Istanbul Metropolitan Planning and Center of City Design (IMP), the planner of the Ergene Basin Environmental Plan, can be considered as an example of public-private partnership or public corporation. Yet, this transformation may not improve problem solving capacity of these actors.

Considering neoliberal processes, governance can be discussed along with capitalist accumulation, commodification of nature and unlimited utilization of natural resources. Brenner and Theodore (2007) defines neoliberalism as market-oriented institutional shift which dictates “free market” doctrines at institutional, political and ideological scale. According to Brenner and Theodore (2007), neoliberalism induces economic and governmental failure instead of resolving the political, economic, environmental crises. Neoliberal transformation of environmental policies causes a vast scale of transformation in favor of market and replacement of regulations with the rights of private property (Brenner and Theodore, 2007; Czarnecki and Fiedler, 2016). For instance, companies resist to comply with pollution control regulations, because they prioritize their interests. This explains why industrial companies have denied to establish wastewater treatment plants or have not operated them for years in the Ergene River.

2.3. Development Process and Environmental Degradation

Since 1980, Turkey has the agenda of neoliberalization in terms of commodification and privatization of factories, public services, and finally natural resources. Environmental management and infrastructure services have been privatized and transferred to different institutions and companies. We can see this process in small hydroelectric dams and in the Soma accident. In this sense, as the state's control decreases over the private sector as part of neoliberal policies, required measures cannot be taken to ensure the regulations which provide occupational health and safety and environmental conservation. Environmental pollution occurs as a result of neoliberal environmental governance due to less control over industry's polluting activities, and the domination of the market on environmental regulations and implementation processes. Neoliberals mostly refuse the state's intervention to regulate market's activities (Harvey, 2005, p. 67; Boğaziçi Soma Dayanışması, 2014; Acara, 2015).

On the other hand, state policies' success or failure depends on the type of governance and adaptive capacity to socio-economic changes and challenges. When it comes to rapid industrialization and urban sprawl, national and local authorities have to be ready to meet the needs at political, administrative, technical and social levels. As Adaman et al. (2009) explained in the Turkish state context, environmental concerns have been ignored in line with the state's modernization path and the current environmental governance type. In addition, the lack of continuity in bureaucracy adversely affect environmental conservation measures.

Acara (2015) defines "non-governance" as a method of administration in the Turkish state context. Non-governance implies "organized irresponsibility' across different regulations, institutions, and various other stakeholders within the privatized water sector, as an organizing principle of neoliberalism" (Acara, 2015). Disorganization between institutions and authority conflicts are symptoms of non-governance. In Ergene, the preparation of environmental plans or establishment of treatment plans were not completed for years due to these conflicts.

Environmental degradation has frequently taken place in Turkey in spite of the fact that there is a broad environmental legislation. Adaman (1997) demonstrates that environmental concerns have been put on the agenda with several articles in constitution dated 1982. The main article (Article 56¹) defines the right to the environment as "Everyone has the right to live in an unpolluted environment,

¹ <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.2709.pdf>

enjoying equally the beauty of nature. The state and the citizens have both responsibility in preventing pollution and in protecting as well as enriching the environment” (quoted in Adaman, 1997). Additionally, environmental related laws were enacted in compliance with the constitution which are notably The Environment Law (1983) and “The National Parks Law; the Law for Protection of Cultural and Natural Wealth; the Law to Protect Coastal Zones; the Construction Law; the Municipalities' Law; the Law to Protect General Health; the Law to Encourage Tourism; the Law of Forestry; the Law of Water Products; the Decree of Using Agricultural Lands” (Adaman, 1997). Moreover, development plans also highlighted environmental issues, and institutionalization processes have gained acceleration in terms of water and environmental regulations. Additionally, the presence of international agenda for the environment starting with Rio Conference (1992) and burgeoning of environmental resistances in Turkey since the 1990s, for instance the Bergama movement, contributed to the establishment of environmental legislation and environmental consciousness.

In addition, The European Union (EU) harmonization process had an impact on environmental regulation processes. Turkish government has initiated new directives related to EU’s environment and water acquis such as the EU Urban Wastewater Treatment Directive, the EU Dangerous Substances Directive, the Water Framework Directive (Tigrek and Kibaroglu, 2011; Orhan and Scheumann, 2011; Sümer and Muluk, 2011). The Water Framework Directive (2000) in line with the EU water legislation which is known as “water policy constitution” hold an important role in regulation of water management. The directive focuses on protection of surface, groundwater, coastal water resources and it offers an integrated approach for watersheds (Olgun and Çobanoğlu, 2012). Yet, by putting EU harmonization processes aside in recent years, environmental policies are adversely affected. Moreover, regulations and laws have not been put into practice due to the lack of environmental consciousness and rights-based political culture (Adaman, 1997; Akbulut and Soylu, 2012). Industry resists implementation steps so as to save its interests. In this sense, the Ergene Basin case, as a pollution control failure example, shows the reluctance of the state in terms of implementation of conservation policies. In addition, development scheme has determined pollution control steps, thus natural resources have been deteriorated in the absence of enforcement mechanism to ensure pollution control efforts.

3. METHODOLOGY

The methodology of this study consists of in-depth interviews with the experts and a desktop study in order to analyze the enduring pollution problem in the Ergene Basin. In this context, the causes of pollution problem were investigated by analyzing reports, articles, news, websites, and TV programs. Moreover, semi-structured in-depth interviews with experts and academics were carried out to understand pollution control failure in the basin.

Collecting data from media coverage helped to understand the history of pollution and its effects on livelihood. While desktop study provides to identify the problems from past to present, interviews enables us to understand positions and perceptions of stakeholders (Özkaynak and Adaman, 2004). Interviews were conducted to get deeper insight into environmental governance problem in the region. On the other hand, literature review study has enriched our understanding of socio-economic and ecological aspects of the pollution problem through political ecology perspective. The literature of political ecology provided us a starting point in order to understand the enduring pollution problem in the basin, the role of power relationships between authorities leading to this problem. By examining pollution processes, we reached ideas about how the river was polluted and how power relations affected this pollution control failure.

In the beginning of the study, characteristics of the region and pollution processes were determined. To this end, data collection was a substantial starting point. The pollution hotspots (Çerkezköy, Çorlu, Muratlı) were chosen to investigate how pollution occurred in line with industrialization processes. Other than these districts, the basin's physical, social and economic characteristics were examined so as to evaluate industrialization process and its effects on the environment. Firstly, reports prepared by national authorities and research studies conducted by academicians were analyzed. Ministries' and agencies' reports showed different aspects of the problem with wider information about the region and the river's characteristics.

Although there were weaknesses in the reports, specifically the lack of systematic archive of river pollution levels or pollution sources, yet reports helped to give a general idea of the pollution processes from past to present. It was important to elicit information and data not only from official sources, but also from non-official sources which were very eye-opening. Agencies' and NGO's reports were used to compare the ideas about solutions to the pollution problem.

Another important source of the study is the interviews which enables understanding their opinions about the problem. In-depth interviews demonstrated how industry's needs dominated environmental concerns and how people excluded from policy making processes. Interviews were conducted by open questions so as to give an opportunity for the interviewer to explore further questions and ideas. In order to investigate the causes and effects of pollution in the region, different actors were determined. Local authorities, NGOs representatives, academics, engineers were the stakeholders. Within the scope of this study, we interviewed with Tekirdağ municipal officers, Edirne SHW officials, engineers who work for wastewater treatment plants of OIZs in Çorlu/Tekirdağ, Trakya Platformu representatives, former Ergene İnisiyatifi and Ergene Platformu activists, academics from Namık Kemal University, Trakya University and Kocaeli University and headmen from Kırklareli. Snowball sampling was used in which a contact led to new contacts. Interviews in Tekirdağ, Edirne and Kırklareli were crucial to comprehend the process of pollution control failure, its political reasons and local dynamics. Particularly, listening to local activists was deeply inspirational to understand the problem. Overall, we interviewed 16 stakeholders from the region and 6 academics from universities in Istanbul between November 2016 and September 2017. They shared their knowledge and opinions about pollution problem, its historical development, pollution control policies implemented by national authorities and their weaknesses, and their involvement.

On the other hand, there were some limitations in terms of field research. Some state officials and municipality officers either had no sufficient information about the problem, or it was hard to find respondents to get in contact with due to rapid changes of officials, the lack of transfer of knowledge. Besides, some participants were not eager to share their ideas openly. Nevertheless, adequate information and opinion about mechanisms in local and government offices were reached by means of interviews. During the interview, a number of questions were asked about the historical development of pollution, how actors were affected from the pollution, the effects and causes of the pollution, the actors' opinions about the pollution control efforts of the national and local authorities, and finally their suggestions for solutions. In addition, interviewees' ideas about industrial settlings, wastewater discharge, pollution control programs were discussed. These interviews provided an opportunity to evaluate various aspects of the problem related to the state's policies leading to pollution by prioritizing industrial development processes. In spite of the limitations of the field research detailed information was obtained by different type of actors.

4. AN OVERVIEW OF THE BASIN AND POLLUTION

4.1. General Outlook

4.1.1. Physical Properties

The Ergene Basin is located in Thrace Sub-Region and it is surrounded by the North Marmara Basin, the Meriç Basin and Bulgaria border. East-west line length of the Ergene Basin is 160 km, north-south line length is 140 km (Figure 4.1) It includes Tekirdağ, Edirne and Kırklareli provinces (Çevre ve Orman Bakanlığı, 2010; Pelen et al., 2013).

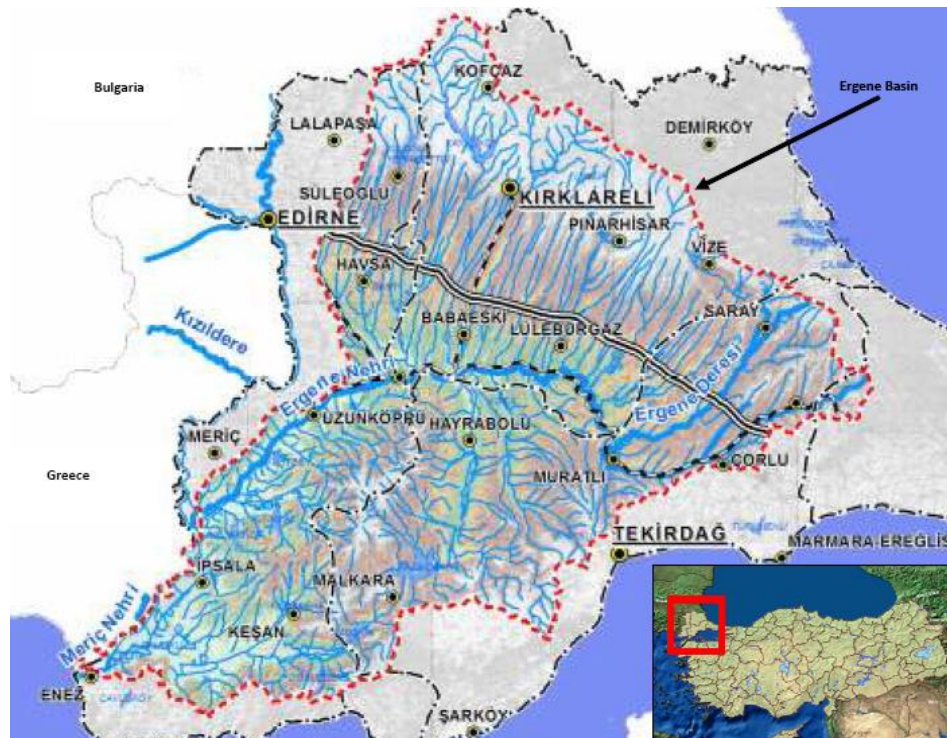


Figure 4.1. The location of the Ergene Basin (Çevre ve Orman Bakanlığı, 2008).

The Ergene Basin has officially 1179 wells drilled by General Directorate of State Hydraulic Works. Excessive groundwater extraction for industrial purposes adversely affects groundwater level. For instance, Çorlu-Çerkezköy line, groundwater levels reduced due to excessive groundwater extraction for industrial purposes (Pelen et al., 2013). Thrace region has a total of 3618 documented wells, 558 of which belong to Groundwater Irrigation Cooperatives. Apart from these wells, there are about 4000 unauthorized wells (Orman ve Su İşleri Bakanlığı, 2013). 80% of reserve groundwater is used for irrigation, drinking or industrial purposes.

The basin comprised of fertile agricultural lands, mainly wheat, rice, sunflower are grown by irrigated and dry farming (Metin, 2011). The Ergene Basin's surface area is 12.438 km², its main water supply is the Ergene River. The basin has important water resources including the Ergene River, its tributaries, and groundwater resources. The basin has 1,71 billion m³/year water potential; 78% of which is surface water and 22% of which is ground water (Orman ve Su İşleri Bakanlığı, 2011a). The main water resource of the basin is the Ergene River which arises from Istranca (Yıldız) Mountains, flows 282 km in length and flows into the Meriç River throughout Çorlu, Çerkezköy, Lüleburgaz, Babaeski, Pehlivan köyü, and Uzunköprü. The Ergene River is the most important water resource which farmers use for agricultural irrigation in 1., 2. and 3. grade agricultural lands with a surface area of 300.000 da. (Çevre ve Orman Bakanlığı, 2009). According to the Ministry of Agriculture and Rural Affairs, 1. grade lands are fertile, arable, 2. grade lands are good that can be easily cultivated by taking some precautions, 3. grade lands are moderately good lands (Tarım ve Köyişleri Bakanlığı, 2008).

4.1.2. Population and Industrialization

Thrace region has 3 provinces (Tekirdağ, Edirne, Kırklareli), also called TR21 region, 83 municipalities, 26 districts and 678 villages. Population was calculated as 1.511.952 in 2009. The region's population has remained at low levels but then after increasing industrialization, population increased dramatically. Industrial companies migrated from Istanbul to the Thrace region. Industrial sectors moved to Çerkezköy and Çorlu due to their proximity to Istanbul and highways (Trakya Kalkınma Ajansı, 2010).

Population growth rate in industrial areas is given in Table 4.1. Columns 4, 6, 8 and 10 present respectively TR21/Turkey ratio, Tekirdağ/TR21 ratio, Edirne/TR21 ratio, and Kırklareli/TR21 ratio. Tekirdağ comes into prominence with its population growth rate due to becoming industrial area in the region. TR21 presents Thrace Region including Tekirdağ, Edirne and Kırklareli provinces according to the Classification of Statistical Region Units.

Table 4.1. Population statistics in Thrace region (Turkstat).

Year	Turkey	TR21	(%)	Tekirdağ	(%)	Edirne	(%)	Kırklareli	(%)
1965	31.391.421	849.001	2,7	287.381	34	303.234	36	258.386	30
1970	35.605.176	876.502	2,5	302.946	35	316.425	36	257.131	29
1975	40.347.719	929.118	2,3	319.987	34	340.732	37	268.399	29
1980	44.736.957	1.007.436	2,2	360.742	36	363.286	36	283.408	28
1985	50.664.458	1.089.457	2,1	402.721	37	389.638	36	297.098	27
1990	56.473.035	1.182.953	2	468.842	40	404.599	34	309.512	26
2000	67.803.927	1.354.658	2,1	623.591	46	402.606	30	328.461	24
2007	70.586.256	1.458.114	2,1	728.396	50	396.462	27	333.256	23
2008	71.517.100	1.502.358	2,1	770.772	51	394.644	26	336.942	22
2009	72.561.312	1.511.952	2,1	783.310	52	395.463	26	333.179	22

Industrialization and urbanization proceeded at a low pace until the 1960s, thereby the basin's feature remained as rural. Parallel to the industrialization, urban population increased, whereas rural population was in tendency to decrease due to the lack of agricultural production and investment. Between 1995 and 2000, Tekirdağ had a remarkable increase in the population with 96,8% percentage (Figure 4.2) (Trakya Kalkınma Ajansı, 2010).

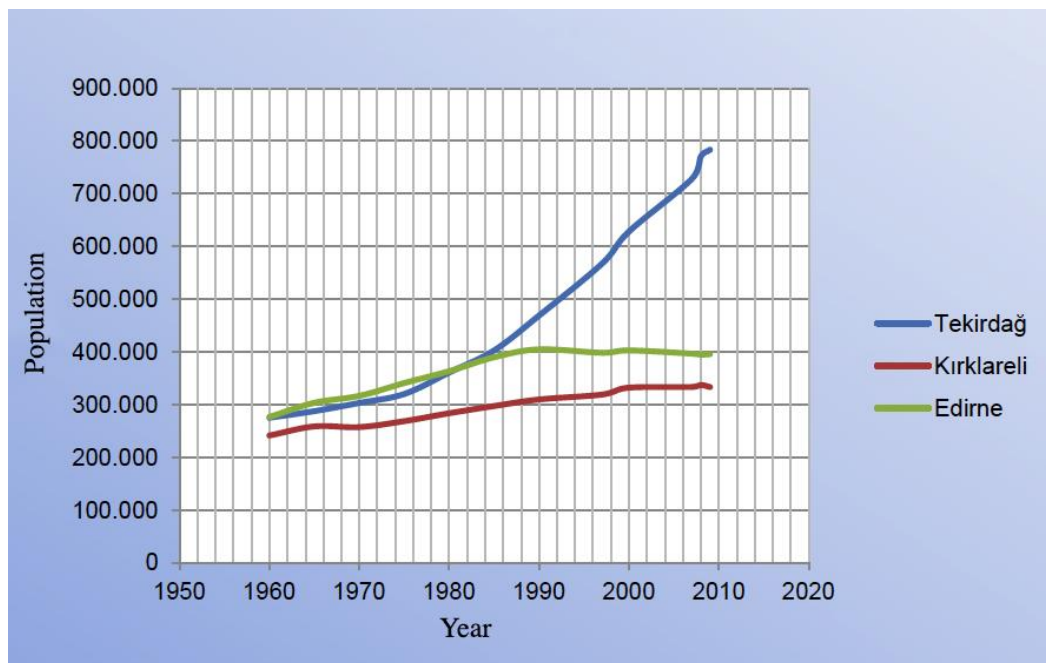


Figure 4.2. Population distribution in provinces (Çevre ve Orman Bakanlığı, 2010).

The rate of urbanization constantly increased between 1975 and 2000 in Thrace region (Olçay et al., 2006). Population statistics followed a fluctuating course based on industrial processes, yet, in industrial areas, population increased since the 1960s. Specifically, Tekirdağ's population has increased by developing of industrial sector in Çerkezköy and Çorlu along the highway. Çerkezköy and Çorlu have population density respectively 473 person/km² and 271 person/km² (Trakya Kalkınma Ajansı, 2010). Urban population of Thrace region was 48-51%, rural population was 42-45% in 2006 (Güler and Turan, 2013). As the region expands and population grows, the amount of domestic and industrial wastes increase, which causes pollution in the river. We can see river pollution hotspots nearby Çorlu Sağlık and Çerkezköy quarters at full length of the river (Figure 4.3).



Figure 4.3. Çorlu Brook and shanty houses.

4.1.3. Means of Livelihood

Thrace Sub-Region shows hybrid features in terms of means of livelihood, in that industry and service sector are dominant in Tekirdağ, on the other hand, Edirne and Kırklareli have fertile lands for agricultural production (Çevre ve Orman Bakanlığı, 2009). In the basin, agricultural production and animal husbandry were the main activities. On the other hand, their importance has diminished after the 1960s with rapid industrialization (Trakya Kalkınma Ajansı, 2010).

4.1.4. Agriculture

The Ergene Basin has the most arable lands compared to the average of Turkey. While the average rate of arable soil (the first four classes of soil) in Turkey is 33,6%, the region has more than double size of arable soil with the 81,9% rate (Trakya Kalkınma Ajansı, 2010). In the basin, 65,1% of land is used for agricultural production. The mass production of wheat, rice and sunflower of Turkey has taken place in this region (Çevre ve Orman Bakanlığı, 2011). Sunflower production meets

61% of the total demand. 54% of Turkey rice demand is met in the basin (Orman ve Su İşleri Bakanlığı, 2011b).

4.1.5. Industrial Development in the Basin

Industrialization in Turkey has taken place since the 1950s, from the II. World War onwards with the help of agricultural mechanization, development of communication and transportation which led to migration from rural areas to urban areas to the vast amount of area from Istanbul to İzmit. These areas have become new promising areas for industrialists regarding cheap production, closeness to water resources, simplicity of land acquisition and also new living areas for migrant labor (Güler and Turan, 2013). In addition, Thrace region has access roads to other region of Turkey with the help of highways. Industrial facilities tend to move from city centers to periphery so as to meet the demand for bigger land and cheaper labor (Figure 4.4) (Olcay et al., 2006).

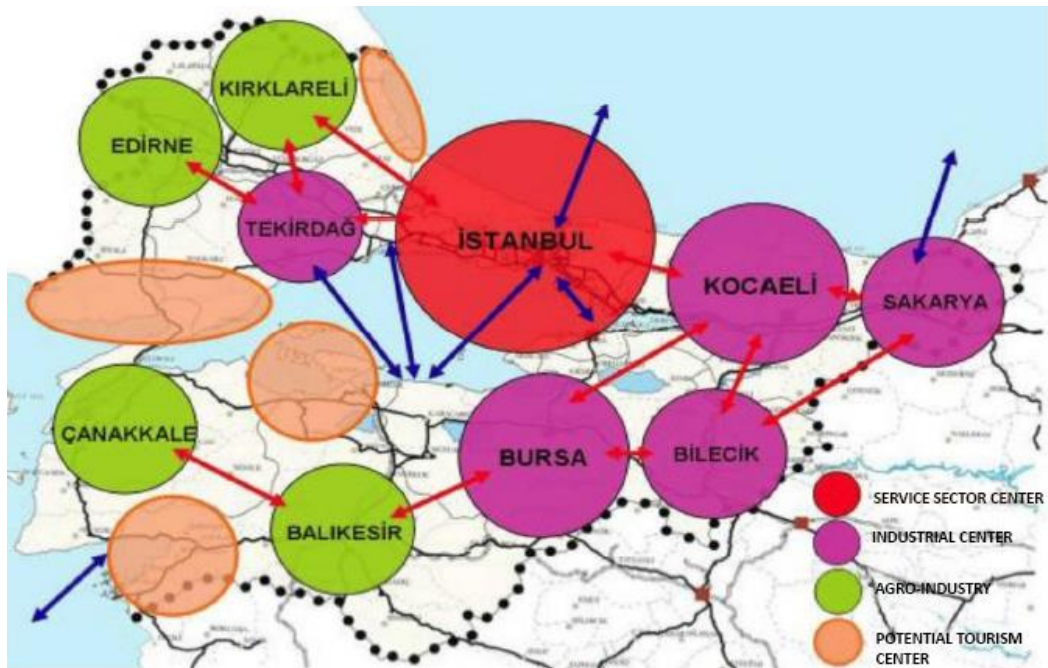


Figure 4.4. Sectorial distribution in the region (Güler and Turan, 2013).

Figure 4.4 shows that industry scattered around cities nearby Istanbul. Parallel to diffusion of industry, Thrace region has become an attraction center. Industrial facilities have started to operate in Gebze, Kocaeli and Sakarya since the 1970s, this tendency continued with the moving of industrial areas towards Thrace region. This diffusion gained acceleration since the 1980s (Çevre ve Orman Bakanlığı, 2008). Besides, in line with industrialization and population growth, fluctuation of population in provinces and districts can be seen in Table 4.2.

Table 4.2. Population changes in the region (Güler and Turan, 2013).

	1970	1980	2000	2010
Kırklareli	257.131	283.408	328.461	332.428
Lüleburgaz	64.378	82.053	117.606	134.073
Tekirdağ	302.946	360.742	623.591	798.109
Çorlu	59.346	77.921	179.033	252.974

Table 4.2 shows that industrialization bring along urbanization and population growth. Since the 1970s, Lüleburgaz showed drastic changes on population, while Kırklareli can be considered stable in terms of increasing rate of population. Similarly, a tendency can be seen in Tekirdağ and Çorlu considering industrial developments in these regions.

Industrialization has begun by operating small scale agricultural companies, these facilities varied and increased in time since the 1980s. According to TR21 Thrace Regional Plan (2010) there were 1809 industrial facilities, respectively 1277 of them were in Tekirdağ, 265 of them were in Edirne and 267 of them were in Kırklareli (Trakya Kalkınma Ajansı, 2010).

Table 4.3. Number of operations in Thrace region (Edirne, Kırklareli and Tekirdağ Sanayi ve Ticaret İl Müdürlükleri, 2010).

	Textile and leather	Food and drink, tobacco	Stone, sand, mining	Paper and package	Plastic, chemical, dye,	Machine, equipment,	Forest products, furniture	Other	Total
TR21	600	407	207	30	184	180	38	163	1809
Tekirdağ	511	162	115	28	169	157	21	114	1277
Edirne	23	152	55	0	0	0	0	35	265
Kırklareli	66	93	37	2	15	23	17	14	267

Number of operations is given in Table 4.3 which presents the significance of textile-leather, food-drink, mining, machine-equipment-automotive sectors in the region with the rate of respectively 33%, 23%, 11% and 10% (Trakya Kalkınma Ajansı, 2010). Currently, 2037 industrial facilities are active according to the report of Ministry of Forestry and Water Affairs (2013). The share of provinces in terms of industrialization is presented in Figure 4.5.

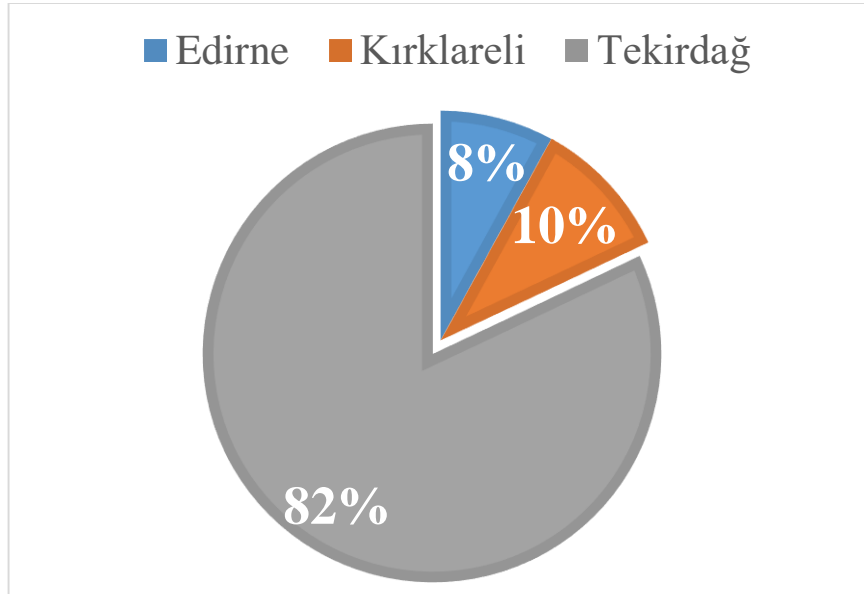


Figure 4.5. The share of industrial facilities in Thrace region provinces.

Tekirdağ province has become a pioneer region for industrialists due to its locational and transportation advantages. The TEM, D-100 and D-110 highways pass through the provincial borders which connect to Istanbul and Europe. Textile, leather, carpet, metal, chemical, electrical and electronic sectors tended to move towards Tekirdağ (Çevre ve Orman Bakanlığı, 2010). Many of textile factories in Turkey are settled in Tekirdağ. Apart from textile industry, food, chemical, leather, mining industries are the main sectors in the region. Çorlu and Çerkezköy are the significant areas in attracting industrial investments. When examining of distribution of sectors, Çorlu is the prominent district in terms of leather production, as to textile sector is concentrated in Muratlı. In short, sectors are mostly settled in Çorlu, Çerkezköy, Muratlı (Figure 4.6) and the Ergene River sub-basin (Çevre ve Orman Bakanlığı, 2008).

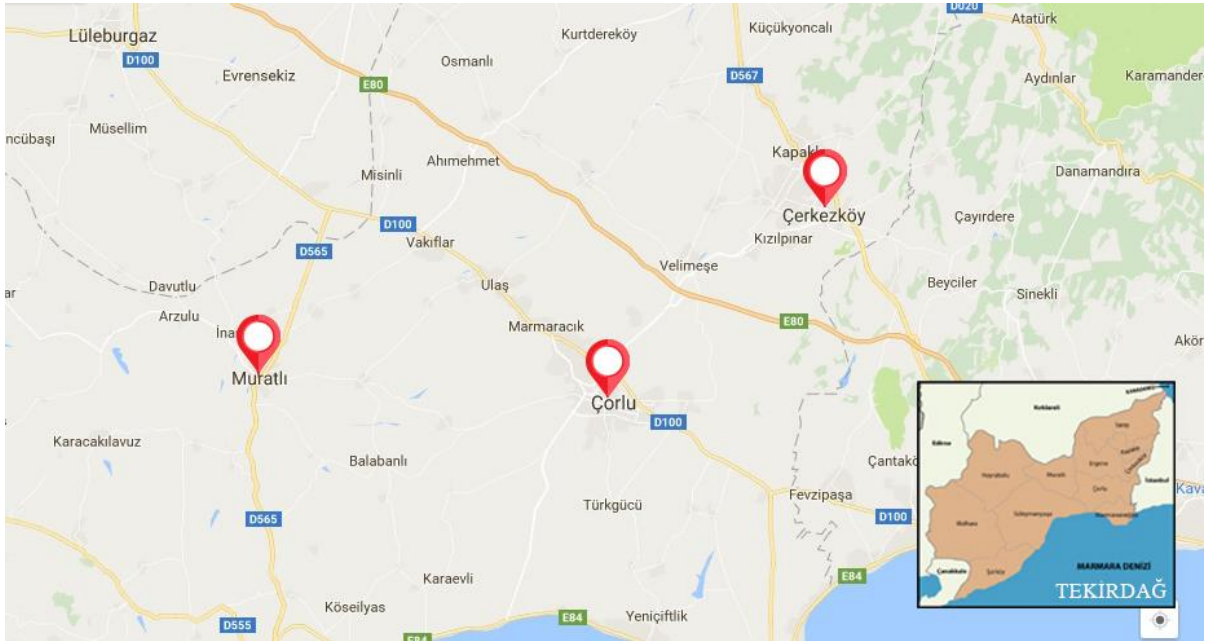


Figure 4.6. The location of Muratlı, Çorlu and Çerkezköy.

Leather industry is concentrated in Çorlu district during the 1980s. In the early 1950s, 7 facilities were merely settled nearby Çorlu. In 30 years, leather facilities have been increased by 108 (Kubaş, 2003). Initially, there were small scale/family companies, as export increased, companies have become medium-sized enterprises. Not only textile and leather industry, but also food, sunflower oil, paper, machine production are main branches of industries (Çevre ve Orman Bakanlığı, 2008). After moving leather tannings to Çorlu and Tuzla from Kazlıçeşme in the mid-1990s as part of decentralization policies and European Union (EU) harmonization process, Çorlu Organized Leather Industrial Zone was established in 1997. On the other hand, centers of industrial companies are still in Istanbul. Textile industry mostly operates on yarn production, dye, and manufacture. Textile and leather dyeing is common in the region which leads to heavy pollution in the river. It is claimed by local people that dirty parts of production are moved to Thrace on purpose because the region is seen “a trash dump region of industry” (Çevre ve Orman Bakanlığı, 2008).

OIZs play an important role in moving industrial facilities from city centers to periphery. History of OIZs dates back to the 1970s (Kocaman et al., 2011). Thrace region has 18 Organized Industrial Zones. In addition to 5 OIZs, there is 1 European Free Zone (EFZ) in Ergene. In OIZs, industrialists take many advantages such as land acquisitions (mostly fertile agricultural lands) without paying VAT, lower costs for natural gas, telecommunication and water, exemption from real estate duty for five years, paying taxes by separating of plots, and the municipality taxes if the OIZ does not receive municipality service. For instance, EFZ companies have 100% tax exemption through their profits generated from activities. However, OIZs threaten to agricultural lands. Between 1962 and 1996, 36

OIZs have been operated in Turkey. On the other hand, only 5 of them had wastewater treatment system, while 1 of them had permission to discharge (TMMOB MMO, 1997).

Decentralization of Istanbul industry can be seen in “development plans”. Within this context, the first plan for Istanbul was prepared by The Ministry of Development and Housing (*İmar ve İskan Bakanlığı*) in 1980, called “1/50000 Scaled Istanbul Metropolitan Structural Plan/*İstanbul Metropolitan Alan Nazım Planı*”. The plan included an extension policy to periphery from Istanbul. The report stated that “industries which require skilled labor and advanced technology should be established in Istanbul in harmony with development of Istanbul. On the other hand, industries that have standard technology and unskilled labor should transfer off the site of Istanbul Metropolitan” (Sazak, 2000). The similar tendency can be seen in “1/100000 Scale Environmental Plan of Istanbul” dated 2006, prepared by IMP (İBB, 2009). The plan pointed out the importance of decentralization of industry to solve Istanbul’s problems.

Çorlu-Çerkezköy line has become promising area for industrialists. Illegal settlements, land grabbing² and misuse of fertile agricultural lands have taken place in the absence of pollution control programs, regulations and auditing. This unplanned settlement expanded to Muratlı and Tekirdağ line. Industrial facilities have settled illegally in agricultural lands, nearby Çorlu brook and Çorlu-Çerkezköy village road. This expansion has increased towards Tekirdağ and Muratlı line along the Ergene River over the years. Companies have discharged their wastewaters in the Ergene River without any treatment (İnci, 2011).

Middle and large-scale factories were moved to Thrace region with the help of government promotion to industrialists such as giving expropriated lands to industrialists for building factories, reduction of taxes etc. In this context, agricultural lands of Sağlık and Marmaracık quarters located near periphery of Çorlu district were subdivided into individual residential plots to meet housing demand for migrant labor (Sazak, 2000). That is to say, urbanization has developed parallel to industrialization. Thus, the river became a “dead river” and the fertile lands have been contaminated. These quarters now suffer from heavy pollution, odor problem, and health problems (Figure 4.7). Pollution in industrial areas has reached the highest level particularly in Lüleburgaz, Çerkezköy and Çorlu due to wastewater discharge from industrial facilities and from domestic use.

² For more information about environmental pollution hotspots: Türkiye Çevre Adaleti Atlası, <http://beta.cevreadaleti.org/ihtilaf/ergene-nehrinin-ve-su-havzasinin-kirlenmesi>



Figure 4.7. Industrial facilities in Çorlu, 2017.

4.2. Pollution Processes and Parameters

4.2.1. From Development to Tragedy: Pollution in the Ergene River

In the neoliberal era, parallel to the domination of the market and the reduction of the state's control over public services, environmental problems have occurred. Bryant and Bailey (1997) claim that, the state as a regulator actor is responsible for finding solutions to environmental problems, on the other hand, it is doomed to failure because the state gives a priority the interest of the market which causes environmental problems. Once profit of market has come to prominence, protection of environment might be ignored (Harvey, 2005; Scheumann et al., 2011), common resources might be enclosed and commodified such as water resources³.

³ Enclosure movement is now experienced in natural resources such as rivers, lakes and underground resources. To read discussion about enclosure movement and its appearances in Turkey:

<http://alisayselekoloji.blogspot.com.tr/2011/05/turkiye-derelerini-kusatma-hareketi.html> and also for a brief historical narrative: <http://www.thelandmagazine.org.uk/articles/short-history-enclosure-britain>

Pollution has occurred as an inevitable outcome of industrialization in both developed and developing countries associated with many environmental challenges facing the world. It is mostly experienced as severe health problems, water scarcity, contamination of lands and rivers, and loss of biodiversity. In addition, in developing countries, contradictions between economic-social development and protection of natural resources have emerged from many challenges such as the lack of state control over industrial processes, the reluctance of the state for environmental conservation and institutional conflicts. Thus, similar problems have taken place in developing countries. As Economy states (2007), in China, industrialization and urbanization threaten natural resources such as groundwater and surface water. China's 70% of total drinking water is provided from groundwater resources. However, wastewater discharge, leachate from solid wastes, the use of pesticides contaminate the main sources. The report prepared by a government agency states that "the aquifers in 90% of Chinese cities are polluted". In addition, industrial companies do not comply with the regulations with regard to wastewater discharges. According to another report, "one-third of all industrial wastewater in China and two-thirds of household sewage are released untreated" (Economy, 2007).

Industrialization processes are persistently implemented at the expense of deterioration of natural resources. Similarly, water policies are carried out to accomplish industrial sectors' objectives. Within this context, policy makers may ignore impacts of industrialization (Orhan and Scheumann, 2011; Véron, 2006; Acara, 2015). Thus, environmental disasters take place due to less control over polluting activities. For instance, in 2010, the Danube River as an international river was under the risk of contamination due to toxic red mud leakage from alumina plant. Apart from accidents, illegal dumping of hazardous materials and wastewaters threatens both national and international rivers (Figure 4.8).

Love Canal case in the USA took place as a result of the disposal of hazardous wastes into the canal located near the Niagara Falls. Residents were exposed to heavy pollution and health problems (illnesses, birth defects) as of the mid-1960s with related to noxious fumes, corrosive waters and oily materials. Approximately 200 chemicals have been found in metal containers in 1978 (Phillips et al., 2007). People had to move to the other region of the country (Figure 4.8).



Figure 4.8. Love Canal and Ajka Alumina plant disasters.

Pollution in the Ergene River can be considered as a part of unplanned development story. Heavy pollution in the Ergene River is being experienced due to rapid industrialization and urbanization. For instance, while Sağlık quarter established in 1929 was named from its beautiful nature, now it has a bad reputation of increasing health problems. Similarly, heavy metals were found in crops in the basin which are toxic for human body (Yolal, 2014). According to a research conducted by the Ministry of Health between 2011 and 2016, Arsenic and Aluminum was found in water samples taken from Ergene, Kocaeli and Antalya. The report has not yet been announced, however some results of the research were published in newspapers and websites. According to the news, Arsenic was detected in 316, Aluminum was detected in 181 of the 764 water samples taken from the three provinces in Ergene (Bülent Şık, Cumhuriyet, April 17, 2018). Moreover, there are number of studies about the cancer cases that point out to the relationship between pollution in the Ergene River and increasing cancer rates. A similar case took place in Dilovası, which is another industrial area, heavy metal accumulation in breast milk was detected by Onur Hamzaoğlu and his colleagues from Kocaeli University Faculty of Medicine Department of Public Health. Hamzaoğlu and his colleagues have taken action and started a survey as of 2001 to draw attention to increasing air pollution and cancer rates in the region (Hamzaoğlu et al., 2010).

The history of pollution problem in the Ergene River dates back as far as 40 years ago. Industrial facilities have caused heavy pollution since the 1980s. Water-based industries started to operate nearby the large and small brooks and discharged wastewaters into these brooks over the years (İnci, 2010, p.35). Pollution hotspots have been generated, particularly in Çorlu-Çerkezköy line. Fevzi Aytekin, the former Minister of the Environment (1999-2002), admitted that “textile factories have discharged their wastewaters into water-wells without any treatment, they were to be punished, yet they are still operating” (Nejla Demirci, Yeşil Direniş, October 22, 2012).

Meanwhile, rapid industrialization has caused drastic changes in groundwater levels (Varol et al., 2010). In the Ergene Basin, industrial facilities drew-off excessive amount of groundwater, and then they discharged their wastewaters into groundwater (Candeğer, 2010). Since groundwater is free, industrial facilities, especially the textile companies have been using groundwater more than they need, it is the same for the other sectors. As one of my interviewees said, “Textile factories in the region use more groundwater than absolutely necessary. Groudwater is used 3 times during the process in these factories whereas it is used only once in similar factories in Istanbul”. Industry has to get permission for extraction, yet they draw-off excessive amount of water that they are allowed to. Either State Hydraulic Works, local and national institutions could not halt them or they have ignored the excessive extraction of groundwater. Furthermore, the use of fertilizers, pesticides, soil conditioners and hormones caused pollution in the soil (Kocaman et al., 2015). Polluters in the Ergene River seep into groundwater from the river (Candeğer, 2010). Domestic wastewater is another main polluter in the Ergene Basin. The lack of treatment systems and adequate sewerage systems increase pollution load in the river (Çevre ve Orman Bakanlığı, 2010).

Currently, the Ergene River is considered as a “dead river”. In the past, it was a place in which people used to swim, spend their leisure times, and use for irrigation in agricultural lands, now it suffers from heavy pollution (Figure 4.9 and Figure 4.10). According to the State Hydraulic Works, in 1995, while the flow rate of the river was 2 m³/s, in the following years, it has reached up to 8 m³/s due to wastewater discharge, which means $\frac{3}{4}$ of river flow is wastewater (Türkiye Barolar Birliği, 2015). On the other hand, excessive pollution causes the loss of self-cleaning capacity of the river (Kocaman et al., 2015) which is harmful for the whole ecosystem in the watershed. River pollution also plays an important role in contamination of soil, surface and groundwater, jeopardizing biodiversity, wild animal life, human life, agricultural production (Acara, 2015).



Figure 4.9. Pollution in the Ergene River.



Figure 4.10. Contaminated river water in Karamusul village, 2017.

Today, the river cannot be used for any purpose due to its heavy pollution level. Although, it is prohibited using for irrigation, farmers use mixed water from the Ergene River and water from dams and wells (Acara, 2015). In addition, more than half of the rice production of Turkey is met from the region which endangered food security for population of Turkey. According to Edirne Provincial Directorate of Environment and Forestry (*Edirne İl Çevre ve Orman Müdürlüğü*), the Ergene River

has the IV. grade of water in terms of physical, chemical, organic, inorganic parameters based on observation station data from 2009 to 2010 (Kocaman et al., 2011).

Total domestic and industrial wastewater is calculated as 560.000 m³/day. 240.000 m³/day of domestic wastewater introduces into the river without any treatment. The Ergene River has become a sewer according to the report prepared by the Ministry of Forestry and Water Affairs. Besides, groundwater level reduced approximately 100 m due to excessive groundwater extraction for industrial and agricultural purposes. (Orman ve Su İşleri Bakanlığı, 2013).

4.2.2. Pollution Parameters

State Hydraulic Works classified of river waters by pointing out the Directive for Water Pollution Control as “Class I refers to high quality waters, Class II refers to minimal pollution, Class III refers to polluted water and Class IV refers to very polluted water”. This classification is based on physical, chemical parameters, organic and inorganic parameters, bacteriological parameters⁴ (Sümer and Muluk, 2011). According to the report dated 2015, the Ergene River has the IV. grade of water in terms of Dissolved Oxygen (DO), Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Kjeldahl Nitrogen (TKN) with reference to Surface Water Management Regulation and Water Pollution Control Regulations. Besides, the pollution hotspots were determined in Çorlu brook (Tekirdağ), the Ergene River, Evrensekiz brook (Kırklareli) between 2012-2015, and the increasing of the amount of COD and lead (Pb) is observed (Çevre ve Şehircilik Bakanlığı, 2015).

4.2.2.1. Industrial Wastewater. Industrial wastewater is the main polluter in the basin in terms of both polluter parameters and flow rate. Although industrial facilities and OIZs have wastewater treatment systems, the river has got polluted from past to present. Industrial facilities do not operate their wastewater treatment plants and illegal wastewater discharge continues. Industrial wastewaters vary from sector to sector. Besides, differences of process, raw material and technology affect characteristics of wastewater (Çevre ve Orman Bakanlığı, 2008).

Particularly textile, leather, chemical, food, and metal industries located in mostly Çorlu, Çerkezköy, Lüleburgaz and Muratlı generate a vast amount of wastewater. Leather and textile industry are the leading sectors followed by food and drink industry. Textile, leather and chemical industries come into prominence as heavy polluters due to their features of wastewater. In Tekirdağ,

⁴ The complete list of surface water quality parameters is given in Appendix A.

chemical and pharmaceutical industries have high capacity considering their numbers of industries in Çorlu and Çerkezköy. Although there are number of industries, mostly textile, leather and food industries consume water and produce wastewater (Table 4.4) (Çevre ve Orman Bakanlığı, 2010).

Table 4.4. The number of water based companies and quantity of wastewater in the Ergene Basin (including OIZs) (2010).

Provinces	Number of companies	Wastewater quantity (m ³ /day)	Ratio between industrial ww /total wastewater
Tekirdağ	521	278.780	85,2
Kırklareli	94	47.090	14,4
Edirne	16	1.183	0,4
Total	631	327.053	100

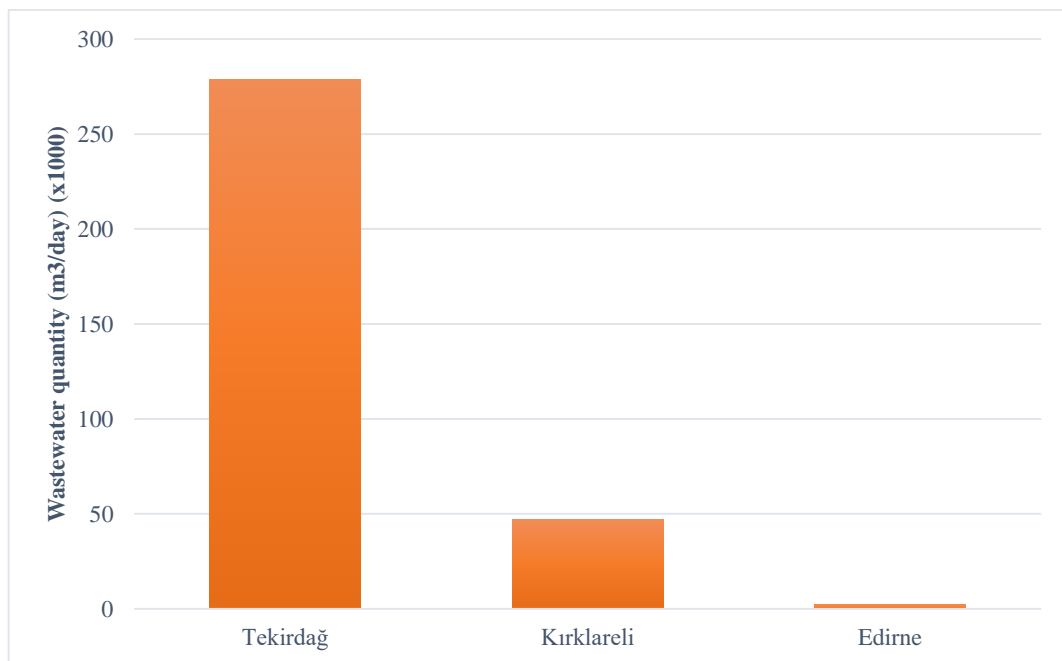


Figure 4.11. Industrial wastewater allocation in provinces (Çevre ve Orman Bakanlığı, 2010).

Food industry includes organics which reduce the amount of DO in rivers. It might generate odor and anaerobic environment. Drink industry contains high amount of BOD. In textile industry, color stemming from dyeing process, sodium hydroxide (NaOH) and high pH level are the main problems. Engine oils, sulfides (S²⁻), zinc (Zn) are also abundant in industrial wastewaters derived from textile industry. Chemical industry may generate sulfide and phenol (C₆H₆O), high pH level, phosphate, non-reducible organics leading to odor problem and intoxication. Metal industry wastewater may

include chrome (Cr), cadmium (Cd), cyanide (CN⁻), and zinc (Zn), some of which may introduce in food chain. Polluters stemming from tanners have solid, mud, BOD, nitrogen, high level pH and odor (Çevre ve Orman Bakanlığı, 2008). Heavy metal accumulation in the soil may have toxic effects, introduces human body and could not be disposed out of it (Kocaman et al., 2015).

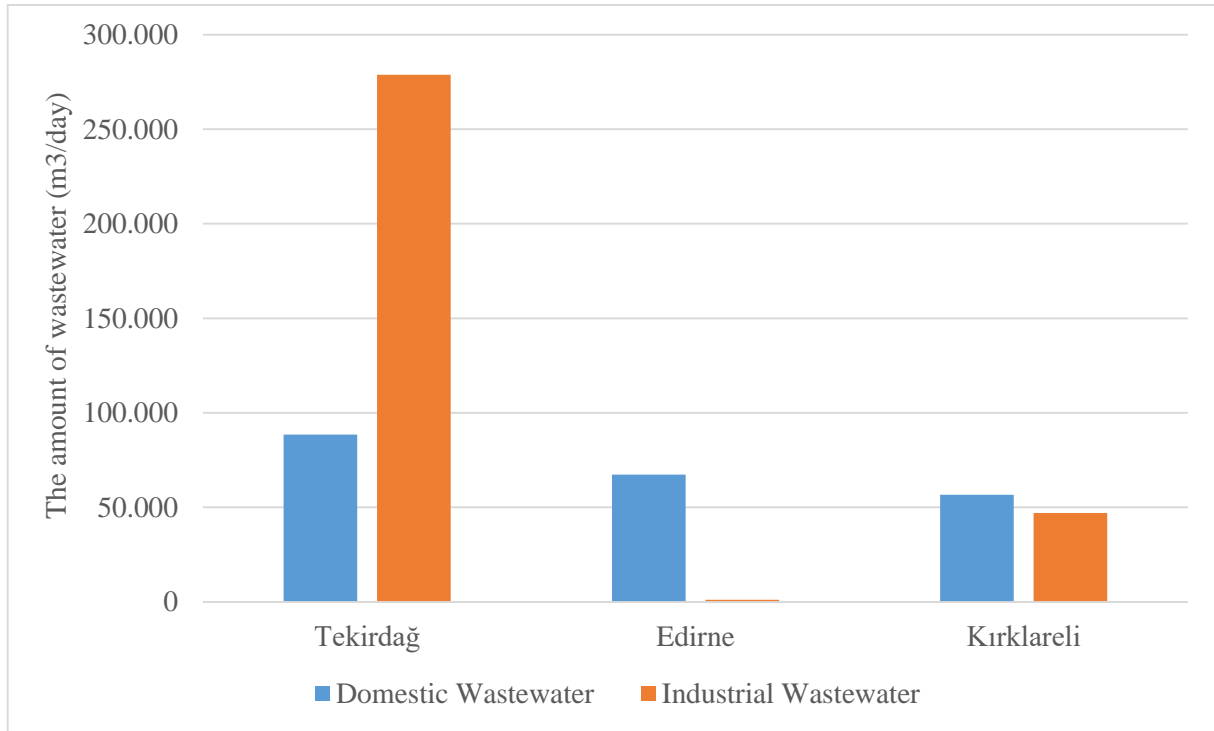


Figure 4.12. Domestic and industrial wastewater flow rates allocation in provinces (Çevre ve Orman Bakanlığı, 2010).

Industry mostly located in Tekirdağ, the amount of industrial wastewater is higher than the other provinces of Thrace region. Figure 4.12 presents the wastewater volume with the comparison of provinces.

4.2.2.2. Domestic Wastewater. In the 1990s, parallel to increasing of urban population, the need of sewerage networks gained importance regarding sanitation, health and infrastructure issues. (Orhan and Scheumann, 2011). In the basin, while 92% of urban population has sewerage system, almost the whole amount of wastewater is discharged into the receiving water body without any treatment (Yıldırım, 2015). There are 68 municipalities in the basin, only 1 of which has domestic wastewater treatment system, 32 of which have plans to operate. Even if industrial wastewater would be ignored, domestic wastewater could cause huge amount of pollution load in the river. In Thrace region, there are some shortages in terms of modernization, maintenance and repair services in sewerage systems.

90% of Kırklareli, 95% of Lüleburgaz, 90% of Çerkezköy have sewerage system, yet wastewaters discharge to the brooks without treatment (Çevre ve Orman Bakanlığı, 2008).

Domestic wastewater consists of suspended solids, dissolved organic and inorganic matters. It is the main sources of nutrients such as N (Nitrogen) and P (Phosphorus) which are necessary for microorganisms. In order to treat wastewater, it is crucial to calculate the amount of N and P. N and P accumulation leads to loss of biodiversity and imbalance in the aquatic environment through eutrophication, and algae bloom (Çevre ve Orman Bakanlığı, 2008). 213.000 m³/day⁵ domestic wastewater is generated that corresponds to 2,4 m³/s.

4.2.2.3. Agricultural Residues. Agricultural production reduces as industry develops. This tendency determines agricultural production in both developed and developing countries. Yet, some techniques are carried out to enhance farm yield per unit. Using fertilizers is one of these methods. However, while using of artificial fertilizers is common in agricultural practices, it creates significant environmental problems such as eutrophication and water pollution through infiltration and drainage systems (Saysel, 1999). In addition, analyses carried out in the Ergene Basin demonstrate that agricultural products and some plants contain heavy metals due to pollution. Lead (Pb) and cadmium (Cd) were detected at toxic level in leafy and tuber plants in Çorlu. Pb, Cd, chromium (Cr) were found at high level in plants grown in industrial areas and in areas near intensive vehicle traffic. Cd is considered as “modern toxic metal” which is found in pesticides and fertilizers. Hence, it may introduce to the nature through soil (Yolal, 2014). While Thrace region has the most arable lands, the level of fertilizer consumption is higher than the other regions of Turkey which causes groundwater pollution due to excessive use of nitrate and nitrogen (Çevre ve Orman Bakanlığı, 2008).

4.2.2.4. Leachate. Solid wastes are collected irregularly in the Ergene Basin and disposed mostly near streams and brooks. There are 16 hazardous waste storage areas but there are no precautions for leachate and gas release, thus leachate introduces into groundwater or surface water (Çevre ve Orman Bakanlığı, 2010). Gas chimneys should be used to prevent accumulation of methane (CH₄), carbon dioxide (CO₂), hydrogen sulfide (H₂S), ammonia (NH₃), and nitrogen compounds (Çevre ve Orman Bakanlığı, 2008). Leachate consists of heavy polluter compounds and elements. According to Solid Waste Control Regulations, solid wastes should be collected and treated in accordance with “sanitary landfill method”, whereas sanitary disposal has not been carried out in the basin.

⁵ The amount is domestic wastewater was calculated as 240.000 m³/day in 2013.

4.2.3. Evaluation of Parameters

When the current situation and the result of the studies are analyzed, the Ergene River shows the following characteristics;

- The Ergene River and its tributaries are polluted due to industrial and domestic wastewater. The Ergene River water quality is IV. grade (very polluted).
- Industrial areas are concentrated in Çorlu, Çerkezköy, Lüleburgaz ve Muratlı, thus these regions are the most polluted areas.
- The amount of wastewater reaches about 2-3 times of its daily natural flow rate.
- Domestic wastewaters are discharged into the receiving body without any treatment.
- Precautions should be taken to prevent illegal groundwater extraction.
- The excessive use of pesticides and fertilizers causes pollution in the river and groundwater.
- Sanitary storage areas are absent, thus leachate is one of the polluter sources.
- The lack of pollution control steps aggravated the pollution problem in the Ergene River over the years.

5. POLLUTION CONTROL EFFORTS IN ERGENE

5.1. An Overview of the Plan Making Processes

Pollution in the Ergene River has drawn public attention since the 1990s. The news regarding pollution started to appear in the local and national newspapers. NGOs, professional chambers, locals held meetings on industrialization and its effects, lands and agriculture, pollution, urbanization, groundwater and surface water in Thrace (İnci, 2010a, p.19). In response, several plans were prepared by different institutions. Pollution control projects made by public institutions, ministries or private companies reflect different approaches. While most of them focus on sustainable development and making the region a competitive trade center, others focus on ecological balance in the basin. In this chapter, pollution control projects are discussed associated with plan making processes and their political and technical problems. Treatment plans are summarized in Table 5.1.

Table 5.1. Plan making and implementation processes in Ergene.

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
1999 (started) 2002 (finished) 2004 (approved)	The Thrace Sub-region Ergene Basin Environmental Plan (<i>Trakya Alt Bölgesi Ergene Havzası Çevre Düzeni Planı</i>)	The Ministry of Environment	Trakya University	Trakya University, Yıldız Technical University, Kocaeli University, Edirne Bar Association, city planners, academics, public institutions, municipalities, locals, NGOs (TEMA, ÇEKÜL, environmental organizations), TMMOB and its branches, trade unions	The main focus: To develop holistic approach to plan the whole basin Targets: Sustainable economic development, protection of agricultural, tourist and historical identity, planned industrialization, strategic planning and holistic approach, participation of all stakeholders	Auditing polluting industries in cooperation with related institutions, integrated wastewater treatment plants	Cancelled ⁶ . A new (revised) plan was approved in 2009.

⁶ 1/100.000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan (2009) General Provisions: “2.10.2. From the date of approval of this plan, the 1 / 100.000 scale Ergene Basin Environment Plan approved in 2004 is abrogated.”

Table 5.1. Plan making and implementation processes in Ergene (continued).

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
2008 (finished)	The Ergene Basin Environmental Management Master Plan (<i>Ergene Havzası Çevre Yönetimi Master Planı</i>)	The General Directorate of Environmental Management of the Ministry of Environment and Forestry	The General Directorate of Environmental Management of the Ministry of Environment and Forestry, TRAKAB	Public institutions, TRAKAB	The main focus: Data collection from previous works and auditing works in order to determine pollution level and its sources Targets: To investigate environmental effects of the industrial activities, aiming at eliminating technological and infrastructure deficiencies in pollution sources, management of pollution	To establish a legal framework to be used in watershed management, to coordinate water and wastewater infrastructure investments for conservation purposes, to establish joint domestic wastewater treatment plants	Monitoring and auditing services are not operated in the whole basin

Table 5.1. Plan making and implementation processes in Ergene (continued).

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
2008 (finished)	The Meriç-Ergene Basin Protection Action Plan (<i>Meriç-Ergene Havzası Koruma Eylem Planı</i>)	The General Directorate of Environmental Management of the Ministry of Environment and Forestry	The General Directorate of Environmental Management of the Ministry of Environment and Forestry prepared as a report	The Ministry of Environment and Forestry, Provincial Bank, Directorates of Provincial Food Agriculture and Livestock, Provincial Special Administrations, TRAKAB, Municipalities, Directorates of OIZs	The main focus: To solve domestic wastewater problem Targets: To find a solution for the population and industrial pressure of Istanbul, to improve the quality of the river water, to develop holistic solution to environmental problems in short, medium and long term	Taking into operation of the domestic WWTPs in the Meriç-Ergene Basin until 2012, improving water quality from IV. grade to II. grade	Color parameter was not issued in 2008 (added to SKKY in 2011). WWTPs and joint WWTPs are started to establish, the quality of water has not reached II. grade

Table 5.1. Plan making and implementation processes in Ergene (continued).

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
2006 (started) 2009 (approved) 2010 (amendment and approved)	1/100.000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan (1/100.000 <i>Ölçekli Trakya Alt Bölgesi Ergene Havzası Revizyon Çevre Düzeni Planı</i>)	The Ministry of Environment and Forestry	Istanbul Metropolitan Municipality Metropolitan Planning Center (İBB İMP), TRAKAB	The Ministry of Environment and Forestry, TRAKAB, Istanbul Metropolitan Municipality/ Directorate of Zoning and Urbanization Affairs, Istanbul Metropolitan Municipality Metropolitan Planning Center (İBB İMP)	The main focus: Sustainable development Targets: • Sustainability • Rural development and loss of rural population • Limiting industrial development with plans • Establishment of functional links supported by integrated transport systems	<ul style="list-style-type: none"> • Joint WWTPs should be established • SKKY discharge standards must be provided • Groundwater should be drawn from the wells to be opened under the supervision of SHW and given to industrial enterprises by the amount determined by SHW • It is recommended to establish a Clean Production Center to serve the industries in the basin • Maintenance-repair work in the sewage system 	Joint WWTPs are established

Table 5.1. Plan making and implementation processes in Ergene (continued).

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
2010 (finished)	The Meriç-Ergene Basin Industrial Waste Management Master Plan Work (<i>Meriç-Ergene Havzası Endüstriyel Atıksu Yönetimi Ana Plan Çalışması</i>)	The General Directorate of Environmental Management of the Ministry of Environment and Forestry	İO Environmental Solutions Co. Ltd.	Interviews were conducted with companies, OIZs, SHW. Undersecretary of the ministry, General Directorate for Environmental Management, academics, Provincial Directorate of Environment And Forestry of Tekirdağ, Kırklareli and Edirne contributed to this report	The main focus: To develop management systems to eliminate industrial wastewater by establishing joint wastewater treatment plants Targets: To develop concrete measures for improvement of water quality of the basin, to aim to develop a management system for industrial wastewaters	Joint wastewater treatment plans and ROIZs are offered, the Marmara Deep Sea Discharge project is mentioned as an alternative (it was implemented after the announcement of the ‘Dawn Operation’)	Joint WWTPs are established

Table 5.1. Plan making and implementation processes in Ergene (continued).

Date	Name	Owner	Commissioner	Process /Participation	Premise/Main Goal	Targets For Pollution Control	Elements Implemented
2011	The Ergene Basin Protection Action Plan (<i>Ergene Havzası Koruma Eylem Planı</i>)	The Ministry of Forestry and Water Affairs	The Ministry of Forestry and Water Affairs (abrogate The Ministry of Environment and Forestry)		15 steps were defined to solve pollution problem including improving water quality, preventing the use of groundwater, monitoring and auditing activities, stream remediation, establishing solid waste facilities	To establish joint and advanced WWTPs, ROIZs and domestic wastewater treatment plants, to improve existing treatment plants, to reduce pollution load, to restrain the use of groundwater	ROIZs were established, “Integrated Pollution Prevention and Control Notification in the Textile Sector” was published, Tekirdağ Ergene Deep Sea Discharge Co. was established to plan and implement the Marmara Sea Deep Sea Discharge Project

As İnci (2010a) quoted, several meetings were held (Table 5.2) until a protocol (November 11, 1999) was signed between Trakya University and the Ministry of Environment in order to solve the pollution problem. Thus, 1/100000 Scale “the Thrace Sub-region Ergene Basin Environmental Plan” (*Trakya Alt Bölgesi Ergene Havzası Çevre Düzeni Planı*) was prepared by Trakya University in accordance with the protocol. The plan was finished in 2002, and it was approved in 2004 by the ministry. After being modified several times, the plan was cancelled⁷ and a new plan was prepared by IMP. Table 5.2 and 5.3 present events and meetings about Ergene pollution problem.

Table 5.2. Meetings on the Ergene River pollution before the protocol (İnci, 2010c).

Date	Meeting
1985	Kırklareli Land Congress
27.05.1988	The Gala Lake and its Problems Symposium
20-22.07.1990	Enez Hunting and Fish Festival Environmental Meeting I
05-07.07.1991	Enez Hunting and Fish Festival Environmental Meeting II
17-19.07.1992	Enez Hunting and Fish Festival Environmental Meeting III
1993	Thrace Environmental Problems Symposium I
29.07.1993	Enez Gala Lake Ecological Structure and Problems
03-06.11.1996	Çorlu, Industrialization in Thrace and Environmental Symposium I
09.01.1997	Babaeski, Forum for Saving Thrace I
21.02.1997	Edirne, Kırklareli, Tekirdağ Governors' Meeting
02.05.1997	Lüleburgaz, Forum for Saving Thrace II
29.08.1997	Yeniköy, Ergene Pollution Meeting
09.09.1997	Karamusul, Ergene Pollution and Saving Our Lands Meeting
20-22.10.1997	Tekirdağ Agricultural Faculty, Soil and Fertilizer Symposium
06-08.11.1997	Kırklareli, Industrialization in Thrace and Environmental Symposium II
12-13.02.1999	Tekirdağ, Thrace Environmental Problems and Solutions Meeting
11-13.11.1999	Edirne, Industrialization in Thrace and Environmental Symposium II

⁷ 1/100.000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan (2009) General Provisions: “2.10.2. From the date of approval of this plan, the 1 / 100.000 scale Ergene Basin Environment Plan approved in 2004 is abrogated.”

Table 5.3. Chronology of events after the protocol.

Date	Event
1996-2005	5 symposia were organized by TMMOB MMO
2000	Thrace Regional Municipality Union was established
2002-2003	A parliamentary research commission was constituted to investigate Ergene pollution and the meeting was held in 2003
2002/2004	Thrace Environmental Problems Solution Service Association was established with the statutory decrees of the Cabinet of Minister and it was named as Thrace Development Association (TRAKAB)
2004	Water Pollution Control Regulations was issued
2004	1/100000 Scale "the Thrace Sub-region Ergene Basin Environmental Plan was approved
2006	Metropolitan Mayor Topbaş gave the following statement in 2006: "We (İBB) will prepare Thrace environmental plans"
2006	A new protocol was signed between the Ministry of Environment and Forestry, İBB and TRAKAB to prepare a new plan
2008	The Ergene Basin Environmental Management Master Plan was prepared by the General Directorate of Environmental Management of the Ministry of Environment and Forestry
2008	The Meriç-Ergene Basin Protection Action Plan was prepared and published as a report by the General Directorate of Environmental Management of the Ministry of Environment and Forestry
2009	The revised plan (1/100.000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan) was approved. It was changed and approved again in 2010
2010	The Meriç-Ergene Basin Industrial Wastewater Management Master Plan Final Report was prepared by İO Company
2011	"The Dawn Operation" was announced by the Minister of Forestry and Water Affairs Eroğlu in Tekirdağ
2011	After the announcement "The Ergene Basin Protection Action Plan" was prepared
2011	ROIZs (Reclamation Organized Industrial Zones) were established by the law amendment
2011	"Integrated Pollution Prevention and Control Notification in the Textile Sector" was published in the Official Gazette
2011	The COD parameter discharge standards were published (delayed until 2016)
2011	Tekirdağ Ergene Deep Sea Discharge Co. was established
2012	A report called "Assessment of Cancer Reports of Dwellers from the Vicinity of Industrial Density Areas or their First Degree Relatives in terms of Environmental Risk Factors: Çorlu Case" was prepared by Trakya University

State Hydraulic Works' Report entitled "The Report of Investigation of Pollution in the Ergene River" (1997) was also crucial to bring forward the pollution problem. In addition, Union of Chambers of Turkish Engineers and Architects/Chamber of Mechanical Engineers (Türk Mühendis ve Mimar Odaları Birliği/Makina Mühendisleri Odası, TMMOB/MMO) organized 5 symposia between 1996 and 2005 in cooperation with many NGOs and organizations. Çorlu Chamber of Commerce and Industry, Leather Industrialists' Association, Thrace Industrialists' Association, the Scientific and Technological Research Council of Turkey (Türkiye Bilimsel ve Teknolojik Araştırma Kurumu, TÜBİTAK) were the supporting organization of the first symposium. In these symposia, the importance of regional planning was emphasized. Moreover, the involvement of all stakeholders to be able to enhance the planning processes was aimed. Besides, Thrace Regional Municipality Union was offered to establish in order to "improve the relationships between municipalities and to overcome the problems with the help of cooperation, coordination and control" (Pekdemir, 2011).

After the 2000s, pollution in the Ergene River was discussed as a serious issue by local authorities, academics and the government. When environmental plans have been made, general election was held on 3 November 2002, thus ministries and deputies of the region changed. In 2002, a parliamentary research commission was constituted to investigate pollution in the Ergene Basin, the commission meeting was held in 2003. Commission was established in accordance with The Grand National Assembly of Turkey (TBMM) Decision No: 751 called "On the Determination of Pollution in the Ergene River and the Measures to be taken by Investigating the Effects on the Environment".

Commission's Report consists of important decisions to be taken the necessary steps in the basin. One of the main decisions was to add color parameter to "Water Pollution Control Regulations" (*Su Kirliliği Kontrol Yönetmeliği, SKKY*) (İnci, 2010c, p.380). However, color parameters were added to the discharge standards of the regulation in 2011, obligation for companies started in 2012. This delay is related to development of textile sector in the region, color parameter was seen as a slowing factor in the years that the textile industry boomed. Other decisions of the commission report were river rehabilitation processes, establishing of General Directorate of Thrace Water and Sewerage and Solid Waste Management (*Trakya Su ve Kanalizasyon ve Katı Atık Yönetimi Genel Müdürlüğü*), constructions of wastewater treatment plants, prevention of wastewater discharge into the river and discharge treated wastewater into the Marmara Sea (İnci, 2010c, p.381). The final article of the report was considered by academics as a threat to the Marmara Sea. Yet, Deep Sea Discharge Project is being constructed.

In the wake of the Ergene Basin Environmental Plan's modification after its approval in 2004, a new plan was prepared by IMP in accordance with the protocol with The Ministry of Environment and Forestry. The new plan was announced as the revised plan of the "Ergene Basin Environmental Plan". On the other hand, there were essential differences in terms of planning approaches the region and pollution control steps. The new plan was designed by the Ministry of Environment and Forestry, IMP, Thrace Development Association (Trakya Kalkınma Birliği, TRAKAB) called "1/100.000 Scale Thrace Sub-Region the Ergene Basin Revised Environmental Plan". In this plan (2009), its focal point and vision were determined as "to create a competitive center in the global economy by evaluating local potentials and natural resources in line with social and economic sustainability principles" (Çevre ve Orman Bakanlığı, 2009).

On the other hand, Trakya University and NGOs were excluded from the planning processes, many NGOs and organizations appealed to the local administrative court to object to the other plans signed by municipalities in the region. In addition, in 2009, Union of Chambers of Turkish Engineers and Architects (UCTEA) Chamber of Architects Istanbul Branch (*TMMOB Mimarlar Odası İstanbul Büyükkent Şubesi*) and UCTEA Agriculture Engineers Chamber (*TMMOB Ziraat Mühendisleri Odası*) sued the plan. Despite 26 articles were cancelled by the Council of State in 2010, 1/25000 Scale Provincial Plans were implemented (Hudut Gazetesi, March 20, 2015).

Due to ongoing debates about the pollution in the Ergene River, the Ministry had to make an explanation to the public and put into effect new projects. On the one hand, the ministry blamed municipalities for not establishing wastewater treatment systems, and claimed that "despite the fact that the majority of industrial facilities had treatment plants, discharging domestic wastewaters without treatment polluted the river" (Radikal, August 17, 2011), on the other hand, "the Dawn Operation" was announced in 2011 in order to rehabilitate the river. The Ministry's statement about the municipalities has demonstrated the conflict of authorization.

According to the public announcement of The Ministry of Forestry and Water Affairs, numerous visits were made to the Ergene Basin with other departments on the order of the Prime Minister. It was announced that these visits aimed to solve pollution problem and to be able to provide acceptable pollution limits in the Ergene River (Orman ve Su İşleri Bakanlığı, 2011a). Within this context, "The Ergene Basin Protection Action Plan" (*Ergene Havzası Koruma Eylem Planı, 2011*) was prepared.

Meanwhile, the Minister of Health, Müezzinoğlu stated that everyone was guilty of the pollution in the Ergene River and added “I hope that by the year 2014, the Ergene River will be flowed clearly” (İHA, November 12, 2013). After 3 years of this announcement, the Minister of Forestry and Water Affairs, Eroğlu stated that pollution was reduced by 79% with the help of the action plan (the Dawn Operation) (Orman ve Su İşleri Bakanlığı, 2016). On the other hand, water analyses carried out by Uzunköprü Municipality in an accredited laboratory since 2011, have showed the opposite results (Çevre ve Orman Bakanlığı, 2010). Water samples were taken from the Ergene River Taş Köprü Anagöz outlet as 2 hours composite samples. In 2016, results demonstrated that the COD (chemical oxygen demand) parameter, one of the most important parameters of wastewater quality, was measured at 295 mg/L, while the 4th grade of water quality limit was 70 mg/L (Uzunköprü Adalet Gazetesi, November 18, 2016).

Furthermore, a report (Assessment of Cancer Reports of Dwellers from the Vicinity of Industrial Density Areas or their First Degree Relatives in terms of Environmental Risk Factors: Çorlu Case / *Endüstri Yoğun Bölgede Yaşayanlarda Ya da Birinci Derecede Yakınlarında Kansere Bildirenlerin Çevresel Risk Etmenlerine Göre Değerlendirilmesi: Çorlu Örneği*) was prepared by Trakya University/Department of Public Health and published in 2012. It indicated increasing rates of cancer in Thrace region in relation to industrial pollution. The academics from the Trakya University took samples from the Ergene River and they found heavy metals in the river such as lead, mercury, cadmium, cobalt, copper and chemicals such as arsenic, phosphorus-nitrogen compounds, solvents, acids, alkalis and dyes. In addition, Yolal (2014) claims in his research paper that there is a relationship between pollution in the river and bladder tumors of residential areas nearby the river due to heavy metal (cadmium-Cd) accumulation. In addition, as Yolal quotes, İnci et al. (2013) determine that Cd was found in all cases, zinc and lead were found higher in kidney, in urothelial tumors cases (Yolal, 2014).

While the Ergene River pollution problem has drawn more attention in public, on the other hand environmental movements have gained acceleration in Turkey. Reactions have increased especially against HPP (Hydropower plants) and privatization of water through the Water Utilization Agreement (*Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul ve Esaslar Hakkında Yönetmelik*) (issued in 2003 and revised in 2015) and the V. World Water Forum meeting in Istanbul (2009). At the dawn of the Gezi Parkı protests, environmental movements have become popular and begun to set the agenda. In this respect, as of 2009,

many newspapers, websites put the Ergene River pollution on their front pages. 2011 was the most intensive year in terms of discussion of pollution in the Ergene River.

5.2. Planning Processes and Institutional Conflicts

In the Zoning Law (*İmar Kanunu*) numbered 3194 the environmental plan is defined as “a plan to determine settlement and land use decisions such as housing, industry, agriculture, tourism, transportation in accordance with national and regional plan decisions”. Article 5 of the law sets forth that the master building plan should be parallel with “regional or environmental planning”. On the other hand, planning processes are implemented under the conditions of the lack of coordination between local and national authorities. Such that, one minister may sue the other (Yılmaz, 2007). The failure of planning processes in Turkey stems from non-compliance with the plan hierarchy, conflict of authorization and the lack of control mechanisms (Akay and Akgün, 2014).

Focusing on the planning processes, ongoing conflicts between institutions can be seen. For instance, there has been a jurisdiction dispute between the Ministry of Public Works (*Bayındırlık ve İskan Bakanlığı*) and the Ministry of Environment and Forestry (*Çevre ve Orman Bakanlığı*) on the construction and approval of environmental plans. This dispute has been solved by the amendment in Environmental Law in 2006, however jurisdiction disputes still exist. Consequently, the Ministry of Environment and Forestry has the authority to make and implement the environmental plan of the basin with the scale of 1/50000 and 1/100000. It is discussed by city planners that a new zoning and urban plan must be prepared in a way that would solve the conflict of authority. In addition, the absence of punitive sanctions in cases which plans are not applied, may result infringement in provision of plans.

Planning system in Turkey is carried out by a single central institutions namely the Ministry of Environment and Urban Affairs in the wake of the “Regulation on the Construction of Spatial Plans” (*Mekansal Planlar Yapım Yönetmeliği, 2014*). Spatial Strategy Plans are prepared as Environmental Plans and Construction Plans. According to this, planning stages are as follows from top to bottom: Spatial strategy plan, environment plan, master plan and application zoning plan. In this regulation, plan hierarchy is defined, yet it is not mentioned how to provide coordination between plans. If the ministry prepares 1/100000 (or 1/50000) Scale Environmental Plan including more than one province, 1/25000 scale master development plan should be prepared in province-wide in harmony with the environmental

plan. If the master plan conflicts with other plan, the ministry's plan will be taken as a basis. Unfortunately, coordination between organizations could not be solved due to the lack of agreed planning strategy and vision and jurisdictional disputes. Although plans should include public participation in accordance with legislation, some organizations are excluded from implementation steps (Yılmaz 2007; Aysu, 2010, p.394; Akay and Akgün, 2014).

In Thrace region, master plan (Thrace Sub-region the Ergene Basin Environmental Plan) was prepared by Trakya University in accordance with the protocol between university and ministry, then 1/25000 plans need to be made as priority. However, the plan was cancelled, thereby the task for preparing of 1/100000 Scaled Environmental Revised Plan and 1/25000 Scaled Provincial Environmental Plan were assigned to İMP via Istanbul Metropolitan Municipality BİMTAŞ (Boğaziçi İnşaat Müşavirlik) (a public private company) within the framework of harmonization with Istanbul Provincial Environmental Plan (Aysu, 2010, p.394). In this respect, another protocol was signed between TRAKAB, Istanbul Metropolitan Municipality (*İstanbul Büyükşehir Belediyesi, İBB*) and the Ministry Environment and Forestry (Pekdemir, 2011) in 2006 to prepare a new plan.

5.3. The Ergene Basin Environmental Plans

5.3.1. The Thrace Sub-region Ergene Basin Environmental Plan – 1999-2004

After signing the protocol (1999) between Trakya University and the Ministry of Environment, Trakya University prepared “The Thrace Sub-region Ergene Basin Environmental Plan”. When the plan was made, an authority conflict emerged between the Ministry of Public Works and the Ministry of Environment. The Ministry of Public Works claimed that it had the authority. Then, the Ministry of Environment sued and took the authority to make the environmental plan (İnci, 2010b, p.108).

The first plan consisted of pollution control steps such as integrated wastewater treatment plants, solid waste management projects (Sezen and Kubaş, 2014). Its main goals and targets are defined as providing sustainable economic development, protection of agricultural, tourist and historical identity, planned industrialization, strategic planning and holistic approach, participation of all stakeholders. On the other hand, the plan was modified several times (43 times in 2 years) by the Ministry of Environment after it was approved. It was criticized by academics from Trakya University with regard to planning the

basin in view of Istanbul metropolitan city and its needs. In this sense, relocation of dirty industries from Istanbul to other regions such as Thrace region and Kocaeli was important.

During the preparing processes of the first plan, Thrace Environmental Problems Solution Service Association (*Trakya Çevre Sorunları Çözümü Hizmet Birliği*) was established in 2002 in accordance with the statutory decrees of the Cabinet of Minister, but it was named as Thrace Development Association (TRAKAB) in 2004 (Pekdemir, 2011). This organization is responsible for making sub-regional plans in Thrace. It took 28 months for making tenders by TRAKAB to prepare provincial plans (1/25000). On the other hand, TRAKAB has excluded Trakya University from the planning process. Besides, TRAKAB Administration has decided to adopt IMP made 1/25000 Environmental Plans of Tekirdağ, Kırklareli, and Edirne (Yalçın Bayer, Hürriyet, December 26, 2006). In addition, the society was provoked against the plan with rhetoric and black propaganda, “They tried to stop development, they obstruct the industry, the young people will find work if the factory is opened”. Meanwhile, governors of the region gathered in Istanbul. Istanbul Metropolitan Mayor Topbaş gave the following statement in 2006: “We (İBB) will prepare Thrace plans” (İnci, 2011). This statement can be considered as an intervention of national authorities.

5.3.2. The Thrace Sub-Region Ergene Basin Revision Environment Plan - 2006-2009

In the wake of the statement, IMP took in charge for preparing and implementing the new environmental plan. IMP was established in 2005 as the planning office of BİMTAŞ with the instruction of Istanbul Metropolitan Mayor Topbaş. The task of planning Thrace region was given to IMP despite the fact that it had no such authority. While city planning needs to be made by municipality in cooperation with NGOs and experts, yet Istanbul and even other provinces are being planned by IMP via BİMTAŞ that takes business from the municipality with the tender (Korhan Gümüş, October 17, 2005). Preparation of the plan by the IMP was criticized by locals and academics as a devolution of authority. They claimed that the new plan took into consideration the needs of Istanbul’s industry. This was also considered as an intervention of the government and political elites to the planning processes.

A new protocol was signed between the Ministry of Environment and Forestry, İBB and TRAKAB in 2006. The new plan was approved in 2009, thus the first plan prepared by Trakya University has been cancelled. The new plan was modified through the first plan, but in the new plan, the perspective of

sustainability and conservation-use balances were removed (Aysu, 2010, p.393). This plan was made in accordance with decentralization of Istanbul to Thrace. It is stated in Istanbul Metropolitan Plan as “Migration to Istanbul will be partially prevented by relocating industrial facilities which are not necessary for its new economic and strategic objectives”. Besides, during the plan making process of the new plan, participation was ignored, in that Trakya University was convoked the meeting only 1 or 2 times between 2004 and 2009. Trakya University was excluded from the process and its name was removed from the new/revised plan.

According to İnci (the former President of Trakya University) the first plan was modified so as to harmonize with the “unapproved” Istanbul Metropolitan Plan, thus a new plan has been introduced in 2009 which was changed in 2010 again. On the other hand, in the face of criticisms, TRAKAB Term Chairman and The Governor of Tekirdağ, Doğan claimed that the main principles of the first plan have been saved, agricultural areas would not be industrialized, and “dirty industries” would not be moved to the region. However, in the revised plan, dirty industries (chemicals, metal industry, non-metal industry, transportation) are offered to move to Çerkezköy OIZ from the Büyükçekmece Basin. In addition, Certification in Environmental Impact Assessment (EIA) has been granted to establish cement factories in Saray and Vize districts leading to heavy pollution on natural resources (Tüzün, 2010).

In the revised plan report (1/100.000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan, 2009), the main objectives are defined as follows: “It aims to enhance agricultural sector by pursuing the regional planning approaches which is the greatest potential in the national sense, moreover, to support sectors aside from agriculture.” In the revised plan, 4 main principles are also defined as; “sustainability, rural development and prevention of loss of rural population, limiting industrial development regarding plans, and establishment of functional links supported by integrated transport systems”. In addition, the revised plan claims that Agricultural Sub-Region and Agricultural Organized Zones will play an important role in preventing population loss in rural areas. Furthermore, tourism centers, eco-tourism cities, wind power plants, industrial centers, port areas, brand cities are offered as a part of reconstruction of the region (Çevre ve Orman Bakanlığı, 2009). For instance, thermal power plants are currently put into practice (Rıfat Doğan, October 31, 2017).

On the other hand, the revised 1/100000 Scale Thrace Sub-Region Ergene Basin Revision Environmental Plan (2009) was criticized by Trakya University for some reasons such as there is no

concrete measures of the river pollution, generating new industrial areas leading to population growth and pollution, establishing of agricultural industrial areas in the name of Agricultural Sub-Region and Agricultural Organized Zones, agricultural industrial areas at the edge of pastures (İnci, 2011).

The revised plan focuses on industrialization by pursuing the idea of development in order to become the region a transition and development area in line with the EU targets. It focuses on planned industrialization via OIZs which proves that idea. Moreover, its vision, strategy and objectives are to accelerate developing processes taking into account the EU harmonization criteria. While the plan includes precautions for protecting agricultural areas and prevention on using of agricultural areas and pasture lands' for non-agricultural purposes (Çevre ve Orman Bakanlığı, 2009), yet in practice, industrial facilities have been continuously settling in fertile agricultural lands. For instance, Zarbun Farm (Havsa) which is the 1st grade agricultural land has become a logistic center. As another example, new industrial areas in Kırklareli are planned in agricultural lands and pastures (İnci, 2011).

Nevertheless, the revised plan includes pollution control efforts. To this end, generation of “Integrated Watershed Management Model”, protection of streams harvesting drinking water basins, taking the required measures in agricultural production, rehabilitation of illegal industrial settling by moving to planned land are offered (Çevre ve Orman Bakanlığı, 2009). However, the final item provided an exemption in favor of illegal industrialization (Molla, 2011). The revised plan states that: “The rehabilitation of industrial areas will be ensured by the transportation conditions of unplanned-illegal industries” (Çevre ve Orman Bakanlığı, 2009).

Consequently, while the first plan focuses on pollution control projects by giving priority to conservation natural resources and cultural, ecological identity, the revised plan points out to provide the highest economic and social benefits in the region and to minimize the imbalances between the regions. After revised plan was approved, first plan was cancelled by an article of the revised plan. Moving factories from Istanbul to Thrace region has taken place, especially dirty parts of industries have operated in the region in the absence of pollution control measures.

5.3.3. The Ergene Basin Environmental Management Master Plan – 2008

This plan was prepared by the General Directorate of Environmental Management of the Ministry of Environment and Forestry, covering the whole basin to investigate environmental effects of the industrial activities in Thrace region. Besides, previous works were collected in the geographic database. The results of all analyses were evaluated in order to determine the quality of surface and ground water. A survey was conducted in the field so as to determine the wastewater discharge points and existing treatment plants (Çevre ve Orman Bakanlığı, 2010). Within the scope of the plan, the Ergene River Water Quality Management Model, joint domestic wastewater treatment plants for Çerkezköy, Karaağaç, Veliköy, Kapaklı, Kızılpınar ve Uzunköprü Municipalities and action plan for the prevention and elimination of pollution were developed (Tüzün, 2010).

Industrialization is defined as the main pollution source in this plan. Other important pollution sources are considered as the lack of sewerage networks in urban settlement areas or inadequate sewage network, wastewater discharge without treatment, unplanned urbanization and inadequate wastewater management. According to the plan, it is necessary to reduce domestic and agricultural pollutant loads by 90% in order to get remediation in the river under the existing conditions. According to the scenario mentioned in this plan, even if pollution loads are reduced by 90%, under the conditions of industrial wastewaters being treated before discharging, water quality will not improve in 10 years and it will remain as the IV. grade of water especially in the arid season due to increasing of evaporation. According to this plan, the real improvement in the river can be provided by zero discharge. Yet, it cannot be applied in the region taking into account intensive industrial activities.

According to Küpçü et al. (2008), SHW's observations are not sufficient due to the limitations of data collection and location of monitoring stations. However, SHW makes bimonthly observations on the quality of water. Besides, Uzunköprü Municipality publishes their water quality observation results. However, detection of illegal and irregular discharging is not possible (Küpçü et al., 2008) due to the lack of control over industry.

5.3.4. The Meriç-Ergene Basin Protection Action Plan – 2008

The Meriç-Ergene Basin Protection Action Plan was prepared by the General Directorate of Environmental Management of the Ministry of Environment and Forestry. The plan was published as a report in November 2008. This plan seeks to find a solution for the population and industrial pressure of Istanbul leading to pollution in the basin. The plan proposes a holistic solution in short, medium and long term.

The main goal is defined as follows: (i) to define the sources of pollutants in the basin scale, (ii) to make the planning of the domestic wastewater treatment plants (iii) to determine the date of acquisition and preliminary costs of the wastewater treatment plants in the framework of the final plan; (iv) to ensure that the activities specified in the timetable are carried out under the leadership of the Ministry of Environment and Forestry (Çevre ve Orman Bakanlığı, 2008). This plan mainly focuses on construction of domestic wastewater treatment plans which will improve the quality of water from IV. grade to II. grade according to the future project. It is predicted that the utilization rate of the WWTPs will be increased to cover all municipalities by the year 2012. Constructions of WWTPs are continued for both domestic and industrial wastewaters. According to the Ministry of Forestry and Water Affair, by the year 2018, 12 WWTPs are operated⁸.

Within the scope of the plan, 4 basic alternatives have been defined to treatment of domestic wastewater as follows;

Alternative I: Establishment of new individual wastewater treatment plants (WWTP).

Alternative II: Establishment of individual WWTP in all municipalities.

Alternative III: Connection of the wastewater collection centers using joint WWTPs.

Alternative IV: Establishment of individual WWTP in all municipalities except from Çerkezköy Municipality. Joint WWTPs are constructed in Çerkezköy Belediyesi.

⁸ <http://gorunumgazetesi.com.tr/haber/48825/ergene-icin-12-aritma-tesisi-hizmete-aldik.html>

On the other hand, management problems such as the lack of qualified personnel in public institutions in terms of management of WWTPs, construction of infrastructure projects without planning in small and medium sized municipalities are mentioned. The plan emphasizes that plans should be prepared permanently, yet they have lost their validities due to amendments of plans and non-compliance with the regulations. The plan offers legal framework in order to coordinate organizations, raising public awareness and information and adequate financial support and supervision (Çevre ve Orman Bakanlığı, 2008). Color parameter was discussed in the plan prepared in 2008, yet it has been issued in 2011. That is to say, industrial needs were the first priority within the context of the planning processes. The elements of this reports partially implemented in terms of the establishment WWTPs and joint WWTPs, but the quality of water has not reached II. grade.

5.3.5. The Meriç-Ergene Basin Industrial Wastewater Management Master Plan Final Report – 2010

İO Environmental Solution (a private company) prepared this plan in accordance with the protocol signed between İO and the General Directorate of Environmental Management of the Ministry of Environment and Forestry. The short-term target is defined to improve the quality of water from IV. grade to III. grade in short-term; to II. grade in middle and long term. The plan focuses on developing management systems to eliminate industrial wastewater. Meetings were held with stakeholders from the region, and technical visits were organized to OIZs and industrial facilities (Çevre ve Orman Bakanlığı, 2010).

Table 5.4. Target analysis (Çevre ve Orman Bakanlığı, 2010).

Parameter	Short-term (3 yrs)	Medium term (5 yrs)	Long term (10 yrs)
COD	III. Grade	II. Grade	II. Grade
Conductivity	III. Grade	II. Grade	II. Grade
Color	III. Grade	II. Grade	II. Grade

Table 5.4 presents target analysis carried out according to this plan in short-medium and long terms which aims to improve the quality of water. According to the target analysis the Ergene River will also

be used for irrigation, the odor problem will be solved and small tributaries will not be wastewater collection channels (Çevre ve Orman Bakanlığı, 2010).

Table 5.5. Comparison of current pollutant loads and target loads discharged from industrial wastes to the Ergene River (Çevre ve Orman Bakanlığı, 2010).

Parameter	Pollution load from industrial wastewater (kg/day)	Target max load for average flow rate in arid term (kg/day)	Control (%)
COD	209.095	5.400	97
BOD ₅	72.515	864	99
Total Nitrogen	8.562	1.243	85
Total Phosphorus	2.708	17,28	99

In Table 5.5, the maximum pollutant loads are presented. As Table 5.5 shows that it is necessary to control 97% of COD load, 99% of the BOD₅ load, 85% of the total nitrogen load and 99% of the total phosphorus load. In this approach, it is assumed that all pollution loads stemming from domestic wastewaters and other pollutant sources are under control (Çevre ve Orman Bakanlığı, 2010).

COD is chosen as a key parameter that indicates the organic polluter in order to calculate the required reduction rate to be applied in discharge standards. Since the receiving water body flow rate is very low in summer months, the limit values cannot be reached in the Water Pollution Control Regulation. While maximum COD value is 50 mg/L, in the wastewaters of food, textile, leather, chemical and metal industry, the COD value was found high above 50 mg/L in 2 hours or 24 hour samples (Çevre ve Orman Bakanlığı, 2010).

In this report, “basin-based management system” is defined as taking into account hydrodynamic structures, physiochemical properties and ecological characteristics of the water resources. In the basin-based management systems, the use of environmental resources is selected by considering the general characteristics of the resource (flow, quality, etc.) and the social structure in the region, land use priorities, economic situation.

It is planned to make the quality of water II. grade in 3 years and to use the water for irrigation. Control of many parameters such as chloride, sulphate, boron, fecal coliforms, sodium adsorption ratio, % Na (sodium), suspended solid, total salt are required to control according to Wastewater Treatment Plant Technical Procedures Declaration (*Atıksu Arıtma Tesisleri Teknik Usuller Tebliği, 2010*) in order to provide irrigation water standards. However, since irrigation water standards will bring a considerable cost for other parameters such as BOD₅, Total Nitrogen, Total Phosphorus, in short term, only COD, color and conductivity are used according this plan (*Çevre ve Orman Bakanlığı, 2010*).

Analyses of the samples taken from the inlet and outlet of 9 wastewater treatment plants and from the receiving water body (Çorlu Stream and the Ergene River) demonstrate that the river and the stream are highly polluted in terms of color parameters. There have been no restrictions on color parameters for domestic or industrial wastewater discharges in Turkey. However, the Ministry has issued a notification on the amendment of Water Pollution Control Regulation in 2011 in order to control color parameter.

Electrical conductivity is another parameter of indicators of anions and cations dissolved in the water. If the water contains arsenic, nitrate, nitrite or ammonia, the electrical conductivity value increases. The substances causing the conductivity are salts, minerals, heavy metals, dissolved organics, various anions and cations. Since the water resources in the Ergene Basin are intended to be used for irrigation in agricultural production, it is necessary to put a standard on the electrical conductivity or suspended solid parameters.

Membrane bioreactor (MBR) technology has been selected to be applied in joint treatment plants, since it provides the highest purified water quality integrated with biological treatment. While this technique is useful for removal of COD parameters as well as color parameters, yet it is not expected to remove conductivity.

3 alternative plans are defined respectively;

Alternative I: Improvement of the present situation (Not to build new joint advanced treatment plant).

Alternative II: Construction of 4 new joint advanced treatment plants (using MBR) and collector lines, revision of WWTPs of OIZs in accordance with new discharge standards.

Alternative III: Construction of 4 new joint advanced treatment plants and collector lines, taking wastewater of existing OIZs to joint WWTPs, the reconditioning of WWTPs of other individual industries in accordance with new discharge standards.

According to Alternative II, industries will comply with discharge standards before discharging to the joint treatment collector given at the Water Pollution Control Regulation (WPCR). In the joint wastewater treatment plants, advanced treatment will be carried out. In addition, Alternative II also offers that treated water will canalize into the Marmara Sea via deep sea discharge, yet it is mentioned as an alternative not as an exact solution. HPPs will be built in this course of water so as to product the energy to meet the financial need for running WWTP I. If the HPP option is not considered, the treated waters will be discharged to Çorlu stream.

Joint advanced treatment plants are suggested in the Alternative III such in Alternative II (Figure 5.1). The technological solution for WWTP-II, WWTP-III and WWTP-IV are the same, yet a different technology is recommended for WWTP-I. Accordingly, the existing Çerkezköy OIZ and Çorlu Leather OIZ's treatment outlets will be connected to the WWTP-I collector, while the remaining individual industries will renew the treatment facilities to provide treatment efficiency. HPP is also planned in Alternative III.

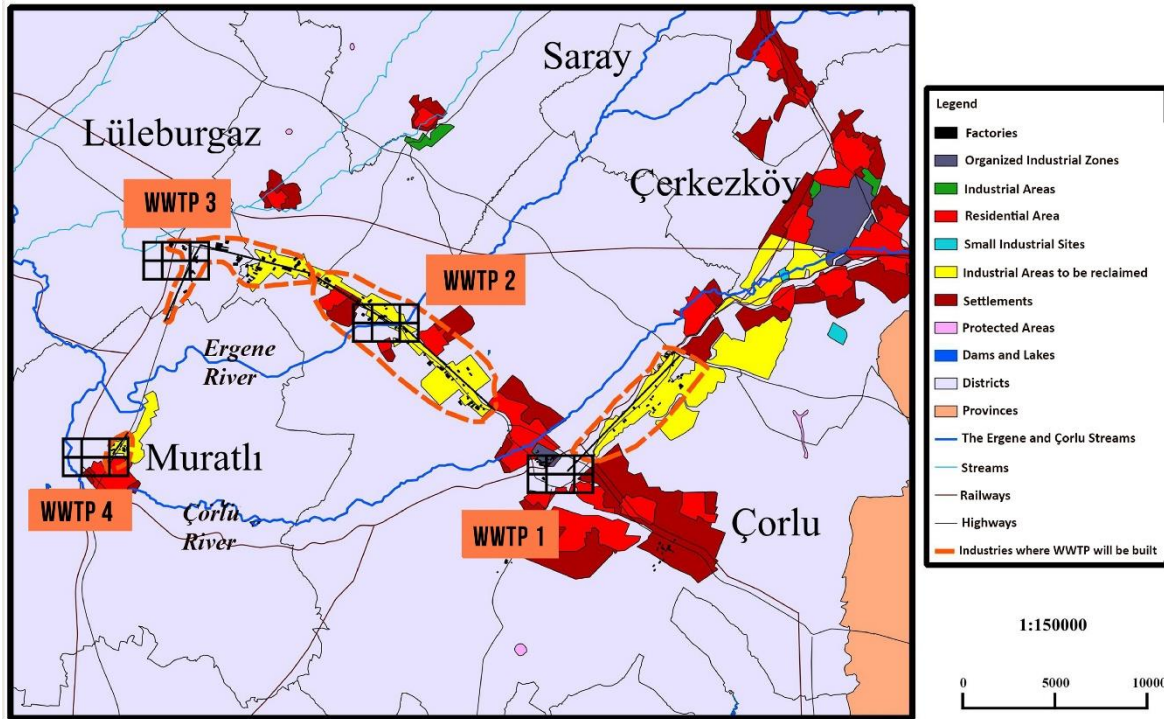


Figure 5.1. The locations of WWTPs planned to be established (Çevre ve Orman Bakanlığı, 2010).

The joint wastewater treatment system (Alternative III) uses activated sludge + membrane (MBR) systems. It stands out as the economically most suitable solution according to the report. Currently, industries in the region use activated sludge systems for organic matter removal. Some wastewater treatment plants have chemical treatment units. However, it is hard to remove color from wastewater which stems from textile industry. Thus, advanced technologies such as membrane processes, adsorption, ozonation or advanced oxidation processes after biological treatment are recommended in this report.

In the Alternative III, MBR technology is suggested to be applied at joint advanced WWTP except for the WWTP-I due to its high flow rate. Besides, it is noted that individual WWTPs should obey the standards. For prevention of excessive extraction of groundwater, putting a meter is suggested on outlet of wells until 2011, however it has not been applied.

Establishment of Reclamation Organized Industrial Zones (ROIZ) and Watershed Management Unit are considered as alternatives, yet due to the lack of legislation in the establishment of them, the alliance of Ergene Environmental Protection Association with Special Provincial Administration is offered. Besides, a bill was submitted in The Grand National Assembly of Turkey called “Law on the Establishment and Duties of the General Directorate of Water and Sewerage Administration of the

Ergene and the Meriç Basin”. The law is considered a major step for establishing the necessary institutional structure in order to achieve the targeted water quality in the basin. Although the law was submitted in 2008, it was not yet enacted in 2010. In addition, the necessary monitoring and audit procedures are recommended in the plan to be applied in companies which have “EIA not required”, “EIA Positive” or “EIA Exempt” certificates. Consequently, Public Private Partnership Model is proposed as an alternative for the financing problems (Çevre ve Orman Bakanlığı, 2010). Within the scope of this report, joint WWTP were established. However, the restrictions to prevent groundwater extraction were not implemented. The quality of water has not reached II. grade.

5.3.6. The Ergene Basin Protection Action Plan – 2011

The Ergene Basin Protection Action Plan was announced to the public by the Minister of Forestry and Water Affairs Eroğlu in Tekirdağ, Çorlu on May 6, 2011. The plan was named in public as “the Dawn Operation”. The plan consists of 15 actions. These actions are as follows (Orman ve Su İşleri Bakanlığı, 2013):

- Stream beds are cleaned
- Municipalities’ wastewater treatment plans are established by the ministry
- Reclamation Organized Industrial Zones (ROIZ) are established
- Integrated advanced wastewater treatment systems for industry
- Reducing water consumption and the use of polluting raw material by the industry
- Forestation and combating erosion in the basin
- Implementation of 1/250000 scale environmental plans
- Solid and hazardous waste disposal and recycling facilities are established
- Pollution from agricultural sources will be controlled
- The Ergene River will be monitored continuously in real time
- Controlling and auditing will be frequent
- The discharge standards are revised including color standards⁹
- Early Flood Warning System will be installed
- The use of groundwater will be controlled

⁹ The obligation to comply with the color standards of the OIZs has been extended until 31.12.2014.

- Dam and ponds and irrigation facilities will be completed

The required sewerage system of 12 district municipalities (Keşan, Çorlu, Çerkezköy Municipality Associations [Çerkezköy, Kızılpınar, Karaağaç, Kapaklı, Veliköy], Muratlı, Kırklareli, Babaeski, Hayrabolu, Saray, Vize, Pınarhisar, Malkara and Uzunköprü) will be built by İLBANK A.Ş. (former Provincial Bank) before WWTP goes into operation. The Lüleburgaz sewerage network and the collector line will be built by means of the European Union grant (Orman ve Su İşleri Bakanlığı, 2013). According to the plan, wastewater treatment plants and operators electricity energy expenses 50% rate will be paid back by the Ministry (Orman ve Su İşleri Bakanlığı, 2011b).

In this plan, overall activities are implemented compatible with the 1/100000 Environmental Plan. Besides, controlling groundwater level is achieved by installing electrical or water meters to well outlets in compliance through SHW regulation dated June 7, 2011. This practice will be applied for more than 20 m³ of groundwater extraction for industrial purposes (Orman ve Su İşleri Bakanlığı, 2011b). Yet, this decision is currently not implemented due to the lack of public auditing. The use of fertilizers and pesticides is also aimed to be reduced (Orman ve Su İşleri Bakanlığı, 2013).

In the wake of announcement of the Dawn Operation, some regulations have been submitted in order to reduce heavy effects of industrial wastewaters. In 2011, adding color parameters to the discharge standards in the Water Pollution Control Regulation was one of these regulations (Orman ve Su İşleri Bakanlığı, 2011b). Moreover, “Integrated Pollution Prevention and Control Notification in the Textile Sector (*Tekstil Sektöründe Entegre Kirlilik Önleme ve Kontrol Tebliği*)” was published in the Official Gazette dated 14 December 2011 and numbered 28142. The main objectives of the notification are defined as “to establish the principles and procedures for minimizing adverse environmental effects of textile industry activities, to achieve an environmentally friendly management through controlling all industrial emissions and to ensure effective use of raw materials and energy as well as clean production technologies”. It was not possible to publish a notification regarding textile sector in the 1990s in which textile sector was one of the main activities in Turkey. However, after textile sector was transferred to other countries in the 2000s, the notification could be published. Besides, the COD parameter discharge standards were published on January 11, 2011 in order to reduce of COD amount. Yet, this regulation was delayed until 2016 by means of a new notification (Orman ve Su İşleri Bakanlığı, October 4, 2016).

Establishment of ROIZs is crucial for Action Plan which was also mentioned The Final Report dated 2010. Within the scope of the Action Plan, 10 ROIZs were established in Tekirdağ and Kırklareli (Sezen and Kubaş, 2014) in 2011 by the law amendment, respectively 8 ROIZs and 2 ROIZs, after the addition of a provisional article to the Organized Industrial Zones Law with the title “Reclamation Organize Industrial Zones”. According to this law amendment, the industrial facilities located in the industrialized zones before April 15, 2000 would be regarded as the organized industrial zone and they will be able to benefit from the advantages of OIZs (Canan Sakarya, Dünya, March 10, 2011). By establishing ROIZs, it is aimed to discharge industrial wastewaters to joint wastewater treatment plants in order to reduce treatment costs. The ROIZs started to operate as OIZs in 2013.

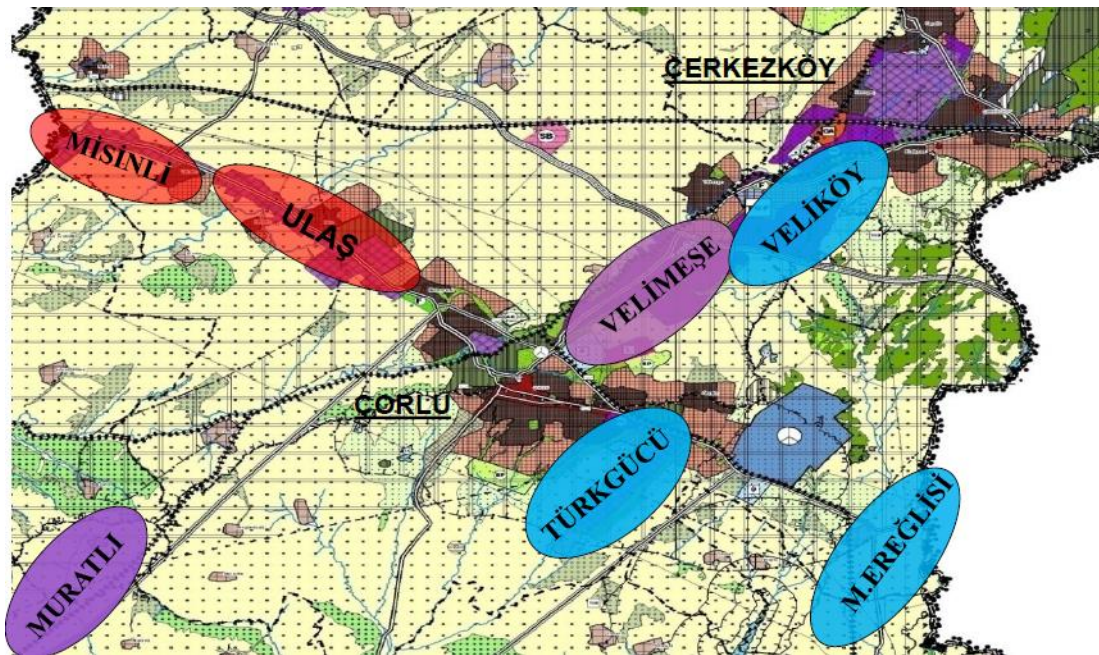


Figure 5.2. Possible locations of Reclamation Organized Industrial Zones (Orman ve Su İşleri Bakanlığı, 2011b).

Figure 5.2 presents ROIZs' locations according to the Action Plan. Industries are organized under the umbrella of cooperatives to implement wastewater treatment systems and other arrangements. In this context, “The Ergene Green Environment Wastewater Treatment and Recycling Cooperative” in Velimeşe-Yulafılı line, “Thrace Industrialists' and Businessmen's Association” in Misinli-Vakıflar line, “Association of Industrialists and Businessmen” in Evrensekiz are established (Orman ve Su İşleri Bakanlığı, 2011b).

past, industrial companies were seen as polluters, but now they work together for the sake of the environment. In addition, it is claimed that advanced biological treatment will be applied in the OIZs wastewater treatment plants before discharging to the Marmara Sea.

However, this project is accused of polluting the Marmara Sea. According to attorney Bülent Kaçar, there are major uncertainties in the project. For instance, it is not certain whether wastewaters will be treated or not (Seçil Türkkkan, Birgün, May 14, 2015). Besides, the wastewater treatment plant of each OIZ is considered as an individual WWTP in the project. While it is necessary to prepare a holistic EIA Report, EIAs are prepared separately for each OIZs. Moreover, it has not been stated that it will comply with the Water Pollution Control Regulation's provisions in the project (Türkiye Barolar Birliği, 2015). On the other hand, Tekirdağ Ergene Derin Deniz Deşarjı A.Ş. defends the project that all necessary feasibility studies were made by Istanbul Technical University (İTÜ). According to the report prepared by İTÜ, the Marmara Sea flow rate is 2400 times more than total wastewater discharge flow rate. Thus industrial wastewaters treated at advanced level will not adversely affect the Marmara Sea (Tekirdağ Ergene Derin Deniz Deşarjı A.Ş.).

On the other hand, within the framework of the 1/100000 Scale Thrace Sub-Region Ergene Basin Revision Environment Plan (2009), highly polluting industrial activities were banned. This item is mentioned once again in the Action Plan. These industrial activities are metal hardening (with salt), metal coating, surface cleaning (with acid), textile dyeing-washing and printing, heavy industrial companies for processing of mines, fibrous washing-lubricants, paper handling (cellulose or straw), refinery, raw leather processing, coal-based thermal power plant, pharmaceutical synthesis plants, grease oil factories (petroleum-derived) iron and steel production, petrochemical, Chlorine-alkali, acid manufacturing and filling, battery manufacturing (Sezen and Kubaş, 2014; Orman ve Su İşleri Bakanlığı, 2011b). However, highly polluting industrial activities are continued in agricultural lands by means of law amendments. For instance, in 2016, two regions were declared as "Energy Production Area" in Silivri - Çerkezköy and Vize by means of the plan amendment. Besides, local lignite-based thermal power plants (TPP) will be built by Electricity Generation in Thrace region (*Elektrik Üretim A.Ş. Genel Müdürlüğü, EÜAŞ*) and the General Directorates of Turkish Coal Enterprises (*Türkiye Kömür İşletmeleri Genel Müdürlükleri, TKİ*) (Çevre ve Şehircilik Bakanlığı, 2016). EIA reports for both thermal power plants were prepared by İTÜ. These EIA reports emphasize that thermal power plants will not cause an emission affecting the quality of the air. Yet, academics and NGOs from the region pointed out that these areas are "agricultural lands"

or “forestlands”, and also “excessive underground water capture area”, “underground waters feeding area”, so they claim that industrial activities should be restrained in these areas. Besides, TPPs have an adverse effect on air quality (Tuncay Uğurlu, Posta Trakya, February 23, 2017).

5.4. Evaluation of Projects and Plans

Pollution control efforts can be discussed in terms of participation mechanisms, scale, sustainability vision and pollution control methods. By examining plan making and project processes, we can sum up the differences between environmental plans as follows:

In the beginning, the involvement of stakeholders was provided during the plan and project making processes, after interventions of national authorities, social actors were deprived of authority to make environmental plans. Thus, participation of stakeholders was not achieved during the plan making processes, top-down environmental governance and devolution of power from locals to central authorities have been carried out.

The first plan (2004) focused on the whole basin with the holistic approach, the revised plan (2009) was prepared with the aim of harmonization of Istanbul environmental plan in line with the decentralization of industry from Istanbul to Thrace region.

While the first plan aimed at planning considering the balance between development and environmental conservation in line with the sustainable development. Non-polluting, advanced technological industries, eco-tourism, and agricultural industrial development were suggested. Unlike the first plan, other environmental plans prioritized neoliberal development agenda of the state in order to make the region an attractive center for industry. To this end, arable agricultural lands have been used for industrial purposes, polluting industrial facilities moved to the basin.

Pollution control programs are different at technical, social and political scale. Pollution problem has occurred in the region due to pollution industrial activities, the lack of auditing of wastewater discharge, and the concentration of polluting industrial companies within the neoliberal development context. Ergene Basin environmental plans which were prepared by the ministries aimed to solve the pollution problem by treatment plants and deep sea discharge projects instead of halted polluting

activities. Thus, pollution burden is paid by the public and the nature by these projects. Deep Sea Discharge project is condemned as it may cause pollution in the Marmara Sea rather than solve the pollution problem in the Ergene Basin. Moreover, industrial companies have not operated their treatment facilities over the years in the absence of auditing services and punishment mechanisms. Industrial companies do not comply with the plan provisions and regulations due to the lack of public enforcement mechanisms. In addition, the state's unwillingness to regulate and implement environmental plans and sanctions create significant time lag in implementation of the plans.

6. RESULTS AND DISCUSSION

This thesis investigated pollution control failure in the Ergene Basin. Within this context, it is crucial to examine participation of stakeholders in pollution control policies, power relations between national and local authorities and plan making processes. Drastic increase of pollution load in the river has changed all features of the soil, agricultural production and the living conditions. Thus, examining enduring pollution in the basin and pollution control efforts provided us an understanding the causes of pollution control failure at political, technical and ecological scale.

A literature survey, a desktop study and interviews with the experts, academics and municipal officers provided a broad information about the history of Ergene pollution and efforts for solving pollution problem. Tekirdağ municipal officers, Edirne SHW officials, engineers who work for wastewater treatment plants of OIZs in Çorlu/Tekirdağ, Trakya Platformu representatives, former Ergene İnişiyatifi and Ergene Platformu activists, academics from Namık Kemal University, Trakya University and Kocaeli University and headmen from Kırklareli were the stakeholders. Semi-structured interviews were made with 16 social actors from the region and 6 academics and activists in Istanbul between November 2016 and September 2017. Within this context, we made visits to Edirne, Kırklareli and Tekirdağ, Çorlu. During the interviews, stakeholders shared their ideas about the development of pollution, its effects on nature and living conditions, pollution control projects, power relationships between authorities and institutions, their involvement in the pollution problem and pollution control efforts and finally their opinions about the solution.

Because of time lag in river protection measures, people live in very polluted environment and they have a heavy task to protect the river. While NGOs, academics, locals have taken an action to restrain increasing pollution processes, national authorities have prepared environmental plans. However, these plans were implemented by adopting top-down environmental governance in the absence of participation mechanisms. That is to say, local dynamics were deprived of authority to make environmental plans due to interventions by national authorities.

The governmental policy was to relocate overcrowded industrial facilities in Istanbul to Thrace. Migration of Istanbul's industry towards Thrace region has led to rapid industrialization. Industrialization

and its effects on the nature has developed in neoliberal context. While the market's interests dominate development and environmental policies, the state ignores environmental concerns. Decentralization of Istanbul's industry was the main motive of industrialization in the region. In spite of upsurge of industrialization in the region, required measures were not taken by national authorities in order to prevent pollution in the river. In that period, "Thrace's fertile lands couldn't be protected" as one of interviewees said. Wastewater discharging without treatment, violation of regulations and the lack of limitations in the regulations in terms of some polluter parameters have caused heavy and unavoidable pollution in the river. As experts from the region stated that "Ergene pollution is just a result". In addition, one of interviewees claimed that "Ergene is the victim of neoliberal policies. Industry doesn't want reduce its interest, wastewater treatment plants are not operated". Thus, the Ergene River became a "dead river", as locals say "The Ergene River is an open sewer rather than a river". Apart from polluting activities, groundwater level has been reducing due to excessive extraction. Academics pointed out that Thrace region has been destroyed by both excessive groundwater extraction and pollution processes. Although pollution control efforts were put into effect, these efforts could not be accomplished or partially implemented. Authorities implemented selected elements of pollution control measures and environmental plans in line with the neoliberal development context.

To sum up, several factors were identified which led to pollution control failure in the basin as follows:

- The impediments to effective pollution control caused by the top-down governance structure: The participation mechanisms are insufficient when pollution control projects are taken into consideration. While the involvement of stakeholders was provided in the beginning, but in time, pollution control projects were implemented with top-down environmental governance. When environmental problems arose, academics, scientist, professional associations, NGOs and locals reacted to the problem by organizing meetings and workshops. However, community participation was hindered by national authorities. When pollution problem became a serious issue, NGOs, universities were involved in pollution control efforts, but in the wake of changes in government agencies and environmental policies, they have been excluded from decision making processes. As scientists' initiatives were hindered, pollution control steps were delayed for years. After the exclusion of local dynamics (locals, academics, NGOs and professional chambers), pollution control programs were prepared under the guidance of the ministries in line with the interests of the industry. Thus, top-down conservation programs have been put

into effect in the absence of downwardly accountability, pluralism and local knowledge. Ribot et al. (2006) state that decentralization of power from central decision-makers to locals improves accountability and effective management of natural resources. However, as diverse perceptions and opinions are ignored, environmental planning processes become controversial. Redistribution of power and resources are retained by the central government, thus top-down management is implemented (Larson and Soto, 2008). Environmental concerns were ignored, thereby environmental plan prepared by Trakya University was cancelled, and local professionals' pollution control efforts were hindered. It can be considered as devolution of authority.

Top-down governance determined the preparation steps of environmental plans in terms of the scale and vision of plans and projects, sustainability vision, conservation policies and pollution control methods. While the first plan which was prepared by Trakya University, focused on the balance between environmental conservation and industrial development, preventing polluting activities, encouraging advanced technological industries and agricultural industry; the other environmental plans aimed at making the region an attractive center for industrialists and decentralization of Istanbul's industry. Thus, highly polluted industries moved to Thrace region in the absence of pollution control measures. After pollution problem has drawn public attention, ministries prepared new environmental plans, yet, pollution could not be halted due to the lack of enforcement mechanisms. Interviews with villagers, NGO representatives, some local officials and professionals work in wastewater treatment plants demonstrated that wastewater discharge without any treatment to the river could not be stopped over the years.

- Shifting the cost of pollution from polluters to the public and to the nature: As a result of factors noted above, pollution burden was paid by the public and by the nature. Industrialists do not operate their wastewater treatment facilities, yet national and local authorities do not take punitive sanctions to industry. Accordingly, people are devoid of living in a healthy environment, the nature suffers from heavy ecological consequences of pollution derived from wastewater discharge, groundwater extraction and new construction projects. Ongoing wastewater discharge to the river cannot be halted in the absence of pollution control measures and enforcement mechanism to ensure them. As the fieldwork of the thesis demonstrates that people who live in the region try to defend their environment, while local or government agencies, industrialists, and professionals highlight development discourse and new pollution control projects such as joint wastewater treatment plants and Deep Sea Discharge. In response to people's reactions against pollution, pollution control measures are taken such as OIZs and Deep Sea

Discharge Projects. However, these projects are not seen as a solution for the basin by academics, villagers and NGOs. Rather, they may cause the public to pay for the pollution burden beyond solving the problem. Academics argue that wastewaters will not be treated properly before discharging to the Marmara Sea, it will be applied only biological treatment which is not adequate to treat highly polluted wastewater. Accordingly, the cost of pollution shifts from industry to public and to the nature as well by transferring the pollution from the river to the Marmara Sea. This situation is described by locals “Thrace is a boiler room, Marmara is a cesspool”.

In conclusion, as neoliberal development agenda of the state determines environmental policies, current pollution has been inevitably occurring in the basin. The commodification of natural resources and environmental services within neo-liberal context bring about heavy environmental degradation. While industrialization in the basin has required environmental conservation measures, industrial needs have been prioritized and the river and the agricultural lands have been contaminated. In other words, natural resources have been victims of the industrial development. In this sense, the Ergene Basin, with fertile agricultural lands and potable water resources, has been experiencing environmental destructive/industrial activities from past to present. In our context, neoliberal environmental governance, neglected environmental policies in favor of market-based policies led to pollution control failure in the basin. In addition, relationship between authorities and devolution of authority from locals to national authorities in pollution control efforts, caused this failure. The findings of interviews and a desktop study show how neo-liberal development process and neoliberal environmental governance lead to loosening of regulations and the structure of institutions in favor of industry and how pollution costs shift to the public and to the nature.

7. CONCLUSION

This thesis analyzed the Ergene Basin related to pollution control failure and focused on the root causes of enduring pollution. After defining the region, industrialization was discussed in a way to understand pollution processes. Development of industry in the region and its outcomes were investigated associated with relevant data through a desktop study. As industrial areas generate the pollution hotspots, it was easy to observe pollution processes and insufficient pollution control efforts in these areas. To this end, focusing on industrial areas was essential to provide an understanding of polluting activities, the excessive use of groundwater and great transformation in the region in terms of ecology, demography, and the means of living. While industrial development has taken place in line with the neoliberal context, the state provided incentives to industry. Industrial facilities take many advantages, on the other hand, the state mostly ignores illegal wastewater discharge to the river and excessive groundwater extraction. This cooperation between the state and industry also led to shift the cost of pollution from polluters to the public and to the nature. The Deep Sea Discharge project can be considered in this context. In this sense, industrialization and its effects in the basin is investigated in the fourth chapter.

After the discussion about the pollution processes, environmental governance implemented in the basin and participation mechanisms are discussed. In this sense, regulations, institutions and their interplay are investigated associated with diverse positions of stakeholders' in pollution control policies. Interviews with experts, academics, NGOs representatives, locals and a desktop study demonstrated that the reluctance of the state in adopting pollution control policies led to this failure. Data collection was very essential in this study to investigate water quality, pollution loads and pollution processes. However, it was difficult to obtain accurate data. Nevertheless, reports, news, environmental plans provided a broad information about the situation in the region. In addition, the literature review promoted the study to point out top-down environmental governance which leads to devolution of authority. In this sense, power politics, motivation of planning processes and implementation phase, relationships between national and local authorities are examined in this study.

The thesis aimed at asking questions and providing some answers with regard to pollution control failure. By analyzing reports, environmental plans and history of the industrialization in the basin, we

examined a set of questions as follows: What are the pollution control efforts implemented by local professionals and national authorities? What is the role of the type of environmental governance in occurring pollution problem? How did the power relationships between authorities and institutions affect pollution control failure? Political ecology perspective provided us to understand possible answers and local dynamics of this problem. Since political ecology demonstrates that environmental degradation stems from not only ecological but also complex social, economic and political processes (Robbins, 2003; Walker, 2005), the thesis relies on political ecology framework which provides us a more elaborative analysis of the environmental problems. The Ergene Basin case showed that social and political processes led to heavy pollution and pollution control failure. In other words, conflicts between national and local authorities, devolution of power from locals to central government and development policies in favor of industry caused this failure.

In response to heavy pollution, people, NGOs, local governments, academics took into action so as to offer a solution to the pollution problem. Their main motives were to protect their living nature and to contribute to pollution control policies. Local professional communities (academics, local governments, NGOs, locals) played an important role in planning processes, until they were excluded from decision making processes. In this sense, Trakya University's efforts were hindered and its plan was cancelled by ministries. Meanwhile, new environmental plans were prepared by adopting top-down environmental governance. Although pollution control projects have put into effect by the state after arising reactions against the Ergene River pollution, yet these plans either have not been effectively implemented or some elements of environmental plans have been carried out on the basis of neoliberal development context. Environmental plans have prioritized industry's needs, environmental concerns have been ignored for the sake of economic development agenda. Wastewater treatment facilities have not been operated, pollution control measures have not been entered into force. In the fifth and the sixth chapters, pollution control programs and the causes of pollution control failure with regard to environmental governance are discussed.

In conclusion, industrial policies were implemented at the cost of environmental degradation regarding the tension between the needs of industrial development and environmental protection. This tension determined environmental policies in Turkey during the modernization period. After the emergence of neoliberal era, in line with the domination of the market and the reduction of the state's control over public services, natural resources have been considered as entities which can be

commoditized and contaminated. Turkey has been experiencing this period as aggressive development processes as of 1980 which led to environmental problems. Thus, environmental policies along with institutions, regulations, implementation steps, participatory mechanisms, the reactions and positions of stakeholders are discussed in this study within the context of the Ergene Basin pollution.

Recent years have seen environmental destructive activities such as HPPs, TPPs, wind power plants, and mining activities other than wastewater discharging in natural protected areas. Although there are number of studies on pollution processes, this study aims to contribute to the literature by discussing pollution processes at technical, social and political aspects and pollution control efforts in relation to environmental governance. This thesis may open up a space for new questions and may lead to further studies so as to investigate similar examples. Moreover, standards and regulations on water and soil quality could be studied in line with environmental policies. This study did not focus on movements and reactions to environmental destructive activities. Environmental social movements in the region may be studied with regard to the currents of environmentalism. On the other hand, institutions and relationship between organizations could be examined in order to discuss environmental protection policies. In that sense, law, bylaws, and policy making processes should be analyzed. Lastly, other pollution control failure examples may be discussed together so as to reveal similarities and differences and to take lessons.

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**APPENDIX A: SURFACE WATER QUALITY MANAGEMENT
REGULATION, QUALITY CRITERIA OF SURFACE WATER RESOURCES
CLASSIFICATION**

Water Quality Parameters	Water Quality Classification			
	I	II	III	IV
<i>Basic parameters</i>				
Temperature (°C)	≤ 25	≤ 25	≤ 30	> 30
pH	6,5-8,5	6,5-8,5	6,0-9,0	not 6,0-9,0
Conductivity (µS/cm)	< 400	400-1000	1001-3000	> 3000
Color	CN 436 nm: 1.5 CN 525 nm: 1.2 CN 620 nm: 0.8	CN 436 nm: 3 CN 525 nm: 2.4 CN 620 nm: 1.7	CN 436 nm: 4.3 CN 525 nm: 3.7 CN 620 nm: 2.5	CN 436 nm: 5 CN 525 nm: 4.2 CN 620 nm: 2.8
<i>A) Oxygenation Parameters</i>				
Dissolved Oxygen (mg O ₂ /L) ^a	> 8	6-8	3-6	< 3
Oxygen Saturation (%) ^a	90	70-90	40-70	< 40
Chemical Oxygen Demand (mg/L)	< 25	25-50	50-70	> 70
Biochemical Oxygen Demand (mg/L)	< 4	4-8	8-20	> 20
<i>B) Nutrient Parameters</i>				
Ammonium Nitrogen (mg NH ₄ ⁺ -N/L)	< 0,2 ^b	0,2-1 ^b	1-2 ^b	> 2
Nitrite Nitrogen (mg NO ₂ ⁻ -N/L)	< 0,002	0,002-0,01	0,01-0,05	> 0,05
Nitrate Nitrogen (mg NO ₃ ⁻ -N/L)	< 5	5-10	10-20	> 20
Total Kjeldahl Nitrogen (mg/L)	0.5	1.5	5	> 5
Total phosphorus (mg P/L)	< 0,03	0,03-0,16	0,16-0,65	> 0,65
<i>C) Trace Element (Metals)</i>				
Mercury (µg Hg/L)	< 0,1	0,1-0,5	0,5-2	> 2
Cadmium (µg Cd/L)	≤ 2	2-5	5-7	> 7
Lead (µg Pb/L)	≤ 10	10-20	20-50	> 50
Copper (µg Cu/L)	≤ 20	20-50	50-200	> 200
Nickel (µg Ni/L)	≤ 20	20-50	50-200	> 200
Zinc (µg Zn/L)	≤ 200	200-500	500-2000	> 2000
<i>D) Bacteriological Parameters</i>				

Fecal coliform (MPN/100 mL)	≤10	10-200	200-2000	> 2000
Total coliform (MPN/100 mL)	≤100	100-20000	20000-100000	> 100000
Hazardous Substances	Hazardous substances will be assessed after January 2015.			

- (a) It is sufficient that if one parameter is provided either concentration or saturation.
- (b) Free Ammonia Nitrogen concentration should not exceed 0.02 mg NH₃-N/L