FROM RIVERSCAPE TO ENERGYSCAPE: CONSTRUCTING THE SPACE OF HYDROELECTRICITY PRODUCTION IN THE İKİZDERE RIVER VALLEY, TURKEY

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DEDICATION

To my grandmothers Ayşe Hanım, Kadriye Hanım, Aysel Hanım, and my primary school teacher Fehime Öğretmen with love and gratitude.

ACKNOWLEDGEMENTS

The path that I have taken to complete this dissertation has been amazing and challenging. Meeting the program requirements, finding my own path, establishing a theoretical and conceptual foundation, framing my research proposal, engaging in fieldwork, and producing the dissertation have taken longer than I initially expected. In my journey, I have been helped by a series of fortunate events and guided by many who supported me in different ways.

I decided to pursue a PhD degree in environmental sciences after a business career as an industrial engineer. I envisioned this study as a chance for a second spring that would allow me to be a student again, refresh me intellectually, and open a new road for an academic career in my area of interest. In 2010 I had attended an ethno botany workshop in Kars given by Gary Martin, who was planning to organize a summer school in 2011 and suggested that I apply, and I did. I began my PhD program in the spring of 2011. In the summer of 2011, I attended a month-long graduate course in Munich, Germany, organized by the Global Environments Summer Academy (GESA). The summer school was one of the key events that changed the course of my doctorate study. I was exposed to environmental social studies and became fascinated by a new way of thinking about the relations between people and the environment. As a part of the curriculum, Dr. Susannah McCandless introduced us to the field of Political Ecology and provided us with a rich collection of articles written by scholars in that field. Since that time, Dr. McCandless has been my mentor, generously supporting my research in numerous ways. I am grateful to her not only for her timely advice but also for her friendship, which kept up my spirits in difficult times.

I began following an environmental struggle that centered around the hydroelectricity boom in Turkey, and was surprised to find that the available literature was limited to offering technical solutions rather than critically examining the issues; moreover, none of the literature included fieldwork. From my industrial engineering background and work experience as

system analyst, I knew how important it was to understand the processes and actors involved in any situation. Therefore, I decided to carry out fieldwork in a rural area that had been impacted by hydroelectricity development. I then encountered my first hurdle: finding an academic advisor who could guide me in my study. I am thankful to Associate Professor Dr. Raşit Bilgin, who accepted me as his advisee and patiently read my earliest vague, unstructured proposals. Since his research funds were not sufficient to help me, however, I continued my study with Assistant Professor Dr. Başak Güven while at the same time desperately looking for a co-advisor in political ecology or in social sciences who could guide my research.

A miracle arrived in the form of a Fox International Fellowship, a student exchange program between Boğaziçi University and Yale University. The Fox Fellowship opened a new chapter in my doctoral study and empowered me to take a huge step forward in my research. The Fellowship generously supported my studies in Yale University during an academic year and financed my attendance at three conferences. I thank the Fox family for establishing this generous exchange program, and extend my thanks Professor Dr. Julia Adams, Professor Dr. Ben Cashore and Julia Muravnik for taking good care of the Fox Fellows both intellectually and personally.

Yale University and in particular the School of Forestry and Environmental Studies offered an impressive list of courses. When I reviewed their content and syllabi, I felt like the proverbial kid in a candy store. I was able to attend courses that supported me in establishing a theoretical foundation in political ecology, exposed me to extensive literature on human-nature relations, taught me research methods and improved my skills in making maps. The courses greatly influenced my critical thinking in the analysis of environmental problems.

In my year at Yale, another miracle occurred when Professor Dr. Michael R. Dove adopted me as his advisee and became my academic mentor and co-advisor. He helped clarify and nurture my ideas, suggested enriching readings, stimulated my thinking by suggesting key points (without imposing his own views on me), strengthened my arguments, and helped me

organize my ideas, empirical data, and writing trajectory. Professor Dr. Dove has been an inspiration to me as an academic and as an advisor. I feel fortunate to be advised by him.

Professor Dr. Dove runs a unique class for his doctoral students, the Dove Doctoral Lab. Various members of the Dove Lab provided friendly and constructive suggestions and suggested additional readings. In particular, I want to thank Luisa Cortesi, Chris Hebdon, Amy Leigh Johnson, Deepti Chatti, Alder Keleman, Lauren Baker, and Francis Ludlow for their contributions.

At Yale, I benefited extensively from courses on research methodologies. Professor Dr. Amity Dolittle gave me helpful advice in reformulating my research questions, developing a research methodology and revising my research proposal in her class "Qualitative Research Methods."

In addition, I had a chance to present my proposal to Professor Dr. James C. Scott. He suggested additional readings that I found very useful in constructing a perspective on engineered rivers.

Just before the start of my fieldwork, my advisor at my home institution resigned from her advisory role, and I was without an advisor and research fund. Another miracle occurred when Professor Dr. Orhan Yenigün became my advisor. He has been a strong supportive person throughout the fieldwork and afterwards, and provided me help in navigating the many administrative and practical complexities of doing a doctorate.

My other thesis follow-up committee members Professor Dr. Yaman Barlas and Professor Dr. Nadim Copty contributed from their special expertise and knowledge. I thank both of them.

The field study required intensive labor that was also a source of joy. When I arrived the town of İkizdere with a notebook, a pen, a recording machine and a laptop, I knew almost nothing about doing environmental research in a rural area. I was fortunate that I had help from numerous people. Through interviews and daily interactions, the local people shared their memories, experiences and concerns. I want to thank to them all for the insights I gained as a result of their participation. I tried to express my gratitude by running a "The Language of Ecology Seminar" for seventh graders in the İkizdere middle school in 2015 spring semester.

I also want to thank to the academics, lawyers, state employees, people from hydroelectric sector, and employees of nature protection NGOs in Rize, Trabzon, Artvin, Ankara and Istanbul, for their time and contributions.

I would also like to thank my research assistants and survey team. Two doctorate students, Gizem Bacaksızlar and Dolunay Uğur, assisted me in focus group studies. Ali Tokgönül helped me transcribe interviews. Nevzat Özer found a great group of seven students from Rize who helped me do surveys at a very difficult time, as did my friend Ekin Kurtiç, who was doing research in the region. Çağlar Akay entered the survey data on paper into Excel and made it ready for analysis.

My dissertation fieldwork was funded generously from October 2014 to October 2015 by a year long the Boğaziçi University Research Fund Grant, Number 9001/2014. Additional support was provided by the Doctoral Dissertation Abroad Research Grant from the TÜBİTAK 2214/A Program. The TÜBİTAK grant allowed me to go back to Yale University and stay from December 2015 to June 2016 to begin writing my thesis. I spent long hours in the Sterling Memorial Library, the Law Library, the Center for Science and Social Science Information, the Bass Library and the Divinity Library. I feel privileged to have had access to some of the best resources a graduate student could ever find.

This dissertation could not have been written without the resources of Boğaziçi University and Yale University. I am indebted to the librarians at both institutions. I also want to thank Bülent Turgut for acquiring segments of maps from the General Command of Mapping. I prepared all the maps in this dissertation at Yale University, and I am grateful to several people, particularly GIS consultants Henry Glick, Sabrina Szeto and Jill Kelly, and

GIS Librarian Miriam Olivares for helping me to bring the pieces together to form a map of the İkizdere Valley, to determine the boundary of the İkizdere River Basin, and to digitize the İkizdere River System and the settlements.

I also want to thank to İstanbul Technical University Hydraulics Department for allowing me to use stream flow annals of DSİ and EİEİ, and to Professor Dr. İlhan Avcı for giving me an insightful historical overview of the hydroelectricity development and lending me past technical studies on the İkizdere River. I extend my thanks to Professor Dr. Necati Ağıralioğlu for explaining the synthetic flow calculation and to Associate Professor Dr. Cengiz Yıldırım for accepting me in his Geographic Information System (GIS) class.

Many other friends have helped in a variety of ways. Gül-Malik Bakır and their daughter Irmak, and Annette Hohenberg opened their homes to me when I was in Ankara for interviews. Gizem Karaman hosted my two assistants at her home in İkizdere. Ethan Mitchell set up a system for the random selection of survey participants. Hakan S. Alioğlu drew a run-of-the river scheme for my dissertation.

Finally, I am grateful to my family, especially my daughter Elif. I felt their support at every stage of my study, and I know that Elif and my family will be delighted to see this project end on a happy note.

A final word from my research site. After I left the İkizdere Valley in November 2015, I learned that the İkizdere HES had been demolished in order to be replaced with a new one with increased capacity. The İkizdere HES had been built after World War II in an era of tight budgeting, without computers or electronic circuits. The workers were proud of the craftsmanship in its electrical set up, which were made of copper. This simple, elegant and efficient technical system worked to produce electricity non-stop for almost 60 years and could have continued to work longer. It is pity that it was destroyed, as it was a success of the state that could have remained as a living museum of hydroelectricity production.

For this dissertation, I created an *ecological niche* for my research with the help of my advisors, mentors, committee members, research participants, supporters, and friends. I have not been able to name everyone I am indebted to. The ultimate responsibility for the views presented in this thesis is my own. I hope that my research will contribute to debates on hydroelectricity development and to the fate of the rivers and the local communities who live alongside them.

FROM RIVERSCAPE TO ENERGYSCAPE: CONSTRUCTING THE SPACE OF HYDROELECTRICITY PRODUCTION IN THE İKİZDERE RIVER VALLEY, TURKEY

This dissertation examines the processes, relations, and practices by which all the involved parties construct, sustain and contest the space of hydroelectricity production in the İkizdere River Valley, Turkey. Beginning with the first hydroelectricity plant built in 1950s, the *İkizdere HES*, the study traces historical small-scale hydroelectricity development in the valley, and then focuses on "the sustainable development" of hydroelectricity program launched in 2003. The thesis explores how the program came about on the national scale and materialized on the İkizdere River Valley with the emergence of five private hydroelectricity plants. It also seeks to explain how the emerging hydroelectricity plants have contributed to the deterioration of the once-positive local perception toward hydroelectricity production. Moreover, this thesis focuses on the water-electricity nexus in order to better understand the hydroelectricity development and to demonstrate the real scale of its environmental and social consequences in the valley. The thesis follows an interdisciplinary methodology, integrating multi-sited fieldwork with a mixed-method design. It employs Lefebvre's the theory of space together with the concepts of relations of production and infrastructure in analyzing the processes and relations. In addition, the thesis uses a post-structuralist approach in examining the policies, regulations, and practices constituting hydroelectricity development program.

NEHİR ALANINDAN ENERJİ ALANINA: İKİZDERE VADİSİ'NDE HİDROELEKTRİK ÜRETİM MEKANININ SOSYAL İNŞASI

Bu tez, ilgili tüm tarafların süreçler, ilişkiler ve uygulamalar vasıtasıyla İkizdere Vadisi'nde hidroelektrik üretim mekanını inşa etmesini, devam etmesini sağlamasını ve buna karşı koymasını incelemektedir. Bu çalışma, vadideki küçük-boyutlu hidroelektrik üretiminin gelişimini 1950'li yıllarda kurulan ilk hidroelektrik santral İkizdere HES'den başlayarak izlemekte ve 2003 yılında başlatılan "sürdürülebilir hidroelektrik" üretim programına odaklanmaktadır. Tez, programın ulusal düzeyde nasıl ortaya çıktığını ve özel firmalara ait hidroelektrik santrallerinin gelişi ile İkizdere Vadisi'nde nasıl gerçekleştiğini araştırmıştır. Aynı zamanda, halkın hidroelektrik üretimine karşı bir zamanlar olumlu olan bakışının bozulmasına yeni hidroelektrik santrallerin nasıl iştirak ettiklerini açıklamaya çalışmıştır. Ayrıca bu çalışma, hidroelektrik üretiminin gelişimini daha iyi anlamak ve vadideki çevresel ve sosyal sonuçların gerçek boyutlarını göstermek için su-elektrik bağına odaklanmıştır. Tez, çoklu-alan çalışmasını karma yöntem tasarımı ile entegre eden disiplinlerarası bir araştırma yöntemi uygulamıştır. Lefebvre'nin mekanın üretimi teorisini üretim ilişkileri ve altyapı kavramlarıyla birlikte süreçlerin ve ilişkilerin analizinde kullanmıştır. Ayrıca sürdürülebilir hidroelektrik üretim programını inşa eden politikaların, yasal altyapının, düzenlemelerin ve uygulamaların incelenmesinde postyapısalcı yaklaşımdan yararlanmıştır.

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LIST OF SYMBOLS/ABBREVIATIONS

Acronym	**Explanation**
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
DSİ	General Directorate of Water Works
EİEİ	General Directorate of Electrical Power Sources Survey and Development Administration
EPDK	Energy Market Regulatory Authority
EPİAŞ	Energy Markets Operation Co.
EPLY	The Electricity Market Licensing Bylaw
EÜAŞ	Electricity Generation Co.
HGK	General Command of Mapping
ROR	The Run-of-The River Hydroelectricity Plant
SKHA Bylaw	The Water Use-Right Agreement Bylaw
TEAŞ	Turkish Electricity Generation Transmission Co.
TEDAŞ	Turkish Electricity Distribution Co.
TEİAŞ	Turkish Electricity Transmission Co.
TEK	Turkish Electricity Authority
TETAŞ	Turkish Electricity Contracting and Trading Co.
TMMOB	Union of Chambers of Turkish Engineers and Architects
TOOR	Transfer-Of-Operating-Rights
YEKDEM	The Renewable Energies Support Mechanism

1. INTRODUCTION

1.1. From Riverscape To Energyscape: A Study of the "Sustainable Development" of Hydroelectricity Program

Historically, two general views of rivers have dominated the literature: the river as an integral part of the land, and the river as a body of flowing water. The latter view reduces the river to a source of energy from which power can be derived, and overlooks its relation to its environment and the people who live along its banks. Richard White, in his book, *The Organic Machine* adopts this view. He uses the metaphor of a river as a machine, a system with many parts working simultaneously as a whole, to describe a river's power, and says "like us, rivers work" (1994: 3). This view characterizes rivers as sites in the geography of energy, and the potential energy of flowing water as a resource to harness and put to work in order to produce electricity. This characterization reflects the dominant approach of states to water in the twentieth century and marks the beginning of the dam-oriented hydroelectricity development era that emerged after World War II. In the USA, the USSR, India, China, Africa and Turkey, under the paternalism of political figures like Franklin Roosevelt, Lenin, Nehru, Deng Xiaoping, and Demirel, massive dams were constructed (Van Slyke, 1988; McNeill, 2000; Öktem, 2005).

Süleyman Demirel was given the nickname "King of the Dams" for his dedication to the large dam policy in Turkey (Kolars and Mitchell, 1991: 25). Deeply impressed by the Tennessee Valley Project and the Boulder Dam in USA (Turgut, 2000), he presented the early plans of the *Güneydoğu Anadolu Projesi*[1] (*GAP*) in the 1960s (Öktem, 2005). The GAP project consisted of large-scale dam construction and irrigation schemes in the Euphrates and Tigris River Basins in the Southeast of Turkey. Turgut Özal was other key politician supporting hydro-developmentalism and the GAP project (Öktem, 2005). Under the political

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[1] The Southeastern Anatolia Project.

support of Demirel and Özal, the GAP project progressed, including twenty-two dams and nineteen hydroelectricity plants, each with more than 1,000 MW installed capacity[2,3]. The Keban Dam was the first large dam of the GAP project, which was completed in 1974. The Karakaya Dam was put in operation in 1987 and the Atatürk Dam in 1990.

This hydro-developmentalism was accompanied by a notion that unexploited river flow is "running waste to sea," the idea being that ideally, "not a drop would go to waste to the sea." This developmental view of the river as an electricity resource is anthropocentric and highly political (McNeill, 2000). It is also incomplete, for two reasons. First, the river is an intersection of biological, physiochemical and geological worlds, "a living biological entity with a kind of 'metabolism'" (Cioc, 2002: 6). Both river and its basin give life to the hydrological system that transport water and sediment downstream from the mountainous upper section of the basin along its channel network to the sea. The river regime and sediment transport are critical factors for the diversity of aquatic habitat (Allan, 1995; Kondolf, 1997; Poff et al., 1997; Wohl, 2000; Rosenberg et al., 2000) and for riparian zones (Naiman and Decamps, 1997). The river continuously shapes its morphology and consequently regulates the lateral water exchange with the floodplain and the vertical water exchange with the aquifer.

The second reason this developmental view of the river is incomplete is that it ignores the human factor. Humans live on rivers. Any river is the site of social, cultural and economic activities, and the history of any river is intertwined with the history of human culture and manipulation.

Big dam projects have historically overlooked important environmental and the human elements. They were developed with "tunnel vision," which focused on the domination of nature in order to harness water. As Scott points out, they are cases of "state simplifications" that were premised on improving the human condition but which ultimately failed (1998). In

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[2] Installed capacity is a technical term used to define the maximum output of electricity that a hydroelectricity plant is designed to produce. The glossary of technical terms is given in Appendix A.

[3] http://www.gap.gov.tr/en/.

fact, the dam projects have negatively impacted local communities, who were not consulted during the planning and implementation stages, and who were later displaced and resettled. While early studies on displacement and resettlement of local populations dates back to the late 1950s (Colson, 1971; Scudder, 1973), earlier studies were rare. It was only when the effects of projects became visible and dam conflicts erupted in the 1980s and 1990s that the research on the environmental and social impacts of the dams grew. These research findings have raised questions as to whether the big dam projects can ever be environmentally sustainable (Goodland et al., 1993) and can be classified as sustainable development (Fisher, 1995). In particular, the well-known 16-year struggle against the Sardar Sarovar Dam in the Narmada Valley in India challenged the large development projects and the ideology of development, which presented the dams as signs of progress and modernity, and raised critical questions about social justice and ecological sustainability (Baviskar, 2004). The struggle in the Narmada Valley forced the World Bank to step back from financing the dam projects (Whitehead, 2008).

The change in the World Bank policy impacted the GAP project and delayed the Ilısu Dam because of lack of international funding (Kadirbeyoğlu, 2005). A new wave of dam projects was initiated by *Adalet ve Kalkınma Partisi* (*AKP*)[4] under "sustainable development" and "renewable energy" programs, when they came to power in 2002. The Ilısu Dam Project was re-launched and the Çoruh River Basin Project, consisting of twenty-seven dams and run-of-the river hydroelectricity plants, was initiated[5].

The shift in the project financing strategy of the World Bank promoted alternative hydroelectricity development schemes such as small-scale hydroelectricity development. Small-scale hydroelectricity schemes are considered cost-effective and environmentally benign solutions particularly suitable for rural electrification (Paish, 2002). Run-of-the river technology has been applied most commonly with the premise that this technology does not

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[4] The Justice and Development Party.

[5] Sezai Sucu and Talha Dinç made a presentation titled "Çoruh Havzası Projeleri" at the Second Congress on Water Policies organized by TMMOB on March.20-22.2008, Ankara. The presentation was downloaded from http://www.imo.org.tr/resimler/ekutuphane/pdf/10912.pdf on May 30th, 2016.

have the same adverse effects on the environment as dams have, and does not require any displacement and resettlement of people. The short construction times, simple engineering and technology requirements, low maintenance costs, and "free production input" that is accepted as a renewable energy source are the main characteristics of the run-of-the river technology.

The small-scale hydroelectricity schemes and the run-of-the river technology have been around since the early 1900s. They were developed for electrification of rural areas and for providing affordable electricity to the rural poor (Inversin, 1985). China has the biggest total installed capacity in small-scale hydroelectricity production (Zhou et al., 2009). The first run-of-the river hydroelectricity facility in Turkey, the Visera hydroelectricity plant, was constructed in the Eastern Black Sea Region and put into operation in 1924.

The adoption of the United Nations Framework Convention on Climate Change (*UNFCCC*) in 1992 and the implementation of the Kyoto Protocol with clean development mechanisms (*CDM*) have triggered a rapid growth in the renewable energy sector and placed the small-scale hydroelectricity development on the agenda of international and national development programs. The run-of-the river hydroelectricity schemes have been constructed in many geographies, including the North America (Douglas, 2007), the Mekong River Basin (Bakker, 1999) and the Himalayas[6]. Turkey has been no exception in this global "renewable energy," "small-scale hydroelectricity" trend since early 2000s.

In 2003, the Turkish state launched a massive hydroelectricity development program that promoted small-scale hydroelectricity plants as renewable energy producers. The premises were that the run-of-the river technology has low environmental impact because of its low installed capacity, and to the fact that it diverts water, uses it to generate electricity, and then releases it back to the river without holding it, and therefore has no effect on the downstream users. Moreover, the underground hydroelectricity projects are promoted as products of technology that result in less damage to the forests and landscape.

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[6] See the article "Run-of-River Hydro: Green Energy or Greenwash?" at https://www.internationalrivers.org/blogs/352-6. It was downloaded on May 5th, 2016.

The aim of the program is to dam almost all rivers by 2023 (Şekercioğlu et al., 2011; Gibbons and Moore, 2011; TMMOB, 2011[7]). The state has opened the river basins to hydroelectricity production, and allowed the private sector to develop their projects at any location along the rivers in order to generate electricity for forty-nine years. The hydroelectricity projects earlier developed by the state institutions were put up for sale. The state approved cascading projects in the river, side by side, completely and continuously interrupting natural hydrological flow (Şekercioğlu et al., 2011; Işlar 2012; Erensu, 2013). Furthermore, the state made a series of legislative changes to attract private investment to the hydroelectricity sector. This shift in national hydroelectricity policy has been driven by "the liberalization and deregulation of the energy sector" (Baskan, 2011: 83) and is referred to as the "Privatization of Turkey's rivers" (Harris and Islar, 2013: 55).

In the period between 2003 and 2008, the state reviewed 953 license applications[8] for hydroelectricity production and issued 312 licenses[9]. At the end of 2011, the number of issued licenses had reached 710, and 774 applications were being reviewed[10]. Some licenses included multi projects, and the number of the approved projects was 1227 by August 2013[11]. The state gave the right to use stream flow at various points on the rivers to 924 private companies from the launch of the program in 2003 until 2012[12]. The official map with the locations of licensed and in-operation hydroelectricity plants demonstrates the spatial extent, scale, and intensity of the program (Figure 1.1).

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[7] TMMOB stands for Union of Chambers of Turkish Engineers and Architects (Türk Mühendis ve Mimar Odaları Birliği in Turkish).

[8] The actual number of application that the institutions have reviewed is much higher. Because the state, first, opens the sections of the rivers to bidding process. The firms apply to bidding and go through pre-review process in which the state institutions check whether application files of the firms are complete. The firm, which wins the bidding, becomes eligible for the review stage.

[9] The Ministry of Energy and Natural Resources replied to the parliamentary question on March 10th, 2008.

[10] The Ministry of Forestry and Water Affairs replied to the parliamentary question on January 12th, 2012.

[11] DSİ Annual, 2014.

[12] The Ministry of Forestry and Water Affairs replied to the parliamentary question on July 19th, 2012.

The Eastern Black Sea Region is part of the country most affected by the program[13]. The pressure of hydroelectricity development program was intensified in the river basins such as İkizdere, Solaklı, Fındıklı, Fırtına and Güneysu. The state has approved multiple projects in these medium size rivers since 2003. For instance, the number of licensed projects has been twenty-four in the İkizdere River Basin and twelve in the Güneysu River Basin.

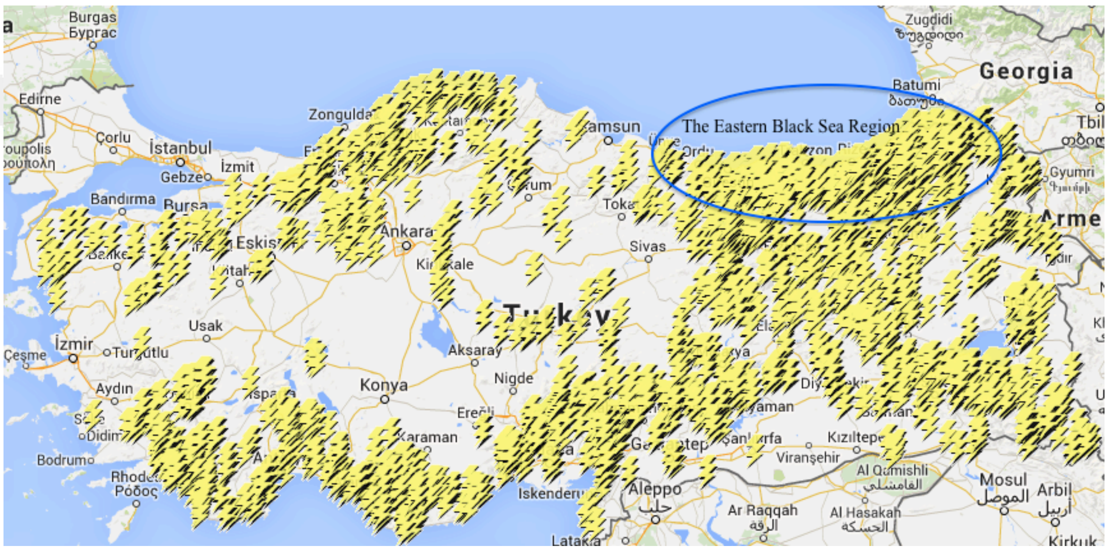

Figure 1.1. The locations of licensed and in-operation hydroelectricity plants, and the location of the Eastern Black Sea Region in Turkey. Source: The Turkish Ministry of Forestry and Water Affairs[14].

The impact of extensive and rapid hydroelectricity development program on the livelihoods of the local people and the environment has been immense (Nature Conservation Center, 2009, 2011; TMMOB, 2011; Hamsici, 2012; Erensu, 2013; WWF-Turkey, 2014). In many cases, locals only became aware of the hydroelectricity projects near their settlements when construction machines suddenly arrived in their communities (Hamsici, 2012). The local

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[13] As of 2009, there are 138 hydroelectricity projects under construction in Turkey, and 23 projects are in the province of Rize, 41 constructions are in the province of Trabzon both are in the Eastern Black Sea Region. In the province of Artvin there are 104 planned projects. These numbers were given in the press release of *Derelerin Kardeşliği*, a regional grass-root opposition coalition against the hydroelectricity development program in the Eastern Black Sea Region. The press release was accessed on May 4th, 2014 at http://derelerinkardesligi.org/web/index.php?option=com_contentandtask=viewandid=20andItemid=9.

[14] The map, accessed in November 2014 at http://geodata.ormansu.gov.tr/index.html?lang=en, the official internet site of the Ministry of Forestry and Water Affairs, shows hydroelectricity plants in all sizes.

people witnessed the hydroelectricity companies cutting trees, excavating soil, channelizing the riverbeds with concrete, opening new roads, pouring debris in the riverbeds and polluting the river, and they also observed and experienced their consequences, including landslides, drying rivers, and fish deaths (Nature Conservation Center, 2009, 2011). The cascading hydroelectricity plants diverted the rivers to generate electricity while leaving water in the riverbeds in such a small quantity that locals in the Black Sea Region complained, "Rivers are dried out" and "Rivers no longer flow in the riverbed; instead they flow in the channels." In many hydroelectricity plants, the hydroelectricity companies diverted most of the flow; as a result, conflicts over the amount of water the companies are required to release have grown and intensified[15].

The exploitation of the rivers and the valleys in the region has sparked strong concerns among local people. It has led them to mobilize both collective and individual responses to the hydroelectricity projects. To challenge the rhetoric of the state officials, that "Rivers flow for nothing," a phrase which situates the rivers as idle objects that need to be harnessed for hydroelectricity production, locals developed the statements "Rivers will flow freely" and "Rivers are not for sale," emphasizing an anti-privatization and anti-commercialization aspect of the rivers. The villagers in the river valleys of the Eastern Black Sea Region, such as the İkizdere Valley, the Fırtına Valley, the Fındıklı Valley, and the Solaklı Valley targeted for hydroelectricity production by the private companies, spontaneously organized village collectives to stop the projects. The local opposition raised and spread against "sustainable development" of the hydroelectricity program. The locals formed village collectives in various places throughout Turkey including the the İkizdere Valley, and the Fındıklı Valley in Rize, the Solaklı Valley in Trabzon, Loç Valley in Kastamonu, the Munzur Valley in Tunceli, the Alakır Valley in Antalya and the Yuvarlakçay River in Muğla. These village collectives later constituted "a coalition of village-based solidarity groups and urban-based environmental activism networks" (Erensu, 2011: 8) to address the emergent issues, and to voice their

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[15] Please see, "Cevizlik'teki HES Dereyi Kuruttu; Yatırımlar da Yanlış" at http://bianet.org/biamag/toplum/123192-cevizlik-teki-hes-dereyi-kuruttu-yatirimlar-da-yanlis, downloaded on 14.March.2014; "HES, Salarha Deresi'ni kuruttu" at http://t24.com.tr/haber/hes-salarha-deresini-kuruttu,235882, downloaded on 23.April.2014; "Rize'de HES'ler dereleri kuruttu" at https://www.haber61.net/gundem/rizede-hesler-dereleri-kuruttu-h266444.html, downloaded on 27.July.2016.

opposition to hydroelectricity development through press releases, street protests, alternative water forums and acts of civil disobedience that included blocking highway traffic and occupying construction sites of the hydroelectricity plants. The opponents of the emerging projects have acknowledged that "We need energy" but have also argued that "We also need our environment" – a point that resonates with wider urban audiences of environmental protection groups, scientists and citizens. The local people have taken the projects to the courts to question their legitimacy. The opposition groups have contested the laws and bylaws that constitute the "sustainable development" of hydroelectricity program and have appealed to *Danıştay* (*The Council of State*) to overturn them.

This extensive, intense and rapid "sustainable development" of hydroelectricity program and strong resistance to the program highlight the importance of understanding the subtle processes and relations at play in the river valleys, and their broader historical, political and social context.

1.2. The Aim of Research

The aim of this thesis is to show how the space of the "sustainable development" of hydroelectricity program has come about through legislative, institutional, social, political, and economic processes within a historical perspective. Through a case study of a river in Turkey - the İkizdere River - I investigate the local practices of these processes that constitute the space of hydroelectricity development in the İkizdere Valley. By exploring the connections between the past and present, the national and local, national hydroelectricity policies with the on-going program and their local practices, I seek to show a complex and detailed account of the neoliberal discourse of the state in the hydroelectricity production and the various factors that lead to conflicts, problems, and environmental and social issues in the İkizdere Valley.

1.3. The Research Questions

This dissertation was initially designed to investigate hydroelectricity development in the İkizdere Valley. The principle research questions were as follows: how had the "sustainable development" of hydroelectricity program worked in the İkizdere Valley and what have been the processes and outcomes? It was my intention that the program could be better understood if it was placed in the historical context of hydroelectricity development. I wanted to explore the evolution of the hydroelectricity development in the valley under the changing legal, social and political circumstances.

As I slowly unraveled the character of the hydroelectricity program, I encountered a very puzzling situation. In spite of the strong opposition toward the emerging hydroelectricity plants, the local people were very positive about the old İkizdere HES that had operated in the valley for 60 years. This social phenomenon pointed to a point of failure in the hydroelectricity development in the valley and served as a point of reference in my research. In following that, I asked, in what ways were the İkizdere HES different from the emerged private plants and the privatized İkizdere HES?

As I progressed in my fieldwork, I saw the inevitable connection between producing hydroelectricity and transmitting and marketing it, and the parallels between the policies and practices on the local scale. It became necessary to add an understanding of how hydroelectricity and electricity sectors influence each other in a historical context. Therefore, I delved into the water-electricity nexus and added two more questions: how have the hydroelectricity production and electricity sectors become interrelated and what have been the issues emerging not only from producing electricity from the river, but also from the transmission and marketing of the generated electricity in the İkizdere Valley?

1.4. The Selection of the Research Site

The İkizdere Valley is one of the river basins in the Eastern Black Sea Region impacted most by the "sustainable development" of the hydroelectricity program. The local residents in the valley have contested the emerged private hydroelectricity projects through press releases, street protests, acts of civil disobedience such as blocking highway traffic, and organizing scientific congresses. They have filed court cases against state decisions legitimizing the projects.

The İkizdere River Basin – also known as the İkizdere Valley[16] offers a unique opportunity to study the "sustainable development" of hydroelectricity program, because the history of hydroelectricity production in the İkizdere Valley goes back to 1940s. The İkizdere Valley is the site of one of the first run-of-the river type hydroelectricity plants constructed in 1950s by the state. People are still living who worked on the construction of "state entity" the İkizdere Hydroelectricity Plant (*The İkizdere HES*), and were employed by and retired from it. The İkizdere HES was privatized in 2008, as the 24 private hydroelectricity projects emerged; five of them were constructed in 2000s. Hence two periods of the hydroelectricity development of the state -- before neoliberalism and during neoliberalism -- have reflections in the valley, and its residents have rich personal and social experiences and observations associated with the two periods. The local perception of the İkizdere HES has been distilled from local experiences and observations for over 60 years and is generally positive. However, local perception of the hydroelectricity development turned negative when the private projects arrived to the valley. The local people of the İkizdere Valley, in particular the residents of the county of İkizdere, strongly opposed the emerged projects. They carried out street protests, filed petitions, initiated court cases against the state institutions to cancel the Cevizlik HES, the Demirkapı HES, the Selin-2 HES and the Şimşirli HES projects, and organized three scientific meetings in 2007, 2008 and 2009 to discuss the environmental problems emerged with the new wave of hydroelectricity development. The radical change in the local perceptions of hydroelectricity development and the deterioration of its public image provide a unique and valuable opportunity for a comparative inquiry into understanding why the locals' perception of old, state operated HES is positive, whereas their perception of the five new private HES is negative.

Additionally, the İkizdere Valley has two other favorable aspects for empirical research. The first is the availability of long-term stream flow data and hydrological studies of the state institutions. The İkizdere River as one of the three main rivers of the Eastern Black Sea Region has been studied for hydroelectricity development since 1940s, and its stream flow has been measured and monitored since 1953. Second, the İkizdere Valley has been the subject of

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[16] I use the İkizdere River Basin and the İkizdere Valley interchangeably in this dissertation.

various research expeditions, land surveys, and scientific studies since the 17th century.

1.5. Theoretical Framework

1.5.1. The theory of space and production of the new spaces

The concept of *space* is vague and has multiple meanings. It is perceived as an empty field, as a container, as a distance, as emptiness, or as a coordinate system that is "the dead, the fixed, the undialectical, the immobile" (Foucault, 2010: 70). In his masterpiece, *The Production of Space,* Henri Lefebvre studies space in great detail and brings to our attention the idea of a diversity of spaces, including physical, mental, social, natural, ideological and political space. He claims that a productive process constructs these spaces and conceptualizes process of production as another type of space, "social space" (Lefebvre, 1991:73). *Social space* consists of relations of the production and actors involved in these relations. It was Emile Durkheim who used the term social space for the first time, but it is Lefebvre who identified social space as the driver of the production process of physical and mental space and defined a discursive relation among spaces by arguing that all spaces produced for economic and technical reasons are also political and strategic spaces (Lefebvre, 1991: 84). Lefebvre sees social space as a "social product" (1991: 26), and provides the roles of these produced spaces:

> The space thus produced also serves as a tool of thought and of action: that in addition to being a means of production it is also a means of control, and hence of domination, of power; yet that, as such, it escapes in part from those who would make use of it (1991: 26).

Lefebvre provides the niche types of *geographical space*, *dominated space* and *appropriated space* that can be useful in describing the transformative action of social space. Dominated space is a space transformed by technology and practice. Dams and irrigation systems are given as examples of dominated space because the physical infrastructure and technology involved necessary for their operation impose a new form into a geographical space. On the other hand, appropriated space is defined as "the natural space modified in order to serve the needs and possibilities of a group that it has been appropriated by that group" (Lefebvre, 1991: 165). Lefebvre defines *property* as a necessary precondition of appropriated space and offers a square, a street and a structure as examples of appropriated space.

Neil Smith studied *second nature* produced by human activity in relation to space, and critically analyzed the "the space of human activity" as a production of space in his book *Uneven Development* (2008). He criticizes Lefebvre for conceptualizing social space separate from physical space and for not making clear connections between them. He argues that Lefebvre's construct is problematic because it conceptualizes two spaces as separate entities. According to Smith, human practice is tightly connected with and in fact produces geographical space:

> While the emphasis here is on the direct physical production of space, the production of space also implies the production of the meaning, concepts, and consciousness of space, which are inseparably linked to its physical production (Smith, 2008: 107).

Doreen Massey made a unique contribution to the theory of space by conceptualizing space integrally with time (Massey, 1994), and theorizing space as "the product of interrelations" in terms of interactions, as a "multiplicity" and as "always under construction" (Massey, 2005).

In this study, the biophysical transformation of the İkizdere Valley for hydroelectricity production is conceptualized as the production of a space for hydroelectricity production (Lefebvre 1991; Smith 2008). The concept of dominated space is used to conceptualize the geographical space occupied by the physical infrastructure of the six hydroelectricity plants and electricity transmission system in the river valleys. The geographical space impacted by their infrastructure and their operation in the İkizdere Valley is considered as appropriated space.

The dominated and appropriasted spaces of the infrastructures which occupy land and use the river together with the social space producing them are the focus of this thesis. These spaces are abstract. Their structure, how they function, and how they interact with each other are obscure and vague. This research seeks to make these spaces concrete in two ways. First, it aims to explore them individually as "social constructs" by identifying and explaining the processes, structures and actors embedded in these spaces that constituted these spaces and maintained them. Second, the thesis aims to describe relations between these spaces and to examine how they interact with each other.

The analytical framework of Yapa, called "nexus of production relations," can be a useful tool with which to initiate the analysis of spaces and the processes (Yapa, 1993: 255). The *Nexus of Production Relations* framework, which was inspired by Marx`s idea of *relations of production*, places the production process in the middle of a web of academic, cultural, technical, ecological and social relations. These relations work simultaneously and constantly in a mutually dynamic and dialectic way during the production process (Figure 1.2). This study modifies Yapa's framework in order to identify and describe the relations of the production of hydroelectricity development and the drivers that transform the İkizdere Valley into a production site for hydroelectricity companies. In the analysis, the relational and temporal order of the activities has significance in explaining the processes in each space and the interactions between the spaces.

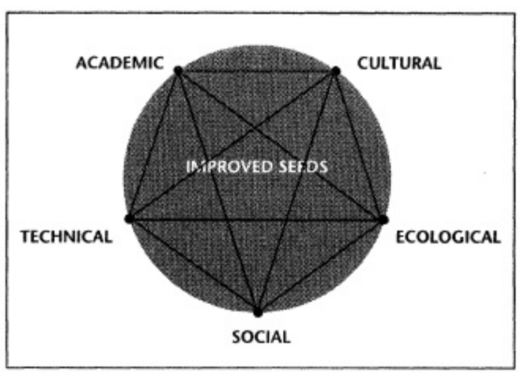

Figure 1.2. The production relations in the production of improved seeds (Yapa, 1993, pp. 256, Figure 1).

The second analytical tool that I utilize is the concept of *infrastructure*. Infrastructure has been conceptualized as a relational concept (Star, 1999; Star and Ruhleder, 1996). Referring to

Appel et al., "material and political lives of infrastructure reveal fragile relations between people, things and the institutions (both public and private) that seek to govern them" (2015), and therefore infrastructure has been a productive location used to analyze the politics of environment (Bijker, 2007; Carse, 2012; Larkin, 2013; Boyer, 2014). Scholars have studied how different values, work done and ethical principles can be embedded (Winner, 1980; Star, 1999; Carse, 2012) even in seemingly similar infrastructure (Bijker, 2007), how infrastructure makes certain material, institutional and social things possible (Appel et al. 2015) by design (Boyer, 2014) and by operation (Edwards, 2006) and how infrastructural spaces can exercise specific forms of power and authority (Harvey, 2012; Winner, 1980).

Referring to Williams et al. hydroelectricity plants are "the most visible manifestation of nexus interactions" (2014: 9), because they have a capacity to enable the electricity. The infrastructure's capacity for enabling something else to happen (Boyer, 2015) provides an analytical lens with which to analyze the relations between the water and the energy. In the thesis, I mobilize the concept of infrastructure to analyze the dominated space of physical infrastructure with a particular focus on the processes and the interrelations involved in their materialization in the İkizdere Valley. Moreover, I use the perspective of infrastructure in the analysis of relations between the hydroelectricity and electricity sectors.

1.5.2. Post-structuralism and social constructivist approach

Post-structuralism is a body of thought developed in 1960s and 1970s primarily by the work of Foucault and has been introduced to study nature-culture relations. Post-structuralism has made new inquiries of research in how knowledge and power are related in certain ways through discursive practices. For Foucault, knowledge is produced and power dominates its production. Once knowledge is produced,

> Knowledge functions as a form of power and disseminates the effects of power (Foucault, 2010: 69).

This way of thinking allows new questions to develop in three areas. First, the notion of social and historical production of knowledge, referred as "epistemological constructivism" (Braun and Wainwright, 2001), focuses on the processes of knowledge production and the politics of knowledge. Furthermore, it orients the analysis to individuals, who have right to produce truths in terms of knowledge (Foucault, 2010).

Second, Foucault conceptualizes power as a more complex thing rather than a simple repressive force exercised over others, saying that,

> Power must be analyzed as something which circulates, or rather as something which only functions in the form of a chain. It is never localized here or there, never in anybody's hands, never appropriate as a commodity or piece of wealth. Power is employed and exercised through a netlike organization (1980: 98).

Additionally, according to Foucault, power is a creative force. It produces things and makes certain things possible. This notion of power enables the analysis of power with its mechanisms and relations in knowledge making.

Third, new notions of knowledge, knowledge making and power direct the attention to a space of regularities, a system that Foucault defines "discourse" as,

> In any society, there are manifold relations of power which permeate, characterize, and constitute the social body, and these relations of power cannot themselves be established, consolidated nor implemented without the production, accumulation, circulation and functioning of a discourse' (1980: 93).

The perspective of discourse, power and knowledge underscores the notion of social constructedness. The study of human-environmental relations from this post-structurist perspective has become one of the objects of environmental studies, and places the focus on the processes, interactions and relations involved in social construction (Braun, 2002). Beginning with Michel Foucault`s pivotal work on the relation between knowledge production and power, a rich literature in environmental studies addresses the relationship between knowledge and power and the way knowledge is used for political and social control (Foucault, 1980; Blaikie, 1985; Ferguson, 1994; Forsyth, 2003; Dove, 2005; Thompson et al., 2007; Matthews, 2011). Proctor contributed to this line of research by emphasizing ignorance as another important dimension of the production of knowledge, and writes "knowledge grows out of ignorance" (Proctor, 2008: 4). Science is used in the production of technical knowledge, and as Aronowitz describes, science can be "integrated into the practices and discourses of production" (1998: 9) and eventually becomes a part of the political discourse by serving the state or those in control of the production process. In the process, science loses its ideological purity and neutrality (Blaikie, 1985; Proctor, 1991; Moses, 2006).

I benefit from this literature in analyzing the social construction of official narratives "scarce energy" and "abundant water," and the knowledge-making processes and practices involved in the hydroelectricity development while addressing the relations between knowledge and power, and the regularities that indicate a state discourse toward neoliberalism. I invoke the Foucault's *archeology of knowledge* approach to examine the paper bureaucracy and involved processes as an apparatus of neoliberal discourse.

1.6. The Contribution of the Thesis

This study makes several important contributions to the existing literature. First, remarkably few critical studies have been published on the "sustainable development" of hydroelectricity program since its launch in Turkey. Therefore, this study adds to the literature on hydroelectricity development - in particular to the small scale, run-of-the river hydroelectricity production - by exploring critical areas of concern. It provides a critique of three major premises; lowering installed capacity of hydroelectricity plant lowers its impact on environment, less environmental damage if facilities are built underground and diverting-using-releasing water without altering the river regime. Second, this study provides a multi-dimensional and multi-level view of hydroelectricity development. Not only does it provide a historical and comparative inquiry into the changes in the perception of the hydroelectricity production, the rules, the principles, the role of state institutions, and the notion of electricity, but it also provides a highly layered analysis of policies, legislative framework and their practices, illustrating how they affect the use of natural resources. Third, this study also contributes to the literature on the study of development narratives, scarce energy and abundant water. Fourth, this study makes a contribution to the literature on neoliberalism. The particular policies, laws, bylaws and processes involved in the commodification of natural resources and the privatization of the hydroelectricity sector are demonstrated and elaborated on. The study offers a detailed account of "knowledge making-power-discourse" and elaborates on procedural type of neoliberalism acting from "bottom-up″ fashion, as revealed in the Cevizlik HES court case. Finally, this study contributes to the literature on state making through hydroelectricity development in Turkey.

1.7. Chapter Structure

This thesis consists of nine chapters including the introduction. Chapter Two provides the methodology of the research and a description of how I engaged in the fieldwork. Chapter Three starts with an overview of the İkizdere Valley with its local residents and provides a comprehensive historical account of hydroelectricity development there. In Chapter Three two periods of hydroelectricity development in the valley are examined: the period before neoliberalisation and the period under neoliberalisation. I compare the products of the two periods: the original İkizdere HES and the emerged five hydroelectricity plants and privatized İkizdere HES. Chapter Four starts with an introduction of two fundamental narratives of the state: scarce energy and abundant water. It then explores how theses narratives were constructed to justify the privatization and commodification in the hydroelectricity sector. I elaborate on the drastic shift in natural resource governance that opened the rivers and protected areas to electricity production. I discuss the various forms of water scarcity experienced in the İkizdere Valley. The focus of Chapter Five is "the space of paper bureaucracy" in the "sustainable development" of hydroelectricity program. The analysis focuses on the legislation framework of the program and how the bureaucratic processes involved in licensing and environmental impact assessment regulations have been defined. Using a post-structuralist approach, the chapter identifies the discontinuities in the processes that occurred by the issuance and modifications made in the laws and bylaws and examine what these changes produced. Chapter Six examines the institutional and juridical knowledge-making practices by tracing the Cevizlik HES court case as a case study. The Cevizlik HES was the first and largest private hydroelectricity plant in the İkizdere Valley. Its emergence and large size with possible impacts on the İkizdere River, on the İkizdere Valley and on the local residents, raised concerns. The local people took the Cevizlik HES project to court contesting its legitimization by the state. The court case lasted six years and ended with a decision on how much water the company was required to release after diverting the river flow for electricity production. A closer look at how the court case progressed and the analysis of the scientific and technical knowledge produced for the Cevizlik HES illuminates the relations between knowledge making, power and discourse. The relations between hydroelectricity production and its transmission and marketing are the focus of Chapter Seven. It explores how a water-energy nexus has been politically constructed in Turkey and directs the focus to how it was manifested in the İkizdere Valley. The emerging risks, hazards, and vulnerabilities driven by the aggregated environmental and social consequences are also addressed in Chapter Seven. Chapter Eight examines the relations of production on three axes: between the state and the private sector, the state and the local people, and the local people and the private sector. It also examines how these axes have been transformed in the İkizdere Valley. Moreover, Chapter Eight explains how the transformation of relations of production drives the transformation of the moral economy of the İkizdere Valley that leads to social exploitation and inequalities on the local scale. Chapter Nine summarizes the findings, comments on the significance of this research, and highlights future directions for research.

2. THE METHODOLOGY AND THE FIELDWORK

2.1. Introduction

This chapter outlines the methodological approach to the study of the hydroelectricity development in the İkizdere Valley and the fieldwork done. The scope and conceptual framework[17] of this dissertation presents a methodological challenge for the researcher. My research into the hydroelectricity development in the Ikizdere Valley necessitated the consideration of several factors. First, to structure an inquiry on hydroelectricity development required consideration of the multiple human and non-human elements of the İkizdere Valley and their visible and invisible interactions. Second, the study of the hydroelectricity development in the valley had not only spatial but also temporal dimension that needed to be considered. Third, the main drivers of the changes associated with the hydroelectricity plants in the İkizdere Valley, whether environmental, social and economic, are external to the valley. In other words, the national hydroelectricity development has shaped the development plans and programs on the institutional level, and they have been made and remade in the capital city, Ankara. The implementation of the programs has been realized, controlled, monitored and facilitated by the regional offices of the involved ministries in Rize and Trabzon. Therefore the construction of field site is itself epistemologically challenging and for this research consists of multi sites with temporal dimensions, with the İkizdere Valley being the key site.

In the following section, I give an outline of the methodological approach used to study the "sustainable development" of hydroelectricity program in the İkizdere Valley. In the third and the final section, I elaborate on doing fieldwork in the rural areas and on my experience in carrying a fieldwork in the İkizdere Valley.

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[17] By conceptual framework, I mean the system of theories, concepts, and presumed relations between them that guide and support my research (Miles and Huberman, 1994: 18).

2.2. The Methods

The research methodology of this thesis is interdisciplinary, integrating qualitative and quantitative methods. An interdisciplinary approach allows a researcher to address different kinds of diverse questions and to collect rich data about various aspects of the problem. It enables the researcher to cross boundaries of academic disciplines by integrating methods in order to understand and to explain the complex, multi dimensional problem (Kammen and Dove, 1997) that this dissertation addresses. Finally, it makes possible methodological triangulation[18], which is to use multiple qualitative and/or quantitative methods, such as interviews, focus groups, survey, and document and policy analysis in order to check whether findings of the different methods point to same problems, issues or concerns related with the hydroelectricity development. Application of triangulation increases the validity of qualitative research by checking how accurately the research findings reflect the real situation and how certain we are that the evidence supports the research findings.

I have three reasons for selecting qualitative methods besides quantitative ones. The first reason is that the qualitative methods allow the researcher to understand the participants' perspective on the experiences, as well as their beliefs and values. The second, they provide a wider perspective to understand the particular contexts in which the participants take action and respond and vice versa. Finally, qualitative methods empower the researcher to reveal the processes embedded in socio-political contexts, as Maxwell has stated:

> Although qualitative research is not unconcerned with outcomes, a major strength of qualitative studies is their ability to get at the processes that lead to these outcomes…(2009: 221).

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[18] Lisa A. Guion, David C. Diehl and Debra McDonald's paper "Triangulation: Establishing the Validity of Qualitative Studies" describes the method and explains its five types: Data triangulation, investigator triangulation, theory triangulation, methodological triangulation and environmental triangulation. Paper was downloaded at http://www.ie.ufrj.br/intranet/ie/userintranet/hpp/arquivos/texto_7_-_aulas_6_e_7.pdf on October 21st, 2014.

Then, it becomes possible to develop causal relations driven by the processes and to use both the relations and the processes in describing and explaining the phenomenon.

My research design included interviews, focus group studies with participatory mapping, surveys, documentary research, policy analysis and participant observation as the primary methods. I applied a sequential mixed method exploratory design (Creswell, 2009). My aim was to explore the hydroelectricity development in the context of the İkizdere Valley, but also to expand my findings to have a broader perspective of the problem. The mixed methods strategy was useful to broaden the range of aspects in order to gain more insightful information from the involved people about the different aspects of the program, to understand the perspectives and the values of the people, and to identify the processes with the actors involved. In the focus studies, I prepared the questions based on initial findings derived from the interviews. Similarly, the findings of the interviews and the focus group studies were used in formulating the questions for the survey (Figure 2.1).

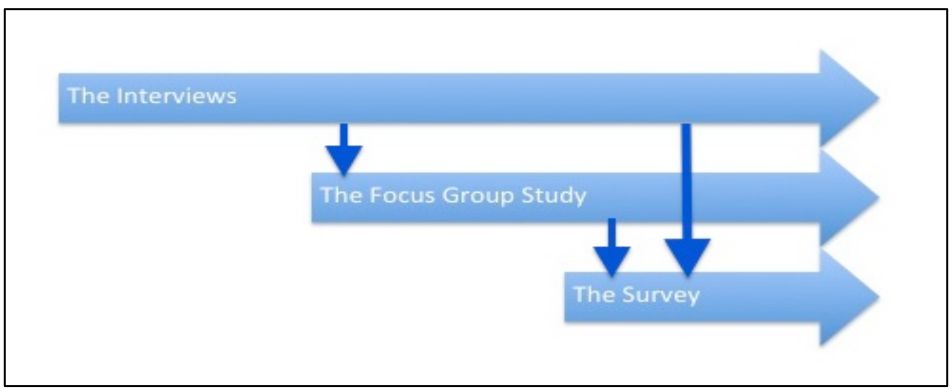

Figure 2.1. The mixed method exploratory research design. The arrows represent the data feeds between methods.

The strategy in data analysis was to conduct it simultaneously with data collection for two reasons. The first is that I progressively proceeded in my interviews and observations to identify the main processes and the involved parties. The second is that this method allowed me to assess and test emerging findings as I progressed. The document analysis and the policy analysis were done after I completed the fieldwork.

In the following section, I describe how the data was collected and analyzed in each method.

2.2.1. Interviews and analysis

Conducting interviews is a key qualitative method. It requires deciding whom to interview, devising techniques to access people for interview, crafting questions that elicit rich data, listening actively, and processing and interpreting the data.

I conducted nearly 100 interviews with local residents of the İkizdere Valley, scientists, experts from environmental protection NGOs, people from regional resistance groups, state officials, people from hydroelectricity industry, and members of juridical system. The interviews were in-depth and semi-structured.

Different methods were applied in selecting interviewees for each group. Snowball sampling technique was used to reach local and local-business interviewees. In selecting scholars and experts, a purposive-sampling method was used. Scholars and experts who carried out research studies and produced reports on the hydroelectricity development in the İkizdere Valley were contacted for an interview. People in the hydroelectricity sector were contacted selectively, and those who agreed were interviewed. State officials and bureaucrats involved either with the hydroelectricity plants in the İkizdere Valley or with the hydroelectricity development program in general at local, regional and national offices, were also contacted for information.

All distinct groups were asked a set of common questions in order to identify and compare differences in experiences, perceptions and values. As initial interviews were being carried out, some questions were revised and new questions were added to the original question sets. The interviews began with the open-ended questions.

For the analysis, the interviews were transcribed and coded. Coding was done by classifying the pieces of information and assigning certain labels. As I progressed in the interviewing, I recoded the coded initial interviews based on collected data. The codes and their frequency guided my further research inquiries and formed an informed base for focus group meetings and for the survey questions.

2.2.2. Focus group with participatory mapping and analysis

Focus group methodology is a social science tool that offers a researcher the opportunity to ask questions to a group of participants in an interactive meeting setting, while assuring a dynamic interaction among the participants in a constructive way. This methodology is powerful in providing data and insights that would be less accessible without group dynamics. The participants verbalize the perceptions, experiences and concerns about a specific problem, and engage in an experience of discovery and learning.

I carried out four focus group sessions, three with men and one with women. Two doctorate students assisted me. The participants were selected from among the interviewed people. Discussion topics were derived primarily from the interviews that I had conducted earlier and from the document analysis. Three distinct but consecutive periods in the lifecycle of hydroelectricity production were covered: before construction, during construction and during operation.

I integrated a participatory sketch mapping activity to the focus group sessions. My aim was to engage participants quickly in the discussion. I drew a blue line on a large sheet of paper, representing the İkizdere River as a reference point. The assistants and I cut small green papers and wrote down the names of the settlements, whether towns, villages or districts. Similarly, we used small yellow papers representing the facilities of all hydropower plants and electrical substation areas. We also printed some photos of the pieces of infrastructures of the hydroelectricity plants (Figure 2.2). I asked participants to help in constructing the sketch map of what comprises the İkizdere Valley. I facilitated the discussion and mapping exercise by placing the nametags of villages with respect to the İkizdere River and neighboring villages and then including the facilities of the six hydropower plants on the sketch map. We then continued mapping the location of the physical features of the electricity transmission system and colored them differently. Participants identified and marked the settlements that have drinking water shortages, which started with tunnel openings during the construction period. They depicted geographical features of the landscape, such as swimming spots in the river, locations of the watermills, the location of land pieces, which were either expropriated or bought or rented by the hydroelectricity companies, and sections of the riverbed that had been completely modified during the construction activities. Using this map, I was able to facilitate discussions on the physical changes in their environments, ownership and land use, gather data on key people and institutions that were involved in these changes, and learn how they were affected.

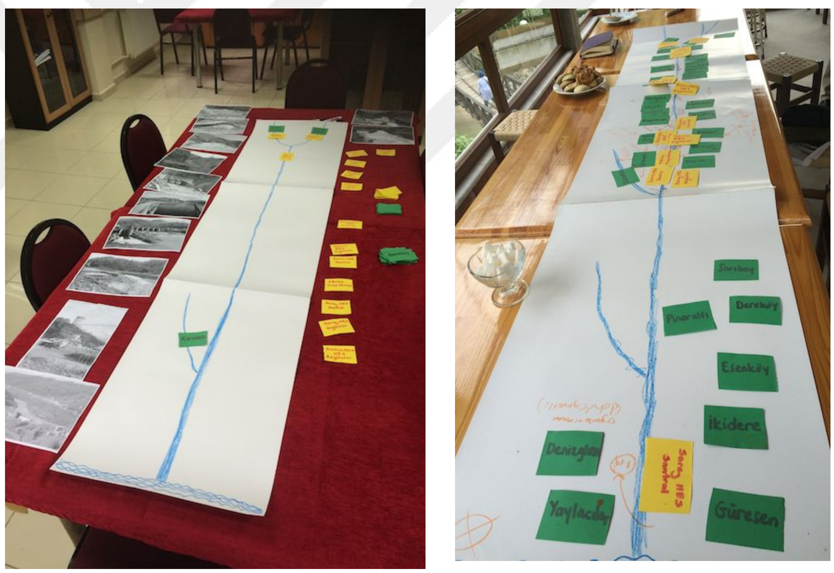

Figure 2.2. The sketch maps in the focus group sessions.

2.2.3. Survey and analysis

2.2.3.1. Survey design. The survey study was carried out in 27 settlements located in the lower and the middle sections of the İkizdere Valley that were impacted by the hydroelectricity plants and electricity transmission system. The study was done in August and October 2015. The main objectives and the scope of questions are listed in Table 2.1.

Target population. A target population was selected from the adult household population in the İkizdere Valley who were living in physical proximity to the existing hydroelectricity infrastructure in 2015. The impact geography of the hydroelectricity development extends

Table 2.1. The objectives and the scope of questions in the survey.

Objective	**Question**
Collect data	Residential status, livelihoods, social and cultural relations with the river, awareness of hydroelectricity plants and their electricity transmission infrastructure, general concerns related to them, issues experienced during the construction activities, issues related to the expropriations, beneficiaries and losers in the hydroelectricity development.
Enable comparisons	Their relations with the river before and after the hydroelectricity plants, Their perceptions of the 'old' state owned İkizdere HES and the five private hydroelectricity plants with the privatized İkizdere HES.
Understand	Local perception on whether the hydroelectricity development provided any good to the İkizdere Valley or not, Their concerns related with the İkizdere River associated with the hydroelectricity production, Their concerns related to the electricity transmission system, The major problems they experienced during the construction of hydroelectricity infrastructure, The major issues they faced because of the expropriations, Their perceptions on beneficiaries and losers in the hydroelectricity and electricity transmission development, How locals visualize the future of the İkizdere Valley.

from the water intake facilities of the İkizdere HES to the coast along the İkizdere River. I refer to this region as the *survey region*. The target population of the survey were persons 18 years of age or older and residing in the private houses or in the flats in the survey region.

Survey population. Geographical characteristics of the survey region placed some restrictions on the survey data collection operation. Some houses do not have road access and are located in forests or on steep slopes. These households were not included to the target population.

Sampling frame. The sampling frame was based on an association of houses with households. In other words, I assumed that the houses represented the households. Considering the cultural and social characteristics of the Eastern Black Sea Region, this assumption is valid. The rural population has been shrinking in this region since the 1960s as a result of outmigration to urban areas. Only local families own the houses. State officials such as teachers, police officers, and gendarmes, who work in the region for a limited time, rent houses; those houses are in the market section of the İkizdere near the official buildings and schools.

In the sampling frame, the elements of the survey population were divided into mutually exclusive groups called *strata*, based on in which village or town the houses are located. In this way, each house or a household could be placed in a single group or stratum. Figure 2.3 shows the physical locations of the villages and towns of the survey region. Different colors indicate the counties that the villages or settlements are governed by.

The 1:25.000 scale twenty-map sheets -- called "*Pafta*" in Turkish -- were obtained from *Harita Genel Komutanlığı*, the official authority providing topographical maps on request. The twenty map sheets were, first, patched to obtain a single map of the İkizdere Valley, and then processed by using ArcGIS to produce the maps for this thesis. For each stratum, houses on the map were numbered systematically.

In the sample design stage of the survey, some houses were selected from the sampling frame to include in the survey. Selection of these houses had to be random, meaning that each house had same probability of being chosen during this selection process. In order to assure this randomness, a list of house numbers was generated, using a random number generator. Reporting units were the randomly ordered houses. 10 % of the number of houses in each stratum, rounded to nearest whole number, was used as sample size. Sampling was stratified, meaning that separate samples were drawn from each stratum using the same selection procedure. The size of samples and the number of completed surveys for each stratum are listed in the Table 2.2.

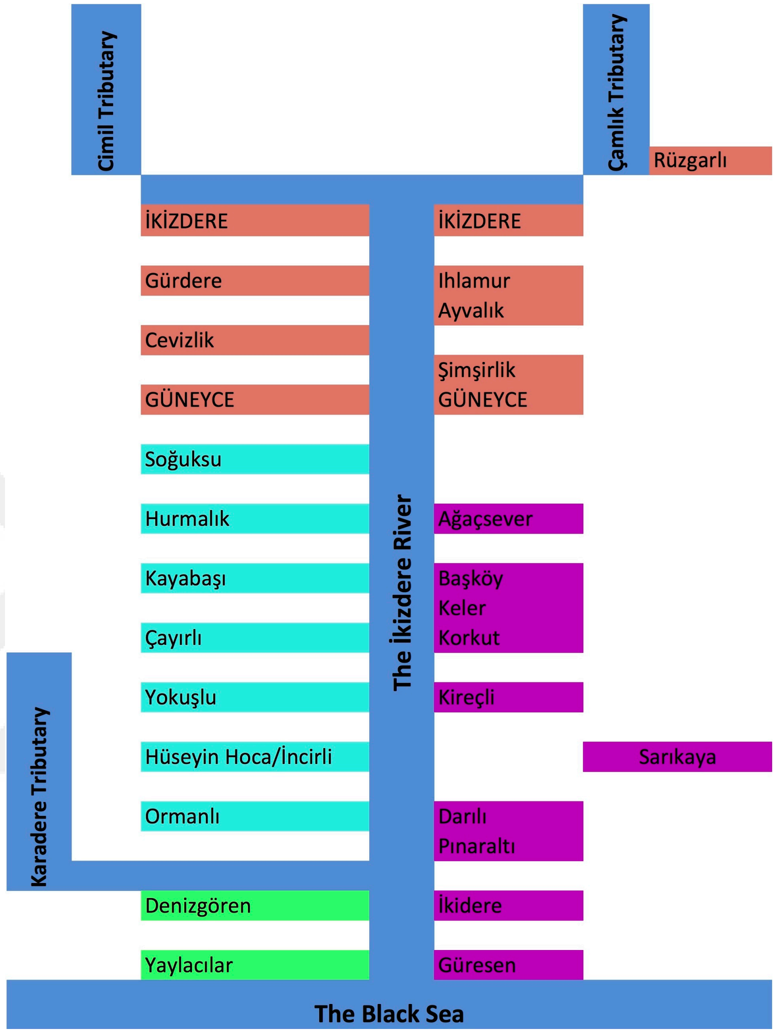

Figure 2.3. The strata of the sampling frame.

I faced several issues during sample design that I need to address. First, there was a risk of under coverage that can occur if some adults in the survey region do not appear in any sample drawn for the survey. The map sheets were dated 2006 and during the next 10 years new, houses could have been built. However, those new houses were built not for rent or sale, but rather for the household members; they were constructed either on top of the old family houses or in the family garden. Hence, the household members appearing in samples were members of the same family. Second, apartments or shared houses created clustering issues. Clustering occurs when multiple households are linked to the same house. I assumed both under coverage and occurrence of clustering as minor issues.

Table 2.2. The sample sizes and the number of surveys that must be completed.

NAME OF SETTLEMENT	NUMBER OF HOUSES NUMBERED ON 1:25000 MAP	10%	ROUNDED
Rüzgarlı	80	8	
İkizdere	425	42.5	43
Ihlamur	32	3.2	3
Ayvalık	100	10	10
Gürdere	169	16.9	17
Cevizlik	60	6	6
Şimşirlik	142	14.2	14
Güneyce	378	37.8	38
Soğuksu	94	9.4	9
Hurmalık	143	14.3	14
Kayabaşı	54	5.4	5
Çayırlı	79	7.9	8
Yokuşlu	70	7	7
İncirli	54	5.4	5
Ormanlı	125	12.5	13
Ağaçseven N	77	7.7	8
Ağacseven S	60	6	6
Başköy	62	6.2	6
Keler	100	10	10
Korkut	54	5.4	5
Kireçli	21	2.1	2
Sarıkaya	107	10.7	11
Darılı N	94	9.4	9
Darılı S	117	11.7	12
Pınaraltı	119	11.9	12
İkidere	60	6	6
Güresen	85	8.5	9
Denizgören	140	14	14
Yaylacılar	90	9	9
TOTAL			311

Third, non-eligible members of the population, people who left the region and abandoned their homes, could appear in the samples drawn for the survey. This is called over coverage. However, it does not create any issue for statistical purposes.

Finally, there were ineligible units in the samples that were not in the survey population, called *serender*. *Serender* is a wooden construct built in the gardens to store corn, fodder and food. They could not be distinguishable from houses in the map.

The last step of the sampling was the selection of one person within a selected household. There are several methods in practice, but none was applicable to my study. We surveyed the persons in selected households who were available at home or working in the home garden, and who agreed to participate to the survey. In several cases, other people, either the member of the same household, or a neighbor or visiting relatives, were present during the interviews.

2.2.3.2. Development of questionnaires. The structure and content of the questionnaire was developed progressively at three stages. In the first stage, Dr. McCandless visited me in the İkizdere Valley, just before I carried out the survey in August, and provided very constructive and supplementary comments on both the survey methodology and the questionnaire. When I prepared the initial set of questions, we reviewed them together. She recommended adding some critical questions, and suggested starting with soft questions, such as the ones asking about the interviewees' residency in the region, their livelihoods and their relations with the İkizdere River, and then moving to other questions such as the ones asking about the hydroelectricity facilities and high-voltage lines and benefiters/losers. She suggested finalizing the survey with private questions, such as their first name, age and other demographical questions.

The questionnaire consisted of open-ended questions, which allowed the respondents to give an answer in their words, and closed questions, which required the respondents to select items from a set of possible answers listed for the question. Open-ended questions were followed by closed questions in order to collect more specific data by reminding the interviewees of some options that they might have ignored or forgotten. Additionally, each questionnaire had an identification section, which contained name of the interviewer, the date and the name of the settlement interview conducted, and it was filled in by the interviewer.

In the second stage, I wanted to test whether the respondents understood each question fully, so that their answers made sense. In order to avoid unit non-response and item non-response, while assuring the cooperation of the respondents, I chose the village of Şimşirli as the first village to test the survey. I know several residents from Şimşirli, a village that was impacted by an hydroelectricity plant operating since 2010. When the interviewers and I completed the first batch of surveys and discussed the issues and problems, I found that the questions that required respondents to give weighted judgments of their feelings - such as much, some, less, none - could not be answered adequately by the respondents. I realized that this type of questions about their feelings confused the interviewees, and I revised the questionnaire by removing them.

After Prof. Dove, Dr. McCandless and I had a discussion over the closed questions and Prof. Dove recommended adding more open-end questions, I did a final revision that allowed locals to formulate answers in their own words (Appendix B).

2.2.3.3. Data collection. In data collection, the mode of administration was the face-to-face interview. High school graduates and university students were recruited as reviewers and briefed on how to approach local residents, how to introduce themselves and explain the survey, how to ask consent for the survey, how to ask the questions, and how to record the answers. Interviews were conducted either in the respondents' homes or in their gardens (Figure 2.4). In order to minimize the non-sampling error that could arise from asking the questions in different ways instead of reading the text from the survey, I conducted a sample interview with the surveyors and sat in on one survey with each. Also I rehearsed several times how the survey questions needed be directed to the people. We carried out the survey together.

In regard to ethical scientific conduct, a statement was made to the respondent. We informed interviewees that the study involved scientific research, explained the purposes of the survey and emphasized that participation was voluntary. To respect the right of privacy of the respondents, we did not record their last names, though we recorded first names if they agreed to provide them.

Data was collected in six days in August and in five days in October 2015. In most of the cases, the respondents welcomed us and they even offered tea, *ayran*[19] and local food. We faced one serious drawback, a consequence of the Ankara bombing[20] that occurred on 10.October.2015. The day after the Ankara bombing, we were in the field, conducting surveys. When an interviewer asked questions about *benefiters and losers*, the respondent couple got irritated, refused to answer the question and asked whether the interviewer was

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[19] A Turkish drink, made by diluting plain yogurt with water.

[20] https://en.wikipedia.org/wiki/2015_Ankara_bombings.

from PKK, a terrorist organization. Next day, another interviewer had similar experience in another village.

Figure 2.4. The survey teams and interviewers with respondents.

<u>2.2.3.4. Post-collection processing of survey data</u>. We did 338 interviews. In post-collection processing, I edited two answers that required *conversion* and coded them. In year of birth questions, all answers were converted to age. In the "how big is your tea garden?" question, some respondents could only report on the amount of their tea produces rather than give the size of their tea garden. I converted the yield amount to approximate land equivalent. The answers were coded and data was entered into Excel for the analysis.

<u>2.2.3.5. Analysis of survey data</u>. The answers to *open-end questions* were processed in the same manner that the interviews were processed. Nominal data, such as gender, or ordinal data, such as education level and whether the interviewee has a tea garden or not, were collected from *closed questions*.

Descriptive statistics were used to describe the characteristics of the surveyed sample. A univariate analysis was done. Depending on the question, I used the mean, median and mode of distribution of a single variable.

<u>*Nonresponse.*</u> The questions and their order in the questionnaire were reviewed carefully in order to minimize the non-response rate. To avoid unit non-response cases, I prepared an introductory paragraph for the interviewers to read to people when they approached them for the interview. During data collection, non-response, both unit and item types, occurred, but very rarely. We did not record the unit non-response cases. The unfilled sections of the surveys can give an idea on item non-response rates.

<u>*"I don't know" response.*</u> The interviewers and I noticed that the general tendency of the respondents was to say, "I don't know" in answer to many of the questions. The "I don't know" answer has multiple meanings. The first is that they really don't know. The second is that they suspect they know, but they cannot be sure. The final meaning is that they are sure but were concerned about the political ramifications of their answer, and therefore, they prefer not to give a direct answer. We insisted on an answer when we got the "I don't know" reply. Since the interviewers were from the region and even two of them from the valley, their localness was helpful in establishing trust and eliciting the answer.

2.2.4. Document analysis

Document analysis was one of the key methods in my research design. To better understand the "sustainable development" of hydroelectricity program and how it has been realized in the İkizdere Valley, I collected and analyzed the environmental impact assessment reports, project information files and court documents that were open to the public. A scholar provided the past official studies done for the İkizdere Valley. I officially requested from Devlet Su İşleri [21] (*DSİ*) the project feasibility reports of the Cevizlik HES, the Yokuşlu/Kalkandere HES, the Kızılağaç HES, the İncirli HES, the Saray HES and the capacity expansion project of the privatized İkizdere HES. However, DSİ did not provide the reports, claiming they were the private property of the hydroelectricity companies, and forwarded my request to the companies. The companies called me for my request. I explained that I needed these reports for my dissertation research. Yet they did not provide them. With the goal of collecting data on state-development practices, I attended two conferences on energy, searched the Internet sites of the ministries, surfed the Internet, and scanned past issues of the local newspapers provided by a local journalist.

In order to collect data on stream flow measurements, I used stream flow annals of Elektrik İşleri Etüt İdaresi[22] (*EİEİ*) and DSİ in the Library of the Department of Hydrology at Istanbul Technical University. EİEİ started publishing annals in 1956. The stream flow annals consist of information about the locations and conditions of the stream gauges with very detailed and comprehensive stream measurements collected at each gauging station. DSİ also published the stream annals. The earliest DSİ annals, I found, was dated 1960.

EİEİ and DSİ continued publishing the annals of the stream flow until 1994. The annals were sent to the universities and to other research institutions free of charge as a governmental service. After 1994, EİEİ and DSİ started to charge fee for this data.

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[21] The General Directorate Of Water Works.

[22] The General Directorate Of Electrical Power Sources Survey And Development Administration.

In order to collect data on hydroelectricity development and issues that were discussed in the Turkish Parliament as well as data on the history of the İkizdere HES, I reviewed the parliamentary minutes and parliamentary questions.

The key documents used for the dissertation are presented in Table 2.3.

Table 2.3. The analyzed key documents.

Title Of The Document	**Date**	**Prepared By**
İyidere Basın Development Plan Master Plan Report	September 1971	ELC-Electroconsult, DAPTA for EİEİ
İyidere Projesi İkizdere HES Tevsii Planlama Raporu	December 1989	DSİ
İkizdere Hidroelektrik Santrali Rehabilitasyon Ve Tevsi Projesi Fizibilite Çalışması	August 1997	SKOPSU PROJE Müh. Müş. İnş. Taah. ve Tic. Ltd. Şti. For Bilgin Elektrik Üretim, İletim, Dağıtım ve Tic. A.Ş.
İkizdere HES Fizibilite Raporu	September 2008	DOĞRU MÜHENDİSLİK LTD. ŞTİ. For ZORLU DOĞAL ELEKTRİK ÜRETİMİ A.Ş.
İkizdere Hidroelektrik Santrali (HES) Revizyonu Proje Tanıtım Dosyası	June 2015	SAVRA INŞ. MAK. MÜH. ÇEVRE DAN. SAN. TİC. LTD. ŞTİ. For ZORLU DOĞAL ELEKTRİK ÜRETİMİ A.Ş.
Cevizlik Hidroelektrik Enerji Projesi Çevresel Etki Değerlendirmesi Nihai Raporu	July 2006	DOKAY MÜH. VE DAN. LTD. ŞTİ. For AKIM ENERJİ ÜRETİMİ SAN. TİC. A.Ş.
Cevizlik Regülatörü Ve Hidroelektrik Enerji Projesi	February 2009	DOKAY MÜH. VE DAN. LTD. ŞTİ. For AKIM ENERJİ ÜRETİMİ SAN. TİC. A.Ş.
Kalkandere Projesi (Kalkandere Regülatörü Ve Hes Yapıları) Çevresel Etki Değerlendirme Raporu Nihai Çed Raporu	July 2009	DOKAY MÜH. VE DAN. LTD. ŞTİ. For AKIM ENERJİ ÜRETİMİ SAN. TİC. A.Ş.

İncirli Regülatörü Ve Hidroelektrik Santralı Proje Tanıtım Dosyası	2008	PRD PLAN. ARAŞ. GELİŞ. VE DANIŞ. LTD. ŞTİ. For LASKAR ENERJİ ÜRETİM PAZARLAMA A.Ş.
Saray Hidroelektrik Enerji Santralı (13.50 MWM – 15.45 MWE) Nihai Çevresel Etki Değerlendirme Raporu	March 2014	ENPARK ÇEVRE VE ENERJİ DANIŞMANLIĞI For MERTLER ENERJİ ÜRETİM PAZARLAMA A.Ş.
Rize İli, İkizdere İlçesi, Doğal Sit Alanlarının Belirlenmesi Çalışması	2010	N-ÇÖZÜM ŞEHİR PLAN. MÜH. İNŞ. TAAH. NAK. VE TİC. LTD. ŞTİ. For İKİZDERE DERNEĞİ

2.2.5. Policy analysis

I analyzed the issued laws and bylaws in order to establish an understanding of the legislation framework for the hydroelectricity development, which has been made and remade over time. I particularly tried to identify the processes and the work flows in and between the institutions, between the state and the public, and between the state and the private sector. In a similar way, issued laws and bylaws defined how the key institutions in hydroelectricity and energy, EİEİ, DSİ and *Enerji Piyasası Düzenleme Kurulu*[23] (*EPDK*) work, and described their responsibilities and authorities. I analyzed these laws and bylaws in order to understand the historical development of the hydroelectricity and energy sectors and the "sustainable development" of hydroelectricity program begun in the early 2000s. The names of the analyzed main laws and bylaws are listed in Table 2.4.

Table 2.4. The analyzed laws and bylaws.

Turkish Title	English Title	Issue Date
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelik	The Water-Use Right Agreement Bylaw (First Issuance)	26.June.2003
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması	The Water-Use Right Agreement Bylaw (Modification)	12.August.2006

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[23] The Energy Market Regulatory Authority.

İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik		
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik	The Water-Use Right Agreement Bylaw (Modification)	8.February.2007
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik	The Water-Use Right Agreement Bylaw (Modification)	18.August.2009
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik	The Water-Use Right Agreement Bylaw (Modification)	14.November.2009
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelikte Değişiklik Yapılmasına Dair Yönetmelik	The Water-Use Right Agreement Bylaw (Modification)	4.July.2012
Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul Ve Esaslar Hakkında Yönetmelik	The Water-Use Right Agreement Bylaw (Re-issuance)	21.February.2015
Su Yapıları Denetim Hizmetleri Yönetmeliği	The Water Infrastructure Control Services Bylaw (First Issuance)	13.May.2011
Elektrik Piyasası Lisans Yönetmeliği	The Electricity Market Licensing Bylaw (First Issuance)	4.August.2002
Elektrik Piyasası Lisans	The Electricity Market Licensing Bylaw (Re-issuance)	2.November.2013

Yönetmeliği		
Elektrik Piyasası Lisans Yönetmeliğinde Değişiklik Yapılmasına İlişkin Yönetmelik	The Electricity Market Licensing Bylaw (Modification)	28.January.2014
Elektrik Piyasası Lisans Yönetmeliğinde Değişiklik Yapılmasına İlişkin Yönetmelik	The Electricity Market Licensing Bylaw (Modification)	26.December.2014
Elektrik Piyasası Lisans Yönetmeliğinde Değişiklik Yapılmasına İlişkin Yönetmelik	The Electricity Market Licensing Bylaw (Modification)	4.February.2015
Elektrik Piyasası Lisans Yönetmeliğinde Değişiklik Yapılmasına İlişkin Yönetmelik	The Electricity Market Licensing Bylaw (Modification)	23.December.2015
Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına İlişkin Kanun	The Law of the Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy (First Issuance)	10.May.2005
Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına İlişkin Kanunda Değişiklik Yapılmasına Dair Kanun	The Law of the Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy (Modification)	8.January.2011
Elektrik Piyasası Kanunu	The Electricity Market Law (First Issuance)	03.March.2001
Elektrik Piyasası Kanunu	The Electricity Market Law (Re-issuance)	30.March.2013
Elektrik Piyasası Kanunu İle Bazı Kanunlarda Değişiklik Yapılmasına Dair Kanun	The Electricity Market Law (Modification)	17.June.2016
Kamulaştırma Kanunu	The Expropriation Law (First Issuance)	4.November.1983
Enerji Piyasası Düzenleme Kurumunca Yapılacak Kamulaştırmalarda 2942 Sayılı Kamulaştırma Kanununun 27nci Maddesinin Uygulanmasına Dair Karar	The Decision to Apply the 27th Item of the Expropriation Law for the Expropriations Done by the Energy Market Regulatory Authority	30.September.2004

Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (First Issuance)	7.February.1993
Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (Re-issuance)	23.June.1997
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	13.August.1999
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	14.April.2000
Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (Re-issuance)	6.June.2002
Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (Re-issuance)	16.December.2003
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	16.December.2004
Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (Re-issuance)	17.July.2008
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	19.December.2009
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	14.April.2011
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	30.June.2011
Çevresel Etki Değerlendirmesi Yönetmeliği	The Environmental Impact Assessment Bylaw (Re-issuance)	25.November.2014
Çevresel Etki Değerlendirmesi Yönetmeliğinde Değişiklik Yapılması Hakkında Yönetmelik	The Environmental Impact Assessment Bylaw (Modification)	09.February.2016

Elektrik İşleri Etüd İdaresi Teşkiline Dair Kanun	The Law of Establishment of The General Directorate Of Electrical Power Sources Survey And Development Administration (First Issuance)	14.June.1935
Eti Bank Kanunu	The Law of ETİBANK (First Issuance)	14.June.1935
Devlet Su İşleri Umum Müdürlüğü Teşkilat ve Vazifeleri hakkında Kanun	The Law of Establishment of The General Directorate Of Water Works (First Issuance)	15.December.1953
Enerji Piyasası Düzenleme Kurumunun Teşkilat ve Görevleri Hakkında Kanun	The Law of Establishment of The Energy Market Regulatory Authority (First Issuance	20.February.2001

2.2.6. Participatory observation

Participant observation is central to establishing a better understanding of the environmental and social contexts surrounding this study. This classic social science data collection technique consists of a variety of ways of collecting both qualitative and quantitative data and analyzing them (Bernard, 2011). I did participant observation of the İkizdere River and its flow regime, analyzed the timing and the amount of flow diverted and released by the hydroelectricity plants, and had informal discussions with locals in daily life and in coffee houses. The observational data was instrumental in validating the findings of the interviews, the focus group studies and the surveys.

2.3. Discussion on the Key Challenges of Fieldwork

2.3.1. Positioning as a researcher

Throughout my stay in the İkizdere Valley, I was continually asked three questions: Which city was I from? What was I doing in İkizdere? Where was my family? I had to justify my presence, my objective position with respect to the hydroelectricity plants and my scholarly intention in asking questions to the locals and to state officials in local and regional offices. People were constantly trying to understand my own objectives. When I visited a local state officer to present him with an official letter from my institute, and introduced myself, the first thing he did was to ask me the question, "Are you opposing hydroelectricity plants?" Another day, while I was in the coffee house, a local approached me and asked questions about my research. After my explanations, he asked,

İkizdere'ye iyilik mi edeceksin, kötülük mü edeceksin?

Are you going to do harm or good to the İkizdere?

I exercised considerable caution in the way I framed my research topic. I felt that I had to be careful to explain that my questions were aimed at understanding what had been experienced and observed, and to emphasize that the cooperation of the local people was important for me in understanding the real issues and problems.

Doing scientific research on hydroelectricity plants with a recent history of struggle and oppression was perceived as a political act. People wanted to know my political views and even which newspaper I read. I did not purchase any newspapers and discuss politics with locals.

Building trust in my research relations was a continuous and complex process. People who were originally reluctant to give me names and phone numbers of other contacts in the early stages of my research later became more collaborative. I had to emphasize my neutral position to the interviewees and assure them that their answers would be kept confidential. An anecdote: after a month's stay, I attended a court case in which the hydroelectricity company was suing people of the Şimşirli village in the İkizdere Valley for halting the construction activities[24]. The long-term nonviolent struggle of people of Şimşirli village turned into a confrontation when the hydroelectricity company tried to proceed with the construction in spite of the fact that the administrative court had ordered the firm to stop all the activities. The gendarmes became involved, and women and men were beaten badly[25]. A local from

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[24] See http://www.hurriyet.com.tr/rizede-heslere-karsi-cikan-simsirli-koyluleri-hakkinda-dava-29308527.

[25] See http://www.cnnturk.com/video/turkiye/hese-karsi-cikan-koyluye-jandarmadan-sert-mudahale http://www.cumhuriyet.com.tr/haber/turkiye/78183/Rize_de_HES_e_direnen_koyluleri_dovduler.html

Şimşirlik village saw me in the court and told me that he had been watching me since my arrival to İkizdere, trying to figure out where I stood.

2.3.2. Confidentiality

I felt that I had to be very specific about the confidentiality measures of my research. I told every interviewee that the interviews were confidential and that if I needed to refer to individuals in a publication, I would use pseudonyms. I want to return to the İkizdere Valley, and when I return, I hope neither to offend nor harm the people who helped me.

2.3.3. Difficulty in reaching to women

As a woman, reaching women interestingly was more difficult than reaching men. In the İkizdere Region, the social worlds of men and women are very separate. Men spend their leisure time in the coffee houses with other men or pacing up and down in the streets. Women are in the forest collecting fresh leaves for the cattle or tree branches, working in their gardens attending to their vegetables, working in their tea gardens, or at home. The *snowballing* process for finding women contacts did not work in the context of my research. Men gave the names of other men, but never a woman's. I had to be strategic in finding ways to enter the women's world. Attending local handcraft workshops and shopping in the local bazaar and shops, which are run by women, was helpful. I was able to organize one focus meeting with a women's group, and the surveys allowed me to reach more women in all settlements. We contacted them in their homes or spotted them in gardens, on doorsteps or on balconies, and asked for their participation.

2.3.4. The mobility of local residents

I had to consider the mobility of local residents in organizing the interviews, focus group sessions and survey, and be flexible in my research program. The majority of the people in the upper section of the İkizdere Valley are highly mobile. They move between rural and urban geographies, and within the valley they move between villages and *yayla*[26] settlements. To be more specific, they spend winter months in the cities and start to come to their houses in March. In June some families move to 'yayla's and stay there until early September. They move back in September or October and remain in the villages until November. The rate of mobility drops as one approach the sea; as an example, permanent residents make up 90% of the population in the village of Ormanlı, which is 10 km from the coast and approximately 30 km from the city center of Rize. The tea-harvesting times is another factor influencing the mobility of local people.

2.3.5. Research plan did not match with the local timing

I did my research planning in June 2014 in Istanbul, unaware of the local life cycles and tea-harvesting dynamics. I had chosen May for the focus group studies. However, my schedule did not fit into the facts of life. The first tea harvest takes approximately 3-4 weeks in early May and starts in the low lands and then moves incrementally to the middle and upper sections of the valley. The Çaykur, a state institution and the largest tea purchaser and processor of the country, makes the harvest schedule. In 2015, climatic conditions delayed the harvesting period to the end of May and early June in the İkizdere Valley. Therefore my timing collided with the tea-harvest timing. Women were in the fields from very early morning to late afternoon collecting tea leaves and carrying their bags to collection stations for sale. They were very tired in the evening, when I held the meetings. I was able to organize only one women's session in a village, just before the tea harvesting. On another occasion, we visited a tea-collection station to chat with women (Figure 2.5), where I learned the importance of the tea economy as an income source for the men in the region. Most of the interviewees and the invitees to focus groups were either employed as seasonal workers in the tea factories, work as tea experts in the tea collection stations, or drive the tea trucks.

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[26] Each village in the İkizdere Valley has a separate highland settlement, called *yayla* in Turkish.

2.3.6. Challenge with the field notes

On a professional level, doing field study was insightful and challenging in many ways. I learned how to jot quick notes in order to record events and impressions as they occurred (Emerson et al., 1995). I used key words, phrases, and even symbols similar to stenographs. Since people were not used to talking to outsiders, the fact of someone's taking notes passionately during a conversation made them uncomfortable. I had to explain that I kept notes for my research and that whatever they said would be kept confidential. I also developed an effective method of writing field notes. Writing these notes on a regular basis was very time-consuming, and required self-discipline and determination.

Figure 2.5. A tea collection station in the Şimşirli Village.

2.3.7. Past scientific studies

As my fieldwork progressed, I encountered negative fallout from the locals' experience with past academic research. People told me that in another valley research had been done on hydroelectricity development, and that graduate students asked questions to the residents. Later, these people heard that the research findings had been given to the hydroelectricity company that was planning to start construction in the valley. The company used the research findings to break the local resistance. This experience caused some of the locals to be prejudiced against researchers, and one local said, "No social scientist can come to my village for research." Initially, it was difficult to cope with such prejudices. On the other hand, it was illuminating to realize how science had been used to the advantage of hydroelectricity development.

3. THE İKİZDERE RIVER VALLEY AND HISTORICAL BACKGROUND OF HYDROELECTRICITY DEVELOPMENT

3.1. Introduction

The biophysical and hydrological characteristics of the İkizdere River Valley began to attract hydroelectricity development in 1940s. Over time social, economic and political factors have affected its development in various ways. More than other river valleys in the Eastern Black Sea Region and perhaps even in the country, the İkizdere Hydroelectricity Plant (*The İkizdere HES*) bears the imprint of the interweaving of the state's hydroelectricity development efforts with local livelihoods and ways of living. Built in the 1950s, the İkizdere HES came to be acknowledged as "İkizdere'nin medarı iftiharı"[27] (a source of pride for İkizdere)[28]. However, since the mid-2000s, when five other private hydroelectricity plants were built under a "sustainable development" program and the İkizdere HES was privatized, positive local perception toward the hydroelectricity development has declined drastically. This social phenomenon became a key focus in my research.

The aim of this chapter is to provide a comprehensive historical account of the hydroelectricity development in the İkizdere River Valley and then to examine how the "sustainable development" hydroelectricity program has shaped the valley. The historical review provides a unique and valuable opportunity for a comparative inquiry seeking to understand this social phenomenon (Prezeworski and Teune, 1970). The chapter provides a historical frame of reference for the dissertation by defining two periods of hydroelectricity development in the İkizdere Valley. The first period begins when the İkizdere HES was established as a state enterprise during a time before neoliberalism. Its institutional, political, social and economic context with its infrastructure form a frame of reference describing the before neoliberalism period. The second period begins in 1980s with the efforts of the state

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[27] Interview in December 2014.

[28] İkizdere was used to mean the county of İkizdere.

toward privatizing the İkizdere HES, and continues in 2000s with emergence of five private hydroelectricity plants and privatization of the İkizdere HES under neoliberalism.

In the following section, drawing on a literature survey and fieldwork data, I provide introductory information about the geography of the key field site, the İkizdere River Valley. In the third section, I focus on the historical development of the hydroelectricity production there. I begin with a history of measuring the stream flow in the İkizdere River and describe the preliminary basin development studies. Next, I make an inquiry into the history of the İkizdere HES. Then, I depict the privatization era in the İkizdere River Valley. In the fourth section, I describe the run-of-the river technology that was implemented in all the plants and review the six plants in the valley from an engineering and economic perspective. I then provide a comparative analysis of the İkizdere HES with the other five private plants and the privatized İkizdere HES.

3.2. Key Field Site, the İkizdere River Valley

3.2.1. Geography

The geography of the İkizdere River Valley or the İkizdere River Basin or shortly İkizdere Valley[29] is a typical one seen in the Eastern Black Sea Region. The basin is 78 km long, extending in north-south direction, and within a short distance the altitude reaches from sea level to 3,000s. The hills are Alpine-type and very steep in character (Table 3.1). The İkizdere River has 28.35 m^3/sec average stream flow with 1,053 km^2 discharge area, and therefore can be categorized as an average sized river (Jaoshvili, 2002).

A river basin is divided into three sections, the upstream, middle course and downstream or lower course (Schumm, 1977). The upstream section of the İkizdere River Basin starts at the high mountain range. This section has a complex topography of high mountains and deep

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[29] The İkizdere Valley and the İkizdere River Basin are used interchangeably in this dissertation.

valleys, in which the İkizdere River comes into existence. A series of springs and rivulets form the fast-flowing and turbulent streams and the tributaries passing through deep valleys.

Table 3.1. The characteristics of the İkizdere River Basin.[30.]

The Discharge Area (km^2)	1,053
The Maximum Altitude in the Basin (m)	3,329
The Minimum Altitude in the Basin (m)	0
The Average Altitude in the Basin (m)	1,823
The Average Gradient (%)	35.3
The Average Gradient of the Main Channel (%)	29.07

They result in a large river. The upstream section is the primary sediment source. The upstream section ends approximately on the periphery of the İkizdere town. The İkizdere HES was established at the lower end of the upstream section. In the middle section of the İkizdere River Basin the gradient decreases, the flow velocity falls and the meander[31] formations begin. The middle section is the transfer zone of the sediment. The middle-course section ends at around the villages of Başköy and Çayırlı. In the lower section or in other words in the downstream of the İkizdere River, the gradient falls down to nil and the flow velocity drops significantly. The lower section is the flood plain of the river. The river spreads through the low land and releases the load of sedimentation, and finally runs down to the Black Sea through a wider riverbed (Figure 3.1).

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[30] The figures in the table are taken from a report, "Rize İyidere Alt Havası İçin Birim Hidrografın Belirlenmesi," published in 2014. The author of the report, Fatma Ceyhan Hoca, works in the Ministry of Forestry and Water Affairs. The report was downloaded on 08.February.2017 at http://suyonetimi.ormansu.gov.tr/AnaSayfa/uzmanteztablo.aspx?sflang=tr.

[31] The meander is a bend in a river.

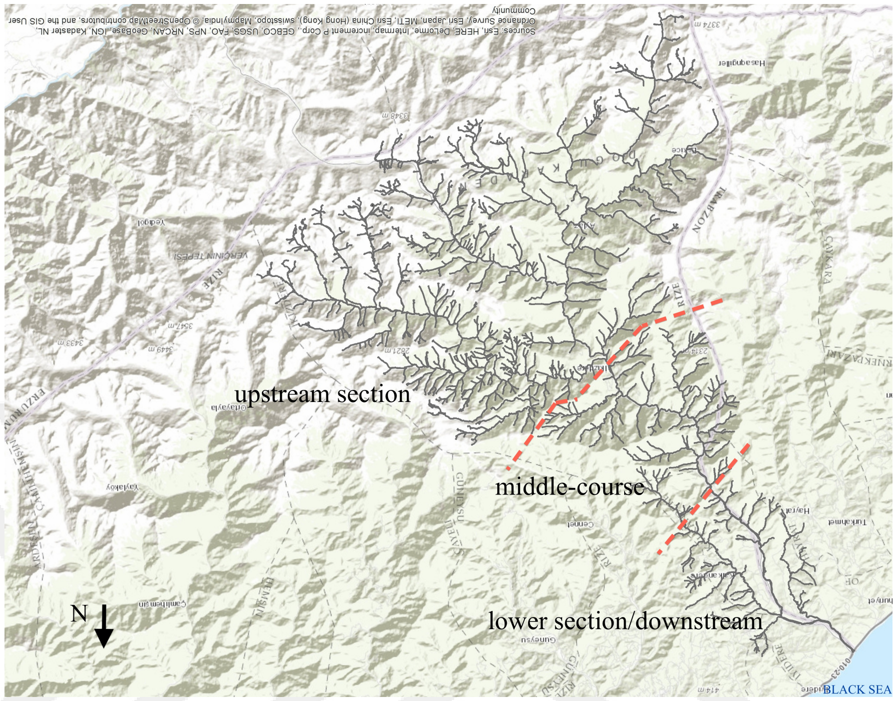

Figure 3.1. The drainage network of the İkizdere River Basin and the sections of the basin.

3.2.2. Climate

The climate of the İkizdere River Basin changes its character going from the lower section, to upstream section, as its geography stretches from the Black Sea to mountainous region at attitude of approximately 3000 m. The climatic characteristic of the lower section is typical of the Black Sea Region, humid and subtropical with perpetual precipitation in terms of rainfall. Temperature and rainfall decrease from coast to the inner sections of the basin, and precipitation, in terms of snowfall, increases[32].

Eriş carried out an empirical study on the climatic conditions to determine the spatial distribution of precipitation in the Eastern Black Sea Region, an in situ the İkizdere River Basin is located (2011). Her study confirmed the existence of two climates coastal and inland, in the Eastern Black Sea Region. The climate of the İkizdere River Basin, as the other river basins in the Eastern Black Sea Region, does not have orographic characteristics, on the

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[32] The climatic variability in the İkizdere Valley was stated in Iyidere Basin Development Plan in 1971 and later in İkizdere HES Planlama Raporu in 1989.

contrary "Mean annual precipitation decreases with elevation for a given range in the valleys" (2011:95). This finding is contrary to wide spread orthodox belief acknowledging only the coastal subtropical climate. This study is also important, because it revealed that the region has been poorly gauged to collect meteorological and stream flow data[33]. Eris suggested increasing the number of these stations in the region in order to collect more real data particularly in the inner sections of the basins that can represent the river basins better.

3.2.3. Nature

The İkizdere Region had been a subject of various research expeditions, land surveys and studies since 17th century. The botanists were the first group of scholars that visited the region. Joseph Pitton de Tournefort had been in the north, east and west Anatolia several times to collect plants and he published his travel notes in his book *Relation d'un Voyage du Levant* in 1702 (Terzioğlu, 1994).

Balansa prepared the largest plant collection of the İkizdere region in 1866. He had picked most of the flowers in Cimil and Gölyayla (Kabahor) parts of the valley (Güner et al., 1987). The plant collection of Balansa was published in *Flora Orientalis*[34], which was written by another botanists, Boissier, who also traveled in Anatolia for plants.

Davis had done the most extensive and long-term study of the plants in Turkey and he traveled to İkizdere and Cimil in 1952 to collect plants. Five years later he came to the region again this time to collect plants in the coastal section. Davis's book *Flora of Turkey and the East Aegean Islands* includes all flowering plants and vascular cryptograms wild or naturalized in Turkey and widely planted crops and introduced trees (1965).

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[33] The General Directory of State Meteorology (*DMI*) established two meteorological stations in the İkizdere Basin, one is in the town of Kalkandere and second is in the town of İkizdere. The İkizdere DMI station was closed. As of February 2016, The General Directory of State Meteorology (DMI) operates four meteorological stations, Cimil at the attitude of 2,020 m., Dereköy at the attitude of 970 m., Sivrikaya at the attitude of 1,926 m. and in the town of Kalkandere at the attitude of 138 m. Devlet Su İşleri (DSİ, The General Directorate Of Water Works) has a meteorological station open in 1974 registered as Sivrikaya station in the Sivrikaya village at the attitude of 1,650 m.

[34] Boissier, E. 1867-1884. Flora Orientalis. Ciltler 1-5. Supplementum 1888. Geneve, Bale and Lyon.

The past studies mentioned two other plant collectors, A. Huber-Morath, who was in İkizdere region in 1958-1959 and F. Sorger, who also collected plants at two sites, İkizdere and Çamlıhemşin, in 1980 and 1982.

Why the İkizdere Valley has attracted the plant collectors over the years? Davis revealed the driver of his visits as the unusual richness of the flora of Turkey because of the existence of three separate phytogeographical regions: Mediterranean, Irano-Turanian and Euro-Siberian (1965). Anatolian Diagonal, a discovery of Dr. J. Cullen, separates these regions. This phenomenal geographical belt divides Anatolia from southwest to northeast in two floristic divisions. Many species do not extend to other side of the diagonal, while belt is the home of a number of endemic species. The Anatolian Diagonal extends to the southwest part of the İkizdere Valley. Therefore some parts of the valley, in particular Anzer section in the southwestern part of the valley has a unique habitat, a conjoint of three floristic regions in Turkey, Mediterranean, Irano-Turanian and Euro-Siberian. This part of the valley is the habitat of more than a hundred flora species, endemic to Rize and İkizdere (Ansin, 1980). Ansin did a botanical study in the İkizdere region and defined the characteristics of the flora as Euro-Siberian and Colsnik. He also found the ancient species of Rhodothamnus sessilifolius, Epigaea gaultheroides, Rhampicarpa medwediewii, Betula medwediewii in İkizdere and Anzer that are dated back to the age of Tersiyere (1980).

Güner et al. had carried out most extensive and long-time botanical research in Rize and worked at sites in Anzer, Gölyayla (Kabahor) and Cimil in the İkizdere Valley (1987). From 1974 to 1986, the research team made several visits for collecting flowers in different seasons. During the sampling visits, Güner et al. made additional land observations. What makes their study distinct is the fact that their research was not a classical taxonomy research but instead very comprehensive and detailed habitat focused study, looking into the relations between the plants, land cover and their habitat. They described the vegetation of the region, as the formations of meso-phytic forests, alpine meadows and scrubs. They identified a local-scale daily water cycle that gives the forests the character of the mist or rain forests. The river is the main component of the water cycle in the İkizdere River Basin. The water cycle is most active when the precipitation in the form of rain is highest in summer and spring. Particularly during summer the high evaporation rate creates mist almost every day. The mist moves up and down frequently and continuously between the lower altitudes in the valleys and the higher altitudes in the mountains while leaving moist on land cover. The local-scale daily water cycle nurtures the forests and land cover in the region. A local reported[35] that until a decade ago, mist occurred in the mornings in the lower section of the basin.

Terzioğlu studied the flora of the İkizdere Valley and the Anzer part during the period of 1993-94 for his master thesis (1994). His study was the first one on the riparian vegetation, and listed the major tree, scrub and herbaceous species of the riparian ecology. He identified two vegetation periods with respect to low land and high land in the region, determined spread range of the tree species, provided the contents and the conditions of the forest land cover, and discovered a new variety of the rhododendron ponticum. Terzioğlu also gave a historical background of the land cover in the İkizdere Valley.

The beekeeping has well established historical as well as cultural roots in particular in the Anzer site. The beekeepers produce "Anzer Balı"[36] with a very high economic value. Most probably these facts attracted scholars to study honey production in the İkizdere Valley. Güner et al. analyzed the pollen content of honey in the İkizdere region, and mentioned other studies, which were done to analyze the relations between plants with nectars and antibiotic characteristics of honey (1987).

The tea is a dominant cash crop of the Eastern Black Sea Region. The tea gardens cover the landscape in the middle and lower sections of the İkizdere River Basin. Even in higher altitudes, the spots of tea gardens scattered through the hills facing the river in descending number from middle section to the south toward the Cimil and Dereköy directions. Tea cultivation is critically important for the livelihoods of the local people as well as for the local and regional economy. In spite of these facts, in my literary survey and during my fieldwork, I could not find any ecological study on *tea*.

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[35] Interview in December 2014.

[36] Anzer honey.

The fauna studies are more recent, mostly done in the past decade. Researchers studied two species, which are both endemic to the region and under the threat of habitat loss, *Salma Trutta Labrax (Karadeniz Alası)*[37], and the *Caucasian Black Grouse*. The studies focused on the migration patterns of the species and the size of their population (Tabak et al., 2001, Isfendiyaroglu et al., 2007, Gottschalk et al., 2007). *Karadeniz Alası* is a unique fish species for several reasons. The first is that its habitat is both the rivers and the Black Sea, and in the fall, it migrates from sea to the upper sections of the river to spawning. The residents of the İkizdere Valley told that the fish was so abundant in numbers and larger in size in the past, and they caught fish as big as 7-8 kg[38] (Figure 3.2). Even after the İkizdere HES started to operate, the local people and workers in the HES caught large-size fish in abundant numbers in the downstream of the plant[39]. Over the years as the anthropogenic pressure on the İkizdere River intensified, fish population declined and fish size shrink. The second, the past studies accepted *Karadeniz Alası* as an indicator species indicating the health of the aquatic life in the rivers.

In my literature survey, I found a very limited number of research papers on the ecology and the ecosystems of the İkizdere Valley. Atalay et al. carried out the earliest study on the ecosystems in the region (1994). Another article was in the field of aquatic ecology, investigating the impacts of run-of-river hydroelectricity systems on the aquatic ecosystem in the Trabzon region, which lies to the west of the İkizdere Valley (Aksungur et al., 2011). Aksungur et al. argued that not only *Karadeniz Alası* but also other migrating species such as the eel and the sturgeon are under the threat of hydroelectricity development. Their arguments were based on the documentary analysis of a number of environmental impact assessment reports of the hydroelectricity plants and on an empirical case study from Spain about the adverse effects of the reduced flow. Başkaya et al. did a similar study with the aim to identify the adverse effects of the hydroelectricity plants (2011). Their findings drawn on literature survey, documentary analysis and personal observations made in short site visits.

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[37] In Turkish.

[38] Interviews in December 2014 and February 2015.

[39] Interviews in December 2014.

Figure 3.2. The photo shows two fishermen and their catch from the İkizdere River in 1960s. Source: Turkey Hunting Encyclopedia, 1966.

Yurtseven carried out the most comprehensive study of the ecological and hydrological relations on the basin level for his dissertation (Yurtseven, 2011). He used the concept of ecohydrology to examine the impacts of hydroelectricity development on the hydrological processes and biotic dynamics. Ecohydrology studies the space-time hydraulic dynamics in relation with climate-soil-vegetation dynamics. His study covered seven regional water basins including the Eastern Black Sea Basin and included the İkizdere HES, the Cevizlik HES, the Kalkandere/Yokuşlu HES and the İncirli HES, besides other 31 plants. One unique aspect of his study is that he evaluated the characteristics of the macro organisms in the river consumed by the migrating fish as an indicator of health and integrity of the river ecosystem. He concluded that two factors, the location of the plant and the length of diversion reach, are very important for the aquatic habitat. His findings revealed that the health of aquatic ecosystem is poorest at the diversion reaches[40], compared to the health of aquatic system in the upstream and in the downstream.

There are studies that focused on river sediment transport in the rivers of the Eastern Black Sea Region. The studies claimed that the sediment transport has been significantly altered by the hydroelectricity development in the region (Berkun and Aras, 2012; Jaoshvili, 2002; Hay, 1994). The study findings draw on the literature surveys except the study done by Hay. Hay used the real sediment discharge data collected by EİEİ.

The literature review demonstrates that other than flora studies, the studies on the river hydraulics, the hydrology of the basin, the river ecology, the riparian ecology and the fauna are scarce, and if ever existed, they confined mostly on literature survey rather than on real data collected through land surveys.

3.2.4. People of the land and human settlements

The various groups of people either migrated from the Caucasus Region and Anatolia, or arrived from the sea, and settled in the İkizdere Valley. There are ancient sites at Çağrankaya and Demirkapı villages remained from the ancient times. The arrival of the Turks was the last migration wave, and Turkish groups used the Ovit highland, a natural gate, to cross the high mountains from East Anatolia to the Black Sea Region in 10^{th} -11^{th} century. The İkizdere Valley was under the Ottoman rule from 15^{th} century until 1915s. Three main groups, Anatolian Armenians, Black Sea Greeks and Turks, were living in the villages until early 1900s. Russia took over the region and stayed two or three years until 1918. When the Bolshevik Revolution broke out in 1917, Russia evacuated the Eastern Black Sea Region. The İkizdere Valley became a part of the Turkish Republic in 1923.

Because of cultural diversity of the valley, the settlements have two names, an old one, originally from Turkish, Georgian, Greek, Anatolian Armenian, and Lazuri, and a new one in

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[40] The river section that stays between the water-intake facility and the power plant.

Turkish such as Cimil-Başköy, Anzer-Çiçekli, Komes-Şimşirli, Ethone-Gürdere (Coşkun, 2013). The local residents use new and old names, interchangeably in daily conservations, however old names are often preferred. The İkizdere River has also an old name, *Kalapotomos*, originated from Greek meaning *Kala*-Good or Nice and *Potomos*-River. The river is also known as the *İyidere River*.

The geography seems to be the main factor in deciding where to locate the settlements. The topography in the downstream section of the basin is flat, and flat land makes living easier. Therefore, in the downstream section of the İkizdere Valley, the settlements are denser and closer one to other, and the population density is higher (Figure 3.3). In the middle course and upstream sections, the villages are scattered on the hills along watercourses. The houses spread on the hills, either in the form of small groups of houses built side-by-side, or individual houses, wide apart from their neighboring houses. The wide spread arrangement of the houses is a distinctive feature of the villages in the Eastern Black Sea Region. In two towns, İkizdere and Güneyce, there is a section, called *Çarşı*[41] extending by the riverbed with a relatively compact form.

The villages have summer settlements in the highlands of the mountains. In the past, the residents were moving to summer settlements with their cattle stock in June, grazing their animals for 3-4 months and returning to the villages in September. Although the number of grazing animals reduced significantly over the years, the residents keep this routine and move to highlands in June. There are approximately 40 actively occupied summer settlements. More than hundred summer settlements were abandoned.

3.2.4.1. Demographics. The İkizdere River Basin lies in two provinces, Rize and Trabzon, and in four counties, namely İkizdere, Kalkandere, İyidere in the province of Rize, and Of in the province of Trabzon. The population statistics show that the region lost almost half of its population in the period of 2000-2012 (Table 3.2). The migration is from rural areas to urban

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[41] Market or downtown.

cities, in particular to Rize, İstanbul and Ankara. In spite of the fact that the rural population declines, the Eastern Black Sea Region still hosts the largest rural population in Turkey.

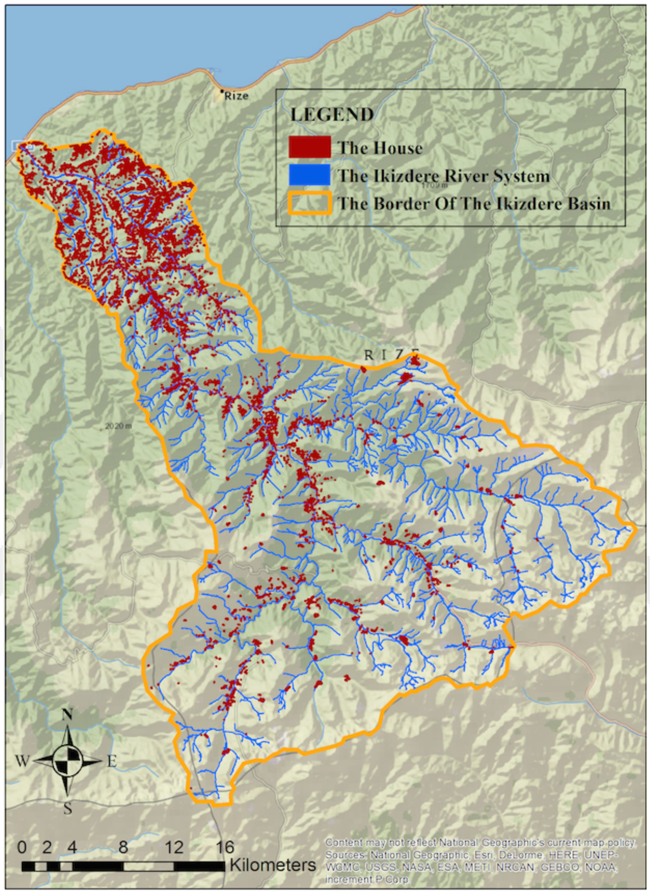

Figure 3.3. The residential houses in reference to the İkizdere River System in the İkizdere Valley.

The population dynamics points to a high level of "urban-rural connection" (Erensu 2011: 15). As one informant said, "people leave their villages but they never abandon them." The most of the people in the İkizdere Valley are temporary residents, moving in and out of the valley periodically. They spend the winter in the cities and rest of the year in their primary houses in the villages or in the summer settlements, called *yayla*. Therefore the population of the İkizdere Valley, especially during summer months, is four even five times higher than the official population.

Table 3.2. Population statistics of the counties in the İkizdere Valley[42].

County	Population (2000)	Population (2012)
İkizdere	10,710	5,395
İyidere	10,074	8,223
Kalkandere	19,131	11,910
Of	78,560	42,138
TOTAL	139,783	75,327

3.2.4.2. Local economy and livelihoods. The households have several income and subsistence sources in the İkizdere Valley. Migrated workers' money has been always the major income source. In the past, the scarcity of agricultural land forced men to seek work in other cities to earn money. Until the Bolshevik Revolution in 1917, Russia was a common destination and the villagers worked mostly in the bread and pastry shops in Moscow. After 1950s, İstanbul, Ankara and other big cities in Turkey were the new destinations of the migrating people.

Tea is the primary cash crop and cultivated extensively in the middle and lower sections of the İkizdere Valley. It is important to note that 60% of the tea produced in Turkey is harvested from Rize. A recent study reveals how crucial tea cultivation is for household economies. The study analyzed the land use/land cover change in Rize and demonstrated that land cover drastically changed in the coastal region in the period of 1976 – 2000, and 36% of the forestland were converted to the tea gardens (Reis, 2008). Local people were the agents of this substantial land cover transformation.

The harvested tea is processed locally by small-scale tea processing plants in the İkizdere Valley. The tea plants are located along the İkizdere River in middle and lower sections of the valley. Nineteen tea processing plants were opened after the İkizdere HES started to generate electricity in 1961 and since then they provided jobs to the locals. Güneyce Çay is the only

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[42] Türkiye İstatistik Kurumu (The Turkish Statistical Institution), 2012. www.tuik.gov.tr/PreTablo.do?alt_id=1059.

tea processing plant in the middle section of the valley. It is owned by a local cooperative in the town of Güneyce. It employed approximately 100 people in the past, however, lately it was shaken by financial problems, and had to downsize its operations.

Bee keeping has ancient roots and is widespread in the İkizdere Valley. Most of the households in the middle and upper sections of the İkizdere Region own several hives. The harvested honey is very important both for the local diet and for household economy. The honey collected from hives in the Anzer Yayla[43] is well known as a natural medicine, and always in high-demand. The price of one kilogram of Anzer honey, *Anzer balı,* was approximately 400 USD in 2014. The hives pass from father to the son in the families. One local told me that he has bees from his grandfather and he was proud of keeping them alive.
The animal husbandry and sale of milk products were other income sources. Both activities are for subsistence now.

The residents of the county of İkizdere are trying to promote their region as a touristic destination and organizing several festivals to attract tourists and locals, who migrated from the İkizdere Valley. The touristic facilities are limited to a few hotels, several family-run restaurants and local handcraft shops. A local businessman opened a thermal hotel in 2010 in the Cimil Valley and it is the largest touristic facility in the İkizdere Valley. The regional tour operators organized rafting tours during high flow months in the İkizdere River, before the emergence of the Cevizlik HES, which reduced the river flow. The money coming from the tours was important for the local economy.

The contribution of hydroelectricity plants to the local economy is discussed in the following section.

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[43] Anzer Highland.

3.2.5. Anthropogenic uses and influences

3.2.5.1. Early uses and influences. The inhabitants of the İkizdere River Basin had utilized the potential power of the İkizdere River and its tributaries and streams in several ways for a long time. One of the earliest means was to use flowing water as a power source in watermills. Watermills have had great importance in the local daily life.

The high volume and high current velocity of the İkizdere River during high-flow months let the locals to use the river as a media of transportation for the timber. The timbers were cut in the upper basin both for lumbering activities of the state and for making firewood to the households and transferred down basin by the river.

The İkizdere River Basin produces a substantial amount of sediments and deposits them on the riffles. In the past, the locals were using the sand, gravel and cobble deposited on the riverbanks as construction materials for their houses.

3.2.5.2. Culture of water. The İkizdere River has been a significant factor in shaping the socio-cultural life and the personalities of the residents of the valley (Coşkun 2005). The İkizdere River with its tributaries and streams, its fish, its continuous sound, visible existence, and other features, in fact as a whole is an integrated living entity or a living system. This system provides a living space to the residents of the valley in many different ways and meanings. An overview of the positions of the residential houses with respect to the streams and tributaries of the İkizdere River system reveals how the flowing water, which shapes the geography of the river basin, is also a fundamental factor in constituting and sustaining the living space of the local residents (Figure 3.3). The results of the survey validated this observation. When I asked "What is the most valuable thing for you in the İkizdere Valley," 17% of respondents said "River" and 19% said "Water." The most valuable thing is "Tea" with 39%. The local economy relies on tea, as the main cash crop in the valley, and tea requires humidity. It is followed by "Nature" with 26% and "Fresh Air" with 20%.

The İkizdere River and its banks were the "social space" and the "common land" of the local residents. A local said, "the sides of the İkizdere River was the summer house for people in the valley." Youths learned swimming from their peers in the natural pools of the river. The banks of the İkizdere River were the picnic sites and the playgrounds. The banks were also the common land for grazing the animals. When hydroelectricity infrastructure and other factories and buildings occupied these banks, the locals lost their "social space" and "common land."

The river provided abundant fish. Fishing was widespread from the upper course to lower course of the river. Fish was an important item and a valuable protein source for the household diet. After the emergence of the new hydroelectricity plants, the locals observed a dramatic decline in the fish population as well as extinction of several species of fish. Blame is not fully on the recent wave of the hydroelectricity development, considering the fact that anthropogenic pressure on the lower section of the river was accumulating since early 1990s. However the hydroelectricity plants, which modify the river regime on the middle and lower course of the river and block the mobilization of the aquatic life, have the largest share from the local perspective.

The water mills are mundane mechanical apparatus, utilized for grinding the corn, basic diet item of the region. The locals grow corn in their gardens and hang them in *serender*[44] to dry. They grind dried corn in the watermills in small quantities as needed. The corn is one of main food supplements of local daily diet. The residents of the valley make corn bread and add corn to most of the dishes as ingredient.

There are numerous watermills in the settlements of the İkizdere Valley (Figure 3.4). The hilly geography, village spread and tone of the daily life pushed the locals to built several water mills for each settlement. The local people constructed small intake points in the streams to take water that was enough to turn the wheel, and built open channels to carry water from the stream to the watermill. Some of them were abandoned because of decreasing resident

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[44] A common wooden single room structure placed on high four poles. It is very common in the Eastern Black Sea region. Every household in the villages has a *serender*.

population. The ones near the resided houses are in working condition. The locals are meticulous about having an active watermill near their houses and keeping them clean. Each watermill is used by a group of households of kins, who belong to a family.

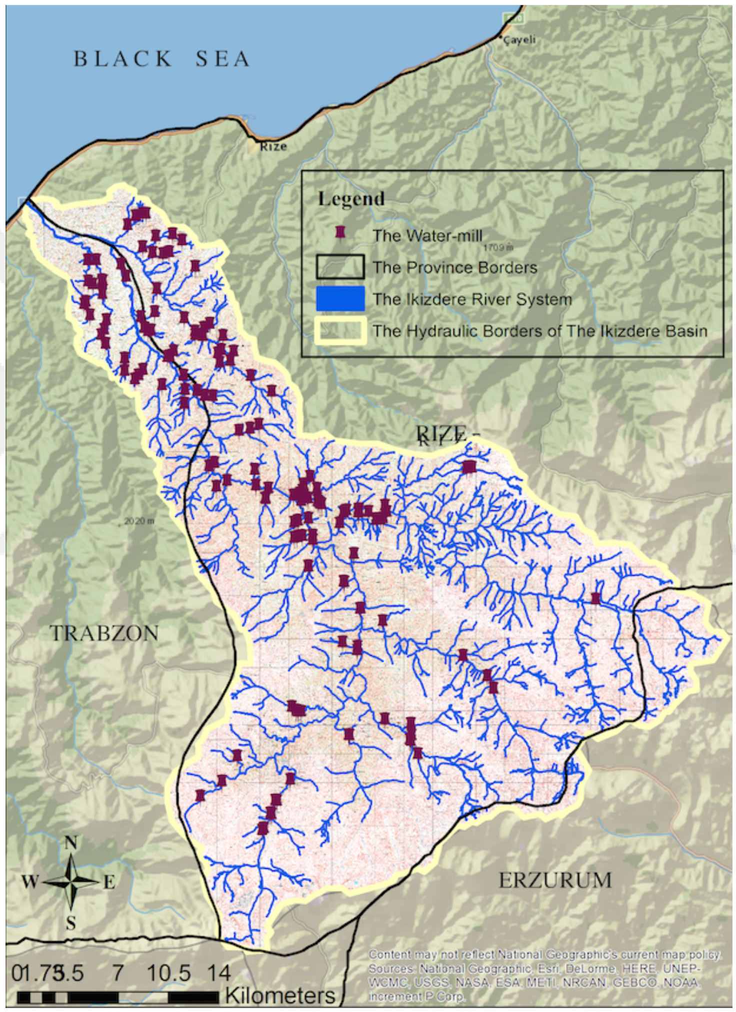

Figure 3.4. The locations of the watermills in the İkizdere Valley.

Water milling has deep historical, social and cultural roots in the İkizdere Valley as well as in the Eastern Black Sea Region. The watermills are known with the names of the family, who built them. The water mills have been integrated to daily lives in various ways. For example; the water mills create a social space especially for women, by allowing them to gather together and talk, while grinding their corn.

<u>3.2.5.3. Escalation of anthropogenic pressure on the İkizdere River Basin.</u> The anthropogenic pressure on the İkizdere River Basin and particularly on the İkizdere River system started to build up in past two decades. The most profound anthropogenic pressure comes from the industrial activities in the İkizdere Valley. The main industrial activity is the tea processing, and the official reports documented the existence of tea factories in the lower basin before the construction of İkizdere HES in 1953[45]. As of 2015, many tea factories, owned by the state and the private sector, lie on the riverbanks in the lower section. Güneyce Çay was established in 1990 in the town of Güneyce and it is the only tea processing factory in the upper part of the basin.

In late 1990s Karadeniz Sahil Yolu Project[46] opened the way to the exploitation of the river resources in the lower section of the basin. The private stone and sand quarries were allowed to do in-channel mining to supply the materials to the project. New stone and sand quarries were opened in the same area later for the regional construction projects, the hydroelectricity infrastructure and the ongoing *Karadeniz-Mezopotamya Dostluk Yolu Projesi (OVİT*)[47]. Overexploitation of the sediment from the river channel deepened and flattened the river bottom, and irreversibly changed the morphology of the İkizdere River. The state altered the river morphology in the lower section of the basin for the purpose of flood control. It built levees to contain the flow within the riverbed. These measures of flood control eliminated the relation of the İkizdere River with its floodplain.

In the past, new factories, such as the flour milling and packing plant and cement plants, repair shops and small production units were constructed in the lower section. A hotel with 350 beds on the Çamlık Tributary and a second hotel with 325 beds on the Cimil Tributary were open in the upstream section.

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[45] İyidere Basin Development Plan, 1971.

[46] Black Sea Coastal Road Project.

[47] Karadeniz – Mesopotamia Friendship Road Project (OVIT).

Hydroelectricity development, which started with construction of İkizdere HES in 1953 and continued with the construction of five more hydroelectricity plants in past 6 years, escalated the anthropogenic impact on the İkizdere Basin.

It is important to note that all these pieces of the infrastructure operating in the basin can be considered as potential point sources of pollution.

Additionally, the settlements, which consist of houses, schools, official buildings and others, gradually became points of pollution due to discharge of wastewater and solid waste. People are accustomed to use the river as a media conveying their garbage downstream. The size of this load increases in parallel to the increase in the purchasing power of people. Steep valleys, location of the settlements on the hill slopes and dispersed houses complicate a centralized wastewater treatment system. Due to high construction and operation costs, and lack of flat land to erect the facilities, municipalities could not establish wastewater treatment facilities, even for the compact town centers. People living near a stream were used to discharge their wastewaters to the nearest flowing water. In the past decade, the state took some action to prevent river pollution and required the households to dig sewer holes near their houses. The garbage collection started. The situation has been improved but the problem remains.

3.3. The History of Hydroelectricity Development in the İkizdere Valley

3.3.1. The history of measuring stream flow

Measuring stream flow has a short history in Turkey. The state officially initiated it with the establishment of *Elektrik İşleri Etüd İdaresi*[48] (*EİEİ*) in 1935. One of the major responsibilities of EİEİ was to survey the existing water resources and determine the most feasible ones for electricity production. Consequently EİEİ was authorized to set up stream gauging stations, and to collect and to record stream flow measurements on a regular basis.

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[48] The General Directorate Of Electrical Power Sources Survey And Development Administration.

EİEİ opened first stream gauging station, registered as İyidere-İkizdere station, in the İkizdere Valley in 1953. One year later EİEİ set up two more stream gauging stations, one was in the downstream of the İkizdere gauging station on the main river, registered as İyidere-Simsirli station, and second one was on the Cimil River, a large tributary of the İkizdere, registered as Cimilderesi-İkizdere station. In 1960, İyidere-İkizdere and Cimil Deresi-İkizdere gauging stations were closed down. Because these stations were put in operation to collect stream data required by the feasibility study of the İkizdere HES project. From 1960 to 1963, only one gauging station was operated in the İkizdere Valley. In 1964, EİEİ opened two stations on two main tributaries of the İkizdere, the Çamlık Deresi and the Tozköy Deresi, and registered them as Çamlıkdere-Dereköy and Tozköy Deresi-Tozköy respectively.

In early 1980s, another state institution *Devlet Su İşleri*[49] (*DSİ*) has started setting up stream gauging stations to record, to collect, to monitor, and to publish stream data. Following that DSİ built two gauging stations on two main tributaries of the İkizdere River, Cimil and Tozköy in 1981, and registered them as Tozköy Deresi/Tozköy and Cimil Deresi/Cimil. In 1999 DSİ closed Cimil Deresi/Cimil gauging station on the Cimil tributary and opened a new station, registered as Cimil Deresi/Köknar, at another point on the Cimil Tributary. Cimil Deresi/Köknar gauging station was closed down in 2008 due to technical problems.

DSİ took over the stream gauging stations of EİEİ in 1990s, and closed down its own Tozköy Deresi/Tozköy gauging station, and kept the EİEİ station on the same tributary and almost at the same attitude with longer historical stream flow data. When the Cevizlik HES was put in operation in 2010, the İyidere/Şimşirli station stayed in the dry section of the Cevizlik HES, and therefore DSİ had to close it down. As of December 2015, two stream gauging stations, namely Çamlık Deresi/Dereköy and Tozköy Deresi/Tozköy, are active in the İkizdere River Basin (Table 3.3).

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[49] The General Directorate Of Water Works.

Table 3.3. The natural stream flow gauging stations in the İkizdere River Basin as of December 2015.

Id	Station Name	Opened By	Date Open	Date Closed	Elevation (m)
2207	İyidere/İkizdere	EİEİ	09.01.1953	12.10.1960	530
2216	Cimil Deresi/İkizdere	EİEİ	09.19.1954	12.10.1960	540
2218	İyidere/Şimşirli	EİEİ	09.25.1954	2010	308
2215	Çamlıkdere/Dereköy	EİEİ	12.01.1963	-	942
2233	Tozköy Deresi/Tozköy	EİEİ	12.01.1963	-	1,296
22-077	Cimil Deresi/Cimil	DSİ	10.01.1981	09.30.1999	1,750
22-078	Tozköy Deresi/Tozköy	DSİ	12.01.1981	2001	1,210
22-096	Cimil Deresi/Köknar	DSİ	10.01.1999	2008	1,280

In 2014, five new stream flow gauging stations were set up for monitoring and controlling the minimum water requirement (*MWR*) that the hydroelectricity plants are required to release to the riverbed, after diverting the river for electricity production (Figure 3.5).

As a final word, it is important to emphasize that some scholars recommend the state to open more stations[50]. The findings of the scholars demonstrate that the stream gauging stations on free-flowing sections of the rivers are insufficient in number, and some of the stations are set up at unfit locations. Moreover, the scholars point to serious data quality issues (Jaoshvili, 2002; Eris, 2011). The hydrological data taken from available stations is either missing or inconsistent.

3.3.2. Preliminary basin development surveys and plans

The İkizdere River Basin was studied numerous times by different state institutions, which were in charge of the water resources of their time. The first development survey of the

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[50] Interview in July 2014.

İkizdere Basin was done by İller Bankası and consequently the İkizdere HES was constructed. In 1969, EİEİ performed a preliminary study of alternative hydroelectricity scheme, called Cevizlik, in the downstream of the İkizdere HES between the elevations of 456.5 and 204 m.

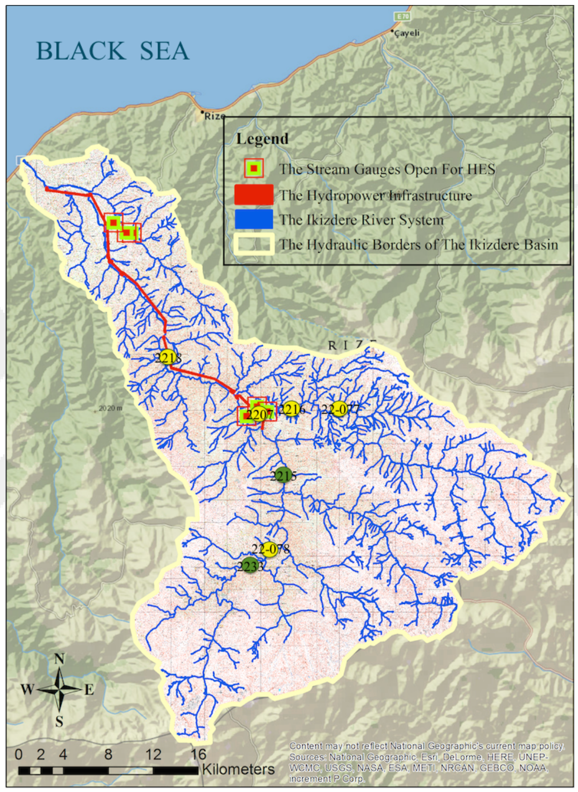

Figure 3.5. The approximate locations of the natural stream flow and MWR control gauging stations. DSİ closed down five natural stream flow gauging stations over the years and they are colored yellow. 22-096 Cimil Deresi/Köknar gauging station is not shown on the map.

This scheme consisted of a dam structure and an outdoor powerhouse. Another scheme, called Başköy, was studied for the utilization of the potential below elevation 204 m. Later Başköy scheme was abandoned, because of huge masses of alluvium in the riverbed. The lowest reservoir of the scheme near Kalecik, was also dropped, because of the geomorphological situation and unfavorable economical condition. The study concluded that additional investigations both in the field and in the laboratory were required in order to collect sufficient information before proceeding with more detailed design work.

In 1977, EİEİ carried out a more extensive survey study covering the İkizdere River Basin. Later, DSİ started a river basin study on a regional level, Eastern Black Sea Basin Preliminary Survey Study, in 1978 including the İkizdere Basin and completed it in 1980. In 1984 during the planning stage of Dereköy Dam, the İkizdere HES was investigated again, and this study was published in the Dereköy Planning Report. In 1989, DSİ was assigned to carry out another study to assess the capacity expansion of the İkizdere HES. In this rehabilitation study, all previous hydroelectricity development surveys and plans, and long-term stream flow data together with meteorological data were collected and analyzed. After evaluating several alternative design schemes for İkizdere HES, DSİ concluded that the existing plant was economically most feasible and cancelled the capacity expansion plan.

3.3.3. A state enterprise, the İkizdere HES

The İkizdere River is one of three main rivers in the Eastern Black Sea Region, and therefore it was the subject of hydroelectricity development efforts of the state since 1940s. The first development attempt was the construction the İkizdere HES, which started in 1955. The İkizdere HES was open in 1961 to generate electricity and it is in operation since then. The 60-year history of the İkizdere HES can be studied in three stages from the perspective of ownership; the state ownership, initiation of privatization efforts and the private ownership after privatization (Figure 3.6).

In early 1950s, the state was planning a hydroelectricity investment in the Fırtına Valley, another major river in the Eastern Black Sea Region. However a prominent local political actor from İkizdere, provincial head of leading party, interfered with this plan, pressured the politicians in Ankara and succeeded to change project site to the İkizdere Valley[51]. The İkizdere HES was planned and designed by Prof. Kazım Çeçen[52]. A Hungarian company, the GANZ, was in charge of the machines and equipment, and a Turkish firm did the construction (Figure 3.7). Local people worked in the construction. Hungarians trained some of the

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[51] Interview in December 2014.

[52] Kazım Çeçen is a Turkish hydraulic professor.

construction workers as technical staff. These locals were employed by the state as the first workers in the İkizdere HES.

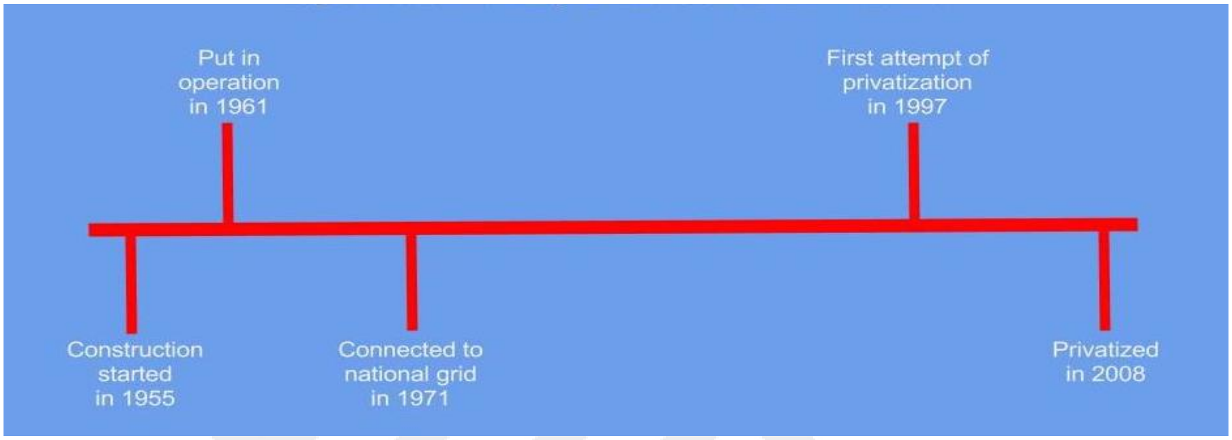

Figure 3.6. The major events in the history of the İkizdere HES.

The İkizdere HES was constructed to produce electricity, a scarce utility of the time. Electricity was an unknown phenomenon, a mystery for the local people in the İkizdere. A local resident, who worked in the construction, says, "We worked so hard to finish as soon as possible, so that we can see what the electricity is."[53]

Before the İkizdere HES, some of the towns had very small hydroelectricity and diesel plants. Tea factories in the region had auto-produced[54] some part of their own electricity demand. The plant was supplying the electricity to meet regional demand arisen from the factories in Trabzon and Rize. When the İkizdere HES was put in operation in 1961, the market section of the city of İkizdere was electrified. However the upper sections of the city and the villages could get electricity after 1970s. Electricity produced by the İkizdere HES was wholesaled to municipalities in the area.

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[53] Interview in December 2014.

[54] An auto producer generates electricity, wholly or partly for its own use to support its primary activity.

In early 1960s, the electricity demand in Turkey was lower than the supply. When the İkizdere HES was connected to the national grid in 1971, all the produced electricity could be consumed.

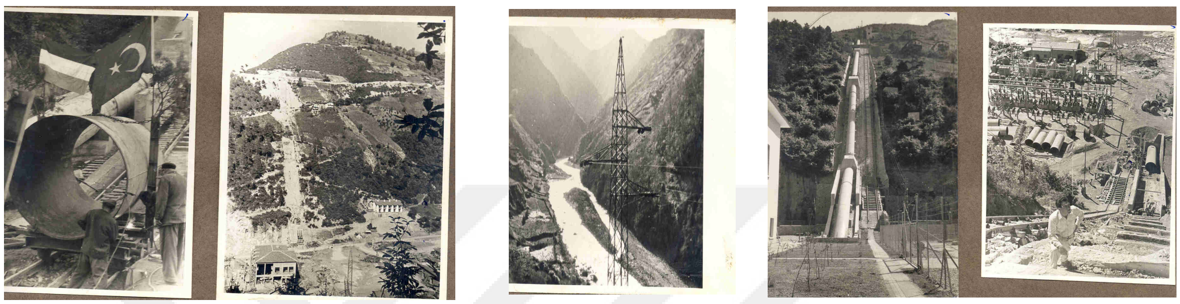

Figure 3.7. The photos from the construction activities of the İkizdere HES in 1950s. Source: The İkizdere HES photo archive.

3.3.4. Privatization history

3.3.4.1. 1st wave of privatization: Cancelled privatization attempts. In the Eastern Black Sea Region, the state made first attempt to privatize the hydroelectricity sector in late 1980s.

BM Müdendislik ve İnşaat Ltd. Şti, a private company, applied to the Ministry of Energy and Natural Resources, which was in charge of water resources at that time, to construct the Dilek-Güroluk HES project to produce electricity in the Fırtına Valley. The ministry signed an agreement with the private company on June 14, 1989, and signed a revised agreement six years later on September 21, 1995. BM Müdendislik ve İnşaat Ltd. Şti. was allowed to construct a hydroelectricity plant in the Fırtına Valley under the investment model, Build-Operate-Transfer. On 7.December.1995, the state gave authorization to the BM Mühendislik for the construction, and provided a guarantee to purchase the produced electricity. DSİ was in charge of water resources of the country, and therefore, the company signed an agreement with DSİ, called Water-Use Agreement on 17.January.1996. BM Mühendislik proceeded to the environmental impact assessment process, which was under the authority of the Ministry of Environment. The company submitted the environmental impact assessment report in May 1996 to the ministry. The ministry stated shortcomings of the report, did not approve it, and required the company to do revisions. The firm revised the report and submitted it again to the ministry in February 1998. The ministry did not approve the revised report and required the company to revise it. The company submitted 3rd revision in May 1998 and 4th revision in June 1998[55]. Instead of waiting for the decision of the ministry, the company tried to initiate the construction activities at the project site. But the local opposition in the Fırtına Valley stopped the firm[56]. In order to cancel the project in the Fırtına Valley, locals took an initiative and applied to Trabzon Cultural and Environmental Wealth Protection Council, to register the Fırtına Valley as a protected land. The council did register the Fırtına Valley as the protected land. However in spite of the council's decision, political pressure over the Ministry of the Environment built up and the ministry approved the environmental impact assessment report of project on 26.June.1998. Shortly after the approval of the environmental impact assessment report, in early July a construction launch ceremony was held with the attendance of the prime minister, Mesut Yılmaz, and the minister of Energy and Natural Resources, Cumhur Ersümer. The local struggle continued, and the local people of the Fırtına Valley, first, initiated a petition, and next, opened a court case against the project. After a long legal struggle, the locals won the court case and the court cancelled this politically supported project in 2001.

When Dilek-Güroluk HES project came to public notice in late 1990s, the state declared privatization plans for the İkizdere HES. Bilgin Elektrik Üretim, İletim, Dağıtım ve Tic. A.Ş. prepared *İkizdere Hidroelektrik Santralı Rehabilitasyon ve Tevsi Projesi Raporu*[57] for the Ministry of Energy and Natural Resources in August 1997. The ministry signed an agreement with the company for operating the İkizdere HES for a specified period, and making investment for the rehabilitation and expansion of the plant. When the privatization plan was made public, the people of the İkizdere Valley were opposed to it. As one informant narrated, the Minister of Energy Cumhur Ersümer and the Prime Minister Mesut Yılmaz were visiting the region at that time, and a group of people from İkizdere, including the provincial head of the leading party, met with them, and requested the cancelation of the privatization plan. After

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[55] The historical background of the Dilek-Güroluk HES was given in the expert report, "Trabzon İl İdaresi Mahkemesi Dosya No.: 1998/963, Dilek-Güroluk Hidroelektrik Santralı Bilirkişi Raporu" prepared for the administrative court.

[56] Interview in November 2014.

[57] İkizdere Hydroelectricity Plant Rehabilitation and Expansion Project Report (Translated by the author).

then, the cabinet did not approve the agreement and privatization plan of the İkizdere HES was halted in the first attempt.

The first wave of privatization, in the context of the Eastern Black Sea Region, had a character of a *selective clientilism* (Buğra and Savaşkan, 2014). The investor base was limited to a few private companies with single hydroelectricity project. As I explain in the following section, this situation drastically changed with the "sustainable development" of hydroelectricity program in early 2000s.

3.3.4.2. 2nd wave of privatization: Emergence of a flock of private projects and privatization of the İkizdere HES. The second wave of the privatization efforts was initiated by *Adalet ve Kalkınma Partisi* (*AKP*)[58], when they came to power with majority votes in 2002. Since 2002, AKP held the majority of the seats in the parliament and therefore was able to command and control law making process. This political context allowed the set up of the required legislative framework for privatization of the hydroelectricity sector, and fostered an *extensive clientilism* (Bugra and Savaskan, 2014) leading to a hydro-boom in Turkey (Erensu, 2013).

The second wave of privatization was reflected onto the İkizdere Valley in two ways. First, a group of companies applied to the state for their projects or for the state developed projects in the İkizdere River, and 24 hydroelectricity projects were approved (Table 3.4). Until 2016, four projects with five hydroelectricity plants were put in operation.

Table 3.4. The approved private hydroelectricity projects in the İkizdere Valley.

Project Name	River, Tributaries And Streams	Location (County, Province)	Company
Arı I-II	Cimil Tributary	İkizdere, Rize	Hilal Enerji Üretim Sanayi ve Ticaret A.Ş./ Arıhes Müş. Müh.Enj.San. ve Tic.Ltd.Şti.
Ayyıldız	Melez, Kunda, Arzayan Streams	İkizdere, Rize	Diktaş Enerji Elektrik Üretim

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[58] The Justice and Development Party.

			A.Ş.
Başbuğ	İkizdere	İkizdere, Rize	Diktaş Enerji Elektrik Üretim A.Ş./ Elektromekanik Yapı Malz. İnş.İmal.San. ve Tic. A.Ş.
Cevizlik	İkizdere River	İkizdere, Rize	Sanko Enerji (Sanko Holding)
Ceyhun	Çaterli, Uyran Dere Streams	İkizdere, Rize	Diktaş Enerji Elektrik Üretim A.Ş.
Çayhan	Not available	İkizdere, Rize / İspir, Erzurum	Erener Enerji Üretim A.Ş.
Deligör	Çamlık Tributary	İkizdere, Rize	Not Available
Dereköy – Demirkapı	Çamlık Tributary	İkizdere, Rize	Bess Elektrik Üretim San. Ve Tic. A.Ş.
Filiz	Anzer Tributary, Çakador Dere	İkizdere, Rize	Ayyıldız Enj. Ütr. ve Tic. Ltd. Şti.
Gelintaşı	Çamlık Dere	İkizdere, Rize	Yataksu Elektrik Üretim San. Tic. Ltd. Şti.
Güneyce Dam and HES	Baltacı and Maki Streams	İkizdere, Rize / Hayrat, Trabzon	AES-IC İçtaş Enerji Üretim Sanayi A.Ş.
İkiz	Ranos Streams	İkizdere, Rize	Not available
İncirli	İkizdere River	Kalkandere, Rize	Laskar Enerji Üretim A.Ş. (Adalı Holding)
Nizam	Çokçor and Taşlı Dere	İkizdere, Rize	Nizam Enerji Sistemleri Elektrik Makina San. Ve Tic. Ltd. Şti.
Orsa – 2	Cimil Tributary and Pancul Stream	İkizdere, Rize	Orsa Enj. Elek. Ürt. Tic. A.Ş.
Rüzgarlı I - II	Rüzgarlı Stream	İkizdere, Rize	Baysan Elektrik Üretim A.Ş. / Atabey Enerji
Saray	İkizdere River	Of, Trabzon	Mertler Enerji Üretim ve Paz. A.Ş. (Adalı Holding)
Sarmakol	Çokçor Stream	İkizdere, Rize	Davraz Enerji Elektrik Üretim San. Ltd. Şti.

Selin I	Cimil Tributary	İkizdere, Rize	Direnç Enerji Üretim San. Tic. A.Ş.
Selin II	Cimil Tributary	İkizdere, Rize	Direnç Enerji Üretim San. Tic. A.Ş.
Şimşirli	Yayla Dere Stream	İkizdere, Rize	Onur Elektrik Enerjisi Üretim, San. Ve Tic. Ltd. Şti. / Entek Enj.Tek.San Tic.Ltd.Şti.
Tozköy	Cimil Tributary, Çokçor, Göl and Kabahor Streams	İkizdere, Rize	Direnç Enerji Üretim San. Tic. A.Ş.
Tozköy II	Cimil Tributary, Çokçor, Göl and Kabahor Streams	İkizdere, Rize	Direnç Enerji Üretim San. Tic. A.Ş.
Yokuşlu-Kalkandere and Kızılağaç59	İkizdere River	Kalkandere, Rize	Sanko Enerji (Sanko Holding)

Second, the state decided to transfer the operating right of the state owned İkizdere HES to private sector in 2008. *Zorlu Holding*[60] offered the highest bid and purchased the hydroelectricity production license for 30 years. *Zorlu Holding* took over the İkizdere HES with the intent to increase the production capacity from 18.6 MW to 78.39 MW by building new infrastructure. This plan was submitted to DSİ in September 2008 and approved. The company revealed publicly its intention for expansion in 2011, and initiated a socio-environmental assessment study in the county of İkizdere. The aim of the study was to understand the positions of local people toward the expansion plan. The five-month study was very comprehensive. The final report was published in March 2012. Report found a strong public opposition toward the construction of additional hydroelectricity infrastructure. Then, the company declared that it cancelled the project in November 2013. *Zorlu Holding* prepared a low scale rehabilitation project for capacity expansion of the İkizdere HES same

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[59] It is important to note that the Yokuşlu-Kalkandere and Kızılağaç Project consists of two hydroelectricity plants, Yokuşlu/Kalkandere HES and Kızılağaç HES.

[60] Zorlu Corporation.

year. DSİ approved the project on 05.May.2014, and *Enerji Piyasası Düzenleme Kurumu*[61] (*EPDK*), issued an energy license for the capacity expansion on 10.Sept.2014. After that, the company prepared the detailed technical plans, but identified technical faults in the preliminary design and decided to modify the project, while further downsizing it. The revised project was submitted to the DSİ in June 2015. The downsized İkizdere HES capacity expansion project was approved by the state and construction activities were started in 2016.

After the issuance of Renewable Energy Law in 2005, the emergence of private hydroelectricity plants was materialized (Figure 3.8). As of 2016, there are six private hydroelectricity plants operating in the İkizdere Valley (Table 3.5).

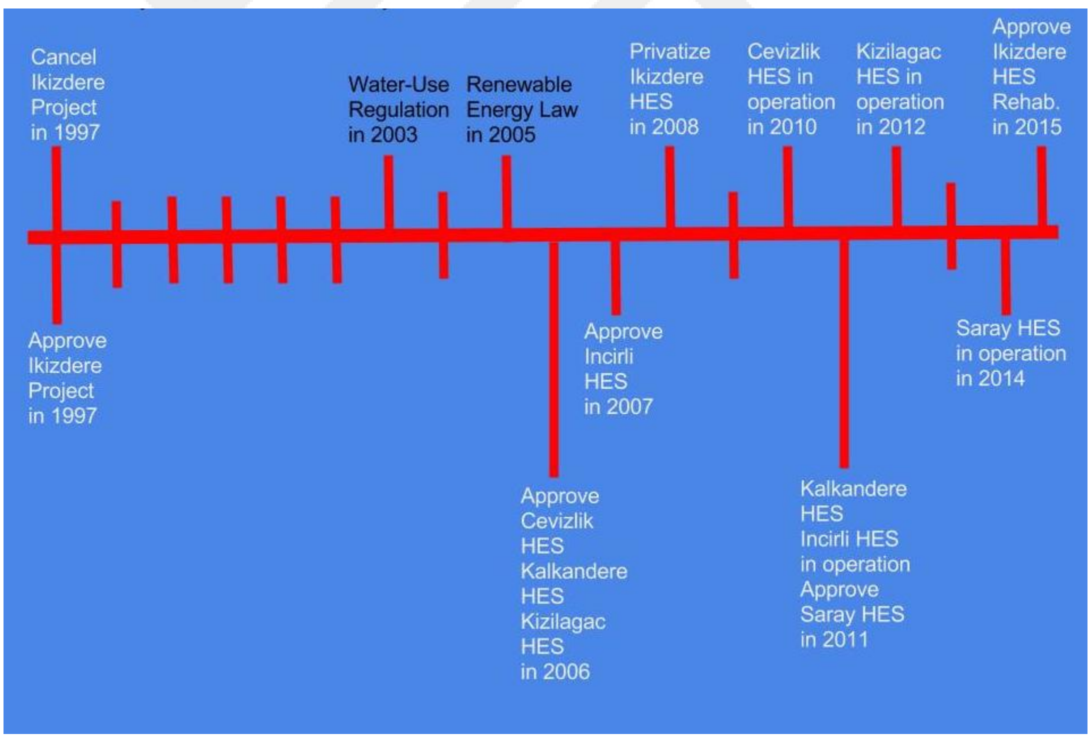

Figure 3.8. The main events of the privatization period of the hydroelectricity production in the İkizdere Valley.

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[61] The Energy Market Regulatory Authority.

Table 3.5. The hydroelectricity plants operating in the İkizdere Valley.

Name	License Received	License Period (Years)	Opened	Installed Production Capacity (Mw)	Owner
PRIVATIZED İKİZDERE HES	01.Sept.2008	30	1961	18.6	Zorlu Enerji
CEVİZLİK HES	24.Feb.2006	49	May.2010	100.0	Sanko Enerji
KALKANDERE/YOKUŞLU HES	14.Sep.2006	49	May.2011	40.0	Sanko Enerji
KIZILAĞAÇ HES	14.Sep.2006	49	May.2012	5.2	Sanko Enerji
İNCİRLİ HES	22.11.2007	49	May.2011	25.5	Laskar Enerji (Adalı Hold.)
SARAY HES	2011	49	July.2014	13.5	Mertler Enerji (Adalı Hold.)

3.4. The Comparatives

3.4.1. The institutional context

In 1950s, EİEİ was the authorized state institution in charge of assessing the hydroelectricity potential of the rivers of Turkey, determining the water resources for the development of technically and economically most feasible plans and preparing the national electrification plans. EİEİ set up the first stream flow gauges in the İkizdere Basin, carried out the first hydroelectricity studies of the İkizdere River, and prepared the feasibility plans of İkizdere HES project. The project, including the İkizdere HES and the regional transmission system, was contracted to a private company, Kesin Limited Şirketi, on 17.May.1955[62]. EİEİ supervised, first, the construction activities, and after then, the operations of the İkizdere HES.

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[62] Dahiliye vekaleti –on 23.5.1956 reply to a query raised by the Rize rep. İzzet Akçal and Mehmet Mete.

In early 2000s, the institutional context is much more complicated with multiple institutions, acting both in hydroelectricity and electricity sectors, the cross-institutional processes and emergence of private companies with the privatization of hydroelectricity development. In this crowded and complex picture, the hydroelectricity companies dealt mainly with three key state institutions, DSİ, EPDK and *Türk Elektrik İletim Anonim Şirketi*[63] (*TEİAŞ*), and involved with two key processes, licensing and environmental impact assessment.

3.4.2. The intent

In 1950s the national grid system did not exist, and therefore, the produced electricity in a plant was used to meet the electricity demand of the near-by industrial facilities and for the electrification of the proximate settlements. The İkizdere HES Project was planned with this intent. It consisted of a hydroelectricity plant and a transmission line to connect the plant to the regional electricity transmission system. The regional electricity transmission system was built to transfer the electricity produced by the İkizdere HES to the İyidere Substation and from İyidere Substation to the coastal system, which was extending from İyidere to the city of Trabzon in the west and to the city of Rize in the east along the coastline[64]. The main premise of the state was to provide electricity in a reliable and stable manner to the tea and timber factories located in the cities and small townships of Rize and Trabzon provinces. The İkizdere HES provided electricity to the provinces of Rize and Trabzon, the counties of İyidere (Rize) and Karadere (Trabzon). The Ministry of The Public Works and Housing was in charge of the İkizdere Project and the minister, Celalettin Uzer, provided a detailed list of beneficiaries of the İkizdere HES in 1964[65]. The start-up capacity was 15,000 kW. Two thousand kW was for the dozen tea factories, two thousand kW was required for the distribution grid of the tea factories, one thousand kW was for the Rize and Trabzon grid, five thousand kW was for the Trabzon Cement Factory, 3,100 kW was for the cities and towns, and remaining 1,900 kW was for the Black Sea Tile and Brick Plant, whose electricity demand

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[63] The Turkish Electricity Transmission Company.

[64] TBMM100011068-68 oturum-25-05-1956-Parliament proceedings.

[65] TBMM01026048-5-2-1964- Parliament proceedings.

was not determined at the time, and a small amount was kept as a reserve to meet unexpected demand.

Fifty years later, the premises of the five private HES and the İkizdere Rehabilitation Project were fundamentally centered on contributing to the national economy, and to the global energy market by providing green energy to the European countries that are required to purchase 22% of their energy demand from renewable energy sources after the Kyoto[66]. The plants were supposed to lower negative environmental impact of non-renewable energy sources, and to revive the rural socio-economic life by providing employment to local residents of the İkizdere Valley.

3.4.3. The technology and the engineering

3.4.3.1. The small hydro and the run-of-the river technology. The small hydroelectricity projects are considered renewable projects for their low installed capacity.

There is no established worldwide standard to define the amount of "low." In China, small hydroelectricity plant is defined as a plant with up to 25 MW installed capacity, in Japan as up to 50 MW and in Sweden as up to 1.5 MW. In Turkey, the state does not provide any scale in terms of installed capacity for renewable hydroelectricity plants. *Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına İlişkin Kanun* defines renewable energy sources and describes the hydroelectricity production plants as "either canal or run of the river type or with a reservoir area of less than 15 km^2."[67]

The small hydro projects have different designs and appearances (Figure 3.9). The run-of-the river type plants, which can work even with small streams, are most common in Turkey.

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[66] This premise was made in İkizdere Hidroelektrik Santralı (HES) Revizyon Proje Tanıtım Dosyası dated June 2015, Cevizlik Regülatörü Ve Hidroelektrik Enerji Projesi dated February 2009 and Kalkandere Projesi (Kalkandere Regülatörü ve HES Yapıları) Çevresel Etki Değerlendirme Raporu Nihai ÇED Raporu dated July 2009.

[67] Article 3, Item 3 of the The Law of the Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy (in English).

Similarly, run-of-the river hydroelectricity plants are dramatically different in installed capacity and in design. Some schemes are scaled-down versions of large-scale hydro plants with dams. Some projects do inter-basin water transfers by diverting water from one river basin and transferring it to other. Although the term run-of-the river is very flexible and the run-of-the river projects come in different sizes and designs, they have common features.

The run-of-the river plants have decentralized infrastructure, consisting of various pieces of physical facilities; multiple water intakes, forebay, water transmission canal or underground tunnel, head pond, penstock, powerhouse, access roads, switch yard and transmission lines (Figure 3.10).

The plants exploit both the stream flow and high *head* to produce electricity (Douglas 2007). Water intake facility diverts the river flow and transfers it to a forebay. The forebay keeps the sediments and directs water to a water transmission channel or to an underground tunnel, and then water flows to a head pond, and through penstock drops down to rotate a turbine to produce electricity in powerhouse. The diverted water returns to riverbed through a tailrace channel. The produced electricity is transferred, first, from the powerhouse to a switchyard, and then, to the national grid and beyond through transmission lines.

Whatever its design and size, each run-of-the river plant interrupts the natural flow regime of the river by diverting the river flow for electricity production, and reduces the flow between water intake facility and tailrace. This section left with reduced flow is called *diversion reach*. The length of the diversion reach is a critical factor in determining the impact of run-of-the river on environment (Yurtseven, 2012). It appears that simplicity of the design is another crucial factor. The large capacity run-of-the river projects with multi water intake infrastructures or *clusters* of run-of-the river composed of as interconnected groups of multiple run-of-the river projects have high impact on environment.

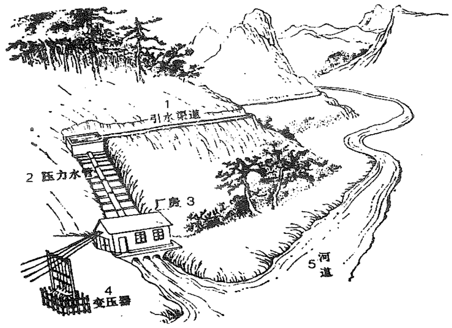

Fig. 7-2. A plant using a man-made channel to divert water and form a large head drop at one location.

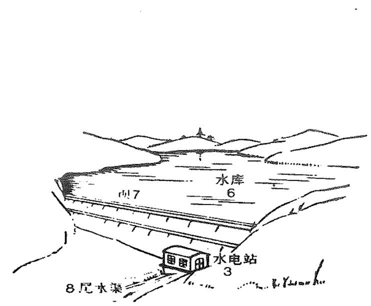

Fig. 7-3. A plant using a dam to form a head drop (station house at the bottom of the dam).

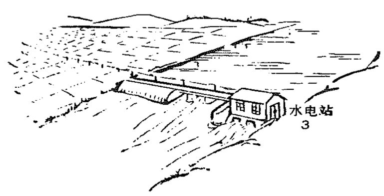

Fig. 7-4. A plant using a dam to form a head drop (station house at the side of the dam).

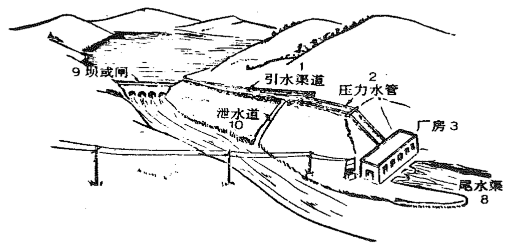

Fig. 7-5. A plant employing both a dam and water diversion channel.

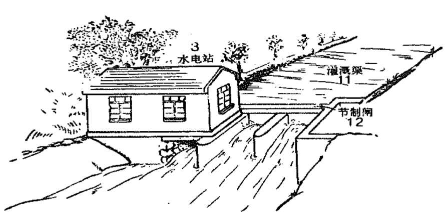

Fig. 7-6. A plant build on an irrigation channel.

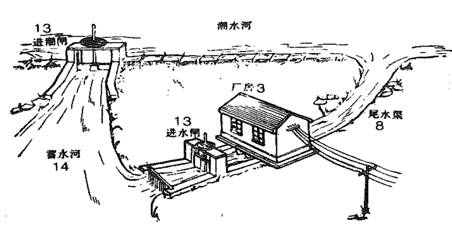

Fig. 7-7. Tidal power plant (electricity generation during low tide).

Figure 3.9. Different design schemes of small-scale hydroelectricity plants. Source: Taylor, 1981, Fig. 7-2 – Fig. 7-7 in pp. 171-172.

<u>3.4.3.2. Principles in site selection</u>. Kazım Çeçen, a hydraulics professor, developed a method to intake water from the mountain rivers and applied his method in the design of the İkizdere HES infrastructure. The most outstanding feature of his method is to minimize -by design- the amount of sediment load that a run-of-the river infrastructure takes with water. The sediment load is the major reason of the operational failures. Therefore its minimization prevents operational failures interrupting the electricity production, and increases plant efficiency (1962).

Figure 3.10. A standard infrastructure scheme of a run-of-the river hydroelectricity plant. Drawings by Hakan S. Alioğlu.

Çeçen made observations and a survey in the İkizdere River in 1950s and stated that the İkizdere River has a high sediment load capacity. The sediment load is the sediment carried in the stream flow. The sediment load capacity is related with the volume of the sediment. If the sediment load capacity of a river is high, it means that river basin has a capacity to generate high volume of sediment, and the river carries it through the river channels to sea. Both Çeçen and the past technical reports raised the high sediment load capacity of the İkizdere Valley as a serious issue that had to be addressed in site selection and design phase of the project development. Çeçen advised a detailed study of sediment load and sediment transfer besides economic feasibility in the planning of the water intake facilities. The size and availability of land were other factors that he examined (Çeçen, 1962).

In Çamlık and Cimil water intake facilities of the İkizdere HES, Çeçen implemented his method for diverting water, which can be called "facing the stream flow" or "along the stream flow." Basically Çeçen located each intake facility at sites, where the river channel was narrow and bending, and placed the facilities longitudinally in the channel, occupying only a portion of latitudinal section of the channel (Figure 3.11 and 3.12).

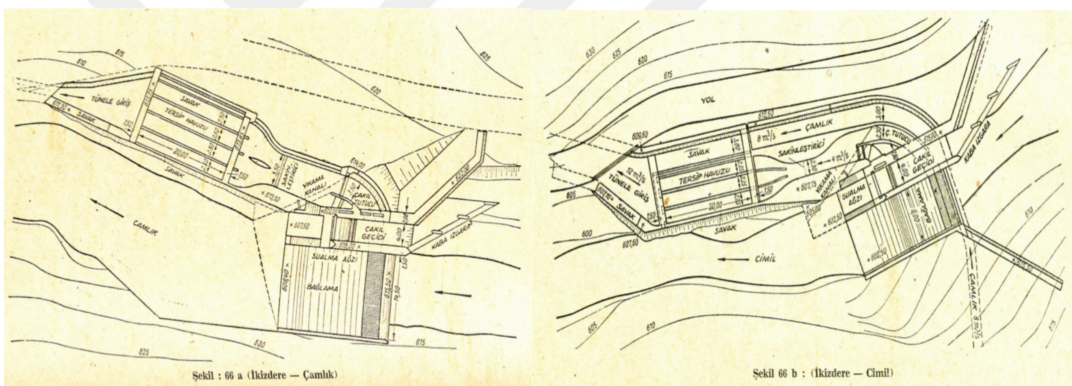

Figure 3.11. The technical drawings of the Çamlık (on the left) and the Cimil water water intake facilities (on the right). Source: Çeçen, 1962, pp. 114-115.

The emerged private hydroelectricity plants were designed with different principles. But two principles were in common. First, two HES, Kızılağaç and Saray, do not have water intake facilities, but rather they receive water directly from the HES in their upstream that is owned and operated by the same company. Rather than releasing the diverted water back to the İkizdere River, the companies preferred to send water directly to their next hydroelectricity plant in the row, and built a chained infrastructure. Kızılağaç HES is chained to Kalkandere/Yokuşlu HES and in a similar way, Saray HES is connected to İncirli HES by design. Second, their water intake facilities were built at the upper part of the assigned elevation range. This location decision allowed companies to maximize the head distance, which in turn theoretically maximizes the electricity generated. The water-intake infrastructures of private HES demonstrate that the extremely high sediment load capacity of the İkizdere River Basin was not taken into account in the design and location decisions.

Figure 3.12. The original infrastructure of the Çamlık water intake facility of the İkizdere HES. Source: Çeçen, 1962, pp. 91.

3.4.3.3. The production capacities. The determination of production capacities of the Cevizlik HES, the Kalkandere/Yokuşlu HES, the Kızılağaç HES and the İncirli HES were based on the past feasibility studies done by EİEİ and DSİ. Mertler Enerji did not provide any explanation on how the production capacity of the Saray HES was calculated in the project information report (Table 3.6).

The production capacities of HES in terms of number of tribunes and the production capacity of one tribune provide an insight to assess how much water is required at least to turn one tribune in each HES. It is important to note that the tribune production capacity of the Cevizlik HES is significantly high and the İkizdere HES has second lowest tribune capacity.

3.4.3.4. Elevations of the plants. The İkizdere HES was the single hydroelectricity plant in the İkizdere Valley from 1961 to 2010. Its two intake facilities, Çamlık and Cimil, were built respectively on Çamlık and Cimil tributaries of the İkizdere River at the elevations approximately 630.5 m and 625.5 m respectively. The power station was constructed at 458 m.

Table 3.6. The production capacities of the hydroelectricity plants with primary and secondary productions.

Name	**Production Capacity In Tribune Detail (Unit X Mw = Mw)**	**Primary Production[a] (Gwh)**	**Secondary Production[b] (Gwh)**
İKİZDERE HES	3 X 6.2 = 18.6	41.81	65.44
PRIVATIZED İKIZDERE HES REHABILITATION	3 X 6.2 = 18.6	41.81	65.44
CEVİZLİK HES	2 X 47.5 = 95.0	167.80	228.60
KALKANDERE/YOKUŞLU HES	3 X 12 = 36.0	51.41	98.80
KIZILAĞAÇ HES	3 X 2.6 = 7.8	9.00	18.00
İNCİRLİ HES	3 X 8.5 = 25.5	46.63	62.49
SARAY HES	2 X 6.75 = 13.5	15.16	35.17

a: Amount of energy guaranteed by the annual production.

b: Additional amount of energy, whose production depends on the annual climatic conditions and precipitation regime. If natural conditions are favorable, this is the maximum amount of electricity a plant can produce on top of primary energy.

The official project files of the hydroelectricity plants provide the elevations assigned to the projects by the state. The ranges are in sequence and the lower elevation of upstream plant overlaps the higher elevation of the downstream plant. They form a chain structure extending from 630 m elevation to the sea level (Table 3.7). In other words they assemble a single body of hydroelectricity infrastructure extending about half of the longitudinal distance of the river almost leaving no river segment with natural flow.

Table 3.7. The range of elevation allocated to hydroelectricity plants in the İkizdere Valley.

Name	**Elevation Range (m)**
İKİZDERE HES	630.50 – 458.00
CEVİZLİK HES	456.00 – 222.00
KALKANDERE/YOKUŞLU HES	220.00 - 119.00
KIZILAĞAÇ HES	119.00 - 102.00
İNCİRLİ HES	102.00 – 50.00
SARAY HES	39.00 – 9.75

3.4.3.5. Tunnels and pools. When water is diverted from the river by any one of the hydroelectricity plants in the İkizdere Valley, the water flows through underground tunnels and pools connected in series. A closer look to the water tunnel-pool structures of the hydroelectricity plants given in the project files reveals four issues (Appendix C). The first is that the dimensions of some tunnels and pools are missing in the documents. The second, there are inconsistencies in reported design configurations and the actual infrastructures (Table 3.8). The third, the sizes and functions of the tunnels and the pools in relation with flowing water create a capacity to slow down the water, to store it, to discharge it and to accelerate it, and consequently the overall structure of the tunnels and the pools has capacity to impact the İkizdere River regime. The final issue is that the total length of the underground tunnels is longer than the length of the water transmission tunnels in the emerged private HES. The reason of this difference was explained as a technical requirement of additional tunnels in the construction of the water transmission tunnels and for their maintenance.

3.4.3.6. Temporal and permanent land uses. The hydroelectricity companies temporarily occupied land as a construction site to park the construction vehicles and to build temporary living quarters for the workers. They permanently required land for their infrastructures. The temporal and permanent land uses of the hydroelectricity companies were stated either unclearly or partially in the environmental assessment reports and in the project information reports.

Table 3.8. The water transmission tunnel and pool details of the hydroelectricity plants.

Name	Total Length Of Tunnels Water Flows* (m)	Total Length Of Tunnel Built* (m)	Number Of Pools	Total Volume Of Pools (m^3)
İKİZDERE HES	4,441	4,441	3	a
PRIVATIZED İKİZDERE HES REHABILITATION	4,441	4,441	3	a + 538
CEVİZLİK HES	8,096	10,886	4	165,185 + b
KALKANDERE/YOKUS LU HES	7,231	9,118	3	53,403 + c
KIZILAĞAÇ HES	1,365 + d	1,365 + d	2	11,400
İNCİRLİ HES	5,150	5,400 + e	3	3,000 + f
SARAY HES	4,168	4,168 + g	1	79,787

*: The lengths of tunnels in two columns are different, because during construction of the water tunnels additional tunnels were open for construction and maintenance of the water transmission tunnels.

a: The volume of pools in the original design.

b: The volume of sedimentation pool, whose dimensions were not provided in the environmental assessment report.

c: The volumes of stilling pool and water intake reservoir were not specified in the environmental assessment report.

d: The length of the tailrace, was not specified in the environmental assessment report.

e: The length of the penstock was not given in the project introduction report.

f: The volumes of water-intake pool and surge chamber were not given in the project introduction report.

g: The lengths of the approach tunnels, which were open for the construction and maintenance of the transmission tunnel, were not given in the environmental assessment report.

3.4.3.7. Land expropriated for the infrastructure. Project information files and environmental impact assessment reports contained information about the land expropriations (Table 3.9). However they were partial, inconsistent and missing quantitative figures. The sizes of the expropriated forestland, agricultural land and other types of private land were not provided in the Environmental Impact Assessment Report of the Cevizlik HES, although the report acknowledged the expropriations. Similarly, the project information file of İncirli HES stated the expropriations of forestland and agricultural land, however did not provide any quantitative figure such as the size of the expropriated forestland.

Table 3.9. The sizes of forestland, private and agricultural lands that were expropriated by the hydroelectricity plants.

Name	**Forestland (m^2)**	**Agricultural Land (m^2)**	**Other Private Land (m^2)**	**Total Land (m^2)**
İKİZDERE HES REHAB	800.00	0.00	0.00	800.00
CEVİZLİK HES	Unspecified	Unspecified	Unspecified	Unspecified
KALKANDERE Project[a]	17,200.00	24,945.00	16,355.00	58,500.00
İNCİRLİ HES	Unspecified	10,000.00	Unspecified	20,000.00
SARAY HES	0.00	18,720.97	7,429.4568	26,150.42

a: The Kalkandere Project consists of two hydroelectricity plants, the Yokuşlu/Kalkandere HES and the Kızılağaç HES.

3.4.4. Economics

3.4.4.1. Profile of the operators. Three corporations operate six private hydroelectricity plants in the İkizdere Valley. The corporations are family-owned and have different corporate culture, business values, priorities and management styles, and code of conduct in establishing relations with the local communities.

Zorlu. *Zorlu Enerji* owned by *Zorlu Holding*[69] operates the İkizdere HES. Main line of business of *Zorlu Holding* is home textiles and polyester yarn. *Zorlu Holding* established *Zorlu Enerji* in 1993 as an auto-producer to provide electricity and steam to the corporation's textile factories. An auto-producer is a company, usually in manufacturing, that requires

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[68] Bush land.

[69] Zorlu Corporation.

electricity for its primary production activity and generates electricity, wholly or partly for its own use, as a secondary activity.

In the following years, Zorlu adopted a strategy to grow in the energy market by selling electricity and steam to national companies and by making energy investments abroad in Russia, Pakistan and Israel. In 2000, *Zorlu Elektrik Enerjisi İthalat İhracat and Toptan Ticaret A.Ş.* was established for the marketing, sales and export of the electricity. In 2008, *Zorlu Holding* purchased the operating rights of eight hydroelectricity plants, including the İkizdere HES.

Zorlu Holding declares that the core principles of their corporate strategy are the public interest and environmental protection, and claims that its aim is to provide eco-friendly, local and renewable energy sources for Turkey's economy and energy sector. In the vision statement of the corporation, sustainability has a profound place, and *Zorlu Holding* claimed to set an example by issuing the first *Sustainability Report* in the energy sector of Turkey in 2011.

Zorlu Enerji carried out a very comprehensive, five-month socio-economic study to understand the local people's ecological sensitivity, economic positions toward their capacity expansion plans for the İkizdere HES in 2011. When the study found out the strong local opposition, the company postponed the İkizdere HES Capacity Expansion Project until 2015 while downsizing it. The construction has started in 2016.

Sanko. *Akım Enerji*, a subsidiary of Sanko Holding[70], operates the Cevizlik HES, the Kalkandere/Yokuşlu HES and the Kızılağaç HES. Main line of business of *Sanko Holding* is textile as well. Its first factory was established to manufacture cotton yarn in 1963. The company remained as a small local producer until 1980s. In 80s and 90s, *Sanko Holding* grew in national textile market while expanding its business connections abroad. The company entered to the cement industry by purchasing privatized state-owned cement factories in

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[70] Sanko Corporation.

1990s. Later, in 2007, the company built its own cement plant. *Sanko Holding* entered to the energy sector in 2006 and as of 2016 owns six hydroelectricity plants and two wind farms.

Adalı**.** *Adalı Holding*[71] owns two hydroelectricity plants in the İkizdere Valley. *Laskar Enerji*, a subsidiary of *Adalı Holding*, operates the İncirli HES and another subsidiary, *Mertler Enerji* operates the Saray HES. *Adalı Holding* was established in 1960s. It was a long-time contractor of US Government Agencies. *Adalı Holding* made investments in tourism sector, and entered into energy sector, after the hydroelectricity sector was privatized in 2003.

3.4.4.2. How the projects were financed? *İller Bankası* financed the İkizdere HES as a project of the İkizdere Municipality, and used external funds to finance 50 % of the project budget. *İller Bankası* was established by the state in 1945 to finance the construction and reconstruction projects of the city and towns as a national development and investment bank.

The five private hydroelectricity plants were financed by corporate capital and international renewable energy funds, given as loans through private Turkish banks. For the Saray HES project, *Adalı Holding* used credit from The Turkish Mid-size Sustainable Energy Financing Facility[72] (MidSEFF), which is credit consortium launched by the European Bank for Reconstruction and Development (EBRD) with the support from the European Investment Bank (EIB) and European Commission (EU). The mission of MidSEFF is stated as "to provide a total of EUR 1 billion in loans through seven Turkish banks (Akbank, Denizbank, Finansbank, Garanti, İşbank, Vakıfbank, Yapıkredi) for on-lending to private sector borrowers, for financing mid-size investments in renewable energy, waste-to-energy and industrial energy efficiency."

3.4.4.3. Life expectancy. The life expectancy figures given in the environmental impact assessment reports and project information files were not consistent (Table 3.10). Infrastructural life expectancy was given only for the Cevizlik HES. The İncirli HES report did not specify the technical life expectancy of the project, whereas it claimed that it will be

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[71] Adalı Corporation.

[72] http://www.midseff.com/tr/.

longer than 49 years, which is the license duration. For the İkizdere Rehabilitation project, no life expectancy figure was provided in the file.

Table 3.10. The life expectancies of the hydroelectricity plants.

Name	**Licence Duration (Years)**	**Technical Life (Years)**	**Economical Life (Years)**	**Infrastructure Life (Years)**
PRIVATIZED İKİZDERE HES REHABILITATION	30	NA	NA	NA
CEVİZLİK HES	49	35	50	100
KALKANDERE / YOKUŞLU HES	49	35	50	Longer than 49
KIZILAĞAÇ HES	49	35	50	Longer than 49
İNCİRLİ HES	49	More than 49	50	NA
SARAY HES	49	NA	49	NA

3.4.4.4. Financials of the plants. The environmental impact assessment reports and project information files did not provide standard information associated with itemized cost amounts. Four cost categorizes were identified in the official documents; the cost of constructing the plant, the cost of electromechanical equipment including the tribunes, the cost of feasibility assessments, project planning, design and control activities, and the cost of expropriated land, in other words, the estimated amount of money to pay to the land owners for expropriating their land. The İncirli HES and the İkizdere HES Rehabilitation project files did not give estimates in any of the cost categories. The environmental impact assessment report of the Kalkandere/Yokuşlu HES included the Kızılağaç HES, and their construction and electromechanical costs were given as an aggregated number (Table 3.11).

The figures show that the construction cost is the highest cost category and the estimated money to pay to the landowners for expropriating their land is the minimum one.

Table 3.11. The cost categories of the hydroelectricity plants and the estimated cost amounts.

Name	**Construction (Million US Dollars)**	**Electromechanical Equipment (Million US Dollars)**	**Assessment, Project, Control (Million US Dollars)**	**Expropriation (Million US Dollars)**
PRIVATIZED İKİZDERE HES REHAB.	Not Specified	Not Specified	Not Specified	Not Specified
CEVİZLİK HES	47.91	23.39	5.27	0.50
KALKANDERE PROJECT	55.75[a]		4.00	0.25
İNCİRLİ HES	Not Specified	Not Specified	Not Specified	Not Specified
SARAY HES	40.63	4.05	4.47	0.30

a: The Kalkandere Project consists of two hydroelectricity plants, the Yokuşlu/Kalkandere HES and the Kızılağaç HES. Their construction and electromechanical equipment costs were provided as a consolidated amount.

When the estimated annual cost and benefit of the plants as written in the reports are examined, the discrepancies in the information provided are seen (Table 3.12). For example, in the project introduction file of the İkizdere HES Rehabilitation Project annual estimated

Table 3.12. The estimated annual cost and benefit of the hydroelectricity plants.

Name	**Annual Cost (Million US Dollars)**	**Annual Benefit (Million US Dollars)**
PRIVATIZED İKİZDERE HES REHABILITATION	Not Specified	Not Specified
CEVİZLİK HES	82.81	136.64
KALKANDERE/YOKUŞLU HES	6.32	6.34
KIZILAGAÇ HES	Not Specified	1.13
İNCİRLİ HES	4.83	4.86
SARAY HES	5.53	2.07

cost and benefit were not provided. It is important to note the contradiction in the official report of the Saray HES. According to the report, the annual cost of operating the Saray HES is higher than annual benefit. In other words, as the company is operating the plant, it is losing money instead of making a profit. These examples illustrate the controversial aspect of producing official reports that is examined in detail in the Chapter Six.

3.4.5. The local communities

3.4.5.1. The contributions of the hydroelectricity plants to households and the local economies. Until its privatization in 2008, the İkizdere HES was the only state-owned industrial enterprise in the county for almost fifty years. Its establishment was a milestone for the local economy, because as an ex-worker said, "Many of us saw cash for the first time." Metaphorically, the İkizdere HES was the "Germany of İkizdere,"[73] turning poor villagers into cash-earning workers. Regular paying jobs brought wealth to the households and local shops, where local workers spent most of their salaries until transportation to shops in Rize and Trabzon became easier.

The İkizdere HES provided employment with on-the job training and job security to several generations of workers. One resident told me that he was the third generation in his family to work in the İkizdere HES. Many locals worked there all their lives. At the time of privatization in 2008, around 60 people were working. Like other state enterprises in Turkey, the İkizdere plant had a housing unit for its workers.

The state-owned İkizdere HES was accepted as a representative of the state, and the local people established paternalistic relations with it. For example, when locals had an electrical problem or broken equipment, they asked help from mechanics or electricians working at the İkizdere HES.

The situation changed dramatically after the privatization of hydroelectricity plant. *Zorlu Enerji* closed the workshops and downsized the labor force to 35 through subcontracting and consolidating some positions. After privatization, financial contribution of the İkizdere HES to the household economies and to the local economy diminished. However, *Zorlu Enerji* was

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[73] Turkish villagers migrated to Germany to seek employment starting early 1960s.

careful in keeping good relations with the locals. Its public relations strategy was publicized as "we see local people as our –neighbors-."[74]

Sanko Holding and *Adalı Holding* have followed a different employment strategy. They have employed locals as subcontracted security guards and cleaning staff, and offered very limited long-term technical positions to the local residents. Each provides approximately 10 permanent jobs, considerably smaller number than the labor size of the İkizdere HES. -- most workers come from outside. Hence their economic contribution to household and local economies is limited.

In a survey conducted in 2015, 90% of surveyed population agreed that the hydroelectricity production in the valley provided no benefit to their families (Figure 3.13).

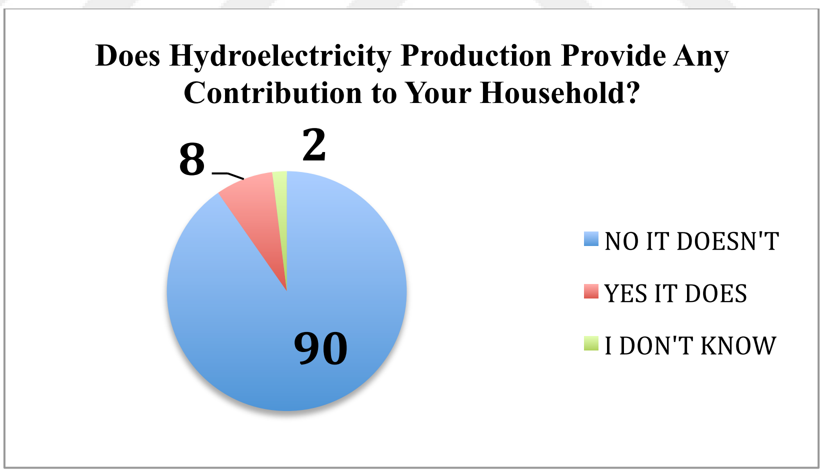

Figure 3.13. Economic contribution of hydroelectricity production to households in the İkizdere Valley. Source: Survey results[75].

3.4.5.2. Local perceptions and understandings of hydroelectricity development. The perceptions of the local people in the İkizdere Valley toward the İkizdere HES are positive. Its long-term contribution to the household and the local economy is one reason. The other

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[74] Zorlu Energy Group 2012-2013 Sustainability Report, page 56. It was downloaded on July 7, 2015 from company site.

[75] Survey questions are given in Appendix B.

reason is its low scale impact on the environment. The people who witnessed its construction and observed its operation over the years recognized that the İkizdere HES inevitably caused changes on the landscape and in the river flow. But its impact over the landscape was minor, and it reduced the flow in only a short section of the river. People who technically know the plant attributed its low-scale impact on the environment to its two characteristics. The first is its "human scale"; in other words its smaller size compared to other hydroelectricity plants in the İkizdere Valley made it have less of an impact. The second is its intake facilities do not store the water. Even people living in the downstream section of the valley, who have never seen the plant, have a positive attitude toward it. Some even described it as "environment friendly," noting that the İkizdere HES did not change the water regime, destroy the aquatic habitat of fish, or damage their relations with the İkizdere River.

The local perception of hydroelectricity development drastically changed with the emergence of private hydroelectricity plants. The amount of water the hydroelectricity plants leaves in the riverbed became a concern for the local people in the valley. Only 21% of the people think that the private hydroelectricity companies leave enough water, whereas 66.4 % think they do not.

The large production capacity of private plants is another concern for the locals. The Cevizlik HES was distinguished among other plants by being the largest in terms installed capacity. Residents have claimed that large-scale hydroelectricity plants require more water, and release no water to the riverbed. They complained that the "River is dried out."

Another major issue is the cascade order of the hydroelectricity plants. When hydroelectricity plants form a chain-like structure on the river, "Water no longer flows in the riverbed, rather flows in the canals" and "The İkizdere River turned into a -hydro-river-" as locals say. The cascading structure intensifies the negative impact. The locals blamed the cascading hydroelectricity structures for substantially reducing flow in the riverbed, and said that "They depleted the İkizdere Valley." What is important to see is that in their perception, the hydroelectricity development negatively impacts not only the river, but also the valley.

The local people assessed the state and private hydroelectricity companies based on several criteria. The first criterion was whether the hydroelectricity plants produce electricity for the public good or for their profit. Whether they provide jobs to the locals residing in neighboring settlements was the second criterion. 51% of population in the survey area thought that private hydroelectricity companies did not provide any benefit to the valley. A third criterion was the companies' consideration for the environment and their willingness to obey the rules and regulations. Local people are concerned that private companies are more interested in making a profit than protecting the environment. It is significant that in the survey, 52% of the respondents agreed that the private hydroelectricity companies damaged the valley.

A unique comprehensive study[76] carried out by *Zorlu Enerji* in 2011 also provided a valuable insight on the position of local people toward hydroelectricity development. The study is very informative regarding how the locals' positive perception has reversed in the past decade. The qualitative socio-cultural study was designed particularly for the capacity expansion plan of the İkizdere HES. However, its findings can be generalized to understand how locals perceived hydroelectricity development, why they opposed it and under what conditions they supported it at the time of the study. The study showed that a majority of the participants, 64%, conditionally supported the hydroelectricity development. 45% of the conditionally supporters, gave socio-environmental consideration as a required condition. For 38%, better planning, tighter enforcement and higher technology were required. 17% of interviewees opposed to the expansion plan of *Zorlu Enerji,* and 62% of them perceived hydroelectricity development as a threat to their socio-environmental conditions. Half of the supporters supported the project, because they recognized it as a project for national development.

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[76] PAR Danışmanlık. 2012. Zorlu Doğal Elektrik Üretim A.Ş. İkizdere HES Rehabilitasyon Projesi Paydaş Katılımı Stratejisi ve Uygulama Planı Yönetici Özeti (The İkizdere Hydroelectric Power Plant Rehabilitation Project Stakeholder Engagement Strategy and Implementation Plan in English), Ankara. Plan was downloaded on December 14, 2013 at http://nurantalu.com/wp-content/uploads/zorlu_final_yonetici_ozeti.pdf

3.4.6. Environmental and social impacts of privatization

The environmental and social impacts that have been observed after the emergence of the hydroelectricity plants vary in type and scale.

The longitudinal section of the İkizdere River impacted by the five new hydroelectricity plants is roughly 30 km - a significantly longer than the section of the river impacted by the İkizdere HES. Each plant occupied more of the landscape, and the amount of expropriated land grew. This observation suggests that the impact of the emerged private HES on the local residents and on environment is higher.

The longitudinal profile of the İkizdere River is concave, with a high slope between the high mountain range to the city of İkizdere in the upstream section of the basin (Yurtseven, 2012) (Figure 3.14). The İkizdere HES was constructed approximately at the lower end of this section. The middle section of the İkizdere Basin extends roughly from the city of İkizdere to the village of Ağaçseven, which is 10 km from the Black Sea. The slope in this section is lower than the slope of the upper section. The Cevizlik HES, the Kalkandere/Yokuşlu HES and the Kızılağaç HES were constructed in the middle section. The location of the powerhouse of the Kızılağaç HES is approximately the starting point of the downstream section of the İkizdere Basin. The İncirli HES and the Saray HES stay in the downstream section. The hydroelectricity plants impact half of the river basin.

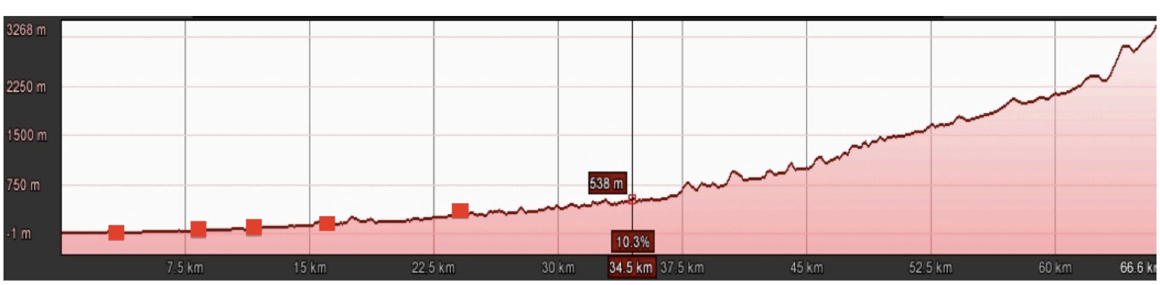

Figure 3.14. The longitudinal section of the İkizdere River with the location of the power plant of the İkizdere HES. The approximate locations of the other five power plants are plotted to the original figure. Source: Yurtseven, 2012, pp. 134, Ek Şekil 32.

Since the first private HES began to operate in 2010, the people of the İkizdere Valley have noticed a decline in fish populations and an increase in water pollution, which becomes apparent in low flow months.

The elders in the İkizdere town recalled that the expropriations of land done for the İkizdere HES in the 1950s affected only a few families. In contrast, the expropriations done for the five private HES and for their electricity transmission infrastructure has impacted a significant population in the valley. One indicator of the size of the impact is the soaring number of court cases brought by local people in response to expropriation decisions of the state.

Moreover, with the emergence of private hydroelectricity plants, various water issues have arisen. The first issue is the minimum water requirement (*MWR*), or as locals call *cansuyu.*[77] The local people are concerned with the reduced river flow, and MWR has become a source of tension between the local people and the hydroelectricity companies. The issue of MWR became the subject of a court case that I examine in Chapter Six. The second issue, explosives used to create tunnel openings in the 1950s damaged the hydraulic system and negatively affected the springs that provide drinking water to the settlements. However, the scale of construction was small and the issue did not become a problem. In the 2000s, the scale of the drinking water problem caused by tunnel openings became much more serious. Despite the fact that the Eastern Black Sea Region is known to have highest amount of precipitation in the country, the settlements near the tunnels began to face problems with their drinking water. Moreover, two watermills became inoperable after the construction of the Cevizlik HES, and when the Saray HES was put into operation, the irrigation of, seven thousand square meters of agricultural land was affected[78]. Finally, there was a fish farm in

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[77] The local people call the MWR "*cansuyu*," metaphorically relating MWR to the amount of water barely enough to keep a living being alive.

[78] The information on irrigated agricultural land and fish farm was given in the EIA Report of the Saray Hydroelectricity Plant.

the project area of the Saray HES that used water from the İkizdere River. How it has dealt with reduced water levels is not clear.

4. A PARADOX OF DEVELOPMENT: CONSTRUCTION OF WATER ABUNDANCE CREATES WATER SCARCITY

4.1. Introduction

The relation between scarcity and abundance has shaped the trajectory of the state's "sustainable development" of hydroelectricity program. The scarce energy and abundant water narratives were coupled and managed strategically to justify the necessity and the urgency of producing electricity from the rivers. As a result, major changes have occurred in natural resource governance. The state control was extended to all the rivers of the county for developmental purposes (Şekercioğlu et al., 2011), while deregulations in the forms of opening protected areas to energy projects and disabling the water governance in the river basins were set.

What is outstanding is the paradox that emerged with the hydroelectricity program on the local scale. A program driven by an abundant water narrative has actually created various forms of water scarcity in the İkizdere Valley. The construction activities of hydroelectricity infrastructure extending into half of the basin have caused the loss of springs or diminished them, and some villages have faced drinking water shortages. The water usage of the hydroelectricity companies creates a water scarcity in the river that threatens the environment and operation of the other hydroelectricity companies in the downstream. These conditions induced conflicts between involved parties in water-use practice, and direct our attention to power relations that have emerged with hydroelectricity development in the İkizdere Valley.

I argue throughout this chapter that the scarcity and abundance narratives were used in a discursive way to legitimize policies that initiate and sustain the privatization of the hydroelectricity sector and the commodification of natural resources. They have environmental and social implications in the national and local scales.

Scarcity is a well-studied topic in economics and social sciences. Until the19th century, the noun "scarcity" meant something temporary as a term of shortage or a period of insufficiency of supply (Yapa, 2005). Later it became the foundational postulate of the political economy and the key to the idea of value (Mehta, 2011: 69). As scarcity is integrated into the economics, it is seen or perceived as a permanent condition (Ross, 1996), a natural product of the supply and demand interactions. Critical studies in the geography, science and technology, along with anthropology and economics critique the conventional visions of the scarcity and identify the notion of scarcity as a social construct (Bakker, 2000; Kaika, 2003; Barnes, 2014, 2009; Mehta, 2011).

When the term "scarcity" becomes no longer sufficient to describe all cases of scarcity, it is separated into two cases: socially constructed and otherwise. For the cases not socially constructed, scholars suggested different terms, such as "absolute scarcity," "natural scarcity" (Ross, 1996), "general scarcity" (Yapa, 1996) and "lived/experienced scarcity" (Mehta, 2011). In this dissertation, I use the term "material water scarcity" to describe the experienced water scarcity cases in the İkizdere Valley, and "energy scarcity" to describe the constructed energy scarcity.

"Social scarcity" is conceptualized as a condition that is constructed or produced by social, political, economical and technological means (Gyawali and Dixit, 2010) and as a process (Yapa, 2005) defined as follows,

> By expanding the demand for a commodity, which is done by contracting alternative sources of supply, and by expanding the use of that commodity beyond the original end use and second, alternatives are rendered unavailable (290).

Studies show that resource scarcity can be an outcome of regulatory regimes (Bakker, 2000), technology choices (Gyawali and Dixit, 2010), and government policies (Bakker, 1999; Barnes, 2009), or it can be a vehicle to legitimize policies for resource privatization (Erensu, 2013; Kaika, 2003) or for large infrastructural developments (Mehta, 2005).

In the literature, the studies on the interrelations between the narratives of scarce energy and abundant water are almost none, and the construction of abundance is rarely dealt with (Alatout, 2009). This chapter makes an inquiry into how the scarce energy and abundant water narratives are co-constitutively constructed to legitimize the privatization of hydroelectricity sector and commodification of natural resources, and how the hydroelectricity development policy promoted with an abundant water resources narrative actually leads to materialization of water scarcity in the river valleys.

I begin with an overview of how the energy scarcity narrative was constructed, and what factors contributed to its construction. Next, I examine the abundant water narrative and how it was linked to the notion of scarce energy. Subsequent sections focus on implications of the development narratives on natural resources, first on the national level, then on the local level. On the national level, I investigate the comprehensive shift in natural resource governance policy. I analyze the material water scarcity cases observed in the İkizdere Valley after the construction of five private hydroelectricity plants with the program, examine how they are handled, and address the emerged power dynamics, and social and environmental vulnerabilities.

4.2. The Construction of Energy Scarcity

4.2.1. Materiality of electricity

The materiality of a resource often makes it poorly suited for commodification (Bridge, 2000; Bakker and Bridge, 2006; Bakker, 2007). Electricity cannot be stored; therefore what is produced assumed to be consumed simultaneously. The materiality of electricity demands the attainment of supply-demand balance in the management of electricity production and consumption. If demand for electricity is higher than the supplied electricity, electricity blockages can occur, entailing economic, social and political consequences. If demand is lower than the supplied electricity, the electricity production plants cannot utilize their installed capacity. Supply shortage has more serious consequences for the state than demand shortage; therefore the electricity supply is planned to be higher than the demand in electricity production and consumption management. The materiality of electricity enforces a technical condition on the management of electricity production and consumption and the uncertainties involved in the consumption create a space of politics in which the production is planned to meet the variable demand. Variable electricity demand and its expected rise are two of the foundations over which the scarce energy narrative is constituted.

4.2.2. Narratives of energy scarcity

In general, the states use population growth, life-style changes and an increase in the economic activity as fundamental assumptions in constructing the demand scenarios for estimating electricity consumption. Similarly, the Turkish State employed these and similar conventional assumptions in constructing a narrative of energy scarcity. The state has presented population growth, economic growth, urbanization, and technological development in Turkey as the driving forces that are increasing energy demand, with an emphasis on its expected annual rise at an accelerating rate[79]. In this approach, other international and national factors influencing and affecting the national electricity demand become almost invisible, and not considering these factors has implications for the overestimation of electricity demand.

In this section, I focus on the assumptions presented by the state and unpack them to provide some insights into how the electricity scarcity narrative has been constructed. The argument linking the growth in electricity demand to a growing population is weak because although the growth of population is a variable, it is a steady one, and therefore can be estimated with a high degree of certainty. Similarly, the contribution of urbanization and technological development, which are associated with life-style change, onto the growth of electricity demand is a variable. It contributes to the growth of electricity demand with a

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[79] The Minister of Energy and Natural Resources, Taner Yıldız and General Manager of EÜAŞ, Halil Alış stated the drivers of ever increasing energy demand in Elektrik Üretim A.Ş. 2014 Yıllık Raporu (Electricity Generation Company 2014 Annual Report). Report was downloaded on November 29, 2015 from www.euas.gov.tr. The World Bank highlighted growth in population, economy and industrialization as the main drivers of growth in energy demand. See the news "Wind, Water, and Steam – a Triple Win for Turkey's Energy Sector" downloaded on April 3rd, 2016 at http://www.worldbank.org/tr/news/feature/2013/05/30/wind-water-steam-a-triple-win-for-turkey- energy-sector.

constant increase, but cannot explain its expected acceleration. The accelerating energy demand expectation of the state implicitly rests on the expectation of economic growth that not only depends on the national policies and programs, but also on global markets and economy. How national electricity demand was influenced and affected by the global economic crisis in 2001 and 2008 provides evidence to validate this conclusion. In spite of the growth in population and urbanization, annual electricity demand dropped significantly during two global economic crises and recovery took at least a year or two[80].

Nowadays, national electricity demand is again lower than the supplied amount[81] in spite of the growing population and urbanization, as I described in previous section. This unusual situation is related to the recent sharp drop in the price of oil. Low oil prices boosted the oil demand globally[82] and consequentially affected the energy mix of Turkey by substituting for electricity and other energy sources, and therefore, caused a bust in the electricity production sector. This situation offers strong empirical evidence that global and international economic factors influence the national electricity demand, and have a significant power to affect its expansion and contraction.

4.2.3. High expectations: Problems in electricity demand estimations

Another important factor in the energy scarcity narrative is the faulty demand estimations of the state. Particularly, the state has a tendency to overestimate electricity demand. The 2013 Annual Report the Turkish National Committee of World Energy Council addressed large gaps between the realized and the estimated electricity demand values for 1989 and for

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[80] World Energy Council Turkish National Committee published *Enerji Raporu 2013* (Annual Energy Report 2013), in January 2014. In section 7.2.1 at page 238, the report shows that the electricity demand was dropped from 8.3% to -1.1% from 2000 to 2001. It was 4.5% in 2002 and rose to 6.5% in 2003. During 2008 global crisis, the electricity demand was dropped from 8.8% in 2007 to 4.3 % in 2008 and -2.0% in 2009. It rose to 8.4% in 2010. Report was downloaded on April 3rd, 2016 from http://www.dektmk.org.tr/incele.php?id=MzA2.

[81] Speech given by Cansen Basaran Symes, President of Executive Committee of Turkish Industrialists' and Businessmen's Association, in "World Energy Outlook Turkey Presentation" meeting in January 11, 2016.

[82] Clifford Krauss, "Oil Prices: What's Behind the Drop? Simple Economics," published on February 16, 2016 in The New York Times. It is downloaded in July 2, 2016 at http://www.nytimes.com/interactive/2016/business/energy-environment/oil-prices.html?_r=0

1998. The report acknowledges the fact that reasonable deviations in the estimations should be expected, and concludes that these deviations, which are as high as and even higher than 30%, however, cannot be accepted as "reasonable."[83]

The repeated failures in electricity planning force us to ask, what these failures actually succeed, and it becomes necessary to review the "side effects" of these failures (Ferguson, 1994). The state uses electricity demand estimations as an apparatus to justify shifts in energy policies and to legitimize and promote new energy development programs. The experts have stated that the faulty electricity demand estimations and bad planning were the main reason for shifting energy policies[5,6]. The energy crisis in the late 1990s forced the state to import electricity and to make uneconomical natural gas import agreements that were later identified as the main cause of increasing dependence on foreign energy sources and the high currency deficit[84]. Another prominent implication of this crisis in the early 2000s was that it provided a context for the state to liberalize the energy market and privatize the hydroelectricity sector (Erensu, 2013). Moreover, the state had used electricity demand estimates in claiming an emerging electricity crisis, with the worst scenario to occur in 2009 and with the best scenario to occur in 2011[85]. Erensu emphasizes that although the crisis in the late 1990s was perceived as a failure of the state in energy planning, the electricity crisis narrative in early 2000s fostered a fundamental planning endeavor toward a liberalized energy market with privatization and commodification in hydroelectricity sector (2013).

In 2012, TEİAŞ published 10-year electricity forecasts of high / low demand scenarios for the period between 2012 and 2021. In a low demand scenario, the electricity demand will increase from 244,026 GWh to 424,780 GWh with an average 7.4% annual growth rate. According to a high demand scenario of TEİAŞ, the average annual growth rate is 9.1%. In contrast, DSİ, the state institution involved with hydroelectricity development, has estimated

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83 World Energy Council, Turkish National Committee Report for 2013, page 257.

84 World Energy Council, Turkish National Committee reports for 2005-2006 and for 2013 provide an overview of the crisis.

85 TEİAŞ, *Türkiye Elektrik Enerjisi 10 Yıllık Üretim Kapasite Projeksiyonu* Report, published in 2006. Report was mentioned in *2005-2006 Türkiye Enerji Raporu* of World Energy Council Turkish National Committee. This report was published in December 2007. It was downloaded on 18.August.2014 from http://www.dektmk.org.tr/pdf/Enerji_Raporu_2005-2006.pdf.

the annual average growth rate of electricity demand until 2030 in a range 6 to 8 %. It is important to note that these estimates of electricity growth rate are significantly higher than 4.2%, the average of annual growth rates of electricity demand. Moreover, the electricity demand rate estimates of two state institutions are significantly higher than the world average of 2.4%, the developed countries average of 4.1%, and the developing countries average, which is less than 2.0%[86].

Contrary to the expectations of high growth rate in electricity demand, the electricity demand has been realized significantly lower than estimated in the early 2010s. In 2016, the hydroelectricity producers were struggling with the low-demand crisis. The oil-prices are considered as the reason for the low electricity demand. Experts estimate that the crisis will be deepening until 2018 and then dissolve slowly[87].

4.3. The Construction of Water Abundance

4.3.1. Narratives of water abundance

Su Akar, Türk Bakar[88].
Turks stare at water while it flows.

This Turkish proverb is often used in government circles in a way that metaphorically

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[86] DSİ Hydroelectricity Energy Policy Presentation, 2007. Downloaded www.DSİ.org.tr

[87] In a news article, a bank official reviewed the supply surplus situation in the electricity sector. He stated that the drop of oil prices as the primary reason. The news article was titled "Elektrikte arz fazlası şiddetlenebilir, zorlanan piyasadan çıkar" and was published on 07.April.2016. It was downloaded on 22.April.2016 from http://www.hurriyet.com.tr/elektrikte-arz-fazlasi-siddetlenebilir-zorlanan-piyasadan-cikar-40083806.

[88] See the article *"Su akar Türk bakar" tarih oluyor* at http://www.yenisafak.com/gundem/su-akar-turk-bakar-tarih-oluyor-111731. The proverb became a subject of a conflict between Prof. Eroglu, the minister of Environment and Forestry and a representative in the parlimanet in 2012. Prof. Eroglu argued the necessity of hydroelectricity projects for the future of Turkey. See the article *"'Su akar Türk bakar' kavgası"* at http://www.hurriyet.com.tr/su-akar-turk-bakar-kavgasi-20383417. Prime Minister and later The President used the proverb in a modified way, " Su akar Turk yapar" saying "Turk develops or uses as the water flows" in his speech about the national development target for 2023 in 2013 and about the success of completed hydroelectricity projects in 2016. See the articles, "*Erdoğan:"Artık -su akar Türk bakar- yok. Artık –su akar Türk yapar"*- at http://www.milliyet.com.tr/erdogan-artik-su-akar-turk/siyaset/detay/1806001/default.htm, and "*Erdoğan: Su akar Türk bakar düşüncesini ortadan kaldırdık*" at http://www.sabah.com.tr/gundem/2016/05/17/erdogan-su-akar-turk-bakar-dusuncesini-ortadan-kaldirdik.

presents rivers as wasted energy resources if they are not dammed for hydroelectricity production. The use of this proverb implies how the state views only certain aspects of the natural resources that can be utilized for development (Kadirbeyoğlu and Kurtiç, 2013). Scott calls this narrowed developmental perspective "tunnel vision" forming "a synoptic view of a selective reality" (Scott, 1998:11) that highlights the exploitable dimension of natural resources. This tunnel vision is widespread in large-scale hydraulic development in many regions of the world (Rosenberg et al., 1997; Bakker, 1999) and was invoked for the "sustainable development" of hydroelectricity program in Turkey.

The state uses the concept of "benefit" as a leverage point in conceptualizing water as the energy source. Rivers are presented as unbeneficial and therefore useless if untapped for the hydroelectricity production, as stated by the Minister of Forestry and Water Works:

> *Boşa akan su kaynaklarımızdan hidroelektrik enerji üretimi için faydalanmak üzere önemli adımlar attık*[89].
> We have taken important steps in order to benefit from our water resources uselessly flowing for hydroelectricity electricity production.

Another group of narratives draws on the hydroelectricity potential of the country and emphasizes the unutilized part of the potential, then uses these figures in a comparative way to create a notion that a country with high hydroelectricity potential has not used its potential effectively and has fallen behind developed countries such as the USA, Japan, Norway and Canada. These narratives are fueled with the notion of national developmentalism, a strong-state tradition in Turkey, whose fundamental goal is to "catch up" with developed countries (Arsel, 2005a).

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[89] The article of the minister, titled "Türkiye'nin Su Politikası: Suyun Ekonomi Politiği" (The Water Policy of Turkey: Politic Economy of Water), was published in İTÜ journal, issue no: 70 (October-December 2015). Downloaded on November 14th, 2015 at https://www.ituvakif.org.tr/dergi/sayi_70.pdf.

4.3.2. Visibility of water

The general assumption made for the Eastern Black Sea Region is that water has always been an abundant resource. In a geography represented by rain, fog, rivers and streams, and green landscape, what do the state and the hydroelectricity companies see with their tunnel vision?

In his famous work *Discipline and Punish,* Michel Foucault, explaining the role of visibility in the use of power over its subjects, writes that "visibility is a trap" (1995: 200). According to Foucault, making subjects fully visible, either literally under the full lighting or by any other means so that they can be seen constantly and recognized immediately, makes the subjects more manageable and controllable. Dove used Foucault's work, in his book *The Banana Tree At The Gate,* in explaining how the indigenous people of Borneo kept co-existing subsistence and market economy activities partially invisible in order to protect the natural resources from the colonial state. As Dove writes, "Invisibility makes exploitation harder for the state" (2011:16).

Benefiting from this line of thinking on visibility, I suggest that the visibility of water engendered by perpetual rainfall and the numerous small and medium size perennial rivers of the Eastern Black Sea Region has empowered the water abundance narrative of the state, and therefore has made the region a main target for the hydroelectricity development.

The topographic and geographic characteristics of the İkizdere Valley make the water visible. The steep alpine hill slopes, low soil depth and granite rock foundation, extending from the middle section of the river basin to the upper lands, all make surface runoff high. The water-soil interaction has created a complex hydraulic system and a hilly topography. Even when the amount of rainfall is small, water on the surface moves downhill by opening numerous channels and forming waterfalls. This on-the-surface move of the rainfall toward the river system through the landscape feeds the İkizdere River all year long and makes the İkizdere River, its tributaries and all its streams, very visible.

The social construct of the visibility of water is another factor contributing to the water abundance narrative for the region. Referring to Bruce Braun, it is a "wider circulation of texts and images by which geographical and ecological imaginations are constructed" (2002:76). The Eastern Black Sea Region is described as *Yeşil Karadeniz* (Green Black Sea) and presented through the visual means such as the photos, Google images and so forth, as an area with spectacular views of forests, rivers and streams, often pictured under fog or rain. The encyclopedic information widespread in the books and documents define the climate of Rize, the province in which the İkizdere River as,

> *Rize her mevsim bol yağışlı ve ılıman olan okyanus iklimine sahiptir.* (Akman, 1971; Güner et al., 1987)
> Rize has an oceanic climate with temperate temperature and abundant precipitation all year round.

Images of rivers and foggy mountains, along with climate myths, empower the abundant water narrative of the state and misrepresent the environment (Fairhead and Leach, 1996; Robbins, 2003). The water-focused representation ignores the existence of two climatic regimes in the region, one drier than the other, and the variability and seasonality of natural conditions.

4.3.3. Metrics of water abundance

The rate of stream flow plays a key role in constructing the water abundance narrative. Stream flow rate or shortly stream flow is the key determinant of hydroelectricity potential and is the ultimate data used as input in a whole range of decisions from hydroelectricity infrastructure design and to determining MWR amounts for the hydroelectricity plants. The stream flow is the metrics of the availability of the water at the measurement point. But also it is a metrics of variability and seasonality of the water at that specific point on the river, however the abundant water narrative ignores this fact.

Jessica Barnes explains in her book *Cultivating the Nile* how the water level in the

Egyptian irrigation system becomes the metric of scarcity. She explains its function as one that "translating the availability of irrigation water into a figure for the water level in a particular canal section, reducing the complexities of water flow into digits" (2014: 48). This single figure representing the water level can move in different circles with ease so that the water level in a canal can be checked and read by different stakeholders and eventually serve to various purposes. This metric becomes the main leverage point of the day-to-day water scarcity discussions, issues and conflicts within the irrigated landscape of Egypt.

In a similar manner, in the context of the hydroelectricity development in Turkey, the stream flow measurements that reveal complexity, variability of river regimes and other distinctive features of rivers are represented by a single figure: average stream flow. However, average stream flow is itself actually very aggregate figure. It is the average of annual average flows, which itself is an average - the average of daily average flows in a year. The daily average flow is the average of real stream flow measurements done in a specific day. This highly aggregated figure is used to represent the rivers in the hydroelectricity discussions and hydroelectricity project justifications.

Besides the average stream flow figures, synthetically produced stream flows, contribute to the abundant water narrative of the state, as I discuss in the next section.

4.3.4. Estimating the hydroelectricity potential

The hydroelectricity potential is the prominent factor in the construction of the abundant water narrative. In academia, hydroelectricity potential is roughly formulated as follows:

$$P = c \times h \times Q,$$

where P is the annual hydroelectricity potential in kilowatts, c is a constant multiplier related with efficiency, gravity and density of water, h is the head distance in meters, and Q is the average flow rate in cubic meters per second. This formulation consists of two variables. The first one is the head distance. Head distance depends on the river topology and the project design. When a hydroelectricity project is designed on a specific geography, the vertical distance between the intake facility and powerhouse gives the head distance. The head distance is a variable, but it is a design variable and controllable and it is fixed to a figure. On the other hand, the second variable, the average flow rate, depends on various climatic conditions, natural and anthropogenic factors. It is an uncontrollable natural variable. However, it can be estimated statistically from real stream flow measurements taken over time.

The estimation of hydroelectricity potential is done in a bottom-up way by EİEİ and DSİ[90]. The state institutions have determined the hydroelectricity potential in multiple scales. The first is the river basin scale. They have selected the major river basins and small river basins with large catchment areas, and set up stream flow gauges to measure their flows since 1935. By using the real stream flow measurements, they developed master plans for these river basins in the 1970s[91]. The master plans, in general, investigate various alternative hydroelectricity schemes for a river basin, and estimate how much electricity each scheme can produce while taking into account technical and economic constraints. The scheme, which theoretically produces the maximum amount of electricity, is determined, and its theoretical production capacity is assumed to give the hydroelectricity potential of the river basin. On the other hand, the hydroelectricity potential of an unstudied river basin is calculated very roughly. Since their stream flows are not gauged, synthetic methods are used to estimate the average stream flow. The method, first, takes the average head distance of the river basin with estimated average stream flow, and calculates a gross hydroelectricity potential. Next, it takes 50% of gross hydroelectricity potential, assuming that only half can be realized due to technical constraints. This figure gives the technically attainable hydroelectricity potential. Finally, the method takes 50% of technically attainable hydroelectricity potential, assuming that 50% can be economically feasible, and accepts it as a technically attainable and economically feasible hydroelectricity potential.

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[90] When EİEİ was closed in 2011, DSİ took over the responsibility of EİEİ.

[91] For example the Fırtına River Basin Master Plan and the İkizdere River Basin Master Plan in the Eastern Black Sea Region.

The second scale is the national scale. The national hydroelectricity potential is simply the sum of two figures. The first is the total of the estimated hydroelectricity potentials given in the master plans of the river basins. The second is the sum of the estimated hydroelectricity potentials of the unstudied river basins.

The technically attainable and economically feasible hydroelectricity potential of Turkey was determined in the 1970s after the master plans were completed. However, in a recent publication[92] the state officials, scholars and private sector provided conflicting estimates. Scholars used the 140 billion kWh as the technically and economically feasible hydroelectricity potential of Turkey, referring to DSİ reports. The DSİ Director presented a higher estimate, 160 billion kWh, and the Minister of the Forest and Water Works supplied even a higher estimate, 165 billion kWh, and underlined that the technically and economically feasible hydroelectricity potential can be increased to 180 and even to 200 billion kWh. These different estimates of the hydroelectricity potential of the country indicate the existence of the hydraulic politics empowering the abundant water narrative.

4.4. Materialization of the Consequences in National Scale

4.4.1. Paradigmatic shift in natural resource governance

The contemporary environmental legislative framework and the structure of environmental institutions have been shaped by domestic and external sources of influence since the 1970s (Kibaroğlu and Başkan, 2011). A governmental body dealing with the environmental issues was established in 1973. It was turned into an under-secretariat on the environment by the Prime Ministry in 1978. In 1991, the under-secretariat was replaced with the Ministry of Environment. The ministerial structure with its own budget and staff pushed the environmental legislative efforts as well as the implementation and enforcement of the

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[92] İTÜ journal, issue no: 70 (October-December 2015).Downloaded on November 14th, 2015 at https://www.ituvakif.org.tr/dergi/sayi_70.pdf.

policies and regulations on the protection and conservation of the natural resources (Kibaroğlu and Başkan, 2011).

The significant part of the legislative work on protection and governance of natural resources, including water resources, was done after the early 1980s (Adaman, 1997; Cerit-Mazlum, 2007; Adaman and Arsel, 2010). The first initiative was the issuance of the Environmental Law in 1983. The second major step was the issuance of the Environmental Impact Assessment Bylaw in 1993. The Ministry of Environment was instrumental in its issuance. The bylaw has forced the consideration of environmental issues in the development projects. Over the years, the environmental legislation has developed in various aspects, and environmental administrative structure has expanded and become established on the provincial level. Moreover, the state has signed numerous international agreements. As Adaman and Arsel stated, "Turkey boasts not only a strongly-institutionalized state machinery, but also well-developed environmental legislation that has been bolstered through negotiations with the European Union on the Environmental *Acquis* since December 2009" (2010: 2).

In spite of the existence of well-developed environmental legislation and strong institutionalized administrative structure expending to the rural regions, environmental problems have intensified since the early 2000s. Adaman and Arsel argue that the "paradoxical situation" emerging in environmental protection is an indication of unwillingness and lack of ability on the part of the state. The state's unwillingness is observed particularly in areas where the state empowers development over environmental protection and conservation. Adaman and Arsel address the inability of the state to be a factor in enforcing the environmental legislation, linking it to historically rooted patronage-based reciprocity and to corruption. For Adaman and Arsel this paradox in environmental governance and protection is related to the neoliberal policies of the state, and "the nation's environmental integrity is rapidly and often times irrevocably compromised" (2010: 14).

Studies emphasize that the ministerial and institutional re-structuring has accelerated in the majority-ruling era of the AKP since 2002. The Ministry of Environment merged with the Ministry of the Forestry in 2003. DSİ, literally a development agency, was attached to the

Ministry of Environment and Forestry in 2007; this was interpreted as an act undermining environmental policy, particularly the protection and monitoring of water resources, due to the conflict of interest between DSİ and the Ministry (Kibaroğlu and Baskan, 2011). In 2011, the state took another bold step in institutional restructuring on the ministerial level, and reshuffled the ministries that were responsible for the environment, natural resources, including water, and urban planning and development. EIEI was closed down in 2011. The environment was merged with urban planning to form the Ministry of Environment and Urbanization, while forestry and water management were put under the Ministry of Forestry and Water Affairs. DSİ was connected to the Ministry of Forestry and Water Affairs. Scholars who have studied sustainable development view the restructuring of ministries and institutions related to the environment as a consequence of neoliberalization of the Turkish State (Adaman and Arsel, 2010; Kibaroğlu and Başkan, 2011).

4.4.2. Commodification and privatization of the rivers

The Constitution in use[93] defines water as "a public good under the State's trusteeship. The authority to explore and manage water resources is vested in the State" (Kibaroğlu and Başkan, 2011:4). However, the state cleverly evaded this constitutional civil law without contesting it by issuing the Water-Use Right Agreement Bylaw in 2003. The bylaw was defined as a fundamental law allowing the "privatization of Turkey's rivers" (Harris and Işlar, 2013: 4), the privatization and greening of energy production (Erensu, 2013), "liberalization of Turkey's hydroelectricity sector" (Başkan, 2011: 83) and "liberalization and deregulation of the national energy and electricity sector" (Scheumann et al., 2011: 141). It was also considered as a part of neoliberal shift in environmental governance (Harris and Işlar, 2013) and particularly in water resources management (Scheumann et al., 2011).

The Water-Use Right Agreement Bylaw was primarily designed for privatization of the hydroelectricity sector. This bylaw allowed private companies to take over the hydroelectricity projects developed by DSİ/EİEİ or develop their hydroelectricity projects and

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[93] Changed after the coup in 1982 and in effect since.

operate them for a temporary period. The bylaw defined an extensive version of Build-Operate-Transfer (BOT) model, which had been tried in the past. BOT model was introduced to the electricity sector in 1984, enabling the private sector to construct and operate hydroelectricity plants for a certain period and then to transfer the plants to the state. However, what is unique about the Water-Use Right Bylaw was that it set a new regulatory framework extending the authority of DSİ to all the rivers of the country to govern them for hydroelectricity production.

DSİ was established in 1953 to develop and manage water infrastructure in Turkey. Its role is similar to the role of the US Bureau of Reclamation (Scheumann et al., 2011) extending over national space. DSİ is also the ultimate authority in allocating public water resources and protecting water rights (Kibaroğlu and Başkan, 2011). Therefore any institution, private company or individual must obtain the approval of DSİ before using any water resource. DSİ has a very centralized institutional structure with three administrative levels: the national, the regional and the provincial level. The state utilized two key areas of authority of DSİ, development of water infrastructure and allocation of water rights, to extend its control to all the rivers of Turkey.

A water-use right license coupled with an energy license is an entitlement given to a private company in connection to a specific section of the river with hydroelectricity potential. The private company can use the river flow at that specific section of the river to produce hydroelectricity for a temporary period. The energy license was designed as a transferable entitlement that can be exchanged between two private companies. The energy license is transferred with the water-use right license. The transferable character of the licenses constituted an unofficial setting in which the companies with licenses sold them to companies that wanted to enter the hydroelectricity sector. Under these conditions, what exchanged were the specific sections of the rivers with hydroelectricity potential or, in another word, the stream flows with hydroelectricity potential, turning the natural resources into a commodity of exchange. Referring to Polanyi's "fictitious commodity" concept, "anything that is bought and sold must have been produced for sale is emphatically untrue in regard to them. In other words, according to the empirical definition of a commodity they are not commodities"

(Polanyi, 2001: 72), the stream flows that are not "produced for sale" are made "fictitious" commodities. The state changed the commodity status of the stream flows from temporary to permanent by allowing recursive licensing in 49 year-intervals in 2009.

4.4.3. Opening protected lands to energy projects

In Turkey, the protected land legislation and the institutional setting are rather complex, disintegrated and fragmented. Protected lands are classified in eighteen categories based on their characteristics and reason for protection and conservation, and they are under the authority of various ministries and departments. Protected land accounts for 5.1% of Turkey's land (Şekercioğlu et al., 2011). The Ministry of Environment and Forestry gives 3.1% of the terrestrial area as the size of protected areas. According to the World Database of Protected Areas[94], this number is even lower, 1.89% of Turkey's terrestrial area. Although the size of the protected lands has grown extensively since 1990, this percentage is still much behind the average of OECD[95] countries. The official target of the state is 10%, was set in 2010 by the Convention of Biological Diversity agreed to by the state.

The Renewable Energy Law[96] issued in 2005 contested the progress of the environmental policy toward expanding the size of the protected land. The aim of the law was to promote the electricity production from renewable energy sources. It played a critical role in attracting the private business to invest in the hydroelectricity sector in two ways. First, the law makes possible that forestlands, lands registered to the Treasury, and the common lands can be rented or used against remuneration, or used for producing electricity from renewable energy sources. Second, the law reduced the annual rental fees and other expenses accrued from the usage of these areas by 50% during the construction period.

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[94] https://www.unep-wcmc.org/featured-projects/mapping-the-worlds-special-places.

[95] The Organization for Economic Cooperation and Development (OECD). The report prepared by OECD in 2008.

[96] Law # 5346.

When the law was modified in 2011[97], it provided more entitlements and easements to the private sector. In particular, the modifications made in Article 8 of Law # 5346 intensified the pressure of hydroelectricity projects on natural resources and protected lands. The state literally opened all protected lands to private sector for the renewable energy production. The definition of the land requirement of electricity production plant was extended to include the new roads and electricity transmission lines, and additionally all annually incurred fees related to usage of the lands were further reduced to 85%; moreover, the reduction in fees was extended to a 10 year operation period. Furthermore, the modified bylaw covered the capacity increase projects of the electricity production plants. What these changes imply in the context of hydroelectricity plants is that the capacity increase leads to diverting more water from the river and hence escalates the ecological and socio-ecological vulnerabilities in the downstream.

4.4.4. Minimum water requirement

The water intake facilities of the run-of- the river type hydroelectricity plants are the points where river flow is served to the hydroelectricity companies. How much water should be diverted for the electricity production becomes a fundamental question. However, the state has reversed the question and focused on the amount of river flow the hydroelectricity companies must release to the river after diverting flow for electricity production. There is no consensus on the term defining that amount. Local people have introduced the term *cansuyu*, using the metaphor of water droplets placed in the mouth of a person dying of thirst to revive him/her. The way local people conceive of the released water by the hydroelectricity companies brings out something about the way they conceive of river flow. The river flow is represented as abundant water giving life to the valley, and cansuyu emphasizes the insufficiency of released water after diverting most of the river flow in keeping the valley alive. In the reports prepared by the companies, there is no agreement on the term. "*Telafi suyu,"*[98] "*Can suyu,"* and "*Cansuyu*" were used to define it. Even on the institutional level, different state institutions use different terms for the concept. DSİ and *TBMM Araştırma*

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[97] Law # 6094.

[98] Compensating flow.

Hizmetleri Başkanlığı[99] use *cansuyu*, whereas the Ministry of the Forestry and Water Affairs uses *çevresel akış*[100]. Scholars translated the term to English as *Minimum Water Requirement*, and therefore in my dissertation I use the term Minimum Water Requirement (*MWR*).

The methodology for determining MWR amount was not clarified in the Water-Use Right Bylaw until 2009, six years after the initial issuance of the Bylaw. In 2009 the MWR methodology was defined partially only for the projects that must follow the environmental impact assessment process (*EIAP*). Bylaw modification issued in 2012 defined MWR methodology for the remaining hydroelectricity projects, which are either excluded from environmental impact assessment regulation or categorized as need not EIAP[101].

Despite the significance of the issue in terms of the water rights in the downstream, DSİ was slow in clarifying it, and this situation created a widespread serious conflict among the parties; the hydroelectricity companies, the state and the local people.

4.5. Water Scarcity in the İkizdere Valley

4.5.1. Emergence of water scarcity problems

Fieldwork is insightful and challenging in many ways. It allows the researcher to gain different perspectives, to hear the voice of people, and to uncover issues not otherwise possible to know about. Although I did comprehensive literature research on hydroelectricity development in the İkizdere Valley, made a 10 day-discovery visit in 2013, talked with key people in the city, and conducted interviews with scholars, lawyers and state officials, it was not until I went to the site and started interviews with the local residents that I became aware of the drinking water problem.

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[99] The Department of Research Services for the Grand National Assembly of Turkey.

[100] Environmental flow.

[101] A modification to the bylaw was issued in RG # 29274 on 04.July.2012.

When I conducted an interview with a man from the village of Cevizlik, the issue of loss of springs during the construction of the tunnels came up. He was hesitant to answer my questions and said,

> *Sorduğunuz soruya bağlı,*
> Depends on your question,

and added,

> *Santrallarla da bir problem yok. Bize de çok sormuyorlar, santral yapalım mı yapmayalım mı? Adam yapıyor.... Suyumuza problem oldu... Yüksek gerilim yine bizim köyün altından geçiyor*[102]*...*
> There is no problem with the hydroelectricity plants. They don't ask us anyway, whether to construct it or not. He comes and constructs. We had a water problem. The high-voltage electricity transmission line passes from our village too…

The electricity transmission lines extending from the İkizdere HES to Cevizlik HES and then from there further down in the direction of the river flow are highly visible I can clearly see where the poles are erected and where the lines are closer to certain houses in the villages. In contrast, the water problem is not physically visible and might stay unnoticed unless the impacted people raise their voices. There are about 100 households in the Cevizlik Village; the population is composed of residents who live in the village year long and semi-residents who come in March, and stay in their house seven or eight months, and leave in November. The village has two neighborhoods with an almost even number of households. During the tunnel construction of the Cevizlik HES, a spring that was the drinking water resource of the village was diminished. The residents acknowledged there had been a change in precipitation over the past two decades with reduced amounts of snow and rainfall. However, the spring had provided water to the village for over 150 years; villagers had built a water distribution system to bring this water to the households in the 1950s.

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[102] "*Altından*" means down on the hillside, not underground. The village is located on a hillside.

My initial interview questions had seemed adequate to my purpose at the beginning; however, when I learned of the loss of the springs and diminished stream flow, I realized that there were unstudied issues associated with hydroelectricity development in the İkizdere Valley. I then decided to extend my inquiry to the tunnel technology and focus on its consequences in the valley.

Water transmission tunnels transfer the diverted water underground and are embedded in rocks and soil. The run-of-the river hydroelectricity projects with such underground tunnels are promoted as "environmentally friendly." The argument is based on the fact that the construction activities are moved underground, away from the sight. Therefore, the landscape is untouched; no trees are cut, no soil or rocks are excavated, no new roads are constructed above ground. From the construction perspective, nothing really changes. Even, for the underground hydroelectricity plants more construction may be necessary: for instance, additional tunnels, called "approach tunnels" and "maintenance tunnels,"[103] might need to be opened, at which point the companies must make additional decisions on the following:

- The route, shape, and dimensions of the tunnel,
- The choice of tunnel opening methods,
- The choice of tunnel opening machinery.

Inevitably, these decisions have environmental and social implications.

Whichever method is chosen, the fundamental activity is to crush the rock foundations to open the tunnels. The construction companies used explosives such as dynamite to remove the rocks. While there were environmental impact assessment and project information reports on the hydroelectricity projects, they gave inconsistent and vague technical information on how the tunnels had been opened. Moreoever, the reports did not provide any information on the impact of using explosives to the residents and to the environment.

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[103] Approach tunnels are used to ease the excavation process and the removing the excavated material in tunnel openings. Maintenance tunnels are open for the maintenance of the water transfer tunnels.

Sixty years ago the Ekin Ltd., company in charge of construction of the İkizdere HES, used dynamite, as the locals recalled. The tunnel, bringing water from the Çamlık Tributary to the water intake facility on the Cimil Tributary, is 720 m in length. The length of the main water tunnel, transferring water from the Cimil water intake facility to the power station of the İkizdere HES, is 3,530 m long. In sum, the construction company opened a 4,250 m long tunnel. The company used dynamite and all construction activities were labor-intensive. The residents of the city, who were very young at that time, remembered their elders talking about disappearance of several springs situated near the tunnel. At the time, the local people tolerated this consequence, possibly due to the availability of other springs that could replace the lost ones.

As I extended my visits to other settlements that the tunnels passed, the drinking water problem became more apparent. Interviews revealed that the Gürdere village, the Kestane neighborhood of the Şimşirli, and the town of Güneyce, which are located on top of or near to the tunnels, are trying to cope with the emerged drinking water problem. The water intake facility of the Cevizlik HES is located in Gürdere village, and in fact, the water transmission tunnel begins at the Gürdere. The locals reported the loss of springs at the time of tunnel construction. Şimşirli is the next village after the Cevizlik. It has two neighborhoods, separated by a geographical border, the İkizdere River. The Kestane neighborhood, which is on the eastern side with respect to the İkizdere River, has about 40 households. Some of them are full-time residents, and all the houses are open in spring and summer, when the semi-residents arrive in spring. Since the construction of the tunnel, they have had a chronic water shortage problem intensifying in the summer months, when the water usage increases with the increasing population. The spring, providing drinking water to the Kestane, at first dried out and later came back in dribbling amounts; however, it never reached to its original level. The water shortage is causing tensions among the people, because the houses at the top of the hill receives water first from the system and if they use a lot, less water is left for the houses in the downhill area. Therefore, the houses in the downhill are more seriously affected.

The town of Güneyce neighbors the Şimşirli village and its official population is 872, reduced from 3200 within a decade due to migration to the cities. When the semi-residents return to their homes in spring, the population rises and triples or quadruples, especially in summer months. Their drinking water system is also affected from the tunnel construction as incoming water is reduced.

The tunnels were open under or near by Soğuksu, Hurmalık, Kayabaşı, Çayırlı, Yokuşlu, Hüseyin Hoca, Ormanlı, Pınaraltı and İkidere for the Kalkandere/Yokuşlu HES, Kızılağaç HES, İncirli HES and Saray HES. In these villages, material water scarcity has caused the loss of springs, and diminishing flows have occurred in various levels of intensity (Figure 4.1).

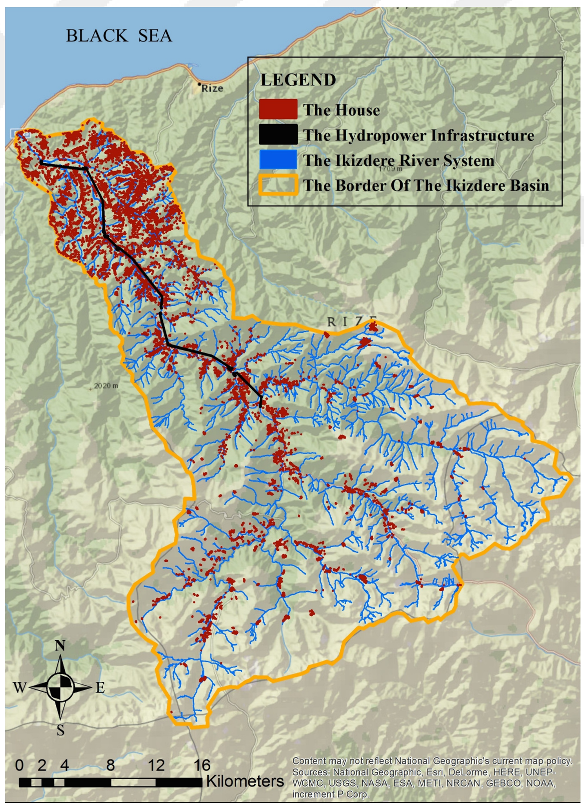

Figure 4.1.The water transmission tunnels of the six hydroelectricity plants in the İkizdere Valley.

For the İkizdere HES, the total length of the tunnels is 4,441 m. For the five new private hydroelectricity plants, the total length of the tunnels is 30,937 m[104]. The length of tunnels of the new private plants is almost seven times longer. In opening these tunnels, the explosions

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[104] See Chapter Three for detailed information on the tunnels.

reconfigured the geohydrology of the valley, and springs and surface waters either disappeared or were diminished. The water scarcity problem emerged with hydroelectricity development, and remains widespread, extending from Gürdere village to Güresen village. The constructed perception of abundant water was used to justify the hydroelectricity development in the İkizdere Valley, and dualistically the hydroelectricity development caused a local water scarcity problem. Now the communities are trying to cope with the drinking water issue.

4.5.1.1. A new negotiation space: Securing drinking water. The emerged water scarcity problem in the İkizdere Valley leads to social vulnerabilities. Loss or diminishment of the drinking water in the settlements due to tunnel openings for the hydroelectricity development created a new negotiation space with two stakeholders: the private company and the local community. This negotiation space has not only a social dimension but also economic and political dimensions. I analyzed this negotiation space in two cases, the Cevizlik and the Şimşirli, and focused on how the communities raised the issue to the private company and how the private company responded to the communities and on what terms agreement was done.

As a general practice, when the villagers need a new drinkable and sufficient water source, they look first to water springs within the border of their village. Then they extend their search toward to the common land in higher elevations, until they find a suitable drinking water source. The water is transferred from spring to the water depots through a pipeline by gravity. The villages have one or several water depots. Either the community or the state defrays the cost of setting up a pipeline and the water depot. The construction of the drinking water system has an initial cost, but otherwise the water is commons and free.

The water system of the Cevizlik was set up in 1955 and the same spring supplied water to the community for more than 150 years[105]. When the incoming water diminished, *Muhtar*[106]

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[105] "Santral inşaatı İkizdere"yi kuruttu" (Hydroelectricity plant construction dried out the İkizdere) by Muhammet Kaçar. News is published on the internet site of the national newspaper, Radikal on November 24th, 2008. Accessed on March 17th, 2016 at http://www.radikal.com.tr/cevre/Santral inşaatı İkizdere'yi kuruttu!

[106] The village head. Village heads are elected with majority of the votes in their communities. Their term of service is four years.

with several locals from the village contacted the hydroelectricity company, negotiated with the manager and demanded a new drinking water source. The company negotiated in terms of money and promised to pay the expenses that might be incurred in bringing water to the community. The community did not want to take money, and insisted that the company find a new water source. In the initial negotiation, the parties did not reach to an agreement. However, both the ignorance of the state and the daily water need of the households put pressure on the community to make an agreement with the company. The community found a new fountain, but soon it disappeared. They were able to find another spring, but it was far away and did not offer much water. The hydroelectricity company paid the cost of pipeline. Since the new spring is much smaller in volume compared to old source, the water shortages continue to occur in summer months, when all the houses are open.

In the Şimşirli Village, the drinking water problem proceeded differently, with the involvement of state officials. The tunnel passes underground through the Kestane neighborhood of the Şimşirli village. As the tunnel opening was progressing from the direction of the Cevizlik village toward the Kestane, news of the disappearance of drinking water spring in Cevizlik reached to the Simsirli village. Şimşirli community is known for their commitment to conservation of their land and their strong opposition to hydroelectricity development. When the drinking water problem occurred there, the officials from the company, accompanied by the state officials, came to talk with the impacted households directly without consulting the village head, who was an opponent of the project. In the negotiations, the company officials tried to convince the community not to escalate the issue. The company made a verbal contractual agreement with the households in the Kestane neighborhood to bring a new water source to them, and the complainants agreed not to file an official complaint. However, the new water resource was not stable. It soon diminished, and then began to flow again at a much smaller rate. The drinking water shortage created tension among the households, and adversely affected their relations with each other. Because the houses at the top of the hill receive the water first, often less water is left for the houses in the downhill. Since then, the availability of drinking water has become a chronic problem in the Kestane neighborhood.

4.5.1.2. Varda project: Commodification of the drinking water. When the water scarcity issue was emerging with the new hydroelectricity plants in 2010, the state enlarged plans for an on-going drinking water project, known as the Varda Project in the Rize Providence. Varda is a highland region within the borders of the Güneyce county and is known with abundant water springs. The Varda Project was initially planned by Iller Bank to provide drinking water to the town of Güneyce with the request of the Güneyce municipality in 2005. However, the project could not proceed because of publicly known cases of fraud and chicanery. In the early 2010s, the DSİ revised the project scope and expanded the scale to supply water additionally to the municipalities of Kalkandere and İyidere that are situated down near the coast. Both towns are away from the water springs and their populations are slightly rising. The rise of a chronic material water scarcity problem in the villages after the tunnel openings forced the state to look for the alternative ways to solve the problem. When DSİ revised the plan again, it included Soğuksu, Hurmalık, Kayabaşı, Çayırlı, Yokuşlu, Hüseyin Hoca, and Ormanlı villages to the Varda project (Figure 4.2.).

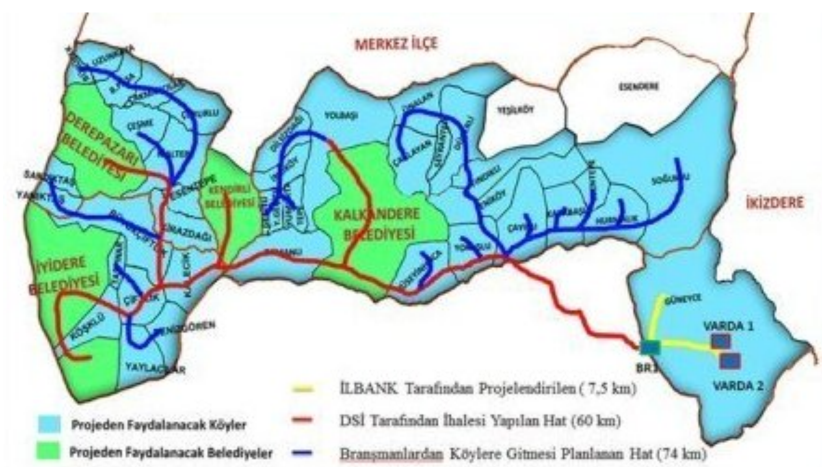

Figure 4.2. The coverage of the Varda Project. Source:www.rizedeyiz.com.

This project is important for two reasons. First, the villagers who lost their springs with hydroelectricity development will now have to pay for water. The Varda project initiated the commodification of the water in the villages, by converting a common resource into an economic good (Bakker, 2007). Secondly, the social and economic vulnerabilities of these communities will rise due to the low socio-economic levels and limited income resources of the residents.

4.5.1.3. Fading in: Early signs of water pollution. One of the early anthropogenic uses of the İkizdere River was to utilize the river's removing and carrying capacity. For years, local people used the river literally as a waste bin and a cesspit. Although municipalities and county governors have established waste collection systems in the past decade and enforced the construction of cesspit for the houses, the water pollution problem has not disappeared. Water pollution became more visible with the emergence of hydroelectricity plants. When the İkizdere HES was put into operation in 1961, the river flow was reduced in the town of İkizdere. The garbage thrown to the river became more visible during low-flow months and residents complained about the odor in the summer. When five new hydroelectricity plants started to operate in the İkizdere Valley, the reduced flow section of the river extended approximately 30 kms from the town of İkizdere to the Güresen village by the coast. Local communities who live close to reduced flow section, particularly in Güneyce, Şimşirli and Ağaçseven[107], started to smell a foul odor emanating from the river during summer months.

Population dynamics, lack of availability of sewage treatment, and poor garbage culture are three factors that give rise to foul odor, a sign of water pollution. With the hydroelectricity development, another factor, the reduced flow in the river channel contributes and intensifies the water pollution problem.

4.5.2. Minimum water requirement conflict

The run-of-the river hydroelectricity plants divert the river flow at the water-intake point and create a biophysical water scarcity in the section of the river that lies between the water-intake facility and the power station. This biophysical water scarcity has not only a spatial but also a temporal dimension. Because the minimum water requirement is a constant flow replacing the seasonally and daily variable natural flow. Moreover, since MWR is a reduced flow, it impacts the channel gradient, grain size, sediment dynamics, and damages aquatic and

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[107] Interviews in November and December 2014, and in May 2015.

riparian biota (Kondolf, 1997; Wohl, 2000; Nilsson and Berggren, 2000; Jaoshvili, 2002; Yurtseven, 2012).

The regulatory weakness described in previous sections turned the material water scarcity produced by MWR flow into a widespread conflict. The licensing legislation did not define a methodology for determining MWR. Instead, the MWR issue was left to EIA regulation, which was not integrated to licensing regulation for a decade. This legislative gap in MWR regulation and the delayed interventions of the state institutions to restore the gap allowed the hydroelectricity companies use the river flow to their advantage, and some hydroelectricity companies diverted almost all the flow for electricity production. As a consequence, the rivers have dried and the locals have come into conflict with the companies to release more water. In spite of the fact that the MWR determination and monitoring have been improved, the major issue complained about and reported to the state agencies is the *cansuyu*[108].

4.5.3. Planning weakness: Scarcity of water in the hydroelectricity production

When privately owned hydroelectricity companies started their operation one after other in the İkizdere Valley, they experienced an unforeseen problem with the river flow, a permanent type of water scarcity, driven not by natural conditions but a politico-technical construct. Powered up by "abundant water" narrative, five new hydroelectricity plants with high capacities were situated on the İkizdere River in the downstream of the İkizdere HES in a cascading order. *Sanko Holding* operates the Cevizlik HES, the Kalkandere/Yokuşlu HES and the Kızılağaç HES[109]. The İncirli HES and the Saray HES are owned by *Adalı Holding*[110]. Their production schedules are supposed to be independent from each other. However, in a cascading structure, the plant with damming capacity regulates the river stream in the downstream, and imposes its water damming and releasing schedule on the downstream plants. If this plant has higher production capacity compared to production capacities of the plants in its downstream, it becomes more powerful. Since the trend in hydroelectricity

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[108] Interview in February and March 2015.
[109] Sanko Corporation.
[110] Adalı Corporation.

projects is toward designs with large damming capacity for economic reasons, this situation is experienced often. In the context of the İkizdere Valley, the Cevizlik HES is the "*Ağa*" or "*Baba*" of the İkizdere River - *Ağa* is economically and politically the most powerful person in a village, and *Baba* is the father. The locals use these metaphors to address power dynamics among the hydroelectricity plants by emphasizing the ruler position of hydroelectricity plant with largest water holding capacity. While the Cevizlik HES fills its pool in 8 hours[111], 2.7 m^3/sec water flows in the downstream of the Cevizlik HES, excluding the contributions of small seasonal streams and the Karadere Tributary joining the river at different points along the river channel. The damming capacity of the Cevizlik HES produces an anthropogenic type of water scarcity, imposed over the roughly half of the İkizdere Valley. This situation will change when the rehabilitation plan of the İkizdere HES is completed. A large pool will be constructed with water holding capacity, and the İkizdere HES will restrain the regular river flow and hence influence the operation schedule of all the downstream plants, including the Cevizlik HES.

The downstream plants are forced to align their operational schedule with water regulating plants in their upstream. This situation has economic implications. It affects the profitability of the companies and creates tension between the hydroelectricity companies. In the İkizdere Valley, in spite of the fact that the İncirli HES and the Saray HES also have damming capability, they rely on the water released from the Cevizlik HES. They must be "good neighbors"[112] and good neighborliness requires negotiation and communication skills in the everyday politics of water. However, the everyday politics of water can become complicated and create conflicts among the companies.

When the disputes over water escalated in the river valleys with multiple private hydroelectricity plants, DSİ had to intervene to act like a liaison. It formed a department working to resolve water scarcity conflicts among the companies operating in cascading order in the rivers.

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[111] Time taken to fill the regulation pool depends on the rate of the stream flow. With the minimum stream flow, the regulation pool is filled in approximately 8 hours.

[112] Interviews in December 2014.

This type of material water scarcity has been driven by two political-technical structures. The first one is the damming capacity of the plants. The second is the cascading structure of these plants on a river. These structures need to be subject of a river basin planning. Therefore, this type of material scarcity of water points to a planning weakness at the river basin level. It is a consequence of abandoning the detailed and comprehensive river basin planning or in technical terms, the master plan studies, and replacing them with an over-simplified method, which is to divide the river channel in sections and allocating each section to a hydroelectricity project.

4.6. Conclusion

In this chapter I examined the development narratives of scarce energy and abundant water, and described how they were coupled to legitimize the privatization of hydroelectricity production and commodification of natural resources through "sustainable development" of hydroelectricity program. The findings of this chapter contribute to studies in hydroelectricity development in several ways.

The study of energy scarcity reveals that the narrative has been predicated on electricity demand projections, and the state has had a tendency to overestimate the electricity demand. In a similar manner, in the early 2000s, the high economic growth expectation of the state dominated the estimations, leaving out considerations of other international and national factors affecting and influencing electricity demand. The energy crisis expectations were used to justify the urgency and the need to utilize all natural resources in electricity production. Moreover, the state has constructed the water abundance narrative on the idea that hydroelectricity production can benefit from any river with hypothetical hydroelectricity potentials. The hypothetical hydroelectricity potentials have been also over-estimated.

The co-constructed development narratives of scarce energy and abundant water have constituted the political context for the licensing regulation that allowed not only the private sector to enter hydroelectricity production but also constituted the commodification of the rivers. Sections of the rivers were allocated to the private companies. Moreover, the commodification of natural resources for hydroelectricity production was extended to the protected areas with the Renewable Energy Law in 2011. Additionally, the regulation on minimum water requirement was missing in licensing regulation until 2009 and was partial defined until 2012.

The abundant water narrative led the materialization of several of forms of material water scarcity in the İkizdere Valley. Local communities faced drinking water shortages when explosives used in opening tunnels caused the springs to disappear or diminish. The Varda Project, which is a project of commodification of drinking water, was crafted as a solution to the chronic water shortage problem in the villages. Moreover, the deregulations in river basin planning and in water use including the minimum water requirement led to two forms of water scarcity. The first is the drought stress caused on the diversion reach sections of the plants. Deregulation in minimum water requirement allowed the companies to divert all the flow for electricity production and local people came into conflict with the companies and the state to raise the amount of water released. In Chapter Six, I examine a specific case of minimum water requirement in detail. The second form of water scarcity was the result of a planning weakness that was caused by abandoning the master plan studies in the river basin scale. I showed that the water scarcity cases indicate the emergence of a new power dynamics in the valley and new spaces of conflict and negotiation among the parties, and briefly addressed the environmental and social implications.

5. A TECHNOLOGY OF POWER: PAPER BUREAUCRACY IN HYDROELECTRICITY DEVELOPMENT

5.1. Introduction

This chapter explores the role of the bureaucracy of the program for "sustainable development" of electricity in shaping itself as an instrument of power. The chapter begins by reconstructing the legislation constituting it and details its gradual transformation, beginning with the launch of the program in 2003. It examines how the bureaucracy, deriving legitimacy and exercising control as a technology of power, works to institute and establish a discursive formation that fosters the neoliberalization.

Neoliberalization takes various forms and includes various processes; it is understood as an ideology, a policy, a program, a state form and a type of governmentality (Springer, 2012; Castree, 2010). Neoliberal transformation as a state form has been under way since the early 1980s; the hydroelectricity sector was one of the first sectors to experience the changes it brought (Kibaroglu et al., 2009). The liberalization and deregulation of the electricity sector was initiated in 2001 with the establishment of a national energy market. The neoliberal and de-regulative transformations in hydroelectricity were intensified with the launch of a program of "sustainable development" in 2003. The program faced opposition, and opponents formed coalitions to resist transformations and to block the program, using lawsuits, demonstrations and establishing various nonviolent organizations. The hydroelectricity projects also faced opposition on a local scale and were taken to court and their legitimacy was challenged in the court. The state then had to respond by pulling back. In this chapter, neoliberalism on the policy and program level is explored, focusing on two phases: deregulation and reregulation (Peck and Tickell, 2002).

Bureaucracy and bureaucratic systems have been the subject of research inquiry since the early years of the twentieth century. Max Weber's book *Wirtshaft und Gesellschaft*[113], published in 1922, is known as the earliest and most influential writing on the bureaucracy. In his insightful analysis, Weber identified the development of capitalism as one of the factors leading to the development of the bureaucratic system of rule (Weber, 1978). The bureaucratic system of rule embeds discursive formation, and the characteristics of discursive formation manifest themselves in the bureaucratic documents that are required and produced through various processes by and for state institutions. In his study of paper documents, Hull pays attention to production and circulation of bureaucratic documents in order to understand how they structure and organize the governance of modern Islamabad and argues that they function primarily to form associations rather than to document (2012). He discusses two types of associations: one that includes people external to the bureaucracy and one that includes objects such as rivers, infrastructure and land. Bureaucratic documents further constitute broader associations of state institutions, private companies, public and places (Latour 2005). The bureaucratic documents establish a "mode of conduct" (Page, 1992:6) and are considered instruments of political and ideological control (Riles, 1998).

Studies of the bureaucratic system related to the environment in Turkey are limited, and empirical studies of bureaucracy exist primarily in the environmental impact assessment examining legislation from an environmental law perspective (Alıca, 2011; Saygılı, 2007; Turgut, 2003). These studies address the fact that one of the weakest parts of the environmental impact assessment is diminishing public involvement. As the environmental impact assessment has gone through various modifications since 2003, the mechanisms to involve public into the process have been weakened. The existing literature on bureaucracy identifies the characteristics of the Turkish bureaucratic system as centralized and political (Arsel, 2005a; Aydın, 2005) and underlines the corruption of bureaucrats in development projects (Çarkoğlu and Eder, 2005; Knudsen, 2009). I aim to contribute to this scholarly debate by discussing the role and the character of the bureaucratic system in hydroelectricity development. I argue that the state establishes a "mode of conduct" for the "sustainable

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[113] Economy and Society.

development" of hydroelectricity program through a system of bureaucratic documents. These documents apply certain rules, define specific processes, and establish transform and eliminate a particular set of relations between and within institutions, and between the institutions and non-state entities such as private companies, the public, and nature.

Methodologically, I extend a type of analysis developed by Foucault (2010) to explore the discursive formation driven by the paper bureaucracy. There are two reasons for using this type of analysis. The first is that it is a historical analysis, employing the notion of discontinuity that is useful in analyzing the discontinuities occurring in the legislation over time. The second reason is that Foucault's analysis dismantles the documents into parts, then re-orders and re-assembles these parts to discover elements and series in order to identify the dispersions and regularities that lead to a discursive formation.

In the following section, I first focus on the mandatory documents of hydroelectricity development as defined in legislation, and examine the "regime of paper documents" (Hull, 2012: 1). In other words, I examine what powers they have in constructing and operating a hydroelectricity plant and what powers they transfer to the private companies. I also analyze the processes they set, reset and eliminate on an institutional level and on a state-public level. In the second section of the chapter, I explore the regularities of the paper regime and explain them as elements of the discursive formation leading the neoliberalization of nature. In the conclusion, I summarize my findings.

5.2. The System of Bureaucratic Documents

The "sustainable development" of the hydroelectricity program is regulated by a system of bureaucratic documents. The state established two fundamental licenses to enable the entrance of private investors into the energy market and into the hydroelectricity sector. The first is the energy license issued by *Enerji Piyasaları Denetleme Kurumu*[114] (*EPDK*). The second is the water-use right agreement (Hereafter referred as the water-use right license)

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[114] The Energy Market Regulatory Authority.

signed with *Devlet Su İşleri*[115] *(DSİ)*. The law defines the terms and conditions of each license. Private companies acquire the energy license and the water-use right license by applying to EPDK and DSİ respectively and undergoing an evaluation process. In the evaluation process, the companies are required to submit a set of technical documents, including technical feasibility report and environmental impact assessment report. The environmental impact assessment report has a more general usage, and circulates in a wider domain of development. It is a product of the environmental impact assessment process run by the Ministry of Environment and Urbanization, and subject to the Environmental Law. The technical feasibility reports are required by DSİ, and DSİ defined their structure and content in the bylaw defining the water-use right license process. The regulatory framework of the sustainable hydroelectricity development program is structured around two licenses and other supporting bureaucratic documents.

The legislation of the regulatory framework has a very complicated structure (Kibaroglu and Baskan, 2011). What makes it complicated, even to legal people who are accustomed to the sophisticated Turkish legal system[116], is not its sophistication. Rather, the difficulty comes from the high frequency of the legislative changes taking place on the rushed and ill-prepared laws and bylaws[117] since the launch of the program. A frequently changing, sophisticated legislation has been difficult to follow for state officials and even for the private sector, which is encouraged to invest in the hydroelectricity sector by the privatization efforts of the state[118]. I focus on the legislative framework of the "sustainable development" of the hydroelectricity program with the aim of exploring the regulatory framework of hydroelectricity development. In my analysis of the regulatory framework through legislation, I examine the related laws and bylaws and the instances of their issuance, re-issuance and modifications on a temporal dimension. I am particularly interested in the discontinuities in the form of changes in the terms, conditions and processes, and their implications (Foucault, 2010).

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[115] The General Directorate Of Water Works.

[116] Interviews conducted in September 2014 in Istanbul and in November 2014 in Karadeniz Ereğli.

[117] Interviews conducted in April 2015 in Rize, in August 2014 in Ankara, in September 2014 in Istanbul, and in January 2015 in Ankara.

[118] The private companies planning to invest in hydroelectricity sector are obtaining consultancy service in order to understand what they are required to do in terms of legislation.

5.2.1. State issued licenses

5.2.1.1. The energy license. The Energy Market was established with the issuance of *Elektrik Piyasası Kanunu*[119] *(EPK)* in 2001. The law also established EPDK. EPDK was in charge of the energy market and led the liberalization process. The law enabled national and global actors to enter the energy market, which is regulated and governed through energy licenses. The energy licenses are instruments that allow holders to carry out specific market activities in the Turkish electricity market. There are different types of licenses; a company needs an energy production license to produce hydroelectricity, and to transmit and market it. In this dissertation, the term *energy license* refers to the energy production license.

Elektrik Piyasası Lisans Yönetmeliği[120] (*EPLY*) defines the terms, conditions and processes of energy licensing. It is a complementary bylaw to *Elektrik Piyasası Kanunu*. The first version of the bylaw was issued in August 2002. After *Elektrik Piyasası Kanunu* was replaced with the new law[121] in March 2013, EPLY was reissued in November 2013. The EPLY[122] issued in 2013 introduced the concept of a pre-license, which is a temporary document with two main functions. The first is that it entitles private companies a temporary formal status in their dealings with the state institutions, ministries and municipalities in order to obtain necessary licenses and permissions related to water-use right, electricity transmission, land access, and construction. Second, it sets a pre-election process by requiring companies to bring either a signed water-use right agreement or an official letter from DSİ confirming their entitlement, and a bank guarantee (Figure 5.1). The energy license application was made more comprehensive and difficult to obtain for the companies. The companies were required to submit the decision of EIA process and an official letter from DSİ confirming their entitlement to the water-use right agreement, and to have all other permissions and licenses (Figure 5.2). These additional requirements were a significant change in the application process. That is because in the earlier version of EPLY, the

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[119] The Electricity Market Law with Law # 4628 was issued in October 2001.
[120] The Electricity Market Licensing Bylaw.
[121] Law # 6446.
[122] RG # 28809 in November 2013.

companies were only required to submit the signed water-use right agreement or an official letter from DSİ confirming their entitlement (Figure 5.3).

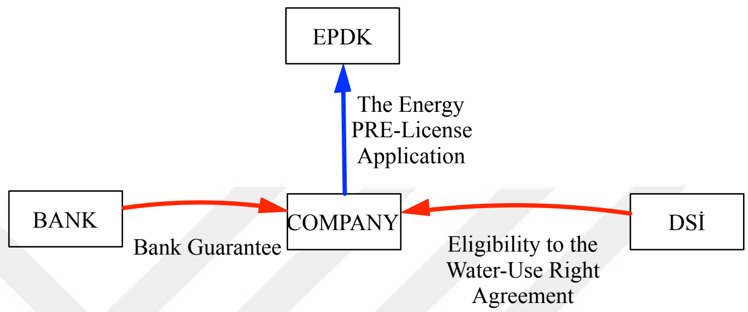

Figure 5.1. The relations of production for the energy pre-license application in EPLY issued in November 2013.

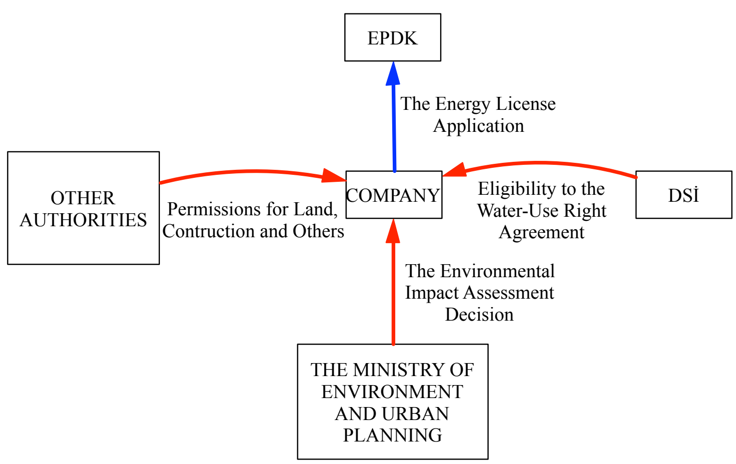

Figure 5.2. The relations of production for the energy license application in EPLY issued in November 2013.

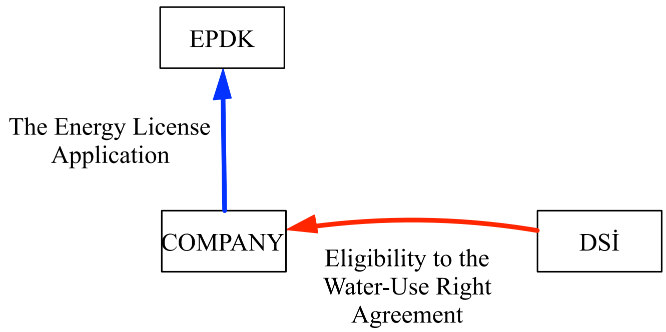

Figure 5.3. The relations of production for the energy license application in EPLY issued in August 2002.

EPLY issued in November 2013 certainly restricted the applications to energy license. However, the two modifications were done in 2015 and they defined easements in favor of the companies. The modification in February 2015 removed three approvals from the list of required documents in the application process. The modification in December 2015 gave the companies, which are in pre-license review process, additional time for obtaining the EIA decision from the ministry (Figure 5.4).

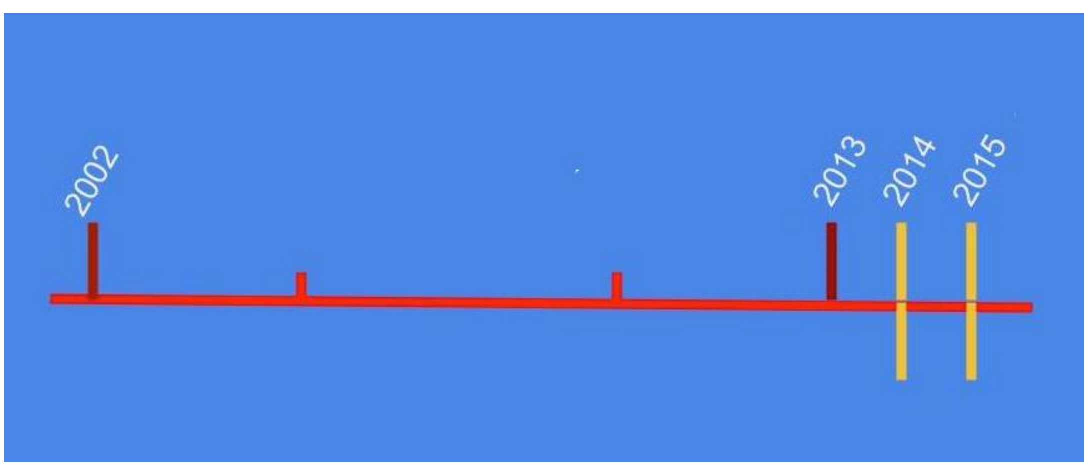

Figure 5.4. The dates of issuance and modification of the Electricity Market Licensing Bylaw. The law was issued in August 2002 and reissued in November 2013. It was modified in January 2014, December 2014, February 2015, and December 2015.

5.2.1.2. The water-use right agreement. The second mandatory bureaucratic document is the water-use right agreement. The water-use right agreement is actually a license that assigns specific privileges and allocates certain rights over national natural sources to a private company. It is a signed agreement between DSİ and the private company that wants to produce electricity using national water resources. The terms, conditions and processes of the water-use right license are defined by *Elektrik Piyasasında Üretim Faaliyetinde Bulunmak Üzere Su Kullanım Hakkı Anlaşması İmzalanmasına İlişkin Usul ve Esaslar Hakkında Yönetmelik*[123] *(SKHA Bylaw)*.

Section three of the bylaw describes the application requirements, or more specifically the application file that the private companies must submit to the DSİ and reviewing process, and how the notification process works. The fourth section of the bylaw defines the procedure between DSİ and EPDK that a private company must follow in order to sign a water-use right agreement with DSİ.

The bylaw was modified five times after the first issuance in 2003 and reissued in 2015 (Figure 5.5).

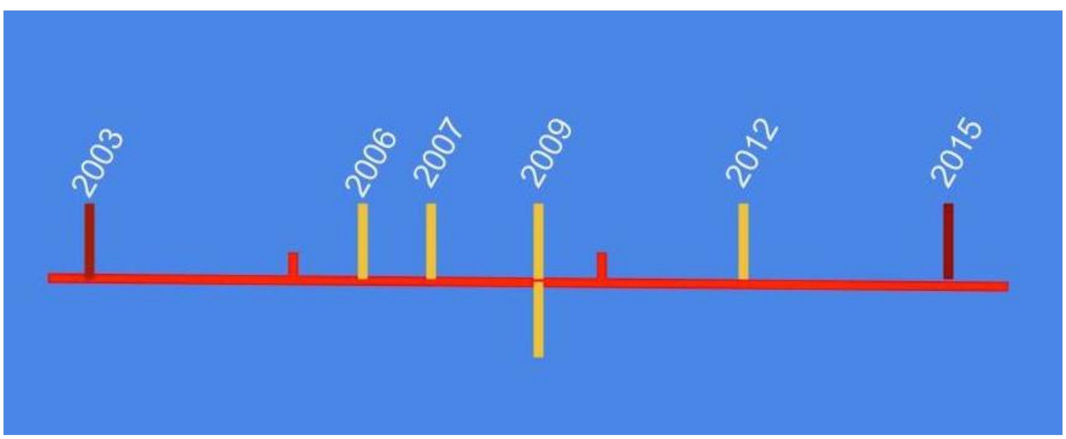

Figure 5.5. The dates of issuance and modification of the Water-Use Right Agreement Bylaw. The law was issued in June 2003 and reissued in February 2015. It was modified in August 2006, February 2007, August 2009, November 2009 and July 2012.

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[123] The Water-Use Right Agreement Bylaw in short.

When the SKHA Bylaw was issued in 2003, companies were required to submit simple non-technical documents to DSİ in the application for a SKHA license (Figure 5.6). In the modifications done in 2007 and in 2012, the number of requested reports increased and the reports were made more technical and comprehensive. The water-use right agreement was designed as a complimentary document to an energy license. It was a prerequisite for applying to EPDK for the energy license. On the other hand, the EIA decision was not defined as a requirement of the SKAY Bylaw until 2012 (Figure 5.7).

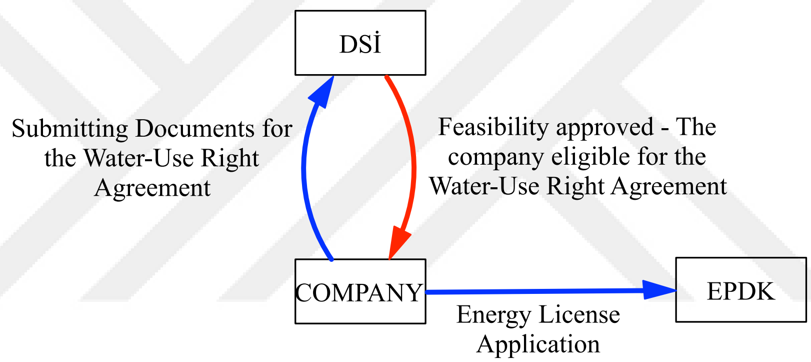

Figure 5.6. The relations of production defined in the SKHA bylaw issued in June 2003.

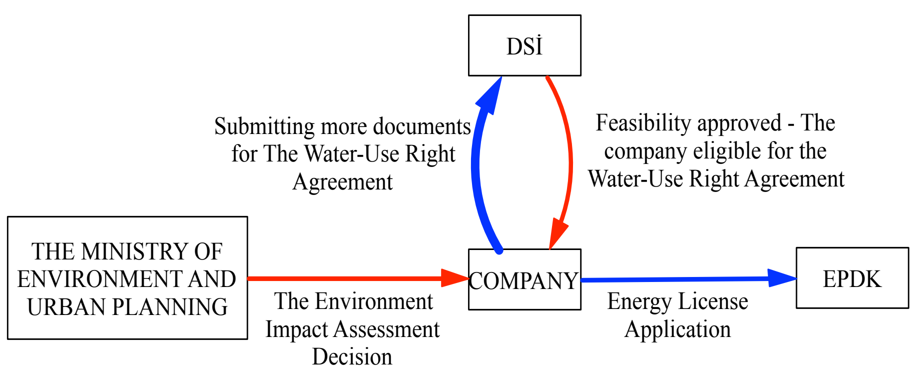

Figure 5.7. The relations of production defined in the SKHA bylaw modification in July 2012.

The following item in the fourth section, item 12, is titled as "Environmental Impact Assessment Report"[124] (EIAR) and states that the private company is obliged to receive a

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[124] ÇED Raporu (In Turkish).

decision from the Environment and Forestry Ministry[125] for their project. The decisions that can be accepted by DSİ, are either approval of the project or exclusion of the project from the environmental impact assessment process.

These changes made to the water-use right license were similar in character to the changes made for the energy license. They were restricting the application process.

5.2.2. Technical documents

5.2.2.1. The feasibility and pre-feasibility reports. DSİ requires feasibility reports and pre-feasibility reports from the private companies in the application for the water-use right agreement. These reports are technical reports on the project level. Their scope, structure, and level of detail depend on the project classification. Before I explain the project classification, I describe very briefly the official project design and development process of DSİ/ Elektrik İşleri Etüt İdaresi[126] (*EİEİ*).

The official hydroelectricity development and design process has been developed over the years, and it consists of five major stages with very detailed technical specifications and requirements. The development and design process starts with initial surveys and continues with preliminary investigations that lead to the preparation of the master plan. These three stages are carried out on the river basin scale and officially called "river basin hydropower development." When river basin alternative hydroelectricity project schemes are developed, a comparative feasibility analysis is done in order to decide which scheme is technically and economically most feasible. The development and design cycle proceeds with two stages on the project level. First, a feasibility report for the selected project is prepared. Finally, a final project plan is completed (Figure 5.8). When the final project plan is approved, the project becomes ready for construction at the designated location. The construction phase has its specific process and reports. I described the stages in the project development and design very

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[125] After the institutional restructuring on ministerial level in 2011, the authority is given to the Ministry of Environment and Urbanization.

[126] The General Directorate Of Electrical Power Sources Survey And Development Administration.

roughly, and it is important to note two points. First, in reality, DSİ/EİEİ have comprehensive and detailed institutional procedures, decision-making and approval processes[127] at each stage. Second, as the project progresses in design and development, the amount of technical knowledge collected, processed and produced for the project increases.

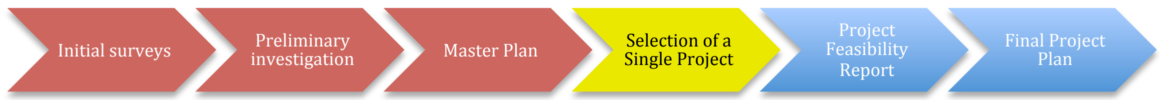

Figure 5.8. The official project development and design process of DSİ/EİEİ.

The project is classified according to two criteria. The first checks whether the project is developed by the state institutions, DSİ and/or EİEİ, or by a private company. The state developed projects are further divided in two groups, depending on the stage of the project in official hydroelectricity development and design process (Figure 5.9).

This project classification is important, because it determines the application procedure of private companies and the level of detail of technical knowledge that the private company must produce for the application. In the analysis, I focus on the processes related to required reports and examine their scope, structure and level of detail, and also examine in what ways the processes and the reports were changed by the legislative modifications.

In the license application process, if a private company has a hydroelectricity project that it developed, DSİ requires the company to submit *Ön Rapor*[128], a preliminary report of the project. According to the SKHA Bylaw, DSİ evaluates the preliminary report by consulting EİEİ and by taking into account the relations of the proposed project with other projects in the planning and construction phases in the associated river basin, if such projects exist. This stage in the license application process seemed to replace the river basin planning of DSİ. If DSİ approves the preliminary report of project, it requests the private company to prepare a more

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[127] Interview in August 2014, Ankara. The journals, books and other technical materials printed by DSİ can be reviewed at http://www.DSİ.gov.tr/yayinlarimiz/yeni-yayınlanan-kitaplar.

[128] A sample of *Ön Rapor* was given in SKHA Bylaw as *EK-4*. It is provided in Appendix D.

comprehensive and detailed *Fizibilite Raporu*[129], the project feasibility report. *Fizibilite Raporu* becomes the application file of the company for the water-use right license.

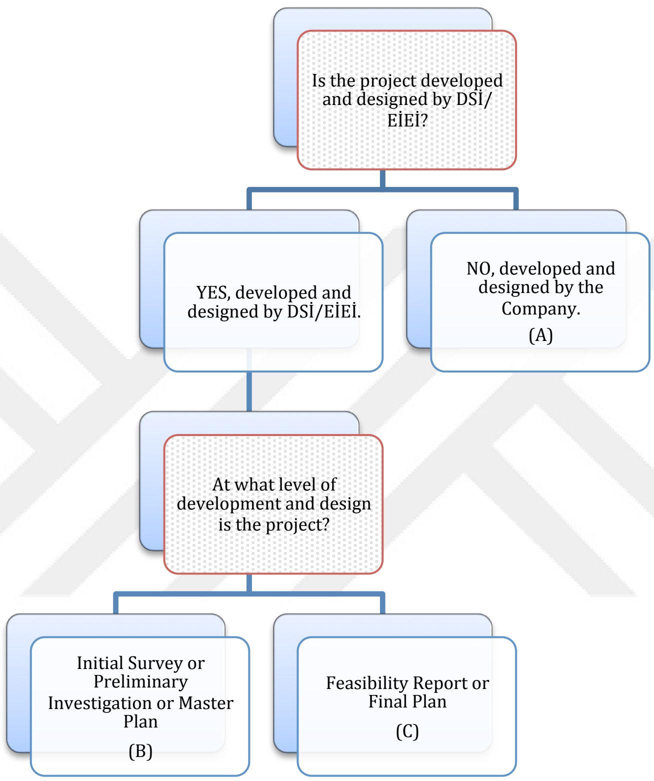

Figure 5.9. The project classification process in the SKHA Bylaw.

In the legislative modifications, this process was kept; however, new sections and new technical specifications of the project were added and the report formats were changed. *Ön Rapor* consisted of two sections in the form of titles. The project definition section included the location of the project, and its hydraulic and geological characteristics. The proposed facilities section provided information on infrastructure, including installed capacity with annual electricity production amount. DSİ required a general layout plan of infrastructure on a 1:25000 scaled map. In 2007 a new section -- a management information form -- was added to this report. This section required elemental information such as the contact information of the applicant company, the name of the river or the river tributary that the company wished to

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[129] A sample of Fizibilite Raporu was given in SKHA Bylaw as EK-3-Hidroelektrik Enerji Üretim Tesisleri Fizibilite Raporunda Yer Alacak Ana Başlıklar. It is provided in Appendix E.

divert, and technical information about the developed project, such as maximum elevation in meters, installed capacity in MW, firm energy and secondary energy in GWh. In 2015 one subsection was added that shows the position of the project with respect to other facilities using the same water resource in the river basin on a schematic plan. Additionally, technical formats of the files and drawings were required to be specified in more detail.

If the private company wants to acquire a hydroelectricity project, which was developed by DSİ and/or EİEİ and will be privatized, it follows another process in SKHA license application that includes the privatization of the project. In the first SKHA Bylaw, the privatization part was vague. If the privatized hydroelectricity project had a feasibility report that was prepared by DSİ[130], DSİ could request the company to update the project feasibility report and submit it as *Fizibilite Raporu*[16] in the format described by the SKHA Bylaw. If the privatized hydroelectricity project did not have a feasibility report[131], the company was required to submit *Fizibilite Raporu*[16] to DSİ.

When the bylaw was modified in 2007, a pre-selection stage was added to the license application process clarifying the privatization part. The private companies were required to apply to DSİ to take over a specific project by submitting a feasibility report and a bank guarantee. I refer to this report as a Pre-Feasibility Report [132] in order to separate it from *Fizibilite Raporu.* When DSİ receives the pre-feasibility reports from different private companies, it evaluates them and decides who is eligible to proceed with the license application. These companies prepare *Fizibilite Raporu* and DSİ evaluates the reports and decides on the project and the company.

In the subsequent modifications, this application process was not changed, but the report formats were modified and made more comprehensive in 2015 when the bylaw was reissued. The review of the scope, structure, and content of the reports demonstrates three important

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[130] The projects in this category are referred as "C" type projects in Figure 5.9.

[131] The projects in this category are referred as "B" type projects in Figure 5.9.

[132] A sample of pre-feasibility report was given in SKHA Bylaw as *EK-3A- DSİ/EİE Projelerinde İstenecek Fizibilite Raporunda Yer Alacak Ana Başlılar*. It is provided in Appendix F.

points. The first is that there is a contradictory situation in feasibility reports. DSİ required more detailed information from the projects it developed than from the projects developed by the private sector, in spite of the fact that DSİ is not familiar with private projects[133]. Second, the report formats are given in the form of a list of broad titles such as "The Characteristics of The Hydropower Plant" or "Sedimentation Situation" or "Energy Transmission" and do not require standard technical information. The low level of specificity inherently makes difficult to elicit the necessary information at the same level of technical detail and quality from various reports prepared by different companies, and lowers the quality in decisions that have long-term effects. Finally, the documents have gotten longer and wordier, while at the same time including more important information. The earlier reports were shorter and simpler. The oversimplified reports can conceal faults and pitfall or simply allow ignorance (Mathews 2011).

These reports have such a power that DSİ relies on them in deciding whether the projects are seemed technically and economically feasible - without requiring any land survey or investigation - and allocates to the companies the right to occupy a certain elevation range in a river basin and construct their projects.

5.2.2.2. The environmental impact assessment reports. The development projects are subject to the environmental impact assessment regulation. *Çevresel Etki Değerlendirmesi Yönetmeliği*[134] (*EIA Bylaw*), which is a supplement of the Environmental Law[135], defines the environmental impact assessment regulation and its process. The involved parties with different perspectives perceive the EIA process differently. One state official defined it as,

ÇED izin değildir. Karar vericiler için yer seçiminde kullandıkları bir araçtır.[136]

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[133] The pre-feasibility report is relatively more comprehensive than Ön Report in that it includes sections "Basin Development Plan," "Climate and Water Resources," "Environmental Impacts," "The Cost of the Plant," "The Proposed Project" and "Economic Analysis."

[134] ÇED is abbreviation in Turkish. The Environmental Impact Assessment Bylaw.

[135] Law # 2872, issued in 1983.

[136] Interview in September 2015.

It is not a permission given by the state, but a tool for the decision makers to use in deciding on a location among alternative locations for a development project.

Saygılı examined the environmental impact assessment regulation from the environmental law perspective in his Ph.D. thesis (2007), and he conceptualized it as a legal and a political tool that incorporates the environmental concepts, facts and issues into the planning stage of a development activity while assuring that the authorized institution makes the decision based on these environmental facts and issues. Saygılı argues that the fundamental foundation of the EIA regulation is its sustainable development rhetoric. He defines the EIA process as,

Sürdürülebilir Kalkınmayı uygulamaya geçiren maddi ve usuli bir hukuki araç (2007: 111).
A materialistic and procedural legal tool putting the sustainable development in practice.

The EIA process was originally designed as a supplementary tool providing feedback for the decision makers to use in selecting a best-suited location, considering the environment among a group of alternative locations for a development project. Site selection comes before obtaining other licenses and permits for construction and operation. In other words, by law, the EIA decision is a pre-requisite to applying for other licenses, permits and to bank credits. In the "sustainable development" of hydroelectricity program, the EIA process was turned into a bureaucratic decision-making process run on reports. An interviewee described it as "*Taahhütler manzumesidir*"[137] (The poem of the commitments).

The transformation of EIA process was driven by a series of legislative changes made since the issuance of the EIA bylaw in 1993. The EIA bylaw was reissued five times and modified seven (Figure 5.10).

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[137] Interview in February 2015.

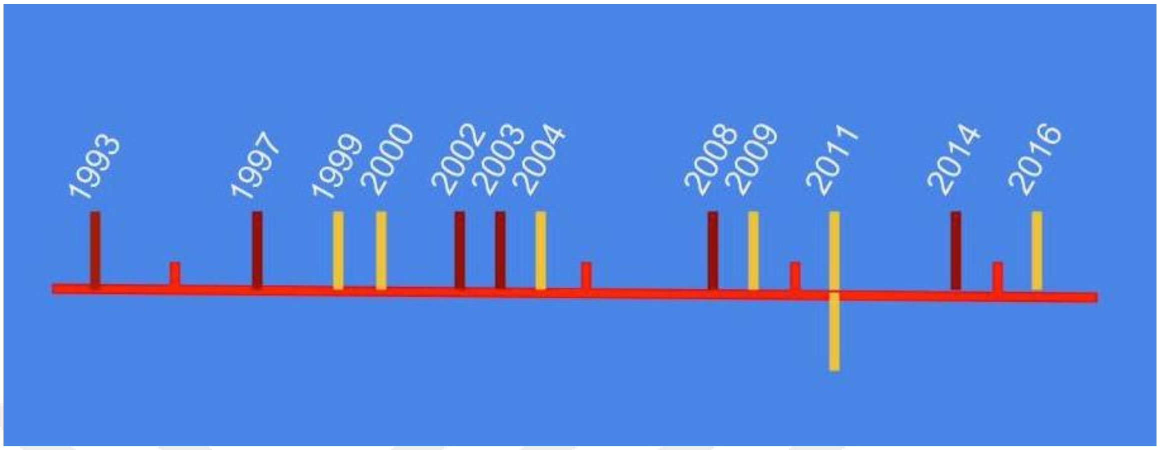

Figure 5.10. The dates of issuance and modification of the Environmental Impact Assessment Bylaw. The bylaw was first issued in 1993, and reissued in 1997, 2002, 2003, 2008 and 2014. It was modified in 1999, 2000, 2004, 2009, 2011 (twice) and 2016.

In the first stage of the EIA process, the Ministry of Environment and Urbanization[138] classifies development projects into two groups: projects needing EIA review and projects not necessarily needing EIA review. It is important to note that there is third group of projects, which are completely exempt from EIA review. This classification scheme seems to be based on the scale of environmental impacts of the projects and how much the environmental impacts can be mitigated. However, the logic of the classification scheme is a black box. The project classification scheme is critically important for private companies that want to invest in hydroelectricity sector because it determines how much time, effort and money they will need to spend for their project in the EIA review process.

The projects that need EIA and those that do not each follow different evaluation processes. The evaluation processes ends with a decision making stage (Figure 5.11). There are four types of decisions, *ÇED Olumlu* (EIA Report Approved*), ÇED Olumsuz* (EIA Report Rejected), *ÇED Gereklidir* (EIA Review Required), *and ÇED Gerekli Değildir* (EIA Review not Required*).* According to Saygılı, *ÇED Olumlu* (EIA Report Approved) decision can be interpreted as,

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[138] The ministry in charge of the EIA process was the Ministry of Environment and Forestry until 2011. In 2011 after the restructuring of the ministries, the Ministry of Environment and Urbanization took over the EIA process.

Faaliyetin çevre üzerindeki etkilerinin hukuken kabul edilebilir bir düzeyde olduğu anlamında (2007: 204).

The environmental impacts of an activity are at legally acceptable level.

The *ÇED Olumsuz* (EIA Report Rejected) decision is critical because it is legally binding and it eliminates the project. The *ÇED Gereklidir* (EIA Review Required) decision is basically a re-categorization of the project and leads to initiation of an EIA review process for the project. The *ÇED Gerekli Değildir (*EIA Review not Required*)* decision is critical both for the environment and the public that will be affected and the project owner, as it means that the environmental impacts of the project is legally negligible and permits the company to proceed with the activity.

The review of the modifications in the EIA bylaw demonstrates that the ministry has made changes on two fronts. The first is the project classification scheme. I discuss the implications in the following section in this chapter. The second is that the EIA Review and the EIA Preliminary Investigation processes have been significantly modified.

In the EIA review process, the project owner submits *Proje Tanıtım Raporu*[139] (The Project Introduction Report) to the ministry, and the ministry appoints a commission that is authorized to decide on the scope and content of the official EIA report and on the field of expertise needed in its preparation. Until 2002, the commission made the Approved/Rejected decisions and the official decision of the ministry was predicated on decision of the commission. In 2002, the ministry took over the decision-making process and the role of the commission was reduced to facilitating the preparation of the EIA Report.

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[139] In Turkish.

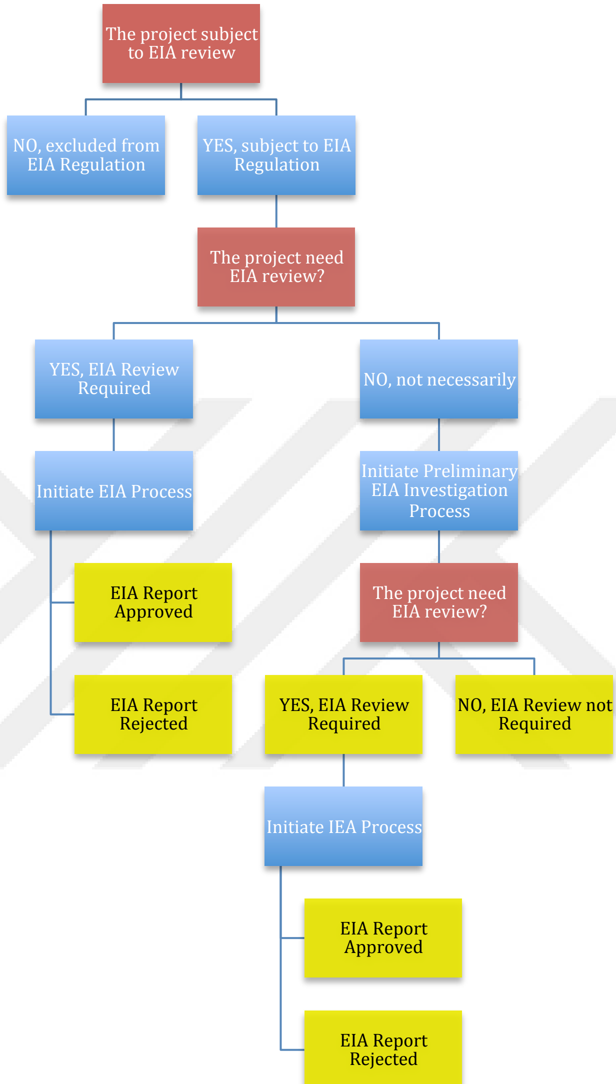

Figure 5.11. The general process hydroelectricity projects follow in the Environmental Impact Assessment Regulation.

In the Preliminary EIA Investigation Process, initially the governor offices, local branches of state institutions and local commissions were authorized to run the process, and a local commission made the decision. In the EIA Bylaw issued in 2002, the local commission disappeared, and although the process was carried out at the level of the governor, the ministry was authorized to make final decision. In the next issuance of the EIA Bylaw in 2003, the process was transferred from local branches to headquarters in Ankara; the project site visit responsibility of the governor's office was also transferred to the ministry, and public meetings were abandoned. The project site visit practice was totally abandoned with the EIA Bylaw issued in 2014. The contributions coming from local offices and impacted local communities and from the site visit observations were prevented. The ministry took over the decision making process from the local offices. As a result, the Preliminary EIA Investigation Process was simplified and made more bureaucratic.

The observed commonality is the shift in decision-making authority from the commission to the ministry. The state reregulated the EIA process by centralizing decision-making activity and controlling the EIA process in a disciplinary manner.

5.2.2.3. Reports of urgency: Water rights reports. The downstream water rights were included in the license process in order to secure the water rights of the other users in the downstream of the hydroelectricity projects when the water-use right agreement license bylaw was reissued in 2003. However, they were presented as an obligation of the company to consider in the planning of its project. The companies were required to take account of the downstream water rights in their feasibility reports. In the SKHA Bylaw of 2015, DSİ added a specific section together with a temporary section for the reports related to downstream water rights. Although the structure and content of the reports were not specified, *Mansap Su Hakları Raporu*[140] (Downstream Water Rights Report) and *Kuyruksuyu Sonrası Su Hakları Raporu*[28] (Tailrace Downstream Water Rights Report) were integrated into the SKHA license application process (Figure 5.12). The DSİ extended the coverage of the bylaw and included the hydroelectricity plants already operating with the water-use right license. This shift in the process forces the companies to consider the other users in the downstream who depend on the same water resource. I suggest that this shift is a consequence of an implicit need for river basin planning, which was abandoned in 2003 with the launch of the "sustainable development" of hydroelectricity program. The sections of the rivers were assigned to the companies without river basin planning in a de-regulative manner to ease the investment

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[140] In Turkish.

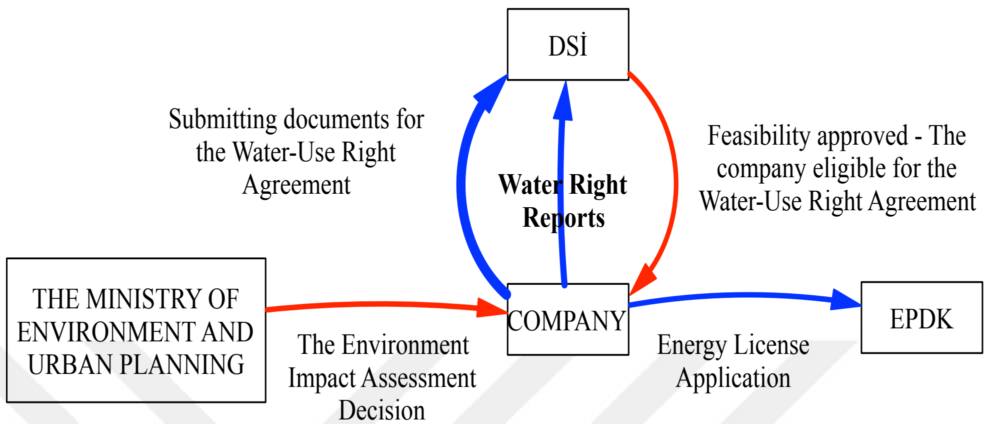

Figure 5.12. The relations of production defined in SKHA bylaw modification in 2015.

conditions of the private sector. When the water rights issues and conflicts rose, DSİ had to implement a sort of reregulation in the form of bureaucratic reports into the license application process.

5.2.3. Terms of licenses, functions and privileges

5.2.3.1. Validity. The licenses allocate certain rights to the private companies on a temporary basis. The validity period of an energy license is a stated 49 years maximum. The validity period of the water-use right agreement license is not clearly specified, but is linked to the validity of the associated energy license. In the first version of SKHA Bylaw, if the energy license was renewed, transferred, terminated and cancelled, or if the decision of EIA process was negative, the water use right agreement became invalid. When SKHA bylaw was modified in August 2009, the case of transfer of the energy licenses was removed from the bylaw, so that now, even if owner of the hydroelectricity plant changes, and the energy license is transferred to a new company, the agreement signed with the previous owner is binding for the new owner.

5.2.3.2. Renewal. The energy license is designed to allow the license holding company to renew the license at 49-year intervals[141]. There are two legal requirements in the license renewal process: an official application of the private company to the EPDK and payment of "license renewal fee."[142] The renewal process of the water-use right license is bounded to the renewal process of the energy license. It has drastically changed through the modifications made to the SKHA Bylaw, and these changes have environmental implications as well as implications on natural resource protection. In the first version of the SKHA Bylaw, when a private company renews the electricity license, it was obliged to go through the water-use right license process. This mechanism allowed DSİ to review the status of the river and the hydroelectricity infrastructure, and to evaluate environmental, social and economic conditions related to water rights. Moreover, the mechanism secured the revision of environmental impact assessment decision and reevaluation of the minimum water amount that the company was required to release. In August 2009, the license renewal was made possible by completely changing Item 11 of the SKHA Bylaw[143] and inserting two conflicting sentences:

> *Su Kullanım Hakkı Anlaşması, lisans süresince ve lisansın yürürlükte olduğu sürece geçerli olur ve Lisansın yenilenmesi, sona ermesi, iptali halinde Su Kullanım Hakkı Anlaşması hükümsüz kalır. Lisansın yenilenmesi halinde, mevcut Su Kullanım Hakkı Anlaşması eski hak ve mükellefiyetleri ile yenilenir.*
>
> The Water-Use Right Agreement is valid during the validity period of the license and as it is valid. If the energy license is renewed, ended and cancelled, the Water-use right Agreement becomes void. In case the energy license is renewed, existing the Water-use right Agreement is renewed with old rights and responsibilities.[144]

The conflicting statements excluded DSİ from the license renewal process, made the EPDK sole authority and as a result allowed recursive license renewal in hydroelectricity

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[141] Item 14 of the first version (RG #24836, August 2002) of the electricity market licensing bylaw states that an electricity license can be renewed maximum for 49 years at each time.

[142] Item 25 of the Electricity Market Licensing Bylaw, RG # 28809, November 2013.

[143] Elektrik Piyasasinda Üretim Faaliyetinde Bulunmak Üzere Su Kullanim Hakki Anlaşmasi İmzalanmasina İlişkin Usulve Esaslar Hakkinda Yönetmelikte Değişiklik Yapilmasina Dair Yönetmelik, RG # 27323, August 2009.

[144] Translated by author.

production. This is a case of deregulation on the management of water resources. When the license period is considered, even if the license is renewed once, the water stream at a section of river becomes dedicated to a private company for a hundred years.

Recursive licensing has two profound implications. The first is that it does not take into account the impacts of hydroelectricity production of licensed company on environment, local communities, and others who depend on the same water source. They become invisible in the process; this situation deepens environmental and social vulnerabilities and causes emergence of new ones. Secondly, it ignores the temporary character of the water-use right license. The conditions of the energy license renewal process create a contradiction with the Turkish Constitution saying that the water is a public resource.

5.2.3.3. Modification. In my analysis of the modifications, I focus on discontinuities in what are accepted as modifications in both licenses. At the beginning, when the related bylaws were issued, the modifications were limited to the ones required by changes in river basin water usage plans and by feasibility reports on the DSİ side, and by legislative changes and amendments to the laws forcing legislative changes on the EPDK side. EPDK also accepted the request of a private company as a reason for modification[145].

When the energy license bylaw was reissued in 2013, the capacity expansion was classified as a modification[146]. Although the bylaw sets the "EIAP Approved" decision as a prerequisite for capacity expansion projects, it allows projects that are "EIAP Not Required." Similarly, the water-use right license bylaw included capacity expansion to list of modification without any condition, when it was reissued in 2015.

Accepting a capacity expansion project not as a new project but a modification to an existing project is very critical. It seems to provide an easement for hydroelectricity companies. It has implications on the environment, particularly on the rivers and the water

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145 The Item 13 of the Electricity Market Licensing Bylaw, RG # 24836, issued on August 4th, 2002.

146 The Item 24 of the Electricity Market Licensing Bylaw, RG # 28809, issued on November 2nd, 2013.

rights. This is because increased capacity requires more water, and diverting more water intensifies the pressure on the river and on the water users in the downstream.

5.2.3.4. Cancellation. Cancelation of an energy license assigned to a hydroelectricity company has not been possible for a decade. The bylaw issued in November 2013 defines a single cancellation condition for the electricity production licenses, and is related to the timing of the construction activities[147]. The electricity market licensing bylaw refers to Item 16 of The Electricity Market Law for other license cancellation reasons. Item 16 lists three business related conditions for energy license cancellation. Neither the law nor the bylaw consider the water or other natural resources that hydroelectricity companies use for electricity production or pay attention to the social aspects of the electricity production. The energy license bylaw dominates the license cancellation in water-use right agreements. The water-use right license can be cancelled only if the energy license of the company is cancelled.

5.2.3.5. Termination. The termination conditions of the water use right agreement are tied to the energy license[148]. The energy license terminates at the end of its validity period. Other conditions for termination are the bankruptcy of the private company, the request of the private company or the loss of granting conditions for the license. However, the electricity market-licensing bylaw[149] fails to specify what the granting conditions are or what is counted as a loss.

5.2.3.6. License transfers as exceptions. The electricity market-licensing bylaw prohibits the transfer of the energy license from the license owner to another company[150]. Nevertheless, it allows license transfer under exceptional conditions. In the first version of the electricity

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[147] The item 27 of the Electricity Market Licensing Bylaw, RG # 28809, issued on November 2nd, 2013 defines the license cancellation condition as "If the construction of the hydropower plant was completed or it is not definite that it can be completed within the officially allowed time period."

[148] Item 11 and Item 38 of The Water Use Right Agreement Bylaw, RG # 25150, in June 2003 and RG #27323, in August 2009.

[149] The Electricity Market Licensing Bylaw, RG # 28809, in November 2013.

[150] Item 5 of the Electricity Market Licensing Bylaw issued in RG #24836 in August 2002 "Lisanslar hiçbir surette devredilemez" (The licenses can never be transferred) and Item 5 of bylaw issued in RG # 28809 in November 2013, "Lisans devredilemez" (The license can not be transferred).

market-licensing bylaw, the exception was restricted to project finance issues, and only the financial institutions that provided the credit to the private company for the hydroelectricity project could request the license transfer. The bylaw issued in 2013 accepted three additional conditions for the license transfers. The first is that when the company undergoes a restructuring through a merger or a demerger, it can transfer the license to another company. The second is that when the company is segregated into several companies or a new company is established with the same stakeholder structure, the license is transferred. Finally, a company can sell, hand over or rent its hydropower plant to another company, which will continue to operate it. The second and third types of exceptions are subject to the approval of the board of EPDK.

In the first SKHA bylaw issued in 2003, the transfer of the energy license was accepted as a condition for cancellation of the water-use right license. In other words, if a hydroelectricity company transferred its license to another company, its water-use right license was cancelled and new energy license owner had to apply to DSİ to sign a new water-use right agreement. This condition was removed from the SKHA process by a modification made to the bylaw in 2009. When a company transfers its energy license to another company, DSİ automatically issues a water-use right license to the new company. The license transfer process empowers EPDK over DSİ and provides a strong incentive to license transfers in hydroelectricity production. This is another case of deregulation on the DSİ side.

5.3. The Regularities as the Elements of a Discursive Formation

Foucault conceptualizes the discourse as a totality, a system of complex relations between institutions, economic and social processes, and he distinguishes these relations from others by calling them "discursive" (2010). He suggests looking for a regularity of practices over a period of time to uncover and clarify those discursive relations that constitute the discursive formation. In exploring the neoliberalism on the policy and program level (Springer 2012), the bureaucratic documents shed light on the discursive relations and processes in varying accounts.

5.3.1. The role and the place of environmental impact assessment

The Environmental Impact Assessment Procedure (*EIAP*) was structured as an instrument to protect the environment by taking into account the environmental issues and concerns in the site-selection process of sustainable development projects (Saygılı, 2007).

The water-use right license is associated with the locational decision. DSİ initially included EIAP into the Water-Use Right Agreement bylaw, as follows;

> *Şirket tarafından inşa edilecek bütün tesislere ilişkin olarak ilgili mevzuat çerçevesinde ÇED, ÇED Ön Araştırma Raporu hazırlanması ve Çevre ve Orman Bakanlığı'ndan ÇED Olumlu Kararı veya ÇED Gerekli Değildir Kararı alınması, şirketin sorumluluğundadır. Şirket tarafından inşa edilecek tesislerle ve tesis yerleri ile ilgili olarak ve ayrıca ÇED veya ÇED ön araştırma raporunda verilecek taahhütler ile ilgili muhtemel bir olumsuz durumun ortaya çıkması halinde bütün sorumluluk şirkete ait olacaktır.*[151]
>
> For all plants that will be constructed by the company, it is the responsibility of company to prepare EIA Report or EIA Preliminary Examination Report within the framework of the related legislation and to obtain EIA "Approved" decision or EIA "Not Required" decision from the Ministry of Environment and Forestry. The company is completely liable for any probable adverse consequences that might occur. The consequences can be related with the facilities that company builds or with locations of the facilities, or with any other commitments made in the EIA Report or the EIA Preliminary Examination Report.

DSİ added one important binding condition: if the decision of EIAP is negative, the agreement automatically becomes void, as follows;

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[151] Item 12 of the Water-Use Right Agreement Bylaw issued in RG #25150 on 26.June.2003.

Şirket tarafından inşa edilecek tesisler ile ilgili Çevre ve Orman Bakanlığından "ÇED Olumsuz Kararı" verilmesi halinde Su Kullanım Hakkı Anlaşması hükümsüz kalır.

If the Ministry of Environment And Forestry gives an "EIA Rejected" decision to the proposed facilities to be built by the company, the Water-Use Right Agreement becomes void.

What is important to see in the bylaw is that the EIAP decision was associated with the facilities but not directly with their location. The ministry became an agency that simply approved the facilities after the DSİ had decided on the location. Hence decisions related to river segments were no longer under the EIAP's jurisdiction. It is also important to note that the DSİ did not integrate EIAP into its licensing regulation and kept it as a bureaucratic responsibility of the company.

The EIAP became a precondition of the water-use right license in 2012 after a decade. DSİ integrated the EIAP into its decision-making process in the following way:

Şirket tarafından inşa edilecek bütün tesislere ilişkin olarak ilgili mevzuat çerçevesinde ÇED Raporu/Proje Tanıtım Dosyası hazırlanması ve Çevre ve Şehircilik Bakanlığından ÇED olumlu kararı veya ÇED gerekli değildir kararı alınması şirketin sorumluluğunda olup Su Kullanım Hakkı Anlaşması imzalanması öncesi bu kararların ibraz edilmesi zorunludur.[152]

For all plants that will be constructed by the company, it is the liability of company within related legislative framework to prepare EIA Report or Project Introduction File[153] within the framework of the related legislation and to obtain EIA "Approved" decision or EIA "Not Required" decision from the Ministry of Environment and Urbanization, and it is required that it be submitted before signing of the water use right agreement.

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[152] Item 19 of the Water-Use Right Agreement Bylaw issued in RG # 28343 on 4.July.2012.

[153] DSİ made a naming convention change in bylaw modification dated 2006 and replaced "Project Introduction File" with "EIA Preliminary Examination Report."

When the bylaw was reissued in 2015, DSİ added a prominent condition for the validity of the agreement by stating that within the scope of the EIAP bylaw, if "EIA Not Required" or "EIA Approved" decisions of the Ministry of Environment and Urbanization are cancelled, the water right agreement becomes void.

EPDK was slower in integrating EIAP into its energy license process than DSİ was. EPDK did not take into account EIAP until 2013. When the bylaw was reissued, EPDK made the decision of EIAP a requirement for pre-license applications. EPDK also required the decision of EIAP for capacity expansion projects. Furthermore, it also demanded the decision of EIAP from the companies, which had energy license but could not or did not start production yet. But in the next modification of the bylaw in February 2015, EPDK eased it by excluding the private companies that had obtained construction permit or any permit accepted as such or any document saying that construction permit was not required. Later, EPDK added a temporary item into the bylaw in December 2015, giving two-year grace period for companies to obtain a EIA decision from the ministry.

EPDK and DSİ conceptualized the EIAP as an external process giving "development consent" to hydroelectricity projects (Turgut, 2003: 166), and they did not integrate EIAP into their decision making processes nearly a decade. I suggest that their aim was to ease the licensing requirements and allow the private companies to proceed with the construction of hydroelectricity plants at allocated river segments immediately. This strategy was a form of deregulation giving flexibility to the hydroelectricity companies.

The timing mismatch between the licensing and EIA process created a legislative conflict contradicting the law. This is because EIA Bylaw states that before positive decision of EIAP is obtained, a project cannot be constructed, or contracted out, and no consent, incentive, approval, license and permit can be given. This situation created delays in obtaining other permits and licenses required for construction. In addition, as I explain in the following section, the local people took the EIA decisions of the ministry to the court, and the courts overturned these decisions and stopped the projects. Therefore, both institutions were forced to integrate the EIA process into their licensing processes.

5.3.2. Politics of inclusion and exclusion in environmental impact assessment

Which projects are subject to EIAP is a very critical question for the private sector. This is because the process builds a bureaucratic barrier that the private companies must pass before proceeding with the construction of the infrastructure. The process requires time and effort, and involves expenses. Therefore categorizing the projects as need EIAP or not need EIAP is a sensitive political-economical work. The project categorization forms two mutually exclusive and complementary domains, whose borders can be pushed in and pulled out over time by the state. If the domain of need EIAP projects expands, the domain of not need EIAP projects contracts and vice versa. The implications of expansion and contradiction of the domains can reveal the neoliberal characteristics of "sustainable development" of hydroelectricity program of the state.

The Ministry of Environment and Urbanization[154] publishes a list of types of projects that are subject to EIAP[155]. The ministry publishes another list[156], which consists of projects that are not directly subject to EIAP, but might be, after a preliminary review process called "Seçme Eleme Kriterleri."[157] For these projects, the ministry first applies a preliminary review process and then decides whether the project must go through the EIAP or not. The criteria applied in deciding which projects need EIAP and which do not are not publicly known.

The installed capacity of a hydroelectricity project, in Megawatt (MW), is the single criterion utilized by the ministry. When the EIAP Bylaw was first issued in 1993, run-of-the river type hydroelectricity plants were not on the lists. The EIA Bylaw was reissued in 1997 and hydroelectricity projects with installed capacity greater than and equal to 50 MW were made subject of EIAP. The projects with lower installed capacity were completely excluded

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[154] The EIA process was under the authority of the Ministry of Environment and Forestry before 2011. After the restructuring of the ministries in 2011, the Ministry of Environment and Urbanization took over the EIA process.

[155] This list is known as "EK-1" (Attachment 1) in hydroelectricity sector.

[156] The second list is known as "EK-2" (Attachment 2) in hydroelectricity sector.

[157] Selection and Elimination Criteria.

from the process. In the bylaw dated 2002, projects with greater than 50 MW installed capacity were made the subject of the EIAP and projects with greater than or equal to 10 MW were included on the list of projects subject to preliminary review. When the EIAP bylaw was reissued in the following year, the criterion and the threshold values did not change. In 2008, the thresholds were significantly lowered. In 2014, the limits further lowered and lower limit for projects need EIAP was set to 10 MW. The lower limit for projects subject to preliminary review was dropped from 10 MW to 0.5 MW in 2008, it was further reduced to 0 MW in 2011 and then raised to 1 MW in 2014 (Figure 5.13).

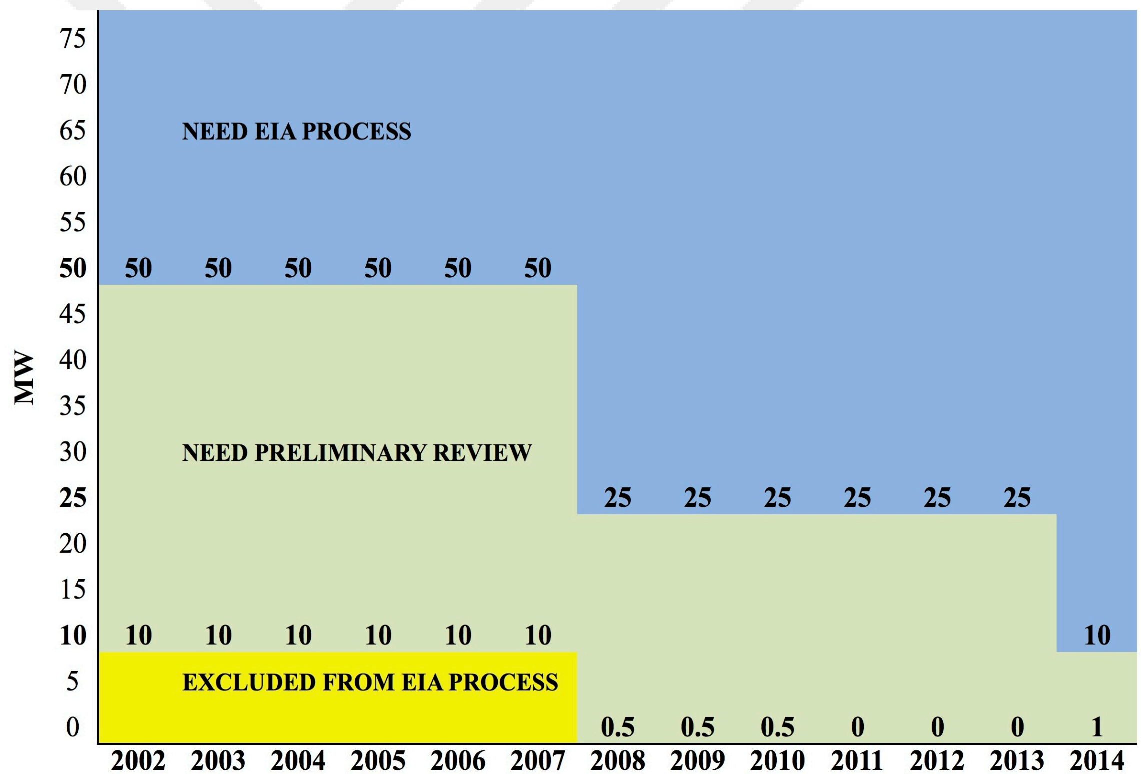

Figure 5.13. The progress of threshold limits in the Environmental Impact Assessment Regulation.

The changes in thresholds illustrate a prominent descending trend. In the period of 2003-2008, the projects with less than 50 MW did not go through the EIAP. From 2008 to 2014, the projects with less than 25 MW were excluded from the EIAP. A report published by a think tank group[158] reveals that 88% of 583 hydroelectricity projects with the energy license have installed capacity in the range of 0-50 MW. In a follow-up report published in 2013, the number of licensed project in the period of 2003-2013 was given as 876. Nevertheless, the report of the think tank group illustrated that majority of the projects had small capacities. The 75 % of the projects, which were in operating, being constructed, and planning and design phases, have the installed capacity less than or equal to 20 MW. The same report pointed to the fact that 50% of these projects have 10 MW or less installed capacity. This indicates that at least 75% of the licensed projects followed the simpler preliminary review process from 2003 to 2013.

Initially most of the hydroelectricity projects were excluded from the EIAP. Because the ministry set the lower limit to the projects need EIA, 50 MW. As a result, the environmental impacts of most of projects were not examined in detail and public were not involved in. Excluding majority of the projects from EIAP is an implicit roll-back or deregulation of the state. The deregulation strategy decreased the state control over natural resources and facilitated a specific type of neoliberalization of nature (Castree, 2010; 2008a). The local opposition rose as environmental consequences of the projects became visible. The local people opened court cases challenging the legitimacy of hydroelectricity projects entitled to "EIA Not Required" decision. As a consequence, the state had to step back and lower the thresholds, first, to 25 MW and then, to 10 MW for the need EIA projects. Likewise, the EIAP exclusion threshold was reduced from 10 MW to 0.5 MW first. In the period of 2011-2014, all the projects were included to the EIAP. In 2014, the threshold was raised to 1 MW. Overall, EIAP was made more inclusive.

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[158] Toprak Su Enerji Grubu, which is a think tank group formed by ex-DSİ bureaucrats and scholars, published a series of reports on hydropower development and publicly share them in their web site at http://topraksuenerji.org . I downloaded "4628 sayılı yasa kapsamındaki nehir ve kanal tipi hidroelektrik enerji tesislerinin üretimlerinin toplam hidroelektrik enerji potansiyeli içindeki oranı" on February 14th, 2015 from their site. It must be noted that project categorization of the report is different than the categorization of the EIAP Bylaw.

5.3.3. Weakening the public voice

Public attendance is the major foundation of the EIA process (Saygılı, 2007). The EIA process is the only legislative mechanism with which the public can raise their voice regarding an investment that will impact their livelihoods and the environment. But the scholars, who studied the development of EIA process from the public involvement perspective stated that its effectiveness and influence was reduced over time (Saygılı, 2007; Alıca, 2005: Turgut, 2003). I contribute to this debate by analyzing the EIA process in the context the hydroelectricity development.

At what stage and in what ways the public opinions were included to the EIA process can serve as indicators of their effectiveness and influence on the decision made in regard to a development project. I suggest that they also indicate the level of the willingness of the state to integrate public opinion into the EIA process.

The state involves the public in the decision-making process of the EIA by holding a one-time only public meeting. Those who cannot attend are invited to write to the state expressing their opinion. I focus on public meetings first. I examine three aspects of public meetings: which projects are required to hold them, how the public is informed about them, and at what stage of the process the public's feelings about the proposed project are considered.

The pre-condition of EIA process is to enable the public to access to information and documents. This pre-condition is mutually related with rights and freedoms on personal level, and with principle of publicity on legislative level (Saygılı, 2007). Therefore, I also examine the disclosure of reports to the public.

When bylaws are examined from mechanisms of public involvement, it is observed that the state is consistent in organizing public information meetings for the projects requiring EIA process. On the other hand, for the projects subject to preliminary review, the contribution of the public undermined in 2002 and then completely removed in 2003.

In 1997, public involvement meetings were mandatory for all projects and the state organized them. The state officials at local branches were responsible for supervising and attending the meetings and preparing official reports of the meetings. In 2002, the state made a significant restructuring of the public meetings in favor of the private companies. The responsibilities of the local state officials were transferred to the companies. The role of local state officials was reduced to getting the meetings notes from the companies. Although the bylaw stated that the governor had to supervise the process, and if necessary ask someone to view the project site, the duties were not well defined in the bylaw. The bylaw renamed the public meetings as "The Process To Inform The Public." The title of the meeting indicated that the purpose of the meetings was to inform the public about the project in a top-down fashion, rather to get the public opinion. In 2003 bylaw, the public meetings were cancelled and public opinion was completely removed from the preliminary review process.

The main mechanism for notifying the pubic of the meetings has been to place an ad on a newspaper. The secondary mechanism has been "askıda ilan" (hanged ads), which means hanging printed public announcements at specific places for the public to see. However, over the years the state incrementally reduced the capacity of public notice methods by reducing the impact of the ads by choosing newspapers with lower circulation, placing the ads less frequently, and timing their announcements so that people might not have enough time to plan to attend the meetings.

In the initial bylaw dated 1993, the companies were required to publish the public meeting ads both in a national newspaper and in a local newspaper. The chosen national newspaper had to be one of the top five newspapers with highest circulation numbers. The ads had to appear at least twice in one week. The hanging ads were also required to remain posted for an entire week. When the EIA bylaw was reissued in 1997, however, the frequency of ads in the newspaper was reduced to one and its timing was set to "three days before the meeting"; and the printed public announcements were required to appear for at least five day, not one week. These modifications restricted the public participation in the meetings (Arıca 2005). Furthermore, for the projects requiring the preliminary examination, the public meeting ads were further limited to appear only in the local newspapers. The state cancelled the publication of the public meeting ads in local newspapers and removed the newspaper selection criteria of "one of the top five newspapers with highest circulation numbers" stated in the EIA bylaw of 2002. In the 2003 bylaw and following reissued bylaws, the frequency of publication of the official ads was not specified. The EIA bylaw in effect, which was dated 2014, the definition of the newspapers has been altered significantly and restricted the dissemination of public meeting announcements. The national and local newspapers were substituted by "Yerel süreli yayın" and "Yaygın süreli yayın." The term "Yerel süreli yayın" defines local periodicals, published weekly or monthly besides local newspapers. The term "Yaygın süreli yayın" involves the newspapers that are published at least in a province in each of the official geographical regions and at least 75% of the country, and additionally the news agency releases.

The historical review of the scope of the public meetings demonstrates that in the first bylaw dated 1993, the public meetings were designed as a platform for informing the public about the project, answering their questions and taking notes on their comments and concerns, and later using official meeting notes as an input to the EIA decision making process. The public opinion was taken before the commission meeting and the official who was the secretary of the public meeting was also a member of the commission. These aspects of the process ensured the consideration of the public opinions in the project review discussions' of the commission.

The preliminary review report of projects was disclosed to public by the EIA Bylaw issued in 1993. The public was allowed to examine it, and express their opinion in written form to the state officials. However, in the 2002 bylaw, public review of the EIA preliminary report was eliminated.

For the EIA required projects, the ministry was inconsistent in allowing the public to review and comment on the EIA Report. Initially the EIA Report was open to public review. In 2002, public review right was cancelled, but in 2003 the next legislative change reinstated it. In the EIA process, when the company submits the EIA Report to the commission, the commission reviews it. Then, the commission finalizes the review and approves the EIA

Report as a final report. In the 2008 version of the bylaw, the state opened the final EIA report to the public review, and allowed the public to see and comment on the final report before the ministry made the "EIA Approved" or "EIA Rejected" decision. The public review of the EIA report was detailed by defining in what ways the public opinion would be reflected to the final EIA decision by a modification on June 30, 2011.

As discussed in the previous section, the majority of hydroelectricity projects were classified as being subject to preliminary review. The ministry decided that most of these projects did not need to go through EIAP, and declared them "EIA Not Required" project. In 2003, public involvement to these projects was eliminated. The profound consequence of ignoring the public voice was the rise of court cases open by the public to cancel "EIA Not Required" decision of the state.

Another gap in the legislation undermining the public involvement in EIAP was created by a conflicting situation between geographical borders and administrative borders. The EIA process operates on a province level and takes into account the administrative borders of the provinces. However, this contradicts the notion of EIA, which is a locational decision in a specific geography. The border issue becomes important particularly in assessing the environmental impact zone and the affected population of the proposed project. When all the issued bylaws are reviewed, it is seen that only the bylaw, reissued in 1997, included a process called "yer tetkiki"[159] (Project site survey). That bylaw clearly stated that if the proposed site lies within more than one province, the company must apply to each governor office separately. Although the EIA process had to be undertaken individually at each governor's office and therefore lacked a complete view, it was ensured that the impact zone was determined based on geography and the actual population living in the impact zone was included in the IEA process. However the project site survey was removed from the EIA process in the subsequent reissuance of the bylaw in 2002. The removal of the project site

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[159] The Item 7 and the Item 8 of the EIA Bylaw, dated 23 June 1997 defined "project site investigation" process as follows: every company subject to the bylaw must apply to the governor of a province where the production is site is located and submit an application file. Thee office of the governor then reviews the application and makes a decision on the acceptability of the activity at the proposed site within the regulatory framework.

survey undermined the effectiveness of the EIA process from the perspective of public involvement.

The hydroelectricity plants in the İkizdere Valley offer an empirical case demonstrating the border issue. The İkizdere River is the administrative border between Rize and Trabzon provinces in the lower section of the İkizdere Valley (Figure 5.14). The infrastructures of the Kalkandere/ Yokuşlu HES, Kızılağaç HES and İncirli HES are located on the eastern side of the İkizdere River, under the administration of the Rize province. The other side of the river is under the administration of the Trabzon province.

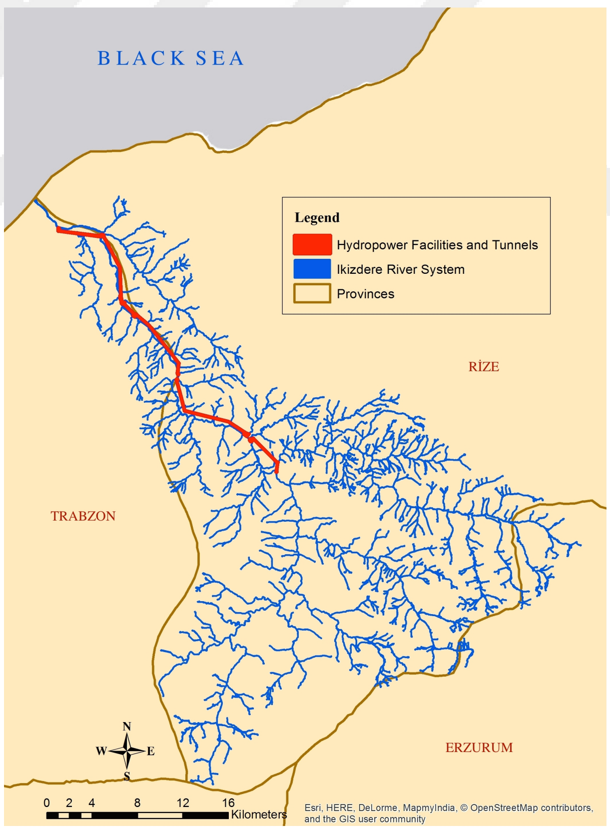

Figure 5.14. The administrative borders of the provinces and the locations of infrastructures of operating six hydroelectricity plants in the İkizdere River Basin.

For the Saray HES, the border issue becomes complicated, because a part of its water intake facility lies on the Rize province, whereas the rest of the infrastructure lies in the administrative zone of the Trabzon province. The local communities on both sides of the river were affected from construction activities in various ways. The electricity production activities of the hydroelectricity plants changed the flow regime of the İkizdere River, impacting the livelihoods and the communities living on the either side of the river. The local people on the Trabzon side were not invited to the public meeting of the Kalkandere/ Yokuşlu HES and Kızılağaç HES and similarly, the local people living on the opposite site of the river in Rize were not invited to public meeting organized for the Saray HES[160]. They did not see the EIA reports. The EIA process did not include all the people affected by the projects.

5.3.4. "Seeing" the hydroelectricity projects

The technical documents of the hydroelectricity development program provide knowledge to the state institutions, and what knowledge they provide creates a "space of visibility" (Braun, 2002: 164). The knowledge that is not in the reports creates its complementary antithesis "space of invisibility." The inherited questions of these spaces, what can be seen and what can not, can partially be answered by looking into the type of knowledge in these reports, and whether they contain real data collected at the productions sites through field surveys, or static knowledge produced by synthetic methods and gathered from various sources. I examine the regime of visibility of the state by addressing these questions in the following chapter; however, in this section I briefly highlight two findings to clarify what I mean by the regime of visibility. The first is that if the contents of pre-feasibility reports required from state developed projects and from privately developed projects[161] are compared, it is seen that for the privately developed projects, the report is simpler. This represents a contradiction, because the state knows less about the privately developed projects and is expected to require more details. This situation creates a "space of invisibility" for the private projects so that the companies have freedom-of-choice in their projects. It is a sort of neoliberal deregulation diminishing state intervention (Castree, 2010). Secondly, the state further narrowed down its "tunnel vision" (Scott, 1998: 13) by excluding the hydroelectricity projects from the EIA process and restricting the public involvement. The space of visibility of the private hydroelectricity projects is contracted and in a way leads to

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[160] Interviews with the locals, carried out from December 2014 to October 2015.

[161] They are called as EK-3A and EK-4 in the bylaw.

creation of an unregulated space with flexible borders in which the private companies can proceed easily. These changes also have a neoliberal character.

5.4. Conclusion

In this chapter it was argued that the regime of bureaucratic documents of the "sustainable development" of hydroelectricity program has established a mode of conduct that embeds a discursive formation toward neoliberalism. The neoliberal character of the program manifested itself in the episodes of roll-back or deregulation and roll-out or reregulation moves of the state in legislation. In other words, the state withdrew or diminished its bureaucratic control in certain areas of hydroelectricity production and enabled companies to "freely" proceed with the construction of hydroelectricity plants. When the excesses of deregulation faced strong national and local opposition and created legal contradictions in a larger context of law, the state invented creatively reregulation mechanisms introducing new forms of regulation that accompany and supplement the initial deregulation episode (Peck and Tickell, 2002; Castree, 2010).

In the analysis of neoliberal discursive formation, Foucault's analysis of discourse provided a critical lens identifying the discontinuities in the legislation and explaining them. The findings in this chapter demonstrate various forms of deregulation cases on the legislative level, and address their environmental and social implications.

First, the application for energy license and the water-use right license were kept simple with fewer control measures, and became more detailed and exercised more control over the project owner company and the project over time. In a similar manner, the technical reports required for the application were expanded and became more comprehensive and detailed. New reports were added to the license application to secure the water rights of the downstream users in a response to the problems that emerged with diminishing state planning and control in river basin management.

Second, the energy license and the water-use right license are connected through license terms and conditions. The terms and conditions empower EPDK over DSİ, and the energy license dominates the water-use right license by means of the relations defined in license validity, license renewal, license modification including capacity expansion, license transfer, license cancellation, and license termination. Inevitably, DSİ's control on the project and on the water resource was reduced significantly and even eliminated. This chapter suggests that EPDK has taken over a certain level of authority of DSİ on the management of water resources for hydroelectricity production.

Third, the mode of deregulation in EIA process was examined on two fronts. First, in the beginning the preliminary review process was made more comprehensive and detailed. The state took inputs from the impacted population, project site survey and local branches of the ministries and the institutions, and decision-making authorities were local. The deregulation was done in the form of simplifying the process by stopping to take these inputs for the decision making process, and transferring the decision-making authority from the local commission to the ministry. The process was centralized, and became vague and open to political manipulations. In addition, there emerged a strong trend in lowering the thresholds defining which projects needed to go through detailed EIAP, which ones would follow preliminary review process, and which ones would be completely exempt from the EIAP, a trend that points to another form of deregulation. Due to initial high threshold levels, 75% of projects went through preliminary review, and most of them were entitled "EIA Not Required" by the ministry. When these projects faced strong local opposition and were taken to court, the courts cancelled this decision of the ministry and stopped the projects. The ministry lowered the thresholds at several instances to increase the coverage of the EIA process. This implies that the state increased both the state control over the projects and public involvement.

Finally, this chapter demonstrates that public involvement has diminished over the years due to numerous modifications made in EIAP legislation. Public attendance is the major foundation of the EIA process (Saygılı, 2007); however, it is still the weakest part of the EIA. How the public effectively can be a part of the process remains an issue to delve into.

6. THE PRODUCTION OF TRUTH BY JURIDICAL AND INSTITUTIONAL PRACTICES IN HYDROELECTRICITY DEVELOPMENT

6.1. Introduction

Beginning with the privatization of hydroelectricity development in the early 2000s, two mechanisms have been producing official knowledge for the hydroelectricity sector in Turkey. The first mechanism is the neoliberal legislative framework driven by the political apparatus (Kibaroğlu et al., 2009; Harris and Işlar, 2013). One consequence of these neoliberal policies was that the state institutions relinquished their power in institutional knowledge-making to the private sector and instead took on an auditing role (Strathern, 2000). The privatization of knowledge-making has led to the fact that the production of official knowledge for the hydroelectricity sector has become political (Okumuşoğlu, 2013; Aksungur et al., 2011; IMO, 2013; TMMOB, 2011; Ülgen et al., 2011). Aksungur et al. reviewed 16 environmental impact assessment (*EIA*) reports of the hydroelectricity projects in the Eastern Black Sea Region from the perspective of the aquatic ecosystem, and stated that six reports did not contain any information at all about how much water the hydroelectricity companies must release as minimum water requirement (*MWR*). They also addressed other issues, such as the fact that officially required sections were missing from the reports; moreover they cited the absence of information on fish species from the reports, the irrelevance of presented studies to the regional rivers and an over-reliance on a literature survey in place of real data collected by field surveys (2011).

The second mechanism involved is the administrative courts. When the hydroelectricity development program faced strong opposition, local people filed court cases in administrative courts to cancel the projects in their areas. The judges and the scientific experts, who were commissioned by the courts to answer the court questions, became key actors in producing and legitimizing the official knowledge. In the courts, knowledge produced through the juridical knowledge-making practice for the hydroelectricity projects contradicted and contested the ones produced through institutional knowledge-making practice, and then replaced them.

The Cevizlik hydroelectricity generation plant (Cevizlik *HES*) court case was one such case, where juridical knowledge-making overruled the institutional knowledge- making and made the knowledge produced by the court official. The Cevizlik HES court case begun to establish the "truth," because the locals were concerned that the approved *EIA report* was not representing in a reliable and comprehensive way either the Cevizlik HES project or the potential consequences of its construction and operation. The administrative courts gave authority to the experts in juridical knowledge-making practice to become "a new type of spokesperson" for the environmental entities that had no voice (Latour, 1998: 230). The scientific experts exercised their power to produce truths representing various elements of the İkizdere River and the İkizdere Valley, including the riverbed, the creeks, the water, the biodiversity, the ecology, the tea gardens, the trees, and the ecological interrelations among them.

During the court case, the minimum water requirement (*MWR*), or cansuyu[162] or *telafi suyu*[163], became the focal point of legal arguments. The MWR is the official answer to a fundamental question: how much of the river flow must the hydroelectricity companies leave in the riverbed after diverting the river for electricity production? The MWR can be viewed as a threshold for exploitation of the river. Institutional knowledge-making practice had initially set the MWR at 150 L/sec. When locals conflicted over the MWR, the court raised it significantly from the initial level - first, to 500 L/sec, and then to 2,800 L/sec, and finally set to a lower flow, 2,600 L/sec. However, even after the involvement of the courts, the residents of the İkizdere Valley still have concerns about the reduced flow of the İkizdere River.

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[162] Local people call the MWR "*cansuyu*," metaphorically relating MWR to the amount of water barely enough to keep a living being alive.

[163] Compensation water (translated by the author). The MWR was referred in the court documents as *telafi suyu*.

The Cevizlik HES court case lasted seven years, from 2006 to 2013. It offers a rich contextual background and documents for analyzing both knowledge as a subject and how it is made, in other words, the knowledge-making practice.

In Chapter Five, I benefited from Foucault's "archaeology of knowledge" approach in examining the paper bureaucracy of the "sustainable development" of hydroelectricity program. In this chapter, I mobilize this notion of discursive bureaucracy on paper again to explore the relations between the knowledge and power in a more comprehensive way.

Foucauldian analysis of knowledge and power is a mode of approach to knowledge. This analysis is not concerned with the contents of the knowledge - in other words, whether it is accurate or not. Instead, it conceptualizes knowledge-making as a type of power and extends the analysis toward to 'individuals', who have right to produce truths. This understanding of relations between power and knowledge indicates that "knowledge derives from and provides the grounds for social control: every particular form of social control rests on and makes possible a particular form of knowledge" (Walzer, 1986: 64). This view is the heart of the Foucauldian state, which is defined by the concept of governmentality (Foucault, 1978). How applicable is Foucault's vision of state to the neoliberal state? Springer offers a detailed account of the studies on neoliberalism. He conceptualizes neoliberalism as a discourse, composed of four understandings of neoliberalism that are interrelated with each other in a circular manner. In addition to three other understandings of neoliberalism as an ideology, a policy or a program and a state form, he identifies governmentality as a type of neoliberalism on a process level working in a "bottom-up" fashion (2012).

I build on this line of thinking as I examine the hydroelectricity plants and dynamics of environmental knowledge, power and discourse, and situate this chapter at the intersection of environmental knowledge, power and neoliberal discourse.

The Chapter Six focuses on two issues. The first, building on the idea that nature is uncertain and that the ways this uncertainty is interpreted, assessed, acted on or ignored can serve particular political and discursive ends, I argue that the different MWRs, proposed by different experts and approved by the courts, as observed in the Cevizlik HES court case, are the outcomes of various problem definitions and solutions, contradicting and contending with each other. These "contradictory certainties" (Thompson et al., 2009: 2) had a political context that was embedded in juridical knowledge-making practices. I suggest that although the juridical knowledge-making is assumed to be objective, based on scientific evidence, and seems to be a mechanism to correct the outcomes of the politicized institutional knowledge making, it has the power to allow overexploitation of the rivers for hydroelectricity production.

The second issue is abandoning the use of real environmental data in the hydroelectricity development. By comparing the EIA report of the Cevizlik HES with two official studies done for the same geography in the past by the state institutions, and by using the "notion of discontinuity" (Foucault, 2010), I examine from a discursive perspective which knowledge was abandoned or in terms of Foucauldian concepts, "disqualified" with the privatization of hydroelectricity development in 2003 and elaborate on related implications (1980: 81).

In the pages that follow I give a background of the Cevizlik HES court case and the phases it went through. I provide a contextual timeline of the court case while defining the "legal chains," as defined by Latour as a juridical way of establishing relations (Latour, 2010: 222). In the third section, I explore who was given power to produce environmental knowledge and how the official questions in the court hearings were prepared. In section four, I examine the knowledge-making process related to the MWR, fish species, and synthetic stream flows. In the section five, I focus on the environmental knowledge that was used by the state institutions in the past but abandoned with the privatization of the hydroelectricity development. I conclude with the argument that the Cevizlik HES court case is the manifestation of neoliberal character of institutional and juridical knowledge-making practices that results in the overexploitation of the rivers for the purpose of hydroelectricity production.

6.2. The Cevizlik HES Court Case: Manifestation of the Juridical Knowledge Making Practice

6.2.1. The background

For the local residents, the Cevizlik HES is the first private HES emerged in the İkizdere Valley. Their perception of the hydroelectricity production was shaped up by their experiences with the İkizdere HES, which was constructed by the state in 1950s and in operation since 1961. The İkizdere HES was embedded in social and environmental settings in such a way that "it was almost invisible."[164]

EPDK issued the energy license for the Cevizlik HES on 24.February.2006. The Ministry of Environment and Forest entitled "The EIA Approved" status to the Cevizlik HES project on 24.July.2006. The rumors about the project design, its size, location and possible impacts on the livelihoods, on the İkizdere River and the İkizdere Valley created tensions among the local residents, particularly among the villagers of Gurdere, where the water-intake facility of the Cevizlik HES constructed. The locals were informed that the ministry had approved the EIA report, when the İkizdere Municipality officially requested information from the ministry about the status of the EIA procedure on 29.August.2006. They questioned truthfulness, completeness, and rationality of the EIA report, which was prepared by a private firm for the hydroelectricity company, and formed a basis for the ministry's decision. In order to cancel the Cevizlik HES project, they took the environmental impact assessment approved decision of the ministry to the administrative court for the cancellation on 21.September.2006. The court cancelled the decision of the ministry on 06.August.2013. However while the court case was proceeding, the construction of the Cevizlik HES was initiated on 02.January.2008 and electricity production started in May 2010.

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[164] Interview on September 9th, 2014.

6.2.2. The first phase: The Trabzon Administrative Court

The locals opened the court case in the Trabzon Administrative Court, where the project fell within the jurisdiction area. In the opening petition, their arguments were in two fundamental areas: the EIA report was not "science-based," and it was partial, underrepresented the Cevizlik HES project and its potential impacts; there were gaps in the legislation and in the practice of the environmental impact assessment process.

In the EIA report, the hydropower company committed to release 150 L/sec flow regularly as *telafi suyu* and to increase this fixed amount seasonally, supposedly aligned with migratory movements of the fish in the river, such as releasing 500 L/sec during the April-August period and making it 200 L/sec in September. The locals required the ministry to explain the scientific methodology behind these numbers. The locals also presented to the court the different scientific methodologies for determining *telafi suyu*[165] that were suggested by the experts and accepted by other administrative courts. I discuss the issue of *telafi suyu* in depth in the section four of this chapter.

They opposed the synthetic methods used to estimate the monthly average flows of the small creeks joining the İkizdere River along the reduced flow section of the river. They argued that *telafi suyu* was not sufficient to sustain the aquatic life and might particularly endanger an endemic fish species, known as the *Natio Maria*, an ecotype of *Salma Trutta Labrax*. The EIA report considered these hypothetical flows, in sum average 2.5 m^3/sec, and presented them as a supplement to *telafi suyu* released by the hydropower company.

They concerned that the Cevizlik HES gives damage to the İkizdere Valley. They perceived the İkizdere Valley as a natural beauty that must be passed with care to the next generations. Additionally, they argued that the valley has a significant tourism potential and pointed to the ongoing thermal hotel construction in the valley. They underlined that canoe

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[165] For the Dilek-Güroluk HES in the Fırtına Valley and for the Rüzgarlı I and II HES in the upstream of the İkizdere HES in the İkizdere Valley.

tours were organized and the route was starting from *Kumluca*, a site by the river in the vicinity of the Gürdere village, where the water-intake facility was planned. The touristic canoe route was passing through section of the river, whose flow was reduced significantly, once the Cevizlik HES started to operate. In fact, the National Canoeing Competition was held in the İkizdere River in 2006.

The locals did not perceive the Cevizlik HES project as a renewable energy project due to its high installed capacity, 95 MW. Furthermore they questioned its infrastructure from three aspects. First, they claimed that the actual length of the tunnels is 11.4 km, longer than 7.8 km given in the EIA report, and the consequences of using dynamite to open the tunnels underground were not studied at all. Second, they criticized the fish passage of the project that was designed for the migrating species of fish, and argued that it was not functional. Finally, they claimed that although the electricity transmission line is a required infrastructure for the hydropower plant and the EIA report of the Cevizlik HES did not cover its environmental and social consequences.

They pointed to the incorrect statements, such as "There is no agricultural activity in HDMA1[166]," actually the land was used for subsistence farming, and to missing knowledges, such as land size of HDMA1, while insisting on lack of long-term real data and field surveys, and political character of the EIA report.

After receiving the responses of the ministry and the hydropower company to the initial petition, the Trabzon Administrative Court decided to carry out one-day court field investigation at the proposed site of the Cevizlik HES on December 15, 2006. It was a routine practice. The court appointed three scholars from the Environmental Engineering Department of a respected university.

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[166] HDMA is the initials for *Hafriyat Depolama ve Malzeme Alanı* (The storage area designated for the excavated soil and rocks during the tunnel construction) and HDMA1 is the one located in the vicinity of the Gürdere Village.

Before the court field investigation, the plaintiff side handed to the court a list of questions for the experts about the issues that were either ignored or vague in the EIA report. The court covered these questions except the ones related to lack of basin planning and exclusion of the electricity transmission line, an integral part of the electricity production. On the other hand, the court extended the scope by asking the opinions of the experts on whether the Cevizlik HES would impact the tea gardens, sources of substantial local income. The field visit was carried out on May 7, 2007. During the field visit, the experts requested additional data: long term stream flow data, measured at the stream gauging stations in the İkizdere Valley, and any official listing of the species in the project area.

The experts delivered their report to the court on July 31, 2007. The Trabzon Administrative Court rejected the court case, but raised the *telafi suyu* to 500 L/sec, as suggested by the experts on August 20, 2007. The legal reasoning for rejection was stated that the mutual existence of two conditions, the action causing irrecoverable or irreparable damage to the plaintiff side and being explicitly against the law, was not constituted in this case.

The locals appealed this decision to the Trabzon Regional Administrative Court, a higher court. The Regional Court endorsed the decision of the Trabzon Administrative Court on October 9, 2007. The following day, before the locals could take the court decision to Danıştay[167] (hereafter The Council of State) for appeal, the Trabzon Administrative Court declared that the Cevizlik HES was no longer within their jurisdiction area, due to the recently established administrative court in Rize in June 2007, and forwarded the Cevizlik HES case to the Rize Administrative Court for rehearing.

6.2.3. The second phase: Transfer of the court case to the Rize Administrative Court

As the court case was sitting in the Rize Administrative Court, the construction of the Cevizlik HES started on January 2, 2008. The company informed the court on March 11,

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[167] The Council of State (in English). It plays the role of Supreme Court for administrative law. In Turkey, administrative law is separate from the criminal and civil law. The administrative courts exercise administrative law.

2008 that they committed to release 750 L/sec as *telafi suyu* and the ministry had approved the amount.

When the Rize Administrative Court reviewed the case file on March 27, 2008, the court accepted the previous expert report, prepared for the Trabzon Administrative Court and reduced the scope of the court case to the aquatic life of the river, particularly to the survival of Salmo Labrax fish species, and appointed a single expert from the department of aquaculture at a local university.

Before the court field investigation, the plaintiff side handed a list of questions, seeking justification of methods and more comprehensive and detailed ecological analysis of the impacts of the minimum flow. They informed the court that the ministry had applied different methodologies in determining the MWR for other hydroelectricity projects[168] and the alternative methods estimated higher MWRs. They requested the use of the same methodology for the Cevizlik HES.

The second one-day court field investigation was held on June 25, 2008, six months after the start of the construction of the Cevizlik HES. The report delivered on July 18, 2008 was basically about the impact of the Cevizlik HES to the aquatic life, and stated that *telafi suyu* was insufficient for the *Salma Trutta Labrax Natio Marina* (*Karadeniz Alası*) and proposed to increase it to 2.8 m^3/sec.

The Rize Administrative Court accepted the argument that *telafi suyu* given in the EIA report is insufficient for the protection and sustainability of biodiversity as well as for the sustainability of the ecological balance and for the continuity of the aquatic life in the river, and cancelled "the EIA approved" decision of the ministry on December 23, 2008. Then, the

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[168] Paşalar HES on the Çağlayan River was given as an example. The Çağlayan River is in the Eastern Black Sea Region and shares similar biological and physical characteristics with the İkizdere River. In a court case opened to cancel Paşalar HES, the court decided that the minimum flow must be 25% of the average flow.

court set *telafi suyu* to 2.8 m^3/sec, while stating that all other environmental impact claims put forward by the locals were within acceptable limits.

6.2.4. The third phase: The appeal of the court decision and the evaluation of the Council of State

All sides appealed the decision of the court for different reasons, but the common denominator was *telafi suyu*. The ministry argued that the species of *Salmo Trutta Labrax Natio Marina* prefers the Fırtına River[169], not the İkizdere River for breeding and hatching, and further claimed that the fish population is low compared to other localities in the region referring to an official study carried out in the rivers of the Eastern Black Sea Region including the İkizdere River in 2001. The hydroelectricity company, by pointing to 2.3 m^3/sec difference in the minimum flows proposed by two expert groups, argued that it was due to ignoring the synthetic stream flows given in the EIA report. The main arguments of the plaintiff side related with the calculation methodology of *telafi suyu*. They also brought to the attention of the higher court the issues not addressed by the Rize Administrative Court, including the lack of river basin plan for the İkizdere River, exclusion of the electricity transmission infrastructure and its impacts from the EIA process, and some other pitfalls in legislation.

Meanwhile, the hydropower company handed a project assessment report to the court, prepared by their engineers working in the construction of the Cevizlik HES. The report declared how much the construction activities had progressed and listed the possible risks and damages that might occur to endanger public safety if they were stopped. It was a part of a "sunk cost" strategy of the hydropower company, as Plater describes:

> Worried about citizen opposition, project promoters try to get as much construction done and spend as much money as possible before opponents can bring effective

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[169] The Fırtına River is another primary river in the Eastern Black Sea Region, similar to the İkizdere River in geographical and morphological characteristics.

> questions to bear. It's a basic rule of any enterprise, public or private: "a rolling stone gathers momentum." The object is to push a project until it exists as a concrete reality. Citizens get demoralized, and project promoters can say, "It's too late to turn back now." "Regrettably," the disingenuous argument goes, "by now too much has been done, too much money spent, too little of value remains, to permit considerations of any alternatives at this late date. (2013:112)

During the appeal phase the construction of the Cevizlik HES was progressing in the İkizdere Valley. The hydropower company submitted a second EIA report to the ministry on February 10, 2009 and contradictory to the previous figures, stated that the *telafi suyu* must be 2.8 m^3/sec. The ministry approved the report and new MWR amount, and again awarded "EIA Approved" status to the Cevizlik HES, officially legitimizing the on-going construction activities. The Cevizlik HES was open for electricity production on May 28, 2010.

The Council of State went into restructuring, which delayed their action until 2011. The assigned circle of judges overruled the decision of the court on December 28, 2011 on the basis of the apparent conflict in *telafi suyu* calculated by two different groups of experts. They returned the case for rehearing and suggested the Rize Administrative Court get an opinion of third group of experts.

6.2.5. The fourth phase: Rehearing of the Cevizlik court case in the Rize Administrative Court

When the Cevizlik HES case returned to the Rize Administrative Court on September 25, 2012, the cancellation of the project was out of question and *telafi suyu* was the only viable and tangible issue that the court could resolve. This time, the court selected three experts in the field of aquaculture from two different universities.

At the time, the number of operating HES in the İkizdere Valley had reached five, and the state approved twenty-two more projects. Under the circumstances, two issues from original petition remained unresolved: insufficient *telafi suyu* and the lack of river basin planning. One day before the court field investigation, the hydropower company requested from the court correction of the question form in such a way that instead of asking the experts to make a new estimation, it would make them decide between two amounts given in the past reports. The official question was about the determination of "sufficient" *telafi suyu* from the perspective of aquatic life. However, the term "sufficient" was not explicitly defined.

The last court field investigation was on February 1st, 2013, approximately three years after the Cevizlik HES was put into operation. The experts confirmed 2.6 m^3/sec as *telafi suyu* on March 1, 2013. The Rize Administrative Court cancelled "the EIA approved" decision of the ministry on August 6, 2013 based on the conflict over *telafi suyu* between the first EIA report and the last expert report, and fixed it to 2.6 m^3/sec (Figure 6.1).

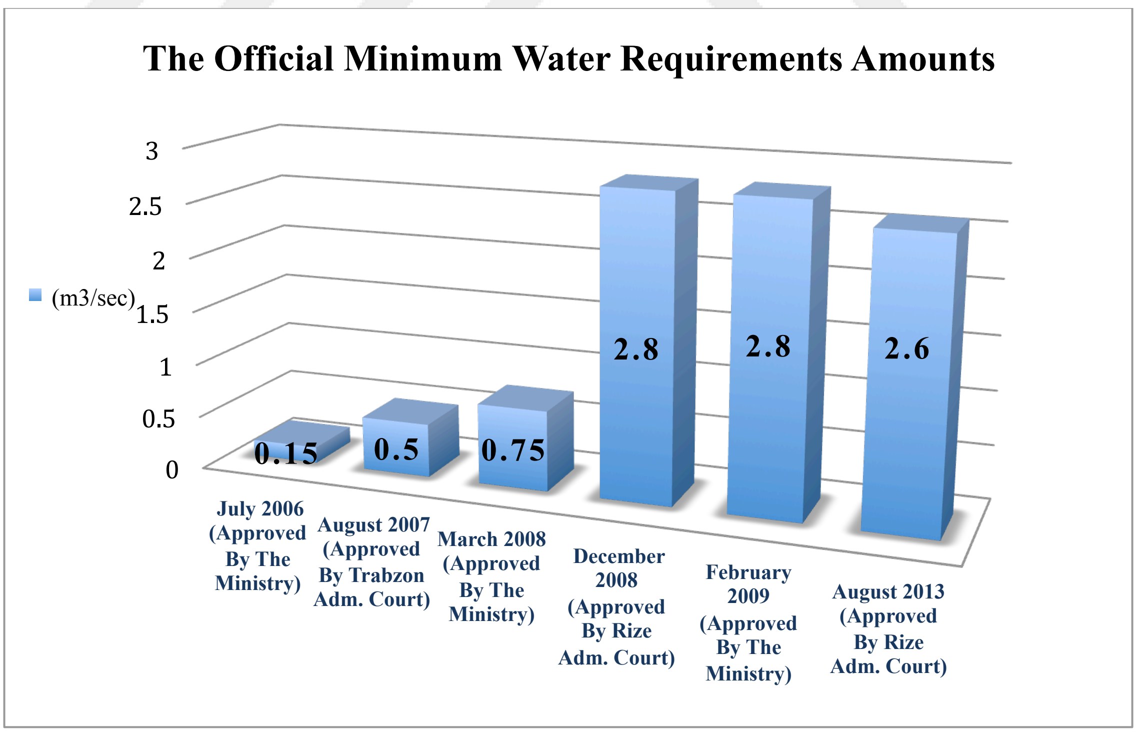

Figure 6.1. The rise and fall of the official minimum water requirement amounts over the course of the Cevizlik HES court case.

6.3. Who Can Speak for Nature?

During the Cevizlik court case the courts, the plaintiff and the defendant selected experts to produce knowledge representing the environment. The various specialists became a new type of spokesperson for the environmental entities that have no voice (Latour, 1998: 230). The experts represented the fish species, *Salma Trutta Labrax Trun ecotype Natio Marina,* the creeks, the İkizdere River, the riverbed, the biodiversity, the water, the İkizdere Valley, the tea gardens, the trees, and more by producing the truths about these environmental entities. Their approach to the environment defines how the experts perceive the environmental entities, and their statements reflect their perceptions, and enable or constrain the court to construct a picture of environment. Thus, the expert selection becomes critical in approaching to problems and in defining solutions.

The courts submitted a list of official questions to the selected experts and framed the knowledge production process on the environmental entities. Two processes, selecting the experts and preparing the official questions that the experts are required to answer, are key in how the environment is represented by the experts in the courts. I argue that power was exercised in these processes in the Cevizlik HES court case to produce knowledge in a discursive way (Foucault, 1980). In this section, first, I focus on how the experts were selected and what criteria applied in expert selection in the Cevizlik HES court case. I also investigate other experts, who were involved to the court case by the plaintiff and the defendant. Next, I examine the process of official questions.

6.3.1. The experts, appointed by the administrative courts

The court cases such as the Cevizlik HES were not common for the administrative courts until the hydropower sector was privatized in early 2000s. The environment was not an area of the expertise of the judges. Particularly a case like Cevizlik HES with diverse environmental issues, environmental and social impacts with temporal and scalar dimensions was more difficult to comprehend and conceptualize. As a routine practice the courts in such cases, select the experts, who are considered as authorities in their fields, and appoint them to the court order. The experts participate to court field investigation to make observations and to collect data in the geography subject to the court case in order to be able to answer the questions of the court. Following this one-day event they prepare an expert report addressing all the questions of the court within 30-day.

The expert reports form a legal basis for the decisions of the administrative courts. It is important to recognize that the administrative courts are equipped with two types of power. First, they decide who will produce the expert reports, in other words, who is qualified to produce knowledge for the court. Secondly, they have the power to give right to produce knowledge to the experts that they appoint. This expert mechanism relies on two powerful notions. First is that the expertise and scientific knowledge of chosen experts is suitable to answer the questions of the court. Second is that the experts, who are scientists and scholar usually, can provide objective, reliable and credible knowledge about the environment. These two notions are open to debate as my analysis of the Cevizlik HES court case demonstrates. In this section, I focus on the first notion. I examine the second notion as I discuss the knowledge production of the experts in the following section.

The Trabzon Administrative Court appointed, a team of environmental engineers working in the same department at one of the most respected universities of Turkey as the first group of experts. The plaintiffs presented to the court evidence of the biased position of these experts toward the hydroelectricity development. They requested the court to assemble another group of experts with unbiased position and diverse expertise, consisting of a geological engineer, a landscape engineer, and an expert on forest and river ecology. However the court ignored their request without any explanation.

The Rize Administrative Court made an unorthodox decision and decided to rely on the scientific knowledge of a single expert. The expert has studied the fresh water fish species in the rivers of Rize region. The locals raised their concerns whether a fisheries expert is eligible to answer their questions related with river and riparian ecology and their interaction with forest ecology, and repeated their request for a diverse group of experts.

When the Council of State returned the Cevizlik HES court file to the Rize Administrative Court for the rehearing, the scope of the court case was reduced to the amount of *telafi suyu* required for sustaining the existing conditions of the aquatic life and the ecological balance of the river. Although the concepts of aquatic life and ecological balance call for ecosystem diversity and river ecology, the court again appointed again three aquaculture experts.

Intrinsically the courts' selection of the experts had an immense impact on how the environment in relation with the Cevizlik HES was presented to the court and that perspective influenced the court decisions. The courts narrowed down the scope of the court case by selecting experts from the fields of the environmental engineering and aquaculture. The perspectives of their field of expertise limited the experts' approach to the court questions. The disciplined gaze of environmental engineering and the aquaculture dominated the knowledge production in the reports as I discuss in the next section.

6.3.2. The experts, consulted by the plaintiff and the defendant

In the due course of the court case, the local people and the hydroelectricity company consulted scholars for scientific evidence to justify their own claims and disprove the other sides' claims. The hydroelectricity company submitted to the Trabzon Administrative Court the report, *İyidere (İkizdere) Deresi'nin Biyolojik Çeşitlilik Açısından Değerlendirilmesi* (The Assessment of İyidere [İkizdere] River from the Perspective of Biodiversity)[170], prepared by scholars, who have studied the fish and aquatic species. However the scope of the report, extending to the river hydrology, river ecosystem, and river biodiversity were not compatible with their area of expertise. Another issue in their report was that the scholars accepted the conflicted hypothetical stream flows provided by the municipality of Güneyce as reliable and true representations of the stream flows of the small creeks in the valley.

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[170] The report submitted to the court on June 4, 2007.

On the other hand, the local people contacted the department of aquaculture at another university for scientific opinion to validate their concern that the Cevizlik HES could reduce the river flow in the 12-km section of the riverbed, and therefore would impact the biodiversity of the river, particularly the local fish species. Their question was directed to the most related field, inland waters biology, and responded by the scholars whose fields of expertise are limnology and taxonomy of inland waters, and planktonology. These experts claimed that the Cevizlik HES must release at least 1 m^3/sec water flow in order to protect the local fish species. Giving a single figure without providing any scientific context for the calculation methodology undermines both the reliability of this figure and credibility of the report.

Locals consulted a marine scientist from another university to check the hydrological calculations of the *telafi suyu* done by the first expert group. The experts demonstrated that the assumption of the first group of experts, taking the cross-section of the İkizdere riverbed as a rectangle, was a bold assumption that required validation.

These cases illustrate that in general the consulted experts tended to overextend the knowledge making act from their area of expertise to the other fields, and the reports lack scientific context, for instance: no referral to the existing literature, use of unreliable data and no justification of the claims and arguments.

6.3.3. The factitious expert

The Cevizlik HES court case demonstrated to what extent the choice of expert can be politicized. In the expert report submitted to court by the company, the municipality of the city of Güneyce was casted as an authority of measuring and recording the stream flows.

6.3.4. The official questions

In the administrative courts, the designated judge, the appointed experts together with representatives of the plaintiff and the defendant carry out a court field investigation. It is a juridical setting for addressing issues and asking questions to the experts, whose answers can support or refute the claims and arguments of the plaintiff and defendant or bring clarification. According to Turkish Law, the official questions are asked by the court, however the court is supposed to take into consideration the questions of both parties. Referring to Foucauldian notion of power, power is exercised not only by preventing knowledge but also producing it (Foucault, 1980), this questioning process gives the administrative courts power to exercise both forms of power in juridical knowledge production. Therefore it is important to analyze the questioning process and to understand how it affected the outcome of the Cevizlik HES court case.

During the course of the court, three court field investigations were organized. The locals submitted their questions to the court for the experts before each of the field investigation. The first court field investigation was on 07.May.2007. The plaintiff side raised issues that were either ignored or vague in the EIA report. The electricity transmission, an integral part of the electricity production, was not included to the report, and the locals raised it as an issue, while requesting a comment from the experts. Also, they wanted the experts to explain how the stream flows of the creeks were estimated technically. Another important point they raised was the need for a basin planning, because at the time of court field investigation, the number of the licensed projects reached to 11. The consequences of the construction, such as the explosions done for opening the tunnels, and the impact of MWR over the fish species and the functionality of the fish passage were the subject of their remaining questions. The court included their questions to the list of official questions, except the lack of basin planning and exclusion of the electricity transmission line from the EIA process. On the other hand, the court extended the scope by asking opinion of the experts whether the Cevizlik HES could have adverse affects on the tea gardens, the main local income source.

The second court field investigation was taken place on 25.June.2008, six months after the start of the construction of the Cevizlik HES. The plaintiff side informed that the ministry applied different the scientific methodology in minimum water estimation in recent EIA reports and complained over the double standard of the ministry. The ministry stated that the minimum water for Paşalar HES on the Çağlayan River[171] was determined 1.7 m^3/sec, where the average stream flow was given 5.31 m^3/sec. The locals requested the use of the same methodology for the Cevizlik HES. Because MWR of the Paşalar HES was 32% of the average stream flow of the Çağlayan River, whereas MWR of the Cevizlik HES was calculated as less than 2% of the average stream flow of the İkizdere River. They also requested the validation of the methodology behind this significantly low MWR. The locals were seeking both justification of the scientific methodology and more comprehensive ecological analysis on the impacts of the minimum water to the environment. The court ignored these requests, accepted the first expert report as valid, and formulated the second set of court questions as an extension of the first report. They asked the expert to answer two questions. The first, in what ways the Cevizlik HES impacts the aquatic life. The second, how much water must be released to the İkizdere River for *Karadeniz Alası* to survive.

The last court field investigation was carried out on 01.February.2013 approximately three years after the Cevizlik HES was put in operation. The number of the operating HES was reached to five and there were twenty-two licensed projects. Under these circumstances the locals had to reduce the scope of their questions to the sufficiency of MWR and its impact to the environment. They also raised the basin planning issue once again. One day before the court field investigation visit, the company made a request to the court on framing the question. The company requested the court to ask the experts to decide between two different MWR amounts calculated by two expert groups in the past, and not to ask them to make a new estimation for MWR. The court defined the purpose of the court field investigation to resolve the conflict between 0.5 m^3/sec and 2.8 m^3/sec. MWRs, calculated by different expert groups. The court based its decision on the decision of appeal court and framed the official question as resolving the contradiction between two MWRs. The third group of experts suggested 2.6 m^3/sec as MWR, a flow amount between two MWRs. In the next section, I focus on how these conflicting MWRs were determined by the experts.

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[171] The Çağlayan River is in the Eastern Black Sea Region and shares the similar biological and physical characteristics with the İkizdere River.

6.4. The Politics of Knowledge

The notion of value free, impartial and rational scientific knowledge has been questioned for long time in various fields of social sciences. The scholars have focused on the social construction of knowledge while addressing the relations between knowledge and power, and they have explained the role of these relations and political character of knowledge making in various cases (Foucault, 2010; Foucault, 1980; Peet and Watts, 1996; Aronowitz, 1998; Forsyth, 2003; Dove, 2005; Proctor, 2008; Mathews, 2011).

In this section, benefiting partially from this literature on politics of knowledge making and mostly from Foucauldian analysis of knowledge-power relations, I focus on expert knowledge making in the court case. During the Cevizlik HES court case, three conflicting areas, the determination of the minimum water, the protection of the aquatic life in the İkizdere River and the estimation of the stream flows, led to a dispute, metaphorically a war of scientific knowledge between the plaintiff and the defendant. I examine how the knowledge made in three conflicting areas from four perspectives: the used data, the assumptions, the utilized concepts and the validation of the suggested methods in determining MWR.

6.4.1. The contradictory certainties: Determining the minimum water requirement

In determining the MWR, the experts reached to "contradictory certainties," the concept Thompson et al. use to describe the problems with plural definitions and solutions, contradicting and contending against each other (Thompson et al., 2007). A straight forward explanation is that they approached the MWR problem from the perspective of their field of expertise, defined it within that context and suggested solutions, which were bounded by their problem definitions. However Thompson et al. argue that in order to explain why plural definitions and solutions contradicting and contending each other occur, these problems must be analyzed from the perspective of the uncertainty embedded in the context of the problem and in the decision making processes. Benefiting from this line of argument, I examine the methodologies of the experts from the perspective of two environmental uncertainties that appeared in the Cevizlik HES court case: the stream flows and the water required for the sustainability of the aquatic life in the İkizdere River. I demonstrate how the experts acknowledged and integrated these uncertainities into their problem definitions and suggested solutions. I also examine the data used, the assumptions made, the concepts utilized, and the methods of justification selected in the methodologies of the experts.

The first expert group introduced a new concept, *ekolojik ihtiyaç debisi*[172] (Q), replacing *telafi suyu*, and suggested a formula to calculate it as follows:

Q = Avg. Daily Min. Flow – 3 x Standard Deviation of Daily Min. Flow.

This formulation acknowledged that daily minimum flows have a stochastic nature, represented best by a normal distribution curve. Then, it employed the three-sigma rule, which states that the stream flow values that fall within the three standard deviations of the average daily minimum flow include "nearly all" values. They used the average and standard deviation of the daily minimum flows, measured by the state at nearest downstream stream flow gauging station, over a period of 42 years.

However, the way this formulation interpreted has two misleading aspects. The first, the experts misinterpreted the three-sigma method for the stream flows and this misinterpretation had drastic implications for the İkizdere River. Their formula calculated value A as 1,000 L/sec and sets it as MWR (Figure 6.2). They claimed that there is a 1% probability that any measured minimum flow can be lower than A. However this reasoning contradicts the 3-sigma rule by not taking into account "nearly all" observed daily minimum flows. In other words, the probability that any measured daily minimum flow will be higher than 1,000 L/s is more than 99%. Thus, it appears that this interpretation of the formulation facilitates overexploitation of the river flow. Since If 99% of minimum flows is higher than the suggested MWR, the MWR induces drought stress in the downstream of the point, where the

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[172] The ecologically required flow.

river is diverted. If B was taken as the MWR, any measured minimum daily flow would have been lower than B with more than 99% probability.

The second, they accepted the conflicted average stream flow of the Gürdere creek, given in the debated EIA report as a fact. The Gürdere creek joins the İkizdere River approximately 200 m. downstream of the point where the Cevizlik HES diverts the river flow. Devlet Su İşleri[173] (*DSİ*) and Elektrik İşleri Etüt İdaresi [174] (*EİEİ*) had not taken its flow into account in their studies in the past. The Gürdere creek appeared in the EIA report with a hypothetical average flow of 0.5 m^3/sec and the experts deducted it from 1 m^3/sec, and concluded that the company must release 0.5 m^3/sec as MWR.

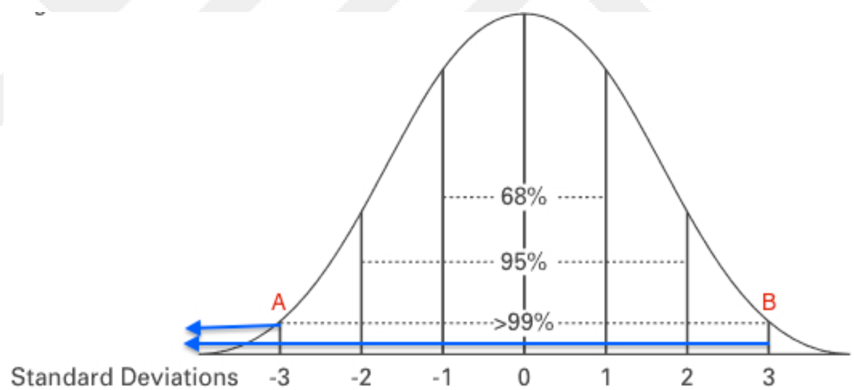

Figure 6.2. This graph illustrates the three-sigma rule. The rule says that when the measured values are plotted on a graph and the average or mean value of variable is shown as zero, the plotted values within three standard deviation from the mean represent 99% of the values.

The second expert was an aquaculture expert and approached to the same scientific inquiry from the perspective of fisheries, his field of expertise. He acknowledged the existence of various methodologies applied in different countries to determine MWR without citing the studies, and argued that their implementation to the rivers in the Eastern Black Sea Region cannot be accepted scientifically and rationally, because of the difference between the fish fauna of the studied rivers and the rivers of the region. In his reasoning, he casually

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[173] The General Directorate of Water Works.

[174] The General Directorate of Electrical Power Sources Survey and Development Administration.

connected the MWR to the fish species, and assumed the depth of the water as an indicator of sustainability of the fish species, in particular *Karadeniz Alası.* He formulated the MWR with three variables as follows:

MWR = Depth of Water x Stream Velocity x Avg. Width of the Riverbed.

Drawing on his empirical studies in the region, he claimed that the stream flow in the diversion reach of the Cevizlik HES must assure 30 cm water depth. He assumed the stream velocity to be 1 m^3/sec and the average width of the riverbed to be 10 m, and using above formula calculated 3 m^3/sec as the overall MWR. Likewise previous experts, he took into account the Gürdere creek. But he assumed its average flow as 0.2 m^3/sec without any justification, deducted it from his original 3 m^3/sec, and reached to 2.8 m^3/sec as the MWR that the hydropower company must release.

The third and last group of experts applied the same formulation, but reached to a different amount, 2.8 m^3/sec as the overall MWR. The reason of the gap between 3.0 m^3/sec and 2.8 m^3/sec was their assumptions. The third group of experts contradicted the assumptions of the second expert and stated that 1 m^3/sec as average stream velocity is extraordinarily high and 30 cm as the average water depth is low. They claimed that the depth of the water in the riverbed must at least be 35 cm, because only this depth can assure the stability of water temperature and sustainability of food chain that are two critical factors influencing the survival of the fish species. As the average flow velocity, they picked 0.8 m^3/sec by simply claiming that as to their knowledge it must be between 0.5 m^3/sec and 0.8 m^3/sec in the low flow months. However, they did not verify these numbers. Likewise, they took into account the Gürdere stream as their peers did. They used 0.2 m^3/sec as its average flow, and after deducting it from the original MWR value, they declared that the hydropower company must release 2.6 m^3/sec as MWR.

The debate over the MWR heated up as both the locals and the hydroelectricity company presented to the court additional expert reports that were written by different groups of scientists from various academic institutions. An expert of aquaculture had prepared the earliest expert report on December 1, 2005 for the Rüzgarlı creek, a small stream joining the İkizdere River at approximately 4-5 km upstream of the water intake facility of the Cevizlik HES. His formulation, centered on the continuity of the aquatic life, relied on one variable, the average minimum flow. He stated that MWR must be approximately one quarter of average of minimum flows measured over the period of 40-50 years. Since the Rüzgarlı creek has not been gauged and there was no real data, he suggested to replace stream flow data with measurable minimum water depth. His hypothetical methodology was influenced by his well-disciplined gaze and causally linked the MWR to the living conditions of the *Karadeniz Alası,* and replaced the notion of minimum water requirement for river and riparian ecology.

When the average water depth emerged to the court discussions as a key variable in determining the MWR, the lawyer of the locals applied to an institute of marine sciences to have a scientific evaluation of the suggested methods. The report of the institute revealed that the cross-section of the riverbed is a critical parameter in this formulation, and whether it is taken as a rectangle or a trapezoid significantly changes the result. Therefore they suggested using a cross-section, which represents the riverbed best. It is important to note that none of the scientists who used water depth in their calculations specified this crucial detail in their reports and verified their assumptions.

The locals applied to another university for a scientific opinion on the minimum flow. The experts from the department of aquaculture suggested another amount, 1 m^3/sec and justified it using general arguments associated with migrating fish species, while conceptualizing the river stream as the medium in which the fish species migrates.

The hydroelectricity company also presented to the court a report that was prepared by the experts, based on data collected in a four-day field survey. The experts confirmed the MWR given in the EIA report, 150 L/sec, as sufficient amount for the aquatic life in the river. They drawn on the results of the empirical data they collected during the field survey, which was rather eyebrow raising. During four days, they measured stream flow, water temperature, dissolved oxygen, water conductivity and pH, and counted the fish along sections of the river 100 m in length at 29 stations. Five of the stations were in the project zone, whereas others were at points extending over a wide geography from Artvin to Trabzon. Moreover, two issues related with stream flows were noticed in their report. The first, they claimed 6.546 m^3/sec as the total measured amount of the stream flows of the small creeks flowing to the İkizdere River. The second, they compared this value with the amount, 2.5 m^3/sec, given in the EIA report and with another amount 4.45 m^3/sec[175] given by the municipality of Güneyce[176]. It indicated that they accepted the municipality of Güneyce as an authority in measuring and determining stream flows.

These weaknesses in the expert reports demonstrate to what extend the scientific reports can be politicized.

6.4.2. The politics of fish

The fish species, in particular the *Karadeniz Alası*, singled out among numerous environmental elements of the İkizdere River as the scope of the court case was reduced to the determination of the MWR. *Karadeniz Alası* first appeared as a species under the protection of the state in the EIA report of the Cevizlik HES. The locals in their opening petition used this fact, besides others, as an argument to cancel the project and claimed that the Cevizlik HES will impact this endemic migrating species, which is under the protection of the Bern Convention[177] to which the Turkish state is signatory. They emphasized two consequences of the Cevizlik HES that put pressure on the fish species; the low water level in the riverbed and the deterioration of water characteristics, particularly a rise in water temperature.

The first experts, a group of environmental engineers, suggested using the water level required by the fish species as a criteria in determining the MWR, and claimed that the water level must be at least 15-20 cm to allow the movement of the fish species and fish migrations

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[175] "Ardarda dere yatağına karışan yan kolların toplam debisi Cevizlik Hidroelektrik Enerji Projesi ÇED Raporunda 2,500 lt/sn, Güneyce Belediye Başkanlığının verilerine göre 4,450 lt/sn, çalışmalarımıza göre de 6,546 lt/sn'ye ulaşması sürdürülebilir bir yaşam için elverişli bulunmuştur" quoted in İyidere (İkizdere) Deresi'nin Biyolojik Çeşitlilik Açısından Değerlendirilmesi (p. 14).

[176] Güneyce is a town located along the İkizdere River within the impact zone of the Cevizlik HES.

[177] Bern Convention on the Conservation of European Wildlife and Natural Habitats. For more information please refer to http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=URISERV%3Al28050.

in the river without providing any scientific evidence. In spite of the fact that they acknowledged the criticality of two other factors, water temperature and the amount of dissolved oxygen in the water, they singled out water depth as a single parameter in determining the MWR. Further, the experts claimed that the MWR they suggested would assure at least 15 cm water depth in the middle section of the riverbed. The court accepted this reductionist theoretical method, weak in scientific evidence, and the expert report set the tone of the MWR debate in the Cevizlik HES court case.

The second and third groups of experts used a simple formula that has the water depth as the only parameter. The other characteristics of the river flow such as velocity, temperature, pH, dissolved oxygen, and other elements that affect aquatic life have become invisible. Foucault suggests to examine what kind of knowledge is disqualified in analyzing the relations between knowledge and power (1980). Rather I ask what kind of knowledge qualified by the experts. The experts of aquaculture with their "tunnel vision" (Scott, 1998: 11), perceived the riverbed as a pool with stable dimensions. In their vision, the amount of water in the riverbed is linearly related to the water level and hence MWR can be determined from the water level. Moreover they abstracted the *Karadeniz Alası* from its natural habitat, the river ecosystem, and considered it as an aquaculture product. They presented it as an object, functioning merely as an indicator of the sustainability of aquatic life in the river.

6.4.3. The synthetic stream flows

When private companies have been allowed to develop their own projects on any river since 2003, they consulted engineering firms for project development and for preparation of the EIA report. When engineering firms approached to a river to estimate its hydroelectricity potential, they faced the reality that DSİ and EİEİ have set up the system of stream flow gauging stations according to their development plans, and the stations are located only on the significant rivers and their major tributaries. The lack of real stream flow data led the companies to apply the synthetic stream flow calculation methodology extensively to generate synthetic stream flows to determine the hydroelectricity potential. However, both the applicability and methodology applied in calculating synthetic stream flows created conflicts as revealed and amplified in the Cevizlik HES court case.

The private consulting firm that prepared the Cevizlik EIA report took into account the creeks joining the İkizdere River in the diversion reach to justify the 150 L/sec as MWR. Instead of setting up gauging stations to collect stream flow data directly from these creeks, it estimated their annual flow by using real flow values coming from the gauging stations, located on the main body of the river and applying a drainage-area ration method. When the locals opposed the method, the hydropower company defended their choice of methodology by saying that:

> *Bu yöntemler yüz yıla yakın bir süredir Dünyada ve Türkiye'mizde kullanılmaktadır ve kullanılmaya da devam edecektir. Bu dereler üzerinde hidrolog marifeti ile birkaç kez debi ölçmenin daha doğru sonuç vereceğini iler sürmek mantıklı değildir*.[178]
> These methods have been and will be used in the world and in Turkey for about a century. It is not rational to argue that collecting the stream flow several times from these rivers by the help of a hydrologist will produce truer results.[179]

The synthetic stream flow generation is a common and important tool in water resource planning and modeling (Stedinger and Taylor, 1982a; 1982b). It is also a research field with the extensive literature on its theory and application. A basic literature review on the topic reveals that the studies on synthetic stream flow consider the variability and seasonality of the stream flow and incorporate these characteristics to the model. The stochastic models work with the ranges of the mean and the variance while accounting for the uncertainty or possible errors in the estimates of the means and variances. These studies reflect the dynamic character of the rivers by representing them with a probability function. However their model, called the drainage-area ratio, which is the most basic and simple one, is constituted on a bold deterministic relation between the stream flow and the drainage area as follows:

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[178] Page 18 of the document dated January 20, 2007.
[179] Translated by the author.

$$Q = K \times A,$$

where Q is the average stream flow in m^3/sec, A is the drainage area in km^2 and K is a constant. The method, first, calculates K at a location on the river, where both variables are known, such as at a stream gauging station, and then carries it over to another particular point on the river and by multiplying with drainage area of that location, finds a flow estimate at that specific point. This deterministic model conceptualizes the river as a water source with constant flow. It is important to note that the daily and seasonal variability characteristics of the river regime of the İkizdere River, completely disappear in this model. Also, it erases the complexity and the uncertainty of the İkizdere River. K, which is assumed to be a constant in this formulation, is actually a variable defining the ratio of the water turning to stream flow after falling as precipitation on a unit size of land, 1 km^2.

This method of synthetic flow calculation was applied to estimate the stream flows of the creeks that join the İkizdere River in the diversion reach. It allowed the hydropower developers and planners to transform the creeks into single representative numbers, "inscriptions," in their offices (Latour, 1986). These inscriptions obviously require less time, effort and money compared to collecting real stream flow data over a period of time.

The plaintiff side objected to the synthetic flows in the EIA report. The method was not validated in the report, and its weak and strong points were also not addressed. In spite of the fact, the synthetic flow calculation was a source of conflict in the court case, the experts accepted these disputed flow estimates of the small creeks as reliable data and use them in their reports. Moreover, the courts have relied on these reports in making decisions.

6.5. The Disqualified Knowledges

When the state has privatized the hydroelectricity sector since early 2000s, the production of the required project reports and various other technical reports was also privatized. The EIA report of the Cevizlik HES is the product of this privatization done in the era of strong neoliberalism (Erensu, 2016). Discontinuity in knowledge production is a political act as well as producing the knowledge (Foucault, 1980). Therefore a comparative study of the knowledge produced for EIA report of the Cevizlik HES and the knowledge of the past studies done for the same geography provides us a window to view the discontinuities in terms of knowledge production before the neoliberalism and after. These studies were done in the specific technical and political context of their times. They reflect the character of knowledge making practice of their periods.

In this section, I explore the discontinuities in the knowledge making practices by analysing the EIA report of the Cevizlik HES with two other reports of the state institutions that were generated in 1970s and 1980s by two different groups of experts for the purpose of hydroelectricity development in the same geography: *The İyidere Basin Development Plan: Master Plan Report* and *İyidere Projesi İkizdere HES Tevsii Planlama Raporu*[180].

The İyidere Basin Development Plan was prepared in two years after EİEİ had done a preliminary study in 1969. EİEİ was the institution in charge of the study and the Italian consulting firm, ELC-Electroconsult S.p.A. of Milano, Italy and their associate company in Turkey, Dapta Engineering had done various technical and field inspection, and data collection missions before designing several alternative hydroelectricity schemes in the İkizdere Valley in addition to existing the İkizdere HES.

DSİ completed the *İkizdere HES Tevsii Planlama Raporu* in 1989 and the purpose of this report was to evaluate the technical and economical feasibility of alternative expansion plans for the İkizdere HES. The DSİ technical personnel was in charge of the study.

Ultimately what the analysis reveals is that discontinuity in real environmental data collections and in application of methods using real data as input amounted to 'freeing' up the İkizdere River by abstracting it from its variable and uncertain character and from its complex ecology, and placing it under the auspices of private sector.

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[180] "The İyidere Project, The İkizdere HES Expansion Report" (in English).

6.5.1. The sedimentation studies

The sedimentation processes are defined as one of the main characteristics of the rivers (Wohl, 2000, 2010). The amount of sediment discharge or sediment runoff, which refers to instantaneous transport rates in kg/sec or m^3/sec is a function of the geophysical characteristics of a river, therefore it varies significantly among the rivers.

The sediment discharge rate is a critical factor in hydroelectricity plant design and in deciding on a plant location in the river (Çeçen, 1962; Kondolf, 1997). Kazım Çeçen who designed the İkizdere HES, carried out the sedimentation study of the İkizdere River. He found out that the sedimentation discharge capacity of the İkizdere Valley is extremely high, and concluded that the sedimentation transport is the most important factor in the design of the water intake facilities for run-of-the river hydroelectricity plants.

The İyidere Basin Development Plan, which was completed in 1971, emphasized the same fact that the İkizdere River has extremely high sediment transport capacity due to the steepness of the riverbed profile, the size of peak flows, and high flow velocity, and recommended collection of real data and more detailed study of the sedimentation runoff.

Likewise 1989 dated DSİ Report discussed the sediment runoff and reported that the rivers in the Eastern Black Sea Region have significantly high rates. The report further emphasized how important to take the sediment discharge rate into account in design of water intake facility of the run-of-the river type hydroelectricity plants.

Paradoxically, the EIA report of the Cevizlik HES did not include any study on sedimentation, in spite of the fact that the sedimentation runoff was estimated 400 m^3/km^2/year at the water intake site.

EİEİ had established a data collection and sampling program that systematically measured the suspended sediment concentrations on a monthly basis (Hay, 1994). The sedimentation program was set up on basis of the international standards of sediment transport characteristics. The data measured through this program was used to calculate the sediment discharge rates. EİEİ was closed down in 2011 and sedimentation program was handed over to DSİ. But DSİ abandoned this technical practice. Eventually the sedimentation discharge rate became a "disqualified knowledge" in hydroelectricity plant design by this shift in the state practice, and lost its required level of recognition (Foucault, 1980).

This development certainly has environmental and economic implications in several fronts. The first, since the Cevizlik HES was put in operation, the water-intake facility traps the sediments and deposits them. New sediment deposit sites appeared in the riverbed (Figure 6.3). I observed during my field study, not only the water intake facility, but also the regulation pool of the Cevizlik HES turned into a sedimentation deposit site. The deposited silt, sand, gravel, cobbles and boulders need to be removed periodically. It costs to the company.

Figure 6.3. The sedimentation deposit sites (red spots) before the construction of the water-intake facility of the Cevizlik HES and after. Source: Photo on the left by Osman Coşkun. Photo on the right by the author.

The locals reported that the natural pools in the river were disappeared. These observations provide the evidence that the Cevizlik HES has altered the sedimentation processes of the İkizdere River.

Kondolf uses the metaphor of a conveyor belt to describe the transportation of the sediment in the river channel downstream to final depositional sites (1997). One consequence is coarsening of the riverbed in such a way that the spawning habitat of fish is damaged. The discharging of accumulated sediment in the water-intake facility may also adversely affect the aquatic habitat conditions in the downstream. The studies state that channel narrowing, channel simplification, and coastline erosion are other possible consequences of altering sedimentation processes (Kondolf , 1997; Nilsson and Berggren, 2000; Jaoshvili, 2002).

6.5.2. Fixing the natural uncertainty and variability of the river flow

A state official with a long-term experience and knowledge about the rivers of the Eastern Black Sea Region describes them as;

> *Dereler canlı organizmalardır. Hareketlilerdir. Değişim içindedirler. Aylık olarak takip edilmeliler. Kendi doğaları vardır. Bir dere bir başka dereye benzemez. Derenin doğasını çok iyi bilmek lazım. Dereyi tanımak zaman ister. Gözlem yapmak gerekir. Havzalar da birbirinden farklıdır. Araklı'nın yağışı İkizdere yağışından farklıdır. Yağış rejimleri, derelerin karakterleri, iklimsel özellikler Karadeniz bölgesinde havzadan havzaya değişir. Dere yatağına göre de farklı akar. Taş ve kayalık zeminde akan dere farklıdır. Kum veya toprak zeminde akan farklıdır.*[181]
>
> Rivers are living organisms. They are dynamic. They are in continuous change. They must be followed monthly. They have their unique nature. One river is different than the other. It is very important to know the nature of a river. It takes a long time to get to know a river. Observations must be done. Similarly, the basins are different from each other. The precipitation regime in Araklı[182] is different than the regime in İkizdere. In the Eastern Black Sea Region, the characteristics of the basins, their precipitation regimes and climatic characteristics change from basin to basin. The river flows differently in

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[181] The interview was taken place on 26.December.2014.

[182] The Araklı Valley is another river basin near the city of Trabzon in the Eastern Black Sea Region.

different type of riverbeds. The stream the river on a rocky or stony riverbed flows different than one on the colluvial or sandy surface.

EİEİ and DSİ followed the stream flows in a systematic way by setting up the stream gauging stations in the İkizdere Valley and by recording the stream flow data, analyzing them and publishing stream flow annals. Three gauging station, Çamlık/Dereköy, Tozköy Deresi/Tozköy and İyidere/Şimşirli, have long-term stream flow data[183]. Çamlık/Dereköy and Tozköy Deresi/Tozköy stations are still active. İyidere/Şimşirli was closed down in 2010.

The long-term stream flow data indicates that the İkizdere River has the characteristics of a mountain river with two prominent flow qualities (Wohl, 2000, 2010) (Figure 6.4, 6.5, 6.6). The first is that the flow regime is strongly seasonal driven by the snowmelt. The long-term stream flow data recorded at three gauging stations show that the peak months are April, May and June. The stream flow starts to decline significantly in July. In August, water volume in the river continues its decline. From September to March, most of the peaks and all of the minimum flows are less than the average flow. The second, there is a significant gap between the measured minimum and peak flows within a month, driven by the rains and the rises in temperature, accelerating the snowmelt. It is an indication of daily fluctuations. The gap between peak and minimum flows gets larger during the high flow months and the peak flows can be five times higher than respective minimum flows. The gap is reduced during the low flow months. The daily and seasonal fluctuations in stream flow demonstrate the natural uncertainty of the stream flows.

Two technical reports on the İkizdere River, produced at different times, one under the supervision of EİEİ, and another by the DSİ staff, demonstrate how natural uncertainty of stream flows were influenced the institutional knowledge-making practice in the past. The general practice of DSİ and EİEİ was to set up steam flow gauging station on the rivers that were considered for hydroelectricity development, to collect the stream flow data, and to base the hydroelectricity development and planning on the real long-term stream flow records. If

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[183] The locations of the stream flow gauging stations are provided in Chapter Three.

and when the estimation of the stream flows was required, they documented explicitly the reason of estimation and justified the estimation methodology.

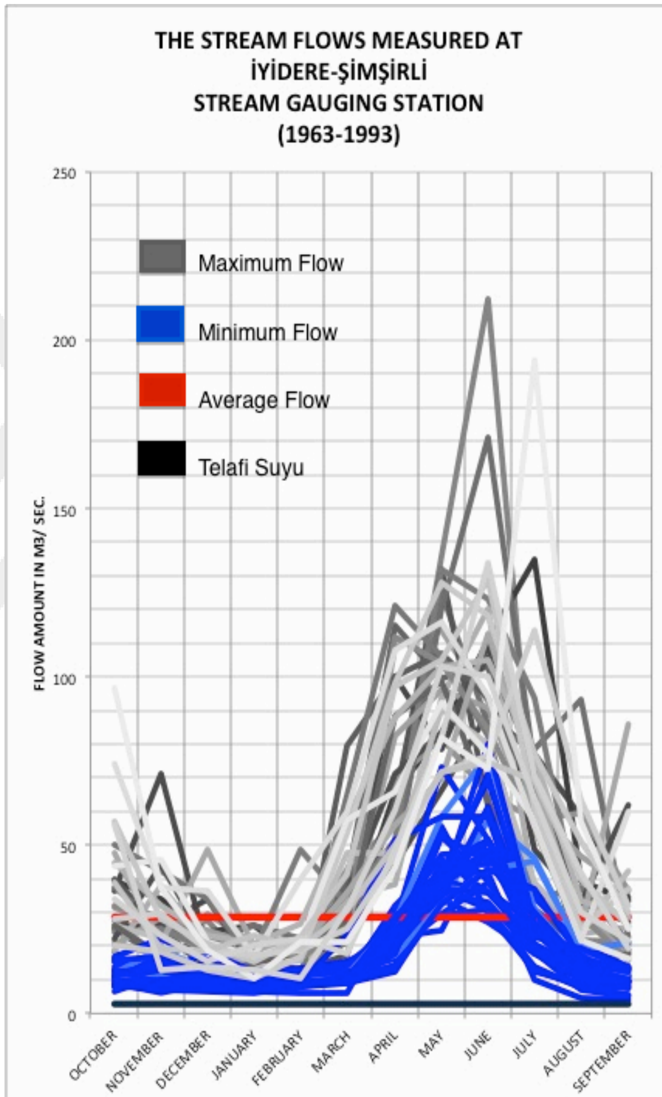

Figure 6.4. The data period is from 1963 to 1993, 30 years, recorded at the İyidere-Şimşirli gauging station, which best represents the flow at the Cevizlik HES water-intake facility. The stream flow is measured at predetermined intervals and recorded. The peaks and the minimum flows point of the river was calculated by plotted on the graph are the highest and lowest of the recorded stream flows within a respective month. The average flow of a month is 25.44 m^3/sec, the average of the averages of annual recorded measurements. The *telafi suyu* is 2.6 m^3/sec as approved by the final court.

Both reports stated that they used the long term, actual and specific data measured at the stream gauging stations. In the studies, the flow estimation at a specific place was done by using the flow data measured at the stream gauging station in its upstream on the same body of the river. The given reasons were that real data represents the true character of the flow best and the upstream data provides a modest estimation as a precaution to overestimation.

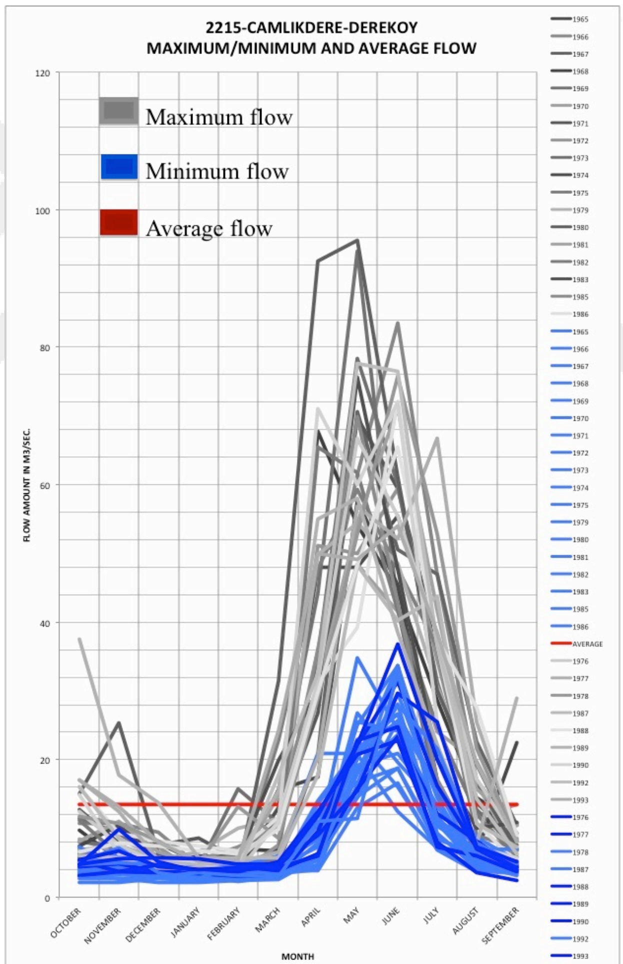

Figure 6.5. The stream flows recorded at the Çamlık Deresi/Dereköy stream gauging station.

However, the uncertainty and variability of stream flows have been buried with the "sustainable development" of hydroelectricity program in two ways. The first is the extensive use of synthetically generated flows, which are theoretical and stable flows. The second is the use of the average of averages of annual measured flows in calculations and estimations as seen in the EIA report of the Cevizlik HES. The average of the averages of annual measured flows is a highly aggregated figure and hides variability and uncertainty of the stream flows.

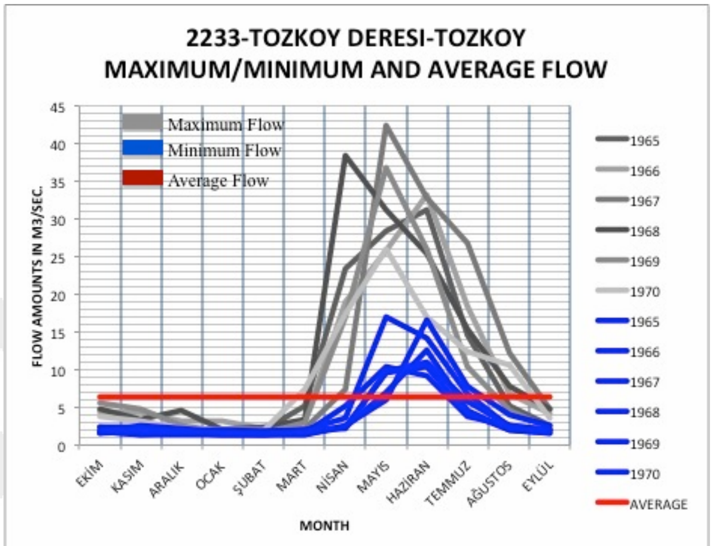

Figure 6.6. The stream flows recorded at the Tozköy Deresi/Tozköy stream gauging station.

6.5.3. Inland vs. Coastal climatic conditions

When the studies are approached from the perspective of climatic data, two points are seen. The first is that the EİEİ and DSİ used snow data besides the rainfall. The EİEİ study even recommended extending the area the snow surveys done. The DSİ study used the snow data measured at the İkizdere Station, because the meteorology station was within the project site and it could represent the characteristics of the İkizdere River Basin best.

The second, the past studies took into account the existence of two precipitation regimes in the Eastern Black Sea Region: the coastal and the inland. In the coast and in the hills of the mountains facing the coast, precipitation is evenly distributed over the year and it is rainfall driven. In the inlands and in the higher altitudes the precipitation rate drops and snowfall dominates it. The DSİ Report used the data measured at the İkizdere Meteorological Station and gave the annual precipitation as 1,079 mm. The state closed down the İkizdere

Meteorological Station, and opened new stations at the sites of Sivrikaya, Cimil and Derekoy in the upstream of the Cevizlik HES.

The EIA report used the climatic data measured at the Rize Meteorological Station, which represents the coastal climate of the region, not the real inland climate of the project site. The EIA report did not explain why the coastal climatic data was used but not the inland climatic data. The EIA Report had 2,263 mm as the annual precipitation measured at the Rize Meteorological Station. It is approximately twofold of the precipitation rate given in the past DSİ report. This finding has two implications. First, this significant gap strongly indicates existence of two climatic regimes in the İkizdere Valley. Second, using coastal precipitation rate leads to overestimation of the synthetic flows.

6.6. Conclusion

This chapter is situated at the intersection of environmental knowledge, power and neoliberal discourse, and focused on the juridical and institutional knowledge making practices from two perspectives using the Cevizlik HES court case as a case study. The first is natural uncertainty and variability of the İkizdere River. The uncertainty allows a politically productive space in which the experts produce environmental knowledge (Thompson et al., 1986; Ives and Messerli, 1989; Hansfort and Mertz, 2011; Mathews, 2014; Barnes, 2016). The analysis of the proposed MWRs has underlined the ways in which scientific experts engaged with the natural uncertainties intrinsic to the stream flows and to the water required for the sustainability of the aquatic life in the river. In constructing the models for MWR, these experts privileged certain forms of environmental knowledge over others, such as the average width of the riverbed and the stream velocity. Although riverbed width and stream velocity were relatively measurable, and the models were given the appearance of objectivity, the estimates were actually highly fluid, flexible, and partial. The studies show the limits of assuming a straightforward application of science and how power can penetrate into the process of the construction of environmental knowledge, making it political (Haraway, 1992; Haenn, 1999; Forsyth, 2003; Dove, 2005).

Foucault (1980) emphasizes the dichotomy of the role of power in knowledge- making and addresses politics not only in preventing knowledge but also in producing it. The courts narrowed down the scope of the juridical knowledge-making practice in two ways that have political implications. The first is that they commissioned experts from the fields of environmental engineering and aquaculture. The disciplined gaze of environmental engineers and aquaculture experts dominated the knowledge production. The second is that the courts not only administered the questioning process, but they also directed it. Gradually, the scope was reduced from the knowledge presented as truth in the EIA report to sustainability of the aquatic life and further to the water flow required by a single species of fish, *Karadeniz Alası.* On the other hand, the way appointed experts exercised their power in producing knowledge illustrated that the experts overextended their authority from their area of expertise to other fields in order to answer the wide-scope questions of the courts. In spite of the fact that hypothetical synthetic stream flows were conflicted in the court case, the experts did not question their accuracy, and used unverified synthetic flows in their formulations.

The central argument of this chapter is that the institutional and juridical knowledge-making practices have a political dimension that can lead to the overexploitation of rivers subject to run-of-the-river type hydroelectricity development. As the Cevizlik HES court case demonstrated, the significant gap between the initial and final values of MWR in EIA reports that were determined by the hydroelectricity companies and approved by the ministry, indicates that the institutional knowledge-making process was structured in favor of the hydroelectricity companies. On the other hand, the administrative courts pushed back attempts to overexploit the river flow to produce a certain level of electricity production by raising the MWR. However, the juridical knowledge-making practice, which seemed to be a mechanism to correct the "knowledge" of the EIA reports by following an objective, scientific evidence-based rational decision-making process, also produced several different MWRs, falling across a wide range.

The Cevizlik HES court case revealed that the state did not commission any study to determine MWR officially when the "sustainable development" of the hydroelectricity program was launched in 2003. The court cases hence forced the involved state institutions to change their status quo position. Even so, the different MWRs suggested by the scientific experts and approved by the courts, have a political context, demonstrating that the institutional and juridical knowledge-making practices produced knowledge in a discursive way. These differences in the values of MWR speak to the central argument of this chapter in that the juridical and institutional knowledge making practices facilitate overexploitation of the rivers that are commodified by the neoliberal political apparatus.

Moreover, the analysis of disqualified knowledge suggests that abandoning or ignoring properly collected environmental data and ignoring this data in knowledge-making practice abstracted the İkizdere River and reduced to a flow source with a stable flow. In this way the İkizdere River was "freed" up for the private sector to develop hydroelectricity projects.

Additionally, the analysis of the Cevizlik HES court case indicated that the ministry and the courts have accepted different methods in determining the MWR for different hydroelectricity plants. This uneven aspect of MWR points to another dimension of knowledge-making in which alternative forms of expertise can produce different knowledge; it also raises concerns in regard to social justice. A further study should seek to incorporate questions addressing these concerns, and attempt to compare the environmental implications of legitimized alternative methods of calculating MWR.

This chapter demonstrated that abandoning the sedimentation program and ignoring the sedimentation processes in hydroelectricity development have implications on the efficiency of hydroelectricity plants and on the river sedimentation processes. Similarly, overreliance on synthetic flows can lead to overestimation of hydroelectricity capacity and further to an idle capacity problem in the hydroelectricity plants. A further study on the consequences of ignoring the sedimentation dynamics of the rivers can provide evidence that may suggest the need to review projects not yet started.

This chapter demonstrated that the political struggle between the locals and the state on the issue of MWR led to another political struggle between the locals and the courts involving concepts, methodologies, assumptions and environmental data (Braun, 2002). The issue of

MWR is still the soft spot of the hydroelectricity development program, undermining the accountability and credibility not only of the state institutions, but also of the administrative courts. This chapter demonstrates that initiating debates on MWR is vital in reforming knowledge-making practices that have resulted in the overexploitation of the rivers. The chapter suggests further initiating debates on improving the juridical knowledge-making practice for environmental cases involving uncertainty. There is no doubt that these debates can illuminate the future of the İkizdere River and similar rivers in Turkey that are under the pressure of the run-of-the-river hydroelectricity plants.

7. THE WATER-ENERGY NEXUS OF THE İKİZDERE VALLEY: AGGREGATED CONSEQUENCES, EMERGING RISKS AND VULNERABILITIES

7.1. Introduction

During my fieldwork, two incidents directed my attention to an inseparable part of hydroelectricity development: electricity transmission. First, I chat regularly with residents in the coffee house in the town of İkizdere. They suggested strongly that I visit the village of Cevizlik to talk with the residents there about the electricity transmission line. The second incident occurred while I was visiting a local woman for an interview in the village of Ihlamur about hydroelectricity plant in her neighborhood. Her house, located high on an uphill slope, was near to her family-owned tea garden. The size of her garden is relatively small, typical of the Eastern Black Sea Region, in keeping with the socio-economic characteristics of the region. This small garden, however, is important for her family's livelihood, since the tea she cultivates, an in-demand cash crop, is the only direct cash income source for her family. She is in her late forties, widowed, illiterate and has three children, two of them dependent on her. With a sob, she showed me official documents sent by the court. Her only land had been expropriated by the state for the electricity transmission infrastructure required by the hydroelectricity plant in the valley. In addition, the court ordered her to pay the advocate's fees of the plaintiff, which is Türk Elektrik İletim Anonim Şirketi[184] (TEİAŞ), a state institution. Visiting other settlements and interviewing the locals during my fieldwork, I recognized how common her situation was in the İkizdere Valley. I was thus forced to extend my research inquiry to pose the following questions: in this geography, what issues emerge not only from diverting river flow to produce hydroelectricity, but also from the transmission and marketing of the produced electricity? What are the consequences of the water-electricity nexus in terms of environmental and social risks and vulnerabilities?

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[184] The Turkish Electricity Transmission Company (in English).

In this chapter, I explore the water-electricity coupling in the İkizdere Valley. My focus is on how the electricity sector is interrelated with the hydroelectricity sector on the national scale and how their relations are manifested on the local scale in terms of water storage, electricity production and transmission infrastructure.

In the following section, I focus on the historical development of the Turkish electricity sector and explain the changing trends, and the priorities, and the positions of the state. I describe the rise and intensification of the liberalization efforts of the state after the coup in 1980 by examining two policies. The first is the deconsolidation and privatization of state institutions. The second is the establishment of a national electricity market. I explore emerging electricity price-setting mechanisms in the electricity market, and what relations they establish with global/European electricity markets. I illustrate how the market and pricing transform hydroelectricity from a public good to a commercial commodity and finally to a global financial commodity. I argue that the commodification of electricity and price-setting mechanisms create "structural tensions" (Williams et. al., 2014: 13) on hydroelectricity generation that are further reflected in the rivers and the river valleys and eventually in the inhabitants of these river valleys.

In the second section of this chapter I focus on water storage, electricity production and transmission infrastructure in the İkizdere Valley as material manifestations of the water-energy nexus. As Williams et al. states, hydroelectricity plants are "the most visible manifestation of nexus interactions" (2014: 9). Infrastructure is a useful theoretical tool for analyzing the politics of environment (Bijker, 2007; Carse, 2012; Larkin, 2013; Boyner, 2014). I illustrate the trend in design toward damming and storing the stream flow and the consequences of this trend by comparing the old İkizdere Hidro Elektrik Santralı[185] (The İkizdere *HES*) with the emerged five hydroelectricity plants and expansion plan of the privatized İkizdere HES. Referring to the view of infrastructure as a relational concept (Star and Ruhleder, 1996), I argue that by using the damming and storing facilities, the hydro companies seek to reshape the relation of water to the *HES* infrastructure in order to optimize

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[185] The hydroelectricity plant (in English).

the delivery of electricity for maximum profit. Their intentions have environmental and social implications.

In the next section, I focus on the electricity transmission infrastructure, and I analyze two prominent processes. The first is the route planning of the electricity transmission line. Using the İkizdere *HES*-Cevizlik *HES* 154 kV electricity transmission line project and established *TEİAŞ* Orhanlı Substation as case studies, I describe the issues involved in the projects and demonstrate how public participation is constrained by legislation. The second process is the process of land expropriation. I show that three issues have emerged within the nexus: the scale of its impact has grown significantly; negotiation over property prices and resultant disputes have increased; and problems have been created as a result of legal fees charged for the lawyer of *TEİAŞ* and enforcement of their payment. This analysis reveals the actual scale of the impact in the İkizdere Valley and illustrates how power relations are involved in these processes.

In the final section, I elaborate on the aggregated environmental and social consequences of water-energy coupling and discuss the emerging risks, and vulnerabilities.

7.2. Political Production of the Water-Energy Nexus

7.2.1. Historical background of the Turkish electricity sector

7.2.1.1. Before the coup in 1980: A sector with diverse players and shifting priorities.

A closer look into the historical development of the Turkish electricity sector illustrates two trends. The first is the coexistence of two major state policy strategies --nationalization and liberalization -- whose power and influence fluctuate depending on the political and economic context of the time. The second trend is the consistency of the state in giving privileges to and making exceptions for the private sector in diverse ways. The state strategy moves back and forth between nationalization and liberalization. The shifts in this cycle are the result of several movements: national developmentalism, a strong-state tradition in Turkey, which has arisen from the nationalistic notion of "underdeveloped" states attempting to "catch up" with developed countries (Adaman and Arsel, 2005) and which has allowed the state to extend and expand its power (Ferguson, 1994), and the global economic crises of the 1930s, 1970s, and early 2000s (Erensu, 2016).

The coexistence of nationalization and liberalization has historical roots that extend to the Ottoman State of the early 1900s. The Ottoman State had privatized the electricity sector by issuing a law in 1910. Private companies with an increasing share of foreign investors built the first electricity generation, transmission and distribution systems. In the politically turbulent year of 1923, with negotiations for the treaty of Lausanne ongoing before the establishment of the Republic in October 29th, the transient government was forced to endorse the privileges of private investments and foreign investors by signing an agreement on June 17, 1923. On the other hand, the state-owned industrial enterprises, which were established in early 1900s, were allowed to build their own electricity generation plants to produce electricity to meet the demand of their plants. This was the start of the auto-producer[186] system.

When the new republic was established in October 1923, private sector and auto-producers were the players in the electricity sector and foreign investors were powerful. Kayseri ve Civarı Elektrik Türk Anonim Şirketi (*KCETAŞ*) was established in 1926 as a private company to produce and distribute electricity for the Kayseri region. High electricity prices, delays, and problems encountered in capacity increases and technical conditions empowered the state to launch the first nationalization policy in 1932. The first step was the purchase of the private electricity companies by the state. The second was the institutionalization of the development and the governance of the electricity sector. Therefore, the state institutions, ETİBANK and Elektrik İşleri Etüd İdaresi[187] (*EİEİ*), were established for the electrification of the county in 1935.

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[186] An auto producer is a company, usually in manufacturing, that requires electricity for its primary production activity and generates electricity, wholly or partly for its own use, as a secondary activity.

[187] The General Directorate Of Electrical Power Sources Survey And Development Administration (in English).

ETİBANK[188] was established as the authority in electricity production, transmission and distribution and related supporting activities, as well as in mining and fossil fuel extraction and banking. However, the internal structuring of ETİBANK could only be completed with the establishment of ETİBANK Elektrik İşletmeleri Müessesesi[189] (EEİM) in 1960. It was the subsidiary of ETİBANK to construct electricity production plants to meet energy demand of the industry, and to complete the electrification of the country by consolidating the plants and the transmission lines under a centralized interconnected system (EMO, 1980). Meanwhile, the municipalities, concessionary private companies, auto-producers and some state institutions independently engaged in electricity production, transmission and distribution activities.

Until 1945, Turkey had few thermal plants of considerable size and no significant hydroelectricity plants. The municipalities of the cities of İstanbul, İzmir, and Ankara operated the thermal plants; the Karabük steel mill, a state-owned industrial enterprise, owned one plant.

The Democratic Party came to power in 1950 and changed the electricity policy by following a more liberal approach. The rights for electricity production-transmission and distribution were once again given to private companies. Çukurova Elektrik Anonim Şirketi (*ÇEAŞ*) in 1953, Kepez ve Antalya Havalesi Elektrik Santralleri Türk Anonim Şirketleri (*KAHESTAŞ*) in 1956 were established with ETİBANK being their main shareholder (Figure 7.1).

The first interconnected electric system was established in the Zonguldak Area, consisting of the Çatalağzı thermoelectric station and the transmission and distribution lines in the area. This local transmission system had become an independent regional system in the Northwest of Turkey by extending coverage to İstanbul in 1953, and to Ankara and other major cities in the region in 1956. In the Western Anatolia Region, new hydroelectricity and thermal plants were put in operation and connected by the transmission lines from 1956 until

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188 The Law of ETİBANK, No: 2805, was issued on 14.June.1935.

189 ETİBANK Electricity Generation and Transmission Department (in English).

1962. These two independent regional systems were linked in 1962 to unify the interconnected system. By 1969, 75% of the produced electricity was within the interconnected system, satisfying 75% of the industrial demand and 40% of the country's population of 34 million.

Under these political, economic and technical conditions, the Trabzon Area, which includes the İkizdere Valley, was served by an electric enterprise organized and financed by İller Bankası[190]. This regional system, extending along the coast from Trabzon to Hopa, was 172 km long and was supplied mainly by the İkizdere HES; it also included three other run-of-the river type small capacity hydroelectricity plants in the Eastern Black Sea Region. The Northeast Regional System was connected to the national interconnected system in 1972 and grew with the completion of the Hopa thermal plant in 1973.

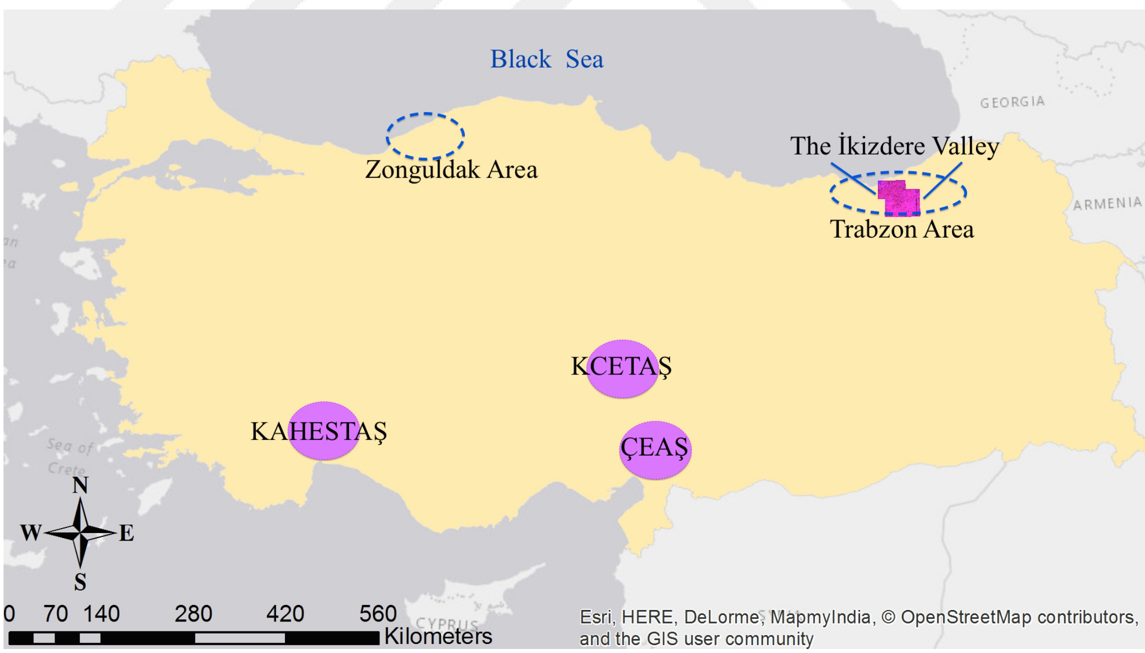

Figure 7.1. The approximate locations of the KCETAŞ, ÇEAŞ, KAHESTAŞ, Zonguldak and Trabzon Areas.

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190 The Municipalities Bank (in English).

The establishment of a single central authority, Türk Elektrik Kurumu[191] (*TEK*), in 1970, consolidated the Turkish electricity generation and transmission sector, which consisted of small networks and nodes of electricity generation and transmission. EEİM made up the nucleus of TEK. By that time, some municipalities already owned their electricity production plants. They were integrated into the national interconnected system by 1971. However, the privately owned systems, *ÇEAŞ* and *KAHESTAŞ*, sustained their structures until the national interconnection system was fully complete in 1975.

It must be noted that in spite of the fact that the state pursued a strong nationalization and centralization strategy for the electricity generation and transmission sector, the sector displaced a complex and diverse ownership structure. There were privately owned and operated electric systems, *ÇEAŞ* in the Mersin, Adana and İskenderun region, *KAHESTAŞ* in the Antalya region, and *KECAŞ* in the Kayseri region until early 2000s. *ÇEAS* and *KAHESTAŞ* ran until the state cancelled their concession agreements in 2003. *KECAŞ* was operating under different scheme and continues to operate. Why and in what terms these privileges were given to these companies and why they were cancelled is not within the scope of this research; however, this contradictory situation must be read as an indicator of the political character of the electricity sector as well as the closeness in relations between the state and private sector.
The development of the hydroelectricity planning, project development and construction followed a more nationalistic path. EİEİ was established in 1935 and given the role as the planner, project developer and controller of operational feasibility of electricity sector. Its responsibilities were to survey the hydroelectricity potential of rivers and river basins in order to determine the feasible ones, to conduct economical feasibility studies of the electricity generation projects, to prepare the electricity plans of the new industrialization programs, to collect data and make statistical analysis of the existing electricity production, transmission and distribution system, to contribute to education of the electrical engineers and technical stuff, and to carry out various studies related with the taxes on electricity, electricity pricing and studies on the imports of electric equipment.

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[191] The Turkish Electricity Authority (in English).

EİEİ established the national stream gauging station network as described in Chapter Two and extended the network while improving the stream data collection and analysis technology. EİEİ set up the first stream gauging stations in the İkizdere Valley, conducted initial feasibility studies of the İkizdere HES, prepared the project of the İkizdere *HES* and carried out various technical and economic feasibility studies[192] to utilize the hydroelectricity capacity of the İkizdere River more. Until the DSİ was established in 1953, the EİEİ cooperated with different institutions in hydroelectricity projects.

DSİ was established by law mainly for institutionalization of the activities of overflow control, flooding protection, irrigation, and drying the marshes. To produce electricity from water was assigned as a secondary responsibility with the restricting condition that the projects must be associated with main responsibilities. The law explicitly stated that DSİ had to collaborate with EİEİ in hydroelectricity projects and to allow EİEİ to prepare the surveys, feasibility studies, and the project plans. It is important to note that the review of the hydroelectricity activities of the state institutions in the İkizdere Valley, indicates that there was a progressive change in the institutional division of work after the coup in 1980. After the coup, DSİ began to set up stream flow gauging stations and carry out feasibility studies.

7.2.1.2. After the coup in 1980: Strong trend toward liberalization and globalization.

The 1980 coup was a milestone in the political economic path toward liberalization and globalization (Baysoy, 2006), and it opened "a political window of opportunity to introduce economic liberalization" (Kibaroglu et al., 2009: 291) that had dramatic impact on social, economic and political dynamics of the country. The impact on the electricity sector was immense and the reforms toward liberalization and deregulation of electricity sector marked a clear departure from earlier policies and programs. The reforms were influenced and shaped by global players, global energy networks, international financial institutions and development banks, International Monetary Fund (IMF) and World Bank, and European Union (EU) (Kepenek and Yenturk, 2010; Baskan, 2011). These reforms were carried out through institutional structuring and restructuring.

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[192] See Chapter Three for these studies.

In the hydroelectricity planning, development and construction sectors, the state followed the privatization toward liberalization policy. The institutional division of labor between two key institutions EİEİ and DSİ deteriorated as the DSİ was obtaining more authority. EİEİ weakened over the years and closed down in 2011. The functions of EİEİ were divided between DSİ and Yenilenebilir Enerji Müdürlüğü[193], a new state institution established in 2011. The basin planning, project design, project development and construction functions of DSİ have been privatized incrementally since 2001.

Centralization of all electricity generation, transmission, distribution and retail activities under TEK was completed by taking over the electricity generation facilities owned by the municipalities and private companies in 1982. However, contradictory to the consolidation policy, which turned TEK into a mega-scale institution, two new trends in state policies and programs were initiated that favored the private sector. First, a new investment model, Build-Operate-Transfer (BOT), was introduced to the electricity sector in 1984, enabling the private sector to generate, transmit and distribute electricity under the provision public good[194]. Two other investment models, Build-Own-Operate (BOO) and Transfer-Of-Operating-Rights (TOOR) with the same purpose, followed it. Next, the privatization of TEK entered the state agenda.

The state took concrete steps in the institutional deconsolidation of TEK and divided it into two separate commercial entities, Turkish Electricity Generation Transmission Co. (TEAŞ) and Turkish Electricity Distribution Co. (TEDAŞ) in 1993. In 2001 TEAŞ was further divided into three separate state institutions: Turkish Electricity Transmission Co. (TEİAŞ), Electricity Generation Co. (EÜAŞ) and Turkish Electricity Contracting and Trading Co. (TETAŞ) (Figure 7.2).

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[193] The Directorate of Renewable Energy (in English).

[194] Erol, İ., 2001. "Build-operate-transfer model in Turkey, legal structure and application," www.ydk.gov.tr/seminerler/turkiyede_yid_modeli.htm#t5, accessed in April 2008.

The state policies have marked a distinctive trend toward liberalization since the early 2000s. The energy sector together with those of construction and real estate were selected as main sectors for economic growth and became the most profitable sectors in Turkey. The state repositioned its place in the global energy market as an electricity exporter country, and as a regional leader in the South European electricity production and transmission system (Kibaroglu et al., 2009; Baskan, 2011), an energy-trading hub in the region (Sözer, 2014). Aligned with these goals, the state implemented the new liberal energy regime by passing legislation and making the energy an attractive sector for private investment. In fact the Turkish energy sector has become one of the fastest growing sector worldwide (Erensu, 2016).

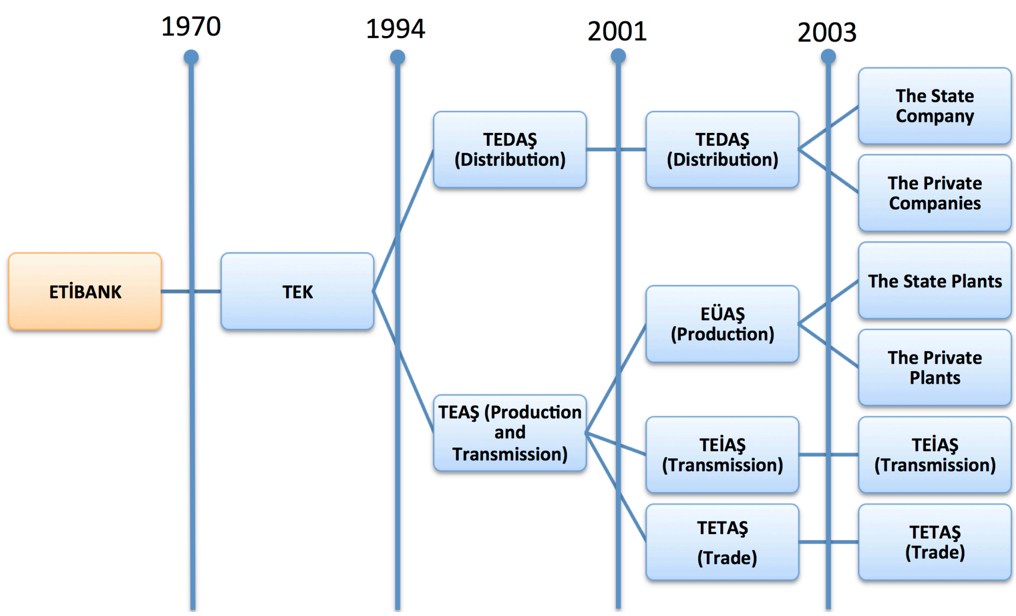

Figure 7.2. The deconsolidation of the state institutions in the electricity generation-transmission-distribution-trade sector.

The Electricity Market Law[195] (*EML*), issued in 2001 established Enerji Piyasası Düzenleme Kurulu[196] (*EPDK*) as the agency in charge of the energy market. EPDK constituted the energy market and led liberalization process in electricity market. The *EML* had various aims, however, two of them are crucial in the context of this section. The first one

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[195] The old Electricity Market Law (No. 4628) dated 20.February.2001.

[196] The Energy Market Regulatory Authority (in English).

is to enable the entrance of new national and global actors into the Turkish electricity market, and second aim is to transform the mechanisms of electricity price realization (Sözer 2014). The new Electricity Market Law in 2013 that has reinforced the consolidation process in the marketization of electricity and fostered the development of the private sector in order to empower the newly established liberalizing electricity market. In this regard, the market operations division was separated from *TEİAŞ* to constitute a new institution, Enerji Piyasaları İşletme Anonim Şirketi[197] (*EPİAŞ*). *EPİAŞ* will carry out the electric utility market operations including exporting and importing electricity to and from European countries and other neighboring countries, and will conduct carbon market operations. Its business goal is to attract foreign energy companies to the Turkish electricity market.

The only stage that has remained public is the transmission stage of the electricity sector, and it is under the sole authority of TEİAŞ due to the public good rationale (Sözer 2014).

Yenilenebilir Enerji Kaynaklarının Elektrik Enerjisi Üretimi Amaçlı Kullanımına İlişkin Kanun (Law of the Utilization of Renewable Energy Resources for the Purpose of Generating Electrical Energy), issued in 2005, was "revolutionary" (Baskan, 2011: 85) in endorsing strong state support for the private sector. The law introduced Yenilenebilir Enerji Kaynakları Destekleme Mekanizması[198] (*YEKDEM*), which is basically a state-regulated feed-in tariff pricing system for renewable energy. *YEKDEM* guarantees the purchase of the electricity by the state at a favorable fixed price. The prices are determined separately for each renewable energy source. Tariff price of hydroelectricity was highest to attract the private investors to the hydroelectricity sector. YEKDEM had contributed significantly to intensification of the hydro-boom in the river valleys.

The details of the ways in which these reforms in the electric utility market were reflected in the hydroelectricity sector are beyond the scope of this study. However I want to emphasize two prominent consequences. The first is that these institutional and legislative changes empowered the private sector and diversified market players. Second, they initiated

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[197] The Energy Markets Operation Corporation (in English).

[198] The Renewable Energies Support Mechanism (in English).

and completed the transformation of electricity from a public good to a commercial commodity that is in turn becoming a global financial commodity.

7.2.2. Emerging electricity price setting mechanisms as a by product of liberalizing electricity market

Sözer, who studied the marketization process of the Turkish electricity market and the power relations in the exchange of electricity (2014), focused on evolution of the price realization mechanisms. She examined how a range of diverse prices were produced, negotiated and fixed in liberalizing electricity market, and concluded that not only the price, as a final product, but also the price-making processes have a political character.

In this section, without going into the complexities of the price-making processes and their historical development, I briefly review these processes, highlight the priorities of the involved agents, and explain how these processes are connected to the rivers that have hydroelectricity production plants.

The structure of the electricity market consists of four electricity trading mechanisms (Sözer, 2014) working with bilateral contracts under the balancing and settlement rule (Hepbasli, 2005; Bagdadioglu and Ozyakmaz, 2009): power exchange or pool trade, over-the-counter mechanism, over-the-counter swap contracts and contracts for differences and financial derivates. The power exchange or pool trade consists of the day-ahead market, the intra-day spot market[199] and the real-time balancing market[200] and insignificant few others.

The most dominant trade form is the day-ahead market as of 2013 (Sözer, 2014). It is a spot market, running with bids and offers of the market actors that are shaped by their daily expectations of diverse factors. The day-ahead market runs with the balancing system in two stages. The first stage is executed by *TEİAŞ* based on the bid and offer prices of the market players on an hourly basis according to day, night and peak hour criteria. *TEİAŞ* calculates

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[199] Sözer commented that this market has not fully established at the time of her study.

[200] Sözer emphasized that this market is operated and regulated by TEİAŞ.

and announces the hourly prices for the next day and informs which bids are turned into real transactions. The day-ahead market plans and organizes the electricity exchange for the coming day, and when the exchange day comes, there can be differences from both the production and demand sides. The real-time balancing power market is designed as a backup to balance these gaps. The daily working of the real-time balancing power market starts in the afternoon of the same day. The market participants submit their offers for over- and under-load, following the fixation of the hourly prices for the next day on the day-ahead market. *TEİAŞ* accepts real-time bids and offers and pays them at their offer price if they turn into a transaction the next day.

In the evolution of price setting mechanisms, *EPDK* separated the day-ahead balancing and the real-time balancing stages, and swaps contracts entered the electricity market. A swap is a forward contract between a seller and a buyer for the delivery of a determined amount of electricity at a predetermined price on a predetermined date and time interval. The critical stage in liberalization of the electricity market was to transform the day-ahead planning market to day-ahead exchange market in 2011, as Sözer underlined, aiming to turn the prices into reliable signals for long-term investments and eventually turning the electricity market into "a futures market" (2014).

Sözer studied the daily routine of a trader working for an electricity production company that operates a hydroelectricity production plant and has several other electricity generating plants that use different energy sources (2014). The trader has efficiency and technical loss statistics of the plants, and first thing he does is to get the estimated electricity production of the plants for the next day in the detail of the day, night and peak hours, from the technical specialists. Then he starts the day by evaluating the estimated production to do "an asset optimization." The asset optimization is simply listing the production capacities from minimum to maximum marginal cost. The hydropower production amount makes the top of his list with almost nil marginal cost. Then the trader checks the several factors of the market, estimates the actions of the other market players, and using all available inputs together with his "optimization" list, prepares his bids. His objective is to anticipate the natural and financial forces in order to make an estimate that brings high profit with low production costs. He favors hydroelectricity over other renewable energy sources because of its low marginal cost. Furthermore, he favors the electricity produced at peak hours because it further maximizes his profit.

The traders interpret the variability of stream flow, which is a natural phenomenon, as a business risk that should be minimized. This market- driven perception of variability of stream flow causes the hydroelectricity companies to have a damming capacity to store as much water as possible, so as to offset daily and seasonal fluctuations in flow and in order to guarantee electricity production at peak times or other desired times. As a result, it is possible to suggest that the emerging electricity pricing mechanisms of the liberalized market will create "structural tensions" (Williams et al., 2014: 13) on hydroelectricity production, which will be materialized as water storage infrastructures. As a consequence, the operation of these infrastructures will create further "structural tensions" on the rivers and eventually in the river basins.

The following section explores how the politically produced water-energy nexus of Turkey in the national scale has manifested itself as various forms of infrastructure on the local scale, as seen in the İkizdere Valley.

7.3. The Manifestation of the Water-Energy Nexus in the İkizdere Valley

7.3.1. Water storage infrastructures of the emerged private HES

The road connecting the city of İkizdere to the larger cities of Rize and Trabzon follows the İkizdere River from south to north in the direction of the river flowing from the mountains toward the Black Sea. It passes through one of the İkizdere *HES* water-intake facilities[201] in the town of İkizdere and approximately 2 km from the outskirts of the town reaches the İkizdere *HES* powerplant, which extends between the river and the road. At a distance of

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[201] The İkizdere *HES* has two water-intake facilities that divert water from two main tributaries of the İkizdere River, namely Çamlık and Cimil, that rejoin in the southern border of the town of İkizdere. The main road passes the Çamlık water-intake facility. The Cimil water-intake facility can be reached through a secondary road that connects the town to the Cimil section of the İkizdere Valley, where the Cimil tributary is born.

approximately 200 m from the tailrace of the İkizdere *HES* power plant, the Cevizlik *HES* water-intake facility appears, lying on both sides of the road (Figure 7.3). The regulation pool with capacity 165.185 m^3 is one of the major infrastructures of the water-intake facility that has been built on the east side of the road. It occupies the land that formerly belonged to the

Imagery ©2017 CNES / Astrium, Cnes/Spot Image, DigitalGlobe, Map data ©2017 Google

Figure 7.3. The relative locations of the hydroelectricity facilities. Source: Google Maps.

local people living in the Gürdere village. Land suitable for subsistence farming and tea cultivating is limited due to the mountainous geography and steep, alpine-like hillsides. Therefore the size of private land parcels is small, while the number of owners is high. Therefore the expropriations undertaken for the water-intake facility of the Cevizlik HES under these specific socio-geographical conditions has impacted a large number of households. In the focus study I carried out in the Gürdere village, the attendants identified five households who had lost their houses, four households who had lost their tea gardens, two households who had lost their grasslands and two households who had lost their subsistence gardens. In order to create space for the regulation pool, soil was excavated, pool walls were constructed above ground, and both the main road and the secondary road to the Gürdere village were relocated. Now the secondary road follows the borderline of the regulation pool as it climbs up the hill. As the road climbs steeply up the hill, the placement and the size of the regulation pool become more visible. The villagers in the Gürdere village call the regulation pool, *Baraj*– "the dam," in English. Their perception is shaped up by a simple comparison of the Cevizlik *HES* with the old İkizdere *HES*. They know that the water-intake facilities of the İkizdere *HES* cannot store water but the regulation pool can.

In the EIA document, the purpose of the regulation pool was given as follows:

> *Regülasyon havuzunun amacı, akarsu debisinin 10 m*^{3}*/sn'nin altına düşmesi durumlarında, günlük regülasyon (günün belirli saatlerinde biriktirme, belirli saatlerinde de tünele deşarj) yaparak türbinlerin düşük verimlerde çalışmasını ve kavitasyona uğramasını önlemektir.*[202]
>
> The purpose of the regulation pool is, under the conditions of the stream flow lower than the 10 m^3/sec, to regulate the stream flow daily by storing water and discharging it to the water tunnel at specific time intervals of the day in order to prevent hydrodynamic cavitation and to operate with low capacity.[203]

"Hydrodynamic cavitation" needs to be explained at this point. Hydrodynamic cavitation is the outcome of a natural phenomenon of water flowing in tunnels. In the run-of-the river design, when a diverted stream flow enters a closed tunnel, the pressure it is subjected to rapidly changes from open-air pressure to closed-tunnel pressure. The sudden change of pressure on the flowing stream forms "cavitation bubbles," vapor cavities in a liquid with high pressure. As water flows down the slope, its weight and velocity decrease the pressure further in the tunnel and the "cavitation bubbles" grow. When the "cavitation bubbles" in flowing water reach the forehead, they accelerate while flowing down through the penstock and hit the metal surface of tribunes like rocks. They implode and generate a shock wave, causing wear on the tribunes. The damage of this natural phenomenon is avoided by constructing another piece of infrastructure - a surge chamber or surge tank or an open air pool - as seen in the

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[202] IEA report dated February 2009, pp. 115.

[203] Translated by the author.

İkizdere *HES*, in order to mitigate the pressure variations in the water tunnels. How the regulation pool at the beginning of water tunnel is supposed to prevent the hydrodynamic cavitation is questionable.

On the other hand, it takes 1.8 hours to fill the regulation pool with the given 24.44 m^3/sec average stream flow, assuming no water is discharged to the power plant. If the stream flow is 10 m^3/sec, the filling time rises to approximately 4.5 hours. Table 7.1 gives the approximate pool filling times based on the monthly average stream flows, given in the EIA Report of the Cevizlik HES. The Cevizlik HES also has an underground surge chamber with 18,185 m^3 volume.

Table 7.1. The approximate filling time of the regulation pool.

Month	**Average Stream Flow[204] (m^3/sec)**	**The Regulation Pool Filling Time (hour)**
October	16.72	2.74
November	16.02	2.86
December	13.24	3.46
January	10.76	4.26
February	11.11	4.12
March	16.60	2.76
April	37.56	1.22
May	59.24	0.77
June	59.11	0.77
July	32.74	1.40
August	17.32	2.65
September	14.80	3.10

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[204] As given in the EIA Report of the Cevizlik HES, dated 2009.

If discharging occurs, these durations become longer. The locals have stated that the filling time can be as long as eight hours and that the water is stored not only during the low flow months but all year around. They have made observations by following the changes in the size of stream flow in the river as they use the road that follows the river and passes by the infrastructures built on or by the river. During my field trip, observing the size of the stream flow also became a habit of mine as I took the bus to or from the town. I observed the level of the water at two points, where the plants are supposed to release the diverted water to the riverbed; at the tailrace of the Cevizlik *HES* powerplant, and at the tarilrace of the Kızılağaç *HES* powerplant. My observations confirmed the locals' observations. In high-flow season there were occurrences that MWR was released.

The other four hydroelectricity plants also have water storage infrastructures (A complete list of infrastructure with water storage capacity is given in Table 3.18 in Chapter Three). Although it is invisible, the Yokuşlu/Kalkandere *HES* has a surge chamber underground with water holding capacity approximately 77,000 m^3. In addition to this man-made water storage infrastructure, the riverbed at the water-intake point was modified and turned into an artificial head pond with a capacity to store water.

The Kızılağaç *HES* is chained to the Yokuşlu/Kalkandere *HES* because it takes water directly from the power station of the Yokuşlu/Kalkandere *HES* through a tunnel. Its invisible surge chamber, built underground, has a water storage capacity of 11,400 m^3.

The three chained *HES* of *Sanko Holding* are followed by two chained *HES* of *Adalı Holding* (Figure 7.4). The İncirli *HES*, which comes after the Kızılağaç *HES*, has three water storage structures. The sedimentation pool, which is one of the fundamental pieces of the run-of-the river HES infrastructure, has a 3,000 m^3 water holding capacity, as given in *EIA* Report. For the İncirli *HES*, a surge tank was erected, which is partially buried underground and partly visible from the road (Figure 7.5). Its dimensions and location were not provided in the officialized project information file. The İncirli *HES* has another piece of water reservoir

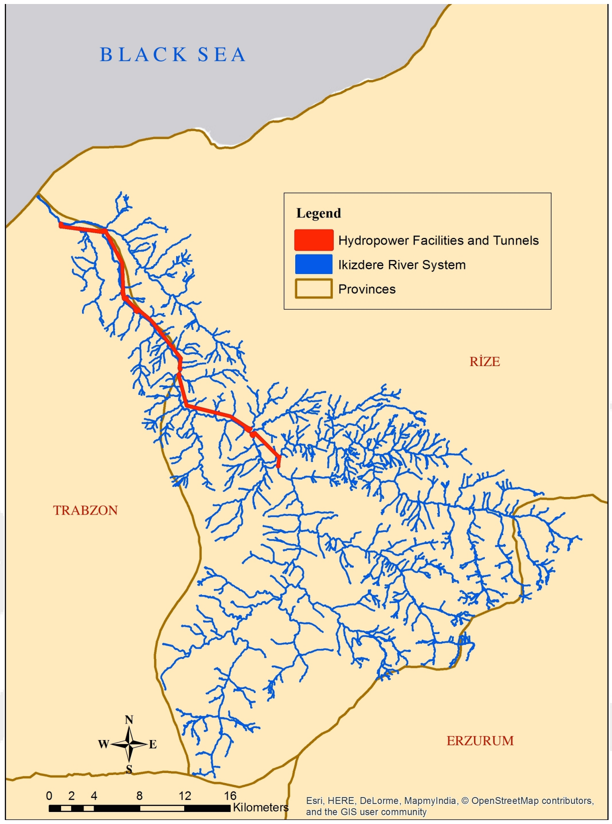

Figure 7.4. The HES infrastructures both underground and on the ground in the İkizdere River Basin.

infrastructure with water holding capacity. The section of the İkizdere River that lies between the Kızılağaç HES tailrace and the İncirli HES water-intake facility has been modified by constructed levees on both sides of the riverbed. This section of the riverbed has been turned into an artificial head-pond. The artificial head-pond was not mentioned in the project information file. Actually, the artificial head-pond and the water-intake infrastructure, which block the river flow completely by extending from one side of the riverbed to the other, form a dam-like infrastructure that stores and regulates the river flow (Figure 7.5).

The Saray *HES* has a surge tank similar to that of the İncirli *HES*, which is semi-buried to the ground and has approximately 71,733 m^3 volume as determined from the figures given in the EIA Report.

Turning riverbed into artificial pools to store water for the water-intake facilities, building the water-intake facilities to block the natural flow, erecting surge tanks and constructing large size pools are acts that ensure that the river will make water available for electricity generation at all times and at the specific times pre-determined in electricity production program. I argue that these infrastructures, which store water, are presented as technical requirements of the design but actually are means to regulate the river to enable profiteering.

Figure 7.5. The photo on the left shows the surge tank of the İncirli *HES*. The photo on the right is taken from the corner of the artificial pool behind the water-intake facility that was constructed on the riverbed for the İncirli *HES* (Photos by the author).

When the stream flow is significantly low in the eight-month low flow period, the damming impact of water storage infrastructure becomes severe for three reasons. First, during low flow season the companies release only MWR to diversion reach, and MWR is drastically lower compared to the minimum and maximum flows measured in a period of 30 years (Figure 7.6). The river almost fully diverted from the river continually flows and fills the artificial head ponds, regulation pools and surge chambers. Since producing electricity at peak times can generate higher profits, it becomes important for the hydroelectricity companies to have as large a water storage capacity as possible. When electricity production starts, the water in the storage is dispatched to the power station. Second, the variability of the river flow is completely lost in diversion reach, since the MWR is a constant flow. Third, the hydroelectricity plants, which are physically proximate and chained, impact approximately 30 km. of the İkizdere River. In the low flow season, the small creek tributaries to the İkizdere River either disappear or are significantly reduced[205] and therefore what mostly flows in the riverbed is MWR. The damming impact of the water storage infrastructure might lessen during the high flow season. Because the ratio of maximum flow to minimum flow is high (Figure 7.6) and it indicates that the maximum flow cannot be completely trapped by the infrastructure and overflows to the diversion reach. Also the small creeks reappear and grow bringing more water to the riverbed.

When they operate, these individual plants form a body of infrastructure that acts together. This consequence becomes significant and visible in low flow months. The Cevizlik HES is the first HES with water storage capacity in the cascade of hydroelectricity plants. It has two tribunes each with 47.5 MW installed capacity. The hydroelectricity plants in its downstream have lower installed capacities and tribune sizes. There is a linear relation between the size of a tribune and amount of water turning the tribune, and the Cevizlik HE*S* requires largest flow in order to operate. In low flow months, the Cevizlik HES stores the water and lets it flow for episodic electricity production. Its episodic operation releases water flow downstream in periods and makes the water available to downstream plants. In other words, it imposes its production schedule on downstream plants and forces them to synchronize their production schedule with its own. The Cevizlik HES and two downstream plants, the Yokuşlu/Kalkandere HES and the Kızılağaç HES, are run by the same company and might have been planned to work in a synchronized way. However, the chained infrastructures and sharing the same water resource impose their work schedule on the İncirli HES and the Saray HES, which are run by another company. Synchronization of water storing and releasing activities means synchronization of electricity production. The individual hydroelectricity plants establish these interrelations under these conditions and work as a coherent entity.

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[205] With the exception of Karadere, which is a large tributary that joins the İkizdere River in the downstream of the İncirli *HES* power plant. It feeds the İkizdere River and is visible in the section of the river between that point and the point river flows to the Black Sea.

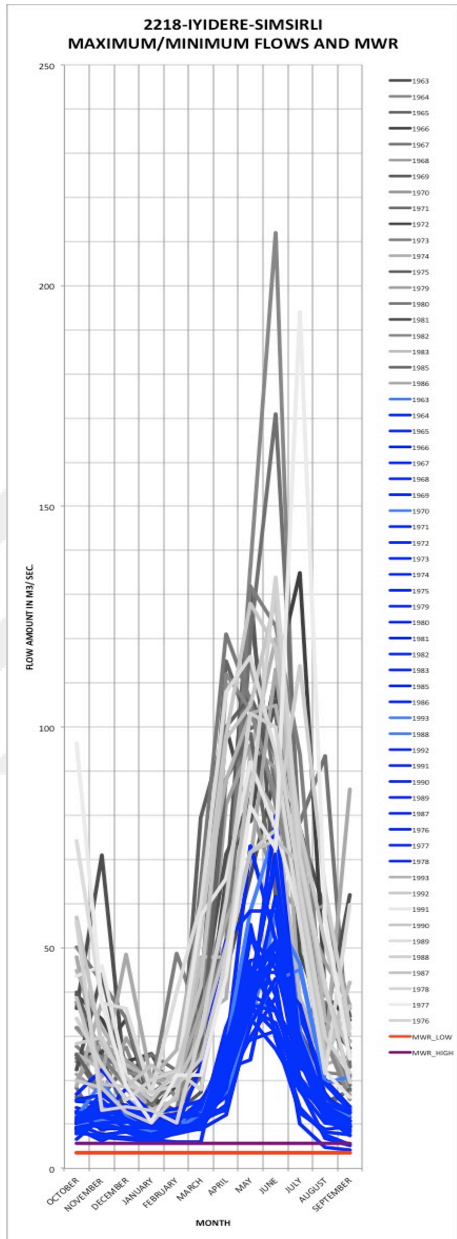

Figure 7.6. The graph shows the minimum and maximum flows measured with respect to the MWRs that the Saray *HES* is required to release. The Saray *HES* is the last plant in the downstream, therefore its MWR is highest among the six plants. 2218-İyidere-Şimşirli Gauging Station data was used as a reference in determination of MWRs.

The situation is different for the İkizdere HES because of the principles applied by Kazım Çeçen in the water intake facilities of the İkizdere HES (1962). Çeçen emphasizes the importance of preventing the sediment and bed load from entering the water intake facility in diverting stream flow from "vahşi dereler"[206] like the İkizdere River. He provides the principles for selecting the location and the position of the facility, and in the design that prevents bed load and sediment flow with the water to the sedimentation pools in order to maximize the overall operational efficiency of the water intake facility. The river bends are selected as places to locate the facilities and water is taken only from the concave bank of these bends, where the bed load and sediment density is low due to secondary flow[207] of the river. His two main principles are related to the amount of diverted water for electricity production:

> *Alınan suyun toplam suya nisbeti ne kadar küçük olursa, dereden o kadar az sürüntü maddesi kanala girer* (Çeçen, 1962: 59).
> The smaller the ratio of diverted flow to the total flow, the less bed load and sediment move with flow from the river to the water intake facility.

> *Dereden ızgaralara giren suyun miktarı mümkün mertebe alacağımız su kadar olmalı fazlası dere içerisinde akıp gitmelidir* (162: 149).
> The amount of water entering the sediment pool must equal the amount of water diverted to the tunnel, and excess water must flow back to the riverbed.

The Çamlık and Cimil water intake facilities were designed with these principles and they have no water storage capacity (Figure 7.7). The main water tunnel between the Cimil water-intake facility and the power station, can allow 13 m^3/sec. flow, which is smaller than 24 m^3/sec. the annual average stream flow, the total of 15 m^3/sec. of Çamlık Tribute and 9 m^3/sec.

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[206] Their characteristics are similar to characteristics of a mountain river as described in Hellen Wohl's books (Wohl, 2000, 2010).

[207] The secondary flow occurs at river bends, where the water hits the banks, its velocity and pressure changes and beneath the primary flow at the top of the water, and a secondary flow along the floor of the riverbed occurs. The secondary flow sweeps sand, silt and gravel across the river and deposits them near the convex bank.

Figure 7.7. The Çamlık water-intake facility is on April 10, 2015 (high-flow season) and on August 16, 2015 (low-flow season) (Photos by the author.)

of Cimil Tribute[208]. Since the İkizdere *HES* cannot divert more than 13 m^3/sec, it does not impact the river regime of the İkizdere HES. The daily and seasonal changes are observed in the city of the İkizdere, which stays in the divertion reach of the İkizdere HES (Figure 7.8, Figure 7.9).

To summarize, the hydroelectricity companies use their water storage facilities for three reasons. The first is to mitigate daily and seasonal flow fluctuations. The second is to collect enough water to turn as long as possible at least one of their tribunes in low flow season. Third is to produce electricity at peak times in order to profit more.

7.3.2. The expansion plans after privatization of the İkizdere HES

The İkizdere HES was known for its uninterrupted electricity production in spite of its long technical life, which lasted 55 years[209]. Its installed capacity was increased from 15.12 MW to 18.6 MW by a modification done in its tribunes without changing the amount of stream flow water-intake capacity in the early 1990s.

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[208] As given in the *İkizdere Hidroelektrik Santrali (HES) Revizyonu Proje Tanıtım Dosyası* dated June 2015. The annual average stream flow was given as 22 m^3/sec. in a previous, İkizdere *HES* Fizibilite Raporu, dated September 2008.

[209] Interview in December 2014.

Figure 7.8. The seasonal flow change in the İkizdere River. The photo on the left was taken on November 26, 2014 in the middle section of the city of İkizdere. November is one of low-flow months. The photo on the right shows the İkizdere River, passing the city of İkizdere in the high-flow month, April. The photo was taken on April 11, 2015 (Photos by the author.)

Figure 7.9. High-flow occurs due to heavy rain in the low-flow month. The photo was taken on November 11, 2015. Source: İsmet Kösoğlu.

An official report dated 2006, stated that its average annul electricity production is 110 million kWh and that the highest electricity production was recorded as 134 million kWh in

1994. The ex-manager of the İkizdere *HES* before privatization, who served from 1990 until 2004[210], said the following:

> *Kurulu gücüne göre Türkiye'nin en fazla enerji üreten santralı burasıdır.*
> This plant is the one, which produces the maximum amount of energy for the size of its installed capacity.
>
> *Çok verimlidir. Başka yerde böyle bir santral bulamazsınız*.
> It is very efficient. You cannot find such an efficient another plant anywhere.

When the Zorlu Holding purchased right to operate the plants for 30 years in 2008, it rehabilitated the infrastructure and renovated the buildings in order to assure the normal level of electricity generation. To increase the electricity generation capacity was on their agenda at the time of privatization, and they submitted the capacity expansion plan to *DSİ* in September 2008. Their main argument was that the state owned İkizdere HES had completed its technological life, which was claimed to be 50 years, and the electromechanical equipment had to be renewed to increase efficiency; capacity also had to increase. *DSİ* approved the plan immediately. However, the rise of strong local opposition toward the hydroelectricity development in the İkizdere Valley slowed the progress of the initial investment plans. The emergence of the Cevizlik *HES* sparked the local opposition, which organized to take the project to court; similar court cases followed it against the other private hydroelectricity projects that had obtained licenses for the İkizdere River. The company did not publicize the capacity expansion plan until 2011. In 2011, the Zorlu initiated a comprehensive socio-environmental assessment study in the county of the İkizdere, where the İkizdere HES is located. The aim of the study was to evaluate the ecological, social and economic dimensions of the capacity expansion investment and to reflect the concerns and demands of the local people. The study showed that 80% of the local people either opposed the capacity expansion plan or only supported it conditionally. In order to get 50% of the people, who supported conditionally, to support the plan wholeheartedly, the company needed to show sensitivity

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[210] Interview in November 2014.

toward the environment and local community. Following the publication of the results of the study, İkizdere Derneği, a local NGO that was the strong opponent of the new hydroelectricity projects, made a public announcement[211], critizing the report for not understanding the true perceptions of the locals toward the capacity expansion plan of the Zorlu Corp.

The strong public opposition to expanding capacity by constructing bigger infrastructure that would replace the existing infrastructure forced the company to revise and downsize the expansion project in 2013. The Zorlu Holding proposed a smaller scale "rehabilitation project" which was approved by the *DSİ* and *EPDK* in 2014. The project was revised once again in 2015, when technical faults were discovered while making detailed plans, as stated in the İkizdere *HES* Revision Project Introduction File. The Zorlu Holding claimed that the insufficient capacity of the existing forebay was the reason for the revision project, while underlining two points several times in the report: no new infrastructure will be constructed and the installed capacity will stay same. The project will replace the existing pool with 32 m^3 active capacity with the larger pool with 570 m^3 capacity. This new formulation of the infrastructure will create a capacity to hold water. The İkizdere *HES* will lose its uniqueness as the only *HES* not storing water for electricity production in the İkizdere Valley. It will start regulating the river and become integrated to the body of water storage infrastructure in its downstream.

7.3.3. The siamese twin of the hydroelectricity development: The electricity transmission development

In the lower section of the İkizdere Valley, the hills drop down as they approach to Black Sea. Here they appear to be covered by a spider's web of electricity lines; most of them are high voltage electricity transmission poles connecting the hydroelectricity plants to the İyidere

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[211] The press release was made on 10.August.2012 and published at http://İkizdere.net/İkizdere-derneginden-kamuoyuna/. The title was, "*İKİZDERE DERNEĞİ'NDEN ZORLU İNŞAATA CEVAP İkizdere; Doğasını, Geleceğini, Ekosistemini ve Suyunu Korumaya Devam Edecektir*," (The Response from The İkizdere Derneği to The Zorlu Construction Corp.: The İkizdere will continue to protect its nature, its future, its ecosystem and its water).

and Ormanlı substations, located in the lower section of the İkizdere Valley. The İyidere Substation, located in the village of Yaylacılar, was put into operation in 1950s. The Ormanlı Substation, which has a substantially higher voltage capacity of 380 kV, has been operational in the village of Ormanlı since 2013. A number of high voltage transmission lines extending from other hydroelectricity plants in the neighboring river valleys in Trabzon and Rize cross the hills to merge and knot at these two substations. The substations are linked to the national grid through different lines. This visibly large and complex system of electricity transmission composed of hydroelectricity plants, transmission lines with poles, and substations, was established within the last decade following the hydroelectricity development boom in the 2000s.

<u>7.3.3.1. Planning faults: Physical proximity to the villages and houses</u>. Where the high voltage electricity transmission lines passed and where the substation constructed became very critical issues and sources of concern for the locals of the İkizdere Valley. When I conducted fieldwork in the villages in the middle and lower section of the İkizdere Valley, the electricity transmission issue appeared as a problem in almost every village. In an interview, the local person described the issue as:

> *Yüksek gerilim bizim çalıştığımız arazilerin üstünden geçiyor. Bize sormadılar.... Bu hat bir yerden geçmek zorunda...Bunu kullanıyoruz tamam da. Tamam bu bir yerden geçecek de bize en zararsız nereden geçer onu yapın.... 3 proje yaptıkları. Başından yukarısından bir ortadan... Onlarda bir güzergahtan gitmemiz gerekiyor diyorlar. Evet ama 10 m aşağıdan gidersen 10 metre yukardan gidersin ama biz burada yaşıyoruz. Bize nereden zarar vermezsin en az. Oradan git... Burası bizim yaşam alanımız. Bazı evlere öyle yakın düşmüş ki 50 metre yok. 100 metre yok. Köyden geçmek zorunda. Neden başka yerden geçiremiyorlar?*[212]
>
> The high voltage transmission line passes over our lands. They did not consult us... This line must pass from somewhere. We understand this. But [they should] pass it from a place so that it will be harmless to us. They prepared three projects, passing

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[212] Interview in December 2014.

> from the top, middle and bottom section of the village. They say that they must finalize the route. Yes, but we live here. Select the route that gives us no harm. This place is our living space. The line passes so close to some of the houses. The distance is less than 50-100 meters. They say that the route must pass through the village. Why can't they pass it from somewhere else?

This new line with 154 kV will replace the old transmission line with 66 kV that the İkizdere HES has been using since 1961. It will be 9 km in length and connect the İkizdere *HES* to the substation of the Cevizlik *HES* in the village of Soğuksu.

The 154 kV İkizdere HES TM - Cevizlik HES TM Enerji İletim Hattı project was subject to Environmental Impact Assessment (*EIA*) Bylaw. It was classified as "Seçme Eleme Kriterleri" project -- in other words, as a pre-EIA project. I described the details of Environmental Impact Assessment regulation and the involved processes in Chapter Five. In the classification of a transmission line project, the ministry uses two criteria: the length of the electricity transmission line in km and the volume of the voltage in kV. Pre-EIA projects are subject to screening by the ministry to decide whether "EIA is necessary" or "EIA is not necessary" for the project. Therefore, the project owner, TEİAŞ, submitted the *Proje Tanıtım Dosyasi*[213] (*PTD*) to the ministry for the screening process. When the ministry assessed the project in terms of its impacts, it decided that for this project "*EIA* is not necessary." If the decision of the ministry were that "*EIA* is necessary," *TEİAŞ* would be required to go through an environmental impact analysis assessment that is more comprehensive and longer assessment, and requires the involvement of the public.

The *PTD* states that both the pieces of the land surrounding the poles and the under the line, a corridor of 50 m. width, needs to be expropriated. The estimated number of poles is given as 45-60 in the report. The impact zone map shows that the line passes through the villages of Ihlamur, Cevizlik, Şimşirli, the town of Güneyce and the village of Soğuksu. Since the project was classified as "*EIA* is not necessary," the public information meeting was not

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[213] The Project Presentation File (Translated by the author).

organized in these settlements and the project file was not opened to the public view.

The *PTD*[214] claims that the official route-making procedure takes into account the physical distance between the line and settlements. However, the way it is done is open to debate from the perspective of "the politics of measurement" (Scott, 1998: 27). First, the village of Ihlamur is not included in the table that lists the settlements within the project impact zone, in spite of the fact that the village is seen in the satellite images and maps in the report. Second, the report claims that the distances given in the table are at an acceptable level according to the current legislation, but it does not specify the methodology of the physical distance measurement applied in making these measurements. The closest distance of the proposed line is given as 80 m. to the village of Cevizlik, and 115 m. to the village of Soğuksu. The villages extend along an imaginary line in parallel to a flowing body of water either on the banks, as in the village of Soğuksu, or on the hill facing the İkizdere River, as in the village of Cevizlik; houses are placed in a series up and down in various altitudes (Figure 7.10). The subsistence gardens and tea gardens usually surround the houses and reach to the banks of the river. The line will pass through the houses and the gardens.

In the interviews, locals emphasized that the line passes through almost every households' land in the village of Ihlamur. In the village of Cevizlik, the proposed line will cross village houses. When the technical team came to the village, the locals attempted to negotiate with them to move the line as far away as possible from the houses, but they were not successful. These new infrastructures inevitably threaten to alter or eradicate existing ways of life.

In the *PTD,* there is no clear evidence as to what criteria were used in planning this particular route. In addition, two points must be noted. First, the economic feasibility of the line was not a part of the report and no alternative routes were proposed, in spite of the fact that the route selection surely changes the economics of the line. The estimated budget is crucially important for the hydroelectricity company that will utilize the line, because

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[214] "154 kV İkizdere HES TM - Cevizlik HES TM Enerji İletim Hatti Proje Tanıtım Dosyası, Rize İli, İkizdere ve Kalkandere İlçeleri," Table 26 on page 28-29.

legislation requires the company to finance the project. Second, although there was an emphasis on the human factor, how that factor was integrated to the decision-making process and to what degree were not specified.

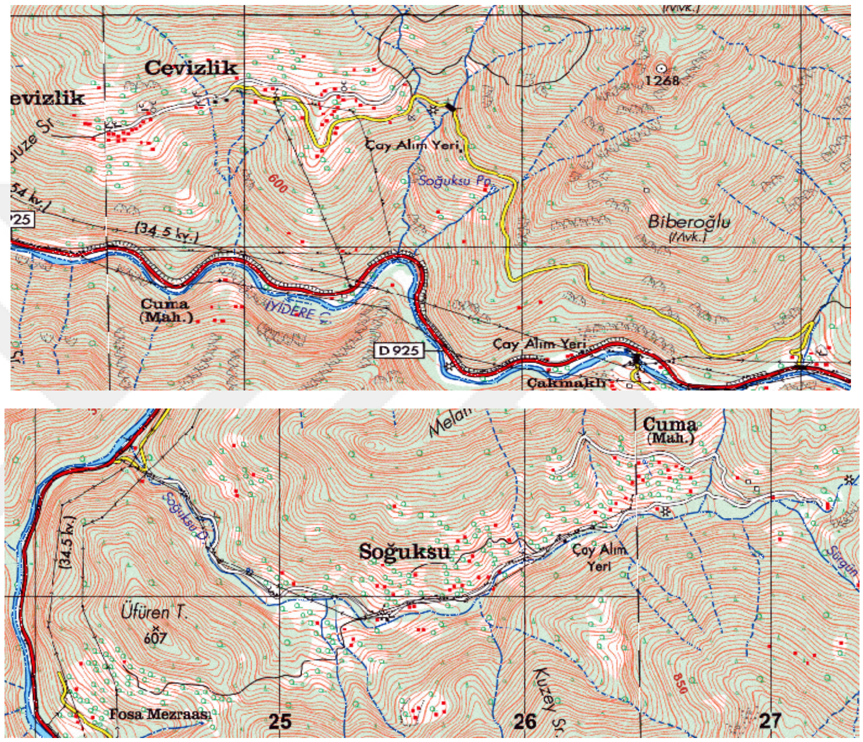

Figure 7.10. The maps illustrate the structure of the village of Cevizlik (the upper) and the village of Soğuksu (the lower). The red dots represent the houses and other buildings; the blue lines are the river and the streams; the red line is the main road; and the yellow lines are the secondary roads, connecting the villages to the main road. The red lines are contour lines. The density of these lines indicates the magnitude of change in altitude. Source: Harita Genel Komutanlığı.

The state practice was similar in the planning of the substation in the village of Ormanlı. The Ormanlı Substation was constructed for the emerging private hydroelectricity plants and put into operation in 2013. It demonstrates another case of faulty planning on the part of the electricity transmission infrastructure for two reasons. First, it is a hub of several high voltage electricity transmission lines extending from the İkizdere Valley to the east-west and the north-south directions over the hills, including the one connecting it to the hydroelectricity plants in the upstream of the İkizdere River. Moreover, the residential population of the village is highest among the other villages in the valley. In the fieldwork, the locals in the interviews and in the survey raised their concerns related to the electromagnetic radiation emanating from the substation and from the high voltage lines crossing over their houses and working spaces in their village.

The issue of physical proximity of electricity transmission lines to living quarters becomes more significant for local people in the lower section of the İkizdere Valley, in particular in the downstream of the village of Soğuksu. This is for two reasons. First, the density of the population and the number of houses increases (Figure 7.11). Second, the intensity of the hydroelectricity infrastructure is higher due to four hydroelectricity plants; so is the intensity of the electricity transmission system. That the high voltage lines passes over the houses or are very near to the living and working spaces is visible to the naked eye.

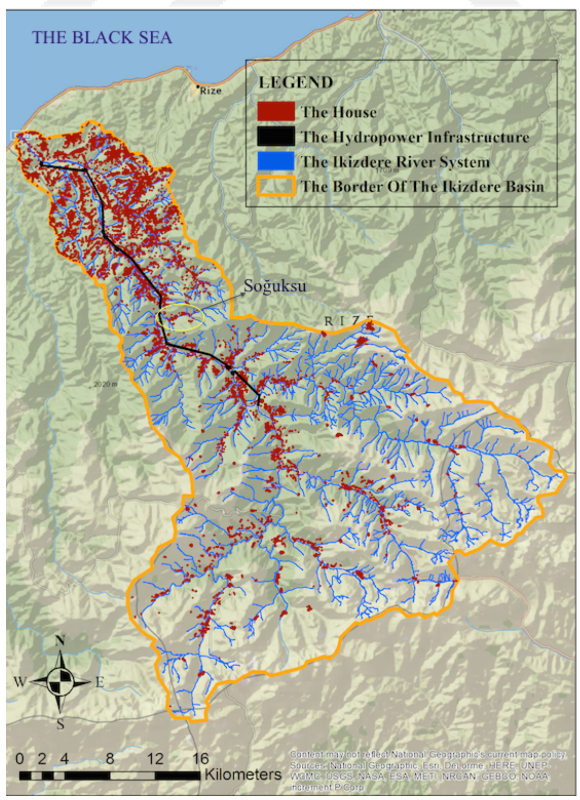

Figure 7.11. The map shows the distribution of the houses and other buildings owned by the local people in the İkizdere River Basin.

The selection of the routes and the location of the substation created greater tensions here. The involved official procedures and their practice raised critical questions about whether the desires of the local people took precedence, as stated in the official documents and reported in communications with the local community, whether private profit and national interests were given preference. As I discuss in the last section of this chapter, the planning faults caused health and security concerns.

7.3.3.2. Land expropriations. In this geography, the local characteristics of private land ownership make land acquisition in the İkizdere Valley challenging. It is almost impossible to purchase land in the villages in general. Land suitable for agriculture is very scarce and the available land brings cash to the households from tea-cultivation. Moreover, the size of the private parcels of land can be small, whereas the number of owners is high[215].

The state can easily take the land away from the local people through expropriation, whether "normal" or "emergency," for the hydroelectricity plants and for their electricity transmission infrastructure. The process of regular expropriations involves a price negotiation stage that takes place between the expropriator and the landowners, and the landowners have the right to reject the expropriation decision of the state. Distinctively, the emergency rule completely disregards the rights of landowners. As I discuss in Chapter Eight, emergency expropriation is a powerful mechanism used by the state to take ownership of private property in a speedy and irreversible manner. Emergency expropriation has become a regular practice with the emergence of the hydroelectricity plants and the electricity transmission infrastructure in the İkizdere Valley in the past decade.

In this section, I analyze three issues experienced in the İkizdere Valley in expropriations of private property in the context of the water-energy nexus: the scale of the impact of the expropriation, the property price negotiation and disputes that occur, and the legal fees involved.

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[215] For example: A land with size 749.45 m^2 is owned by 26 individuals that are registered in Rize, İstanbul, Kocaeli, İzmir and Germany, another land with size 312.46 m^2 has 19 owners, and another land with size 54 m^2 has 37 owners.

<u>*The scale of the impact.*</u> My fieldwork illuminated how significant the scale of the emergency expropriations is in the middle and lower section of the İkizdere Valley. On the village level, Ihlamur, Cevizlik, Soğuksu, Hurmalık, Kayabaşı, Çayırlı, Yokuşlu, Hüseyinhoca, Ormanlı, Denizgören, Yaylacılar, Korkut/Başköy, Çiftlik, Köşklü and Esenköy were impacted. The subsistence gardens and the tea gardens were taken away from the locals in these villages and registered to the TEİAŞ. In the village of Denizgören, locals estimated that 200 households[216] were affected. A resident of the village of Ihlamur said that the line crossed almost everyone's property and that *TEİAŞ* began court cases against all landowning villagers so as to access the land[217].

Public documents of the projects contain vague information about the size of the expropriated land. Not even a rough estimate is provided. The *PTD* of the electricity transmission line between the İkizdere *HES* and the Cevizlik *HES* gives very aggregated information, limited to ratio of how much of the expropriated land is tea garden and how much is subsistence garden without providing the actual total size of the expropriated land.

Another case of "the politics of measurement" (Scott, 1998: 27) is seen in estimating the land requirement for the transmission line route. Its length is given as 9 km. The land in 50 m. range under the route will be expropriated. It must be noted that these figures are weak in representing the actual size of the expropriated land in the hilly geography of the İkizdere Valley, since the specified distance in based on a point to point, two-dimensional topographical map that does not accurately reflect the distance on the ground. When the hilly geography is taken into account, it is clear that 9 km. is an underestimated figure of the actual ground distance. Therefore this means of estimating distance clearly underestimates the actual size of the appropriated land.

<u>*Property price negotiations and price disputes.*</u> Current legislation regarding the expropriation process includes a price negotiation stage in which the property owners whose

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[216] Interview in June 2015.

[217] Interview in February 2015.

land will be expropriated meet with the state institution that is expropriating the land. When the route planning is finalized, *TEİAŞ* makes an estimation to determine the value of each piece of the private land that lies under the route and on which poles are erected. It organizes a meeting in an easy-to-reach location where it meets with the landowners and makes an offer to them for their land. *TEİAŞ* sends a document to the landowners inviting them to attend. When landowners receive the official letter, they become officially aware of the project. According to the legislation, landowners then have three options. First, if they receive the call before the meeting is held, they can attend. Second, if they receive the call after the official price negotiation meeting, they can contact a specific department within 15 days to organize another meeting. Lastly, if they do not attend the price negotiation meeting or if they do not contact the department for another such meeting, the expropriator can open a court case against them in order to expropriate the land through juridical channels.

The expropriation law also requires the expropriator to inform the landowners by publishing an announcement of the meeting in both national newspaper and local newspapers. However, the effectiveness of this channel is questionable, considering that most villages have neither a market nor a shop that sells newspapers. Even in the town of İkizdere, the biggest town in the İkizdere Valley, there is only a single bookseller who sells a limited number of daily newspapers. I did not see any regional newspapers in his shop during my fieldwork.

When *TEİAŞ* opens a court case to finalize the expropriation, the court works in a fashion similar to that of the administrative courts and appoints a group of experts to determine a price for the land. A commission consists of agricultural engineers, public infrastructure experts, and real-estate experts. Some courts include electrical engineers. A court field investigation is organized for the commission to see the property and then the commission delivers an expert report to the court evaluating the conditions, describing factors and criteria they take into account in determining value of the land in an official format defined by the legislation framework.

Both sides, landowners and *TEİAŞ*, can appeal the court decision, if they do not agree with the price set by the court. Usually landowners find the price low and appeal the court's decision. The land price was determined higher after the appeal of the court decision. In those cases, TEİAŞ paid the difference to the landowners.

However, in some appeal cases, *TEİAŞ* found the commission's expropriation land price too high, appealed the court decision, and was successful in lowering it. Then *TEİAŞ* requested the landowners to pay back a certain portion of the expropriation money. It is another concern for the expropriated side as e local resident complained,

> *Beş sene önce direkler çekildi. Cevizlik HES için çekilmiş. Bir sene sonra ödedikleri paraları geri istedi devlet.*[218.]
>
> The poles were erected five years ago. They were erected for the Cevizlik HES. One year later, the state said that the original landowner pay the state a certain sum back.

The legal fees and the enforcement of payment. Another tension has grown out of the legal fees incurred in the courts cases that *TEİAŞ* has opened against the owners of expropriated land. As discussed in the previous section, when landowners do not appear for the price negotiation, *TEİAŞ* asks the court to legalize and finalize the expropriation by assessing the land price, so that the land can be officially taken from its owners and registered to *TEİAŞ*. In these cases, courts have decided in various ways regarding the legal fees. One court did not make any decision regarding the legal fees of TEİAŞ lawyer[219]. The other court decided that the property owner must pay the legal fee of TEİAŞ lawyer, which is 1,500 TL[220]. In that court case, the value of the land was determined as approximately 9,400 TL. This means that the owner had to pay almost 15% of the expropriation price received from the state back to the state for legal fees. The interviews conducted in the villages revealed that charging the legal fees of TEİAŞ lawyer to the defendant, the property owners, has become the norm. The property owners have no option but pay the fee; otherwise the TEİAŞ lawyer can collect the money by levy.

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[218] Interview in April 2015.

[219] T.C. Rize 3. Asliye Hukuk Mahkemesi. Esas-Karar No: 2013/943 Esas – 2014/439.

[220] T.C. Rize 2. Asliye Hukuk Mahkemesi. Esas-Karar No: 2013/924 Esas – 2014/550.

7.4. Aggregated Consequences, Raising Concerns and Emerging Risks and Vulnerabilities

The concept of "structural tensions" is very useful in defining dialectical and dynamic interactions between hydroelectricity production and electricity sectors. Williams et al. define it as "developments in one put increased pressure on the other, and the stresses and insecurities in one simultaneously become stresses for the other" (2014: 13). Turner et al. define stress as "a continuous or slowly increasing pressure commonly within the range of normal variability' (2003: 8074). The hydroelectricity development led the growth of electricity transmission system in the İkizdere Valley. The emerged electricity transmission system puts stress on the residents of the valley. The profit maximization stress in the electricity marketing was transferred to the İkizdere River as flow regulation, which puts stress on the environment and the livelihoods.

Stress and its consequences lead to hazards that can threaten the system, and vulnerability is given as likelihood of experiencing harm due to a hazard (Turner et al., 2003: endnote 8074). These environmental and social stresses further create risks and vulnerabilities to the river, valley and its residents in various forms. In this section, I explain what environmental and social "structural tensions" have emerged in the İkizdere Valley with the hydroelectricity production and electricity transmission line projects. I then discuss their aggregated consequences in terms of risks and vulnerabilities to the environment and residents of the valley.

7.4.1. Environmental

The premise of the state for the run-of-the river hydroelectricity plants is "they take water, use it to generate electricity, and release it back." The success of this premise depends on timing. This premise is true only for the İkizdere HES. The reality is different for other five hydroelectricity plants that have the capacity to store water. The hydroelectricity companies utilize their water storage capacity to have a flexible timing that allows them to produce electricity at times when they profit more, as I explained in previous section. It is evident that with the liberalization of the Turkish electricity market, the emerging pricing methods not only influence the hydroelectricity production of a company, but also indirectly influence the timing of its water storing-discharging. A plant takes water, stores it until electricity generation starts and as it produces electricity releases water back to the river, and this market-driven influence on timing puts pressure on the downstream of any hydroelectricity plant. During a water storing period, a hydroelectricity plant releases only the water defined as MWR to its downstream. MWR is a reduced flow officially determined by considering the diversion reach of a plant, not it's downstream. The pressure of reduced flow on the river extends from the diversion reach to the downstream. This pressure of reduced flow intensifies in low-flow months, as I explained in previous section.

The scale and intensity of the pressure of timing on the river grows in the case of a cascade of hydroelectricity plants. As discussed earlier, the Cevizlik HES has highest tribune size, requiring the largest water storing capacity. Its timing of water storing and discharging forces the four hydroelectricity plants in its downstream to synchronize their operations with the Cevizlik HES. I argue that these relations are consequences of the cascade structure and that these relations constitute a material and stable structure of embedded processes leading to an *assemblage,* a conceptual framework suggested by Deleuze and Guattari that draws from dynamic systems theory and is basically about "process" and "relationship" (Deleuze and Guattari, 2003). The concept of assemblage has been very influential in social science research and is widely used in infrastructure studies to describe and analyze embedded structures of various sorts within temporal and spatial boundaries (Rodgers and Neill, 2012; Larkin, 2013;). An assemblage is about self-organizing systems that may derive from material systems but that be applied to social, linguist and even philosophic systems that make the materials systems happen (Marcus and Saka, 2006). I seek to mobilize assemblage to emphasize how the flexible timing the five hydroelectricity plants in water storage and discharge enforces the establishment of new relations between the plants in cascade order and how the plants self-organize to synchronize their timings, thus establishing new processes within and between the plants.

What these emerging processes form is a structure composed of the cascade of hydroelectricity plants and their technical and managerial elements working purposefully to make profit from electricity production. This structure is an embedded system. I seek to invoke another concept - that of a "cyborg"- to emphasize the nature and scale of this embedded system. A cyborg is a metaphor indicating the composition of separate natural and man-made entities into hybrids (Haraway, 1991). In the context of this dissertation, I suggest to conceptualize the natural elements of the İkizdere River and the embedded system of plants as a hybrid of natural and man-made pieces forming a cyborg extending 30 km. from the city of the İkizdere to the Black Sea and covering half of the İkizdere Valley. What this conceptualization allows to understand is that five "individual" hydroelectricity plants actually form a hybrid system regulating the river regime for 30 km of the İkizdere River Basin. Cyborg conceptualization also allows focusing on the transformative processes that increase man-made entities on the İkizdere River while making it less and less natural. It openes a new way of thinking on hybrid river and on contradictions, tensions and conflicts produced by its processes that are both natural and social, organic and mechanical (Swyngedouw, 2009).

There is as yet no study that has examined the impact of this cyborg on the environment. DSİ has initiated a project titled as "*İyidere ve Solaklı Havzaları'nda HES Projelerinin Çevresel Etkilerinin Araştırılması ve Değerlendirilmesi Projesi*"[221] in 2012. The aim of the project was stated to study the cumulative impact of the hydroelectricity plants on the environment.[222]

The locals, who live in the banks or closer to the river, observe the changes and raise their concerns about the future of the river and their livelihoods. A common observation is,

Dere susuz kaldı.[223]
The river is without water.

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[221] "The Investigation and Evaluation of the Environmental Impacts of the HES Projects in the İyidere and Solaklı Basins" (Translated by the author). DSİ refers the İkizdere Basin as the İyidere Basin.

[222] I contacted and requested a copy of the study from DSİ through official channels, however it is not made available to the public.

[223] Interviews conducted on 9.December.2014, on 9.May.2015 and on 8.October.2015.

The low level of the river even in the high flow months is a major concern. According to one local resident,

> *Derede su kalmadı. Tabiatı bozdu…Herşey ortada. Bu dere iki insan boyu akardı. Şimdi dereye inelim geç karşıya.* [224]
>
> No water left in the river. The environment is damaged… It is clear. In the past, the depth of the river was as high as two human lengths.[225] Now lets go to the river, you can cross it by walking.[226]

The locals causally relate the water level in the river to humidity and consequentially to the tea-cultivation in the valley. They are certain that the tea gardens will be impacted, and as a consequence tea production will drop. One local described the causal relations between the river and the tea plant as follows:

> *Dere boğazında olan çaylar, bitkiler sürekli su çekiyordu ama şimdi çekemiyor. Kuru kalıyor. Kum suyu çekemiyor. Kum kuruyunca bitkilerin kökleri de kuruyor. Toprağın altı kum burada. Karşıki yakaya kadar kum. Bulunduğumuz yerin altıda kumdur. Kayalıklara kadar kumsaldır. Derede su azalınca, kum kuruyor, kuruyunca üzerindeki bitkiyi yakıyor. Su hayattır.*[227]
>
> The tea plants, which were on the banks of the river, were absorbing water but now they can't. They are dried. It is sandy beneath the soil here. Sandy soil extends to the rocks. When the water becomes less, the sandy soil dries. When sandy soil dries, the roots of the plants dry and the plants on top parched. Water is life.

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[224] Interview in May 2015.

[225] This is an expression that uses human body as a measure of height of the water level from the bottom of the river channel to the surface of the stream flow.

[226] The interview has taken place in the high-flow season and the interviewee is emphasizing the change in the river regime.

[227] Interview in May 2015. I interviewed a group of men in a coffee house, which is in the vicinity of the village of Hüseyinhoca (İncirli) at the lower section of the İkizdere Valley.

In some villages, the locals related drying of şimşir[228] trees, which is a highly water-dependent species growing in the banks of the river, to the low water level. The disappearance, if not the extinction of, certain fish species is also linked to the low level of water and to the change in the river regime.

A common belief among the local, who live nearby the electricity transmission lines and poles is that electromagnetic waves emanating from the lines slows down the growth of the trees under the line.

7.4.2. Social

The wired geography extends throughout the river basin. When both hydroelectricity development and electricity transmission development are examined together, we see that they impact a big proportion of the population in the İkizdere Valley. As a consequence, there are several public related major concerns in the region.

First, when the substation in the village of Osmanlı and new high voltage electricity transmission lines were built, public health and safety concerns emerged. One interviewee said the following:

> *Teller yoldan geçerken alçak. Evlerin, yolların üzerinden geçiyor, kar yağınca teller aşağıya iniyor falan korkuyor insan.* [229]
> The lines crossing the roads are low, and they cross the houses and the roads. When it snows, the lines get lower and we are scared.

Their health concerns stem from their perception of the possibility of electromagnetic radiation emanating from the transmission lines, switchyards and transformers. When they raised this issue to the hydroelectricity company staff and to the technical staff working in the construction of the electricity transmission infrastructure, they were told that the lines are no

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[228] Şimşir is a tree species in the buxus familia.

[229] Interview in June 2015.

more harmful than mobile phone[230]. The *PTD* of the İkizdere-Cevizlik electricity transmission line project is clearly making an inaccurate comparison here in order to justify their actions and allay the fears of the residents. Moreover, the file emphasizes that the negative impact of the electromagnetic radiation on human health has not been scientifically proved, equating such exposure as to similar to that from kitchen appliances such as washing machines, mixers and microwaves.

In fact, studies indicate that there exist adverse health effects from long-term exposure to the magnetic fields of the electric transmission systems. Evidence has been found that suggests an association between the exposure to magnetic fields radiating from powerlines and added risk of leukemia, brain cancer, miscarriage and depression (Henshaw and Fews, 2004; Draper et al., 2005; WHO, 2007; Türkkan and Pala, 2009; Seyhan, 2010).

Secondly, the lines have created a public security issue. The region receives the highest precipitation in Turkey and thunderstorms are frequent. Therefore, when storms occur, locals are afraid to work in their gardens or stay in their homes, which are under or very near to the transmission lines, because of the increased risk of lightning strikes.

Thirdly, the water storing capacity of the hydroelectricity companies has created another tension in the valley. When the companies open the pools and release the stored water to the riverbed either for producing electricity or for the maintenance of the pools. the water level in the riverbed rises suddenly from 2-3 cm. to 100-150 cm. Incidents of small children and men needing rescue when a burst of water caught them in the riverbed have occurred. When I reminded them that the drowning incidents have occurred during high-flow months in the past, the interviewees argued that the two situations are different. In the high-flow months or when it rains intensively, locals know that they must stay away from the riverbed. But with sudden releases now occuring, it is impossible to predict when the water level will rise. The locals have shared their concerns with the hydroelectricity companies and requested them to inform the communities before they release the water.

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[230] Interviews in May 2015.

Finally, the expropriation process has generated tensions in other ways. For one, the hydroelectricity companies have intervened in the land value negotiations by approaching the locals on an individual basis and offering them different prices. They have not followed the rules about the negotiation meetings. They have tried to undermine the process. As one interviewee said, the companies,

> *Kim fazla ses çıkarıyorsa ona fazla para verdiler.*[231]
> Paid more to whoever was making more noise.

The gap between the offers could be as different as 3 times and even 20 times[232]. Such cases have caused big discomfort in the villages, and even led to fights among the locals. Moreover, the number of court cases begun by the locals against the state, objecting to the land valuations, has exploded. In addition, the decision of the courts to force he local people to pay the fee of the the state institutions' lawyer has been seen as unfair by the locals, particularly in cases where the legal fee was higher than the expropriation price. Finally, the demographic structure of the İkizdere Valley with its high illiteracy rate, low the socio-economical level, and aging population, has presented a barrier to assessing the situation and developing strategies for the local population to assert their rights. I revisit these issues and elaborate on them in Chapter Eight.

7.5. Conclusion

In this chapter, I examined the water-electricity coupling in the context of hydroelectricity production. My focus is the interrelations of hydroelectricity production and electricity transmission with marketing on a national level and their manifestation as infrastructure on the local level. I argued that electricity marketing creates "structural tensions" on hydroelectricity production and these tensions are reflected in the river valley and its residents in several ways.

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[231] Interview in June 2015.
[232] Monetary units.

First, the liberalizing electricity market led to the emergence of market-driven price setting mechanisms. In the electricity market, the variability of stream flow, a natural phenomenon, is perceived as a business risk that should be minimized. This perception is the reason for constructing water storage infrastructure. The hydropower companies use their water storage infrastructure to offset daily and seasonal fluctuations in flow, to collect enough water to turn at least one of their tribunes in low flow season, and to produce electricity at any desired time, most probably at peak times. The damming impact of the water storage infrastructure becomes particularly damaging to the environment in low flow season.

The İkizdere *HES* was an exception, because it did not have any water storage infrastructure. However, after privatization, the private company initiated a revision project to create a capacity to store water.

Second, the electricity transmission system that emerged with new hydroelectricity plants threatens to alter or eradicate daily life, particularly in the lower section of the İkizdere Valley, where the population density and the intensity of hydroelectricity plants are high. The public concerns and issues related to environmental impact assessment and emergency expropriations that are discussed in the Chapter Eight for hydroelectricity development also hold for electricity transmission infrastructure.

Finally, environmental and social risks and vulnerabilities have emerged in the coupling of water and electricity. The hydroelectricity companies utilize their water storage infrastructure to create a flexible timing capacity for water storing and discharging. The flexible timing puts the pressure of reduced flow on the downstream, a pressure that grows in scale and intensity in the case of a cascade of hydroelectricity plants. The cascade structure forces the hydroelectricity companies to establish a self-organizing system like an assemblage. Furthermore, they form a cyborg structure with the river and the river basin and regulate flow regime of the İkizdere River for approximately 30 km, impacting approximately half of the İkizdere Valley. This chapter also addressed social concerns regarding the regulated river regime in particular those related to tea production, a main source of income. It also addressed health concerns related to the magnetic fields of the electricity transmission system, and public security concerns regarding the sudden release of flow to the riverbed.

This chapter on the water-electricity nexus demonstrated that hydroelectricity production is inherently connected to the electricity transmission and marketing. As the electricity market is liberalized, the intensity and the variety of its relations grow, and the consequences of these relations are reflected in the river, river basin and on its residents. This finding makes a call in two fronts. The first is to consider the cascade of hydroelectricity plants and their electricity transmission system together as a system that requires a specific river basin planning and the review of the entitled licenses. The second is to determine the aggregated consequences of this system and to carefully examine the environmental and social risks and vulnerabilities that such a system can give rise to.

8. REMAKING THE STATE: TRANSFORMATIONS IN THE RELATIONS OF PRODUCTION

8.1. Introduction

The aim of this chapter is to focus on the transformations in the relations of production in the hydroelectricity sector. Beginning with the launch of the "sustainable development" of hydroelectricity program in 2003, I examine how drawing and redrawing the boundary between the state and non-state domains through legislative modifications remade the state, and in what ways these transformations have been manifested in the İkizdere Valley.

I benefit from the literature on state formation that conceptualizes "the state" through social relations. Scholars propose looking into state activities in order to understand what the roles of the state and "non-state" actors are and how these roles are exercised in terms of power in the relations (Ferguson, 1994; Sharma and Gupta, 2006;). These relations are "dialectical" in that they consist of actions and reactions of both parties in a dynamic fashion (Yapa, 1993).

I analyze three sets of relations: the state and the private sector, the state and the local people, and the private sector and the local people (Figure 8.1). This chapter examines each set of relations in the following three sections. Section four addresses in what ways and how the transformations in the relations have been manifested in the İkizdere Valley and what the social implications are on the local scale. In the conclusion, I summarize the findings.

8.2. The Relations Between the State and the Private Sector

State-private sector relations have been transformed by a continuous process that is driven by economic development and cultural change in Turkey in interaction with domestic and global factors (Buğra and Savaşkan, 2014). The institutional context of these relations of production was shaped historically and was not independent from politics. In fact, the state plays a dominant role in defining, constituting, and maintaining the state-private sector relations.

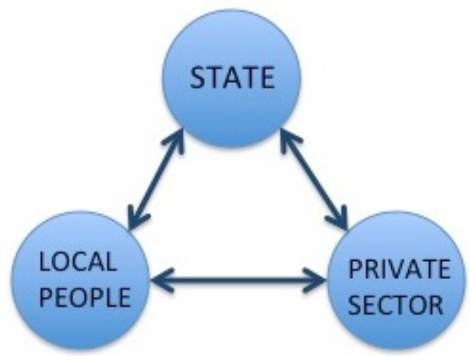

Figure 8.1. The relations of production in the hydroelectricity sector.

In this section, I examine the transformations in state-business relations of production in the context of hydroelectricity development since the early 2000s. The role of the state has been redefined by a series of deregulations that have been accompanied by the privatization of the hydroelectricity sector and the privatization (and commodification) of the rivers and river streams. The state institutions, *Devlet Su İşleri*[233] (*DSİ*) and *Elektrik İşleri Etüt İdaresi*[234] *(EİEİ),* have been restructured. EİEİ was closed down in 2011 and the main responsibilities of DSİ were either reduced to "auditing" or outsourced to the private sector. The changes on policy level have not only remade the state, but also redefined the private sector, and allowed and facilitated a significant number of domestic and foreign firms to enter into the hydroelectricity sector. I refer to this type of privatization *extensive clientilism*. When environmental and social contradictions and conflicts were raised, a series of reregulations were placed for "economic functionality of power" that Foucault explains as "the role it [the power] plays in the maintenance of production and of a class domination which the

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[233] The General Directorate Of Water Works.

[234] The General Directorate Of Electrical Power Sources Survey And Development Administration.

development and specific forms of the forces of production have rendered possible" (Foucault, 2010: 88).

8.2.1. Deregulation and privatization

The Turkish development model was a mixed model. It was state-dependent and the role of private sector in the model has been increasing. In Turkey, the private sector development was supported politically by the state. In the pre-1980s, the private sector was made of family-run, large and multi-activity corporations, and their relations with the state were particularistic and clientelist (Buğra, 1994). Buğra and Savaşkan state that in the post-1980 period, the relationship between the state and private sector has changed and a new form of capitalism has emerged. According to Buğra and Savaşkan, in the post-1980s, particularly during the rule of the *Adalet ve Kalkınma Partisi*[235] (*AKP*) neoliberal economic regulations have provided opportunities to a group of companies with limited business background (2014).

After 2001, legislative reforms as new mechanisms of government intervention opened the electricity sector to private investors for capital accumulation by structuring and restructuring the electricity market. In 2003, privatization of hydroelectricity sector and commodification of the rivers and the stream flow began. The hydroelectricity production became a lucrative business for profit-seeking entrepreneurs and companies of various sizes with or without sectorial experience. The return of investment was around 3 to 5 years, and later rose to 10 years as the legislation framework was tightened and license fees and other fees and taxes paid to the state increased[236]. Since the length of the license is 49 years, the companies will be working until the licenses expire with an option to extend them another 49 years. Moreover, the hydroelectricity sector was lucrative not only for the hydroelectricity companies but also for the broker companies, which made profit by selling their energy licenses to third parties (Buğra and Savaşkan, 2014). The broker companies, called

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[235] The Justice and Development Party (in English).

[236] Interviews in August and September 2014 and in October 2015.

"çantacılar,"[237] were a group of businessmen with strong ties to government and bureaucratic circles. They used their relations to obtain energy licenses in the early stages of the hydroelectricity program and later sold them at a high profit to private entrepreneur who wanted to enter the hydroelectricity sector.

Scholars explained how the state opened the mining (Arsel, 2005b) and seed sectors (Aksoy, 2005) to foreign and domestic companies through a series of deregulations and privatization during 1980s and 1990s in Turkey. In a similar manner, the "sustainable development" of the hydroelectricity program was launched in a deregulated environment to allow the entrance of domestic and foreign companies. As discussed in Chapter Five, the licensing regulations exerted almost no control over the company. The state followed a roll-back strategy in natural resource governance of the rivers and the river basins (Castree, 2010) by diminishing the regulatory responsibilities of DSİ and EİEİ, while extending the authority of DSİ to control all the rivers.

Private companies have penetrated the hydroelectricity sector in two ways. The first is by direct investment. The private companies have been allowed to develop their own projects at any section of a river. At the same time, the projects in the inventory of DSİ, which were in different stages of development cycle, have been listed for sale. Secondly, new companies have entered to hydroelectritiy sector by providing services and technology to hydroelectricity companies. Most of the investor companies had no sectorial experience. The companies were from textile, construction, transportation and logistics sectors; even football clubs entered the hydroelectricity sector. These entrepreneur companies obtained services from other private companies for project development, design and license application, and outsourced the construction of the hydroelectricity projects to construction companies. As a result, the incoming entrepreneurs to the hydroelectricity production have established new business segments in the hydroelectricity sector while nourishing the construction sector[238] and

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[237] Buğra and Savaşkan translated *çantacılar* as baggers (Buğra and Savaşkan, 2014: 91). *Çanta* means bag in Turkish, in this context, it is used for the bag used by businessmen.

[238] Sinan Erensu wrote on the relations of hydroelectricity production with construction business and pointed to how energy projects that the state began in return support the construction sector, which is crucial for economic growth strategy of the state under AKP-rule. "İnşaat ekonomisinin Arhavi eşiği" can be accesses at

hydroelectricity electromechanical sector (See Table 3.11. The cost categories of the plants and estimated cost amounts appear on page 58).

8.2.2. Audit culture and outsourcing

The Water-Use Right Bylaw was the initial signal of the state policy toward institutionalizing the audit culture (Strathern, 2000). As I discussed in Chapter Five, the bylaw reinitiated privatization in the hydroelectricity sector and started a major trend in transferring power from the state institutions to the private sector by pulling back the presence of the state in certain areas to a position of "auditor" so that private companies could occupy the emptied space.

The role of DSİ began to change in the post-1980 period with the implementation of Built-Operate-Transfer (BOT), Build-Own-Operate (BOO) and Transfer-Of-Operating-Rights (TOOR) business models. However DSİ was still in the charge of planning and control. One interviewee described this as follows:

> *Eskiden işlerin başını-ortasını-sonu DSİ yapıyordu…*
> *Yap-işlet-devret modelinde DSİ tam denetler planlardı. Çünkü süresi sonunda baraj DSİ'ye devir olacağı için titiz çalışırlardı*[239].
> In the past, DSİ was at the beginning, in the middle and at the end of work…
> DSİ was planning and auditing in the Built-Operate-Transfer projects. DSİ was working meticulously, because the dam will be transferred to DSİ at the end of license period.

Since the early 2000s, the main critical functions of EİEİ and DSİ have been either abandoned or reduced significantly or restructured to create a space for the private sector.

The audit culture as a state policy became explicit in the *Su Yapıları Denetim Hizmetleri Yönetmeliği*[240] (*SYDHY*), which was first published in 2009. The bylaw has aimed to cultivate

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http://www.sendika.org/2014/08/insaat-ekonomisinin-arhavi-esigi-sinan-erensu-evrensel/.

[239] Interviews in August 2014.

the "audit practice" extensively in DSİ. The audit practice is about verification of knowledge produced by others (Stratern 2000). In the context of this bylaw, I use the concept of "audit practice" in a more extended fashion, including not only verification of the structure of the reports, but also as covered in the bylaw, the activities of control and approval of final design projects (*kati proje*), construction documents and drawings (*uygulama projesi*) and as-built projects (*iş sonu projesi*), and the activities of inspection and supervision in the implementation phase of the hydroelectricity projects and all other water infrastructures. The bylaw allowed DSİ to transfer its supervision and inspection responsibilities to the private auditing companies. This item legitimized another form of privatization, the privatization of supervision and inspection functions of a state institution. The bylaw has made it possible for the hydroelectricity companies to hire private auditing firms to audit their reports and to supervise and inspect their activities. The main responsibilities of DSİ were transferred to private auditing firms and the role of DSİ was diminished to verification of the auditing reports of the private auditing firms. The bylaw was taken to *Danıştay* (The Council of State) for cancellation based on its contradiction with the Constitution, which states that the responsibility of the state cannot be transferred to third parties. The Danıştay cancelled the bylaw. The state modified and reissued the bylaw in 2011. The bylaw was taken to Danıştay again for cancellation of a fundamental section. Danıştay forwarded the case to *Anayasa Mahkemesi* (Institutional Court) and Institutional Court cancelled the section of the bylaw in 2012. Later, the state added that section into another law in 2014, and the bylaw was modified and reissued in 2015[241]. This case demonstrates how persistent the state is in changing the relations between the state and the private sector.

In addition, the trend in outsourcing the responsibilities of the state institutions to the private sector has become apparent since the early 2000s, and this trend is an indication of another state policy aimed at changing the state-private sector relations. For instance, the stream flow monitoring was one of the main line of businesses of DSI. DSİ and EİEİ were in

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[240] The Water Infrastructure Control Services Bylaw (Translated by the author).

[241] See "Su Yapıları Denetim Hizmetleri Yönetmeliği'nin iptali için yargıya başvurduk" at the site of Enerji-İş Sendikası. It was downloaded from www.enerji-is.net on 26.December.2016. Also see "Devlet su yapılarının denetiminden elini neden çekiyor?" It was downloaded from https://www.facebook.com/yusuf.yavuz.7/posts/851589381633198 on 22.March.2016.

charge of the stream flow monitoring and operated two mutually exclusive systems of stream flow gauging. Their responsibilities ranged from the setting up new gauges, maintaining the existing gauges, taking the stream flow measurements, and recording, to analyzing and reporting the recorded stream flow measurements. When EİEİ was dissolved in 2011, DSİ took over the stream flow gauges of EİEİ and became the sole authority in stream flow gauging. In the past decade, DSİ has outsourced maintenance of the stream gauging system and measurement activities to private companies[242].

8.2.3. Reregulation

The rollback strategy of the state in river and river basin governance has become apparent in the slowness of state institutions in setting a regulation for minimum water requirement and in extending the coverage of environmental impact assessment regulation and by the oversimplification of river basin governance in allocating the water-use right licenses. These deregulations allowed the hydroelectricity companies to become self-governing within a loosely defined regulatory framework and even encouraged them not to comply with the regulations. An interviewee from the hydroelectricity sector who wished to remain anonymous explained the situation this way:

> It is like complying to the speed limit. If there is a speed limit at a location and nobody controls the road to detect the speeding drivers and punishes these drivers, and if you are in a hurry or you want to go fast for pleasure, you take the risk and ignore the speed limit.

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[242] An interviewee compared both systems before and after the outsourcing the functions in maintaining the stream gauging stations and taking the measurements. He said that the previous system was providing training to the state personel as hydrologyists, that they were receiving on-the job experience over the years, and therefore allowing technical know-how and environmental knowledge about the river basins and the rivers to accumulate in the state institutions. In the new system, the private companies work with the state based on short-term contracts and employ people only for a short-term. Hydrology training and knowledge accumulation are not possible in the new system. The study of the implications of the privatization of stream gauging related activities to the state is the subject of further study.

The deregulations thus raised tensions in the river valleys. Individual conflicts and local oppositions turned into a nationwide environmental movement. The local people and the opposition groups organized protests, civil disobedience events, filed petitions, and initiated court cases against the state institutions and the hydroelectricity companies (Kibaroğlu et al., 2009; Hamsici, 2012; Erensu, 2013; Kadirbeyoğlu and Kurtiç, 2013). An interviewee described this struggle in this way:

> *Kamu toplumdan sürekli tokat yedi*[243].
> The state is continously slapped by the public.

In addition, the hydroelectricity companies operating in the same river have also encountered the contradictions of the hydroelectricity program affecting their production, as I elaborated in Chapter Four. The water holding capacities and multiple plants located in a cascading order in the river basins have caused conflicts in water use among the hydroelectricity companies using the same river. Moreover, water-use practices of the hydroelectricity companies have created water-right conflicts between the hydroelectricity companies and the villagers, who need stream flow for irrigation (Hamsici, 2012; Aydemir, 2013).

The state was forced to place reregulations to resolve these contradictions. A rollout strategy was implemented, and referring to Bakker, it was "the reconfiguration of the role of the state to ensure the continued functioning of capitalism" (Bakker, 2007: 544). To continue with the "sustainable development" of the hydroelectricity program, the state increased its control in natural resource governance by detailing the licensing application process, asking for additional and more comprehensive reports, integrating environmental impact assessment process in licensing regulation, expanding the coverage of environmental impact assessment regulation and setting a regulation for minimum water requirement. Additionally, the state tightened the rules on capital accumulation by increasing the company requirements in license applications.

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[243] Interview in August 2014.

8.3. The Relations Between the State and the Local People

The study of the hydroelectricity development taking place in the İkizdere Valley shows that new sets of relations between the state and the local people have been established since the early 2000s, in two areas. The first area is the public involvement to the project development. An Environmental Impact Assessment regulation is the only mechanism through which local communities can voice their questions and concerns related to a development project. The ways in which the public has done this are discussed in detail in Chapter Five. The second area involves the state's interventions in providing land to the hydroelectricity companies. While these changes in the state-public relations might be considered "side effects," I classify them as "instrument-effects" (Foucault, 1995); in other words, I see them as instruments of exercising power with powerful and far-reaching impacts (Ferguson, 1994). In this section, I explore how the state expanded its control over the rural land by means of cadastral survey, intervening in the existing local land tenure systems and land use types, and establishing and sustaining private land ownership in rural areas with exclusive and transferable rights.

8.3.1. Cadastral survey practice

Cadastral surveys started in the villages of the İkizdere Valley after the mid 2000s. For instance, in the county of İkizdere, a cadastral survey was initiated in 2006 and completed in 2011[244]. A survey of Kayabaşı Village was done in the period of 2008-2009[245] and another was carried out in the village of Gürdere in 2009[246].

A cadastral survey is a state practice for the cadastral property system that registers and maintains the structures of private ownership. It is particularly important for the people living in villages because they can claim legitimacy for private ownership over the lands they have in *zilyet* ownership. *Zilyet* is a tenure system, which is different than private ownership. *Zilyet*

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[244] Interview in April 2015.
[245] Interview in May 2015.
[246] Interview in January 2015.

defines a possession relation between a person (or a family) and a property based on two conditions: *Corpus*-take control, *Animus Possidendi* - intention to possess[247]. *Zilye*t ownership is not a right but it is a fact that is under the protection of the law. In the İkizdere Valley, *zilyet* ownership was widespread. The families who cleared the land from forest to cultivate tea and to grow subsistence food in the past have *zilyet* ownership of these lands.

Zilyet can be interpreted as a weak land ownership for two reasons. The first, the *zilyet* owners can use the land for cultivation, but they cannot sell the land officially. The second, if the land is obtained by clear-cutting the forest and the possessors do not cultivate the land for a certain time, the forest will regrow and *zilyet* status for the land will be lost.

A recent study demonstrates that both drastic signs of clear cutting and forest regrowth were observed in the period between 1976 and 2000 in Rize (Reis, 2008). Particularly in the downstream section of the İkizdere Valley, where the slope and altitude of the hills are lower and the population is high, the forest was cleared to open space for tea gardens, which is a main cash crop in the valley. In contrast, this trend was reversed in the inner section of the valley, where the slope and the altitude of the hills are much higher and the population is dropping. The study shows that tea gardens and cultivated land were abandoned due to high rates of outmigration, and the forest was regrown.

At the time of a cadastral survey, *zilyet* owners need to provide evidence of their intention to cultivate and use the land. In the cases of forest regrowth, when the lands are registered as forestland, land disputes occur between the *zilyet* owners and the forest department[248]. Once the cadastral survey is completed, it is very difficult to change the status of the land from forestland to private property.

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[247] The *zilyet* regime covers all types of properties, movable properties and immovable properties. See "*Eşya Hukuku-Zilyetlik Tapu Sicili ve Rehin Hakları*" written by Mehmet Serkan Ergüne and Haluk Nami Nomer, published by On İki Levha Yayıncılık in 2014.

[248] Interview in March 2015.

On the other hand, *zilyet* is a strong type of possession for two reasons. Firstly, the law protects the owners of *zilyet* property against the third parties who want to take possession of the land. Secondly, *zilyet* property can be inherited.

The cadastral survey determines the location of property with *zilyet* ownership, marks its borders, indicates its land use type, and records its owners. It creates a "price" information for the property with *zilyet*. In sum, the cadastral survey makes legible the unregistered, locally accepted *zilyet* possession and turns *zilyet* possession into private property ownership backed by legal rights and obligations.

For the state, the cadastral survey, like other type of mapping and surveying practices of the state, is a mechanism for legibility and control. It establishes a system that can be instrumental for the interventions in the politics of land (Scott, 1998; Hetherington, 2012). What is important is that the cadastral property system not only establishes some standard information for the private properties, but also makes this information widely accessible. Therefore, this practice has implications not only to the state and the landowners, but also to the hydroelectricity companies.

The cadastral survey makes the exchange of land easy. It was the first step required before the land could be expropriated or purchased by the hydroelectricity plants in the İkizdere Valley. The cadastral property system creates an inventory of all the information about the land in a standardized format and makes it available to the state and to the private companies. When a hydroelectricity company needs land at a certain site, it knows where it is, who the owners and neighbors are, what the land use status is, and how much it costs. The availability of cadastral information makes the privatization and commodification of land easy.

8.3.2. The privatization and commodification of land

Land is the second basic element of hydroelectricity development following stream flow. The development requires the capitalist method of land ownership with exclusive, transferable and enforceable rights that allow exchange of lands based on a price. The cadastral survey practice entitles property ownership to the possessors of *zilyet* property, and privatizes the land. Privatization is distinct from commodification and it is a precondition of commodification. Assigning a price to land is one of main functions of the cadastral survey. Although the price is for tax purposes, the availability of a price for the land, whose location, borders and private owners are registered to the cadastral property system, fulfills the conditions required for its commodification.

Land is not a commodity produced for sale, but is made a commodity (Polanyi, 2001). Commodification is a process in which things that can be assets, goods or properties, are made available for sale at a price determined by the market (Castree, 2003; Bakker, 2007).

The locals have strong notion of ancestral land and family members are buried in family lands. They never sell their family land, although they may allow close kin or distant relatives to use it. The commodity fiction reorganizes the relations of local people to their land and replaces their perception of the land from family land to a commodity, whose price can be negotiated with external potential buyers.

8.3.3. Emergency expropriation as a regular practice

Emergency expropriation mechanism is irreversible in taking private property from its owners. The cabinet has a unique authority to expropriate private property under the national security conditions or any other state-of-emergency situation. In addition, the existing legal framework entitles flexibility to the cabinet and allows it to make exceptional cases for emergency expropriation. The cabinet uses this flexibility in declaring hydroelectricity projects as emergency expropriation cases.

The emergency process completely disregards the rights of property owners. It simply works by inviting the property owners for a negotiation in order to purchase their property at a price determined by a group of experts. When the money is deposited to a bank, the land is expropriated within 7 days. The owner has no right other than to object to the paid property price. This process is described as "*el koyma*"[249] in the law, indicating speedy and irreversible annihilation of the property ownership. The opponents of emergency expropriations call it a "legal catastrophe."[250]

The cabinet transferred its authority in making exceptional cases for emergency expropriations to *Enerji Piyasası Düzenleme Kurulu*[251] (*EPDK*) and equipped EPDK with a prerogative[252] in 2004. In other words, EPDK was authorized to make emergency expropriation decisions for the electricity production as defined in the 27th item of the "*Kamulaştırma Kanunu*"[253] (*Expropriation Law*). The prerogative of EPDK was debated and opposed, and taken to the state council for cancellation. Later, the state council cancelled the authority of EPDK in making emergency expropriation decisions in 2011. Currently the emergency expropriation practice of the state follows this routine; the cabinet makes emergency expropriation decisions for specific hydroelectricity projects and EPDK implements the decisions.

In strong neoliberal era of the Turkish state now, what is observed is that this exceptional mechanism is transformed into a routine practice for private development projects -- in particular, hydroelectricity projects[254] - to obtain land for their infrastructure in a speedy manner.

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[249] Confiscation.

[250] Lawyer Mehmet Horuş is the legal advisor of the various non-governmental organizations on environmental issues. He wrote an article for the news bulletin of the chamber of geological engineers and debated the emergency expropriations. The article was downloaded from http://www.jmo.org.tr/resimler/ekler/918ea9744eaca53_ek.pdf?dergi=HABER%20B%DCLTEN%DD on April 14th 2016. An article written by Pelin Cengiz, journalist, was appeared in the internet site of Taraf newspaper on September 28th, 2014. In her article, titled "Adı konulmamış savaş hali: Acele kamulaştırma" (Unnamed war status: The emergency expropriations), she discussed the recent cases of emergency expropriations and added the legal views of the lawyers. It was downloaded from http://arsiv.taraf.com.tr/yazilar/pelin-cengiz/adi-konulmamis-savas-hali-acele-kamulastirma/30924/ on July 14th, 2015.

[251] The Energy Market Regulatory Authority.

[252] Interview in September 2014.

[253] The Expropriation Law (in English) with law number 2942 was issued in official gazette, RG # 18215, on November 8th, 1983.

[254] Interview in November 2014.

When the legal framework legitimizing the expropriations for the "sustainable development" of hydroelectricity program is analyzed, it is seen that the state has not only normalized emergency expropriation but also declared the hydroelectricity projects as for the welfare of the nation. The state took a first step by authorizing the board of EPDK to decide whether an expropriation for a specific energy project is for the public good. The Electricity Market Law[255] authorized the board of EPDK to make the decision as to whether a hydroelectricity project was for the public good or not. First, the decision of the board was effective after the cabinet's approval. Later, when the law was reissued in 2013, the cabinet approval condition was removed. EPDK became sole authority in deciding whether a project is for the public good or not. This change, which empowered the EPDK created a contradiction, since one of main duties of EPDK was to work for the growth of renewable electricity production in Turkey (Sözer, 2014).

This legislative framework allows the hydroelectricity sector to appropriate any land, whether it is an agricultural land or forestland or pasture, and whether it is owned privately or is an asset of a public institution, registered to the Treasury, or under the possession of the state. In 2011, EPDK expropriated 30,127 pieces of property and obtained more than 82 km^2 for the energy infrastructure including hydroelectricity projects[256].

The hydroelectricity production of private sector was given highest priority, over and above other socio-economic considerations, including citizens' rights. The expropriation practice of the state raised concerns on the human rights front at the national and even international level (Işlar, 2012). The UN Committee on Economic, Social and Cultural Rights (CESCR) assessed Turkey's compliance with these rights and published recommendations in 2011. The Committee stated their concerns with regard to the potential impact of projects on the rights of the people, who have been subject to forced evictions, resettlements,

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[255] The Electricity Market Law #4628, issued in official gazette RG # 24335 on March 3rd, 2001.

[256] Interview in November 2012.

displacement and the compensation hasn't been enough. They urged the Turkish state to review the related legislation and regulations[257].

8.3.4. Change in land ownership structure

In May 2015, I was visiting a friend in Gürdere, who is a resident of the village. I wanted to help her in planting beans, corn and pumpkin seeds - common subsistence crops in their daily diet. To reach the land, we followed a dirt road that was barely wide enough for one person, extending through the contours of the hill and bordered by tea gardens and subsistence lands. She showed me a plot of land, approximately 50-60 m^2 in size; it resembled a wide step dug into the hill and belonged to one of her uncles. Since he had moved to the cities, he allowed the *hodja* of the mosque to use it. My friend's land was located on a steep slope and bordered by two houses and two roads. It was roughly 20 m. by 50 m. in size. A distant relative was the owner. Too old to cultivate the land, he now allowed her family to grow subsistence food there. The village had a common grazing ground for the animals down by the İkizdere Valley at a site known as *Kumluk,* currently occupied by the Cevizlik HES intake facility[258]. In the village of Gürdere, the families own several pieces of land and use them for tea cultivation and growing the subsistence food. The village also has common grazing grounds either on the patches of land along the river and the streams or on the uplands. This local land ownership structure can be generalized to other villages in the İkizdere Valley and even to the Eastern Black Sea Region.

This local property ownership structure has changed with the emerging hydroelectricity plants in the İkizdere Valley. To construct the Cevizlik HES, 83 pieces of property were expropriated by the state. Four of them were private houses and one of them was an old wooden house (Figure 8.2). For the Saray HES, 11 pieces of land, which included common land of the village of Güresen, were given to the private company. The land exchange was done in two ways. One way was that the company negotiated with the landowners and

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[257] CESCR–Committee on Economic, Social and Cultural Rights. 2011. Report E/C.12/TUR/CO/1 accessed on 7.June.2014 at http://www2.ohchr.org/english/bodies/cescr/docs/E.C.12.TUR.CO.1-ENG.doc

[258] Focus group meeting and local participatory mapping exercise carried out in June 2015.

purchased the lands directly from them. In other cases, the land was expropriated with emergency status by the state and given to the company to construct the infrastructure.

In 2011, 30,127 pieces of property with different land ownership status were assigned for energy projects[259]. This is a gross figure, and does not break down the land by category; it also fails to indicate whether the land was expropriated for HES projects or not. However, it does provide a rough idea of the size of the impact of energy projects.

In addition, the current legislation requires the registration of the private and common property to the state that is appropriated for hydroelectricity plants. The expropriated properties are directly registered to the state by court order. However, if the companies purchase land directly either from the landowners, or in the case of commons land from the village heads, they are required to notify the state and re-register the land to the state. Considering the fact that the energy licenses are temporary and transferable, the land that is directly purchased by the hydroelectricity companies is apt to create an issue for the state in the long run.

8.4. The Relations Between the Local People and the Private Sector

The land has been central to the constituted relations between the local people and the private sector. The interventions of state have transformed the rural land - in particular, tea cultivated *zilyet* properties - into private property that can be bought, sold, accumulated and transformed into industrial land. The state established conditions for the hydroelectricity companies to develop relations of production for land with the private landowners either through expropriations or by direct purchasing.

When hydroelectricity companies have approached landowners to appropriate their lands, various land disputes and price disputes have resulted, and some landowners have resisted the expropriation decision of the state. The companies obtained the land ownership either through

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[259] 12th Turkish Energy Congress, 2012, Ankara.

the courts or by negotiations with the landowners. These cases demonstrate the emergence of a new form of power with the transformations in the relations of local people and the private sector in the İkizdere Valley.

8.4.1. The politics of land

8.4.1.1. Disputes and court cases. Land expropriation processes, both regular and emergency, were instrumental in accessing the land for the hydroelectricity infrastructure in the İkizdere Valley. Expropriating the land is an exercise of state power. The expropriation practice reveals the system of power, and the disputes that have emerged can be considered as responses to the emergence of the new forms of power that have come into being with hydroelectricity development.

Three types of disputes have occurred in relation to land. The first has to do with official land price. The landowners found the official land price set by the state too low and objected to it. In cases of emergency expropriation, the landowners can file a court case against expropriator and request the re-determination of the land price. In the case of regular expropriation, a different process works. The current regulation orders a price negotiation to take place between the expropriate and the expropriated parties, and if the parties do not agree, it then allows the expropriator to open a court case in *Asliye Hukuk*[260] for finalization of the expropriation. The court appoints a commission to determine an official price for the property subject to expropriation, and finalizes the case in approximately 4 to 5 months. The parties have the right to object to the court decision and take the case to a higher court. If this happens, the finalization of expropriation takes longer time.

The number of the court cases that involve objecting to official pricing[261] is highest in the İkizdere Valley[262]. The high volume of cases indicates that the private property expropriation

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[260] The civil courts of general jurisdiction.
[261] This type of court cases is called "*bedel tesbite itiraz*" in Turkish.
[262] Interview in June 2015.

has become a mundane operation of the state in the valley and in response has given rise to a non-violent, legal way of resistance.

The second type of disputes is related to land ownership. These disputes have occurred as the result of complicated land possession and ownership structures. In the region, families are large and the rate of outmigration is high; thus family members are scattered all over Turkey and beyond. There are cases involving more than a hundred individuals owning a relatively small piece of land. When the owners are not residing in villages, the location and the borders of *zilyet* property and its owners are determined by the testimony of village headmen, members of council of aldermen and village elders. This process is open to politics. If a person claims a right over a *zilyet* property and opens a court case, the expropriation process is halted until the ownership issue is resolved.

The third type of dispute is related to project modifications in the hydroelectricity projects. When the hydroelectricity companies make project modifications and change how they use the appropriated land, disputes can arise between the local people and the private companies, as seen in the Soğuksu case.

In the village of Soğuksu, the residents took the Cevizlik HES and the state to court for constructing the switchyard of the Cevizlik HES at a location in the village in close proximity to the houses. They claimed that this location was different than the approved location stated in the environmental impact assessment report. The cadastral survey is a state practice; however, the villages have a right to reject it in their official land. The village of Soğuksu did not want the state to do a cadastral survey[263], because there are *zilyetli* tea gardens that are officially forestland. The private company negotiated with the possessors to build *lojman*[264] for its workers in *zilyetli* property and purchased it from them. Afterwards, the company modified the project and constructed the switchyard on the *zilyet* property. The local people took the case to the court and argued that the switchyard is a threat to the health of the locals

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[263] Interview in June 2015.

[264] Residential building for the workers and their families in Turkish.

whose houses are near the facility; therefore the construction of switchyard in the village must be subject to an environmental impact assessment.

These active struggles at the local level over the land price and ownership, and land use clearly indicate how complicated and power-laden land related relations of the local people with the hydroelectricity companies have become.

8.4.1.2. Negotiation and persuasion in land purchases. In accessing the land in the İkizdere Valley, the processes of negotiation and persuasion between local land owners and the hydroelectricity companies have played a key role. Dolittle argues that negotiation can be considered as an expression of local agency, a way society resists or suggests alternatives to state policies and expresses them within the limits of existing systems of power (Dolittle, 1999). In her argument, negotiation is postulated as an unidirectional process empowering the locals. In contrast, I argue that in spite of the fact that negotiation between the local landowners and the private companies seems an articulation of the agencies of both parties, in the context of the hydroelectricity development in the İkizdere Valley it is an expression of power over.

Negotiation and persuasion processes have provided a space for private companies to contact local landowners to access their land for the implementation of hydroelectricity projects. A local described how the process works:

> *Devlet yol için kamu yararı diyerek ikna eder. Özel sektör para ile ikna ediyor*[265].
> The state persuades for the road by saying that it is for the public good. The private sector persuades with money.

Another local associated the negotiation and persuasion process with *ikna odaları* (persuasion rooms), which is the name given to political pressure applied by university administration to university students to remove their headwear in late 1990s.

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[265] Interview in April 2015.

There are several prominent factors influencing and affecting the negotiation and persuasion process. The first is the price of the land and it was the fundamental point of negotiations. The landowners have claimed that the official prices determined by the commissions were low. If the landowners open a court case, the legal procedure delays the companies to access the land. Therefore, the hydroelectricity companies approach the landowners to offer a price for their property and the official price becomes a reference point and a threshold in the negotiations. There are many instances when the companies have offered prices that are significantly higher than the official price in order to purchase the land – sometimes two, three or four times higher. The sale of land for two-four times higher than the official price is a reflection of the power the landowners had over the companies. But the significant gap in the land prices also points to other side of the coin, where the companies have exercised their power over some local landowners to make them agree to the lower prices.

The second factor is the ownership status of the land, whether registered in the cadastral property system or in *zilyetli* status. A closer look at the ownership status can illustrate how different actors have manipulated the cadastral survey for different purposes. As I explained, *zilyet* is a claim of possession of the land, and the laws protect this type of possession. However, it is not as strong as a private ownership with legal rights. In many instances in the İkizdere Valley, the *zilyet* properties are cleared forestland and might be the subject of conflict between the forest department and the local owners at the time of cadastral survey. Therefore, there is a possibility that the owners of *zilyet* can lose the possession title to land, and this insecurity has been instrumental in land negotiations driven by the private companies[266].

The third factor is the legal fees and the time taken by the court cases. The landowners have an option to open a court case to object the price, but the legal action requires legal fees and timely responses from the plaintiff side. Therefore, the local owners were discouraged to pursue their civic rights. This situation coupled with the strong presence of the

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[266] The politics involved with zilyet properties in the development projects can be a further research topic.

hydroelectricity companies backed by the state and further constrained local people who oppose giving up their land. As a land dispute case between a local owner and the private company in the village of Ağaçseven demonstrates, when the company illegally entered onto private land, the owners had rights to sue the company, but instead agreed to sell their land to the private company[267]. A local describes the emerging power dynamics as,

Şirket devleti arkasına aldı. Vatandaşı zorladı[268].
The company was backed by the state and pushed the citizens.

On the other hand, the companies have mobilized also alternatives methods of payment other than money to access the land. They have provided cement for house construction to the landowners and constructed new houses to replace the expropriated family houses. Also they have offered alternatives such as permanent or temporary jobs in the hydroelectricity plants to compensate residents for the loss of permanent income coming from the tea gardens.

8.4.2. The complaint management

The road to the Gürdere Village starts on the riverbank of the İkizdere River, climbs uphill slowly and passes through the regulation pool of the Cevizlik HES. The first house on the road borders the Cevizlik HES and a high fence made of concrete and steel separates it from the site of the hydroelectricity plant. In my several visits to the village I noticed some peculiarities about this house and its garden. It was built on an unusually steep hillside downward from the Gürdere stream. It looked new but incomplete. It had four floors, and the level of incompleteness changed from floor to floor. The ground floor stayed below the road because of the slope. It was coated but not painted and had no window frames. The top two floors were the most incomplete with neither coating on the walls nor window glass. The main entrance was on the second floor, where people were living. It was the only floor with coating and paint. A home garden surrounded the house where beans, corn and collard green

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[267] Interview in May 2015.
[268] Interview in April 2015.

were planted for household consumption. The garden extended downhill to the stream, and due to the steepness of the slope, land had slid down at several points. There were tea plants, pear, apple, and walnut trees on the other side of gate, which separated the home garden from the Cevizlik HES site. A section of the gate had been removed and two small plots (parcels of land) were open for beans and collard greens in relatively flat parts of the hillside at the Cevizlik HES side. The house and its garden stood as explicit articulations of the land conflict between the landowner of the house and the Cevizlik HES.

The landowners had a house located on flatter land by the Gürdere stream and another one made of wood. Their houses, the tea gardens, and the home gardens had been expropriated for the water intake facility. The family, along with other landowners whose houses and lands had been expropriated, struggled against the project. At the time, the Cevizlik HES court case was ongoing and the company could not risk the progress of the project with possibility of other new court cases; a negotiation and persuasion process between the landowners and the company was therefore initiated. Commitments were made to the landowners for their material losses, including promises to build a new house at another location and allowing the family to continue cultivating their tea gardens. However, the family complained that the commitments were not kept fully once the plant was put in operation. They demanded the completion of the house and claimed the use rights of their tea garden as promised at the time of negotiation. The conflict deepened. The family removed the fence and kept harvesting tea, and in response, the company removed the tea plants and burned them.

Another unresolved conflict is the case of Komesoğlu watermill in the village of Gürdere[269]. The case involves the issues of water rights and cultural heritage. An elder of the village in his eighties maintains the mill that has belonged to his extended family for over 150 years. The watermill is on one side of the road to Gürdere and the regulation pool of the Cevizlik HES is on the other side (Figure 8.2). Before the infrastructure was constructed on the land, the water that runs the mill was coming from the Gürdere stream through an open channel that had been built by his ancestors. Due to high level of sedimentation, the materials

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[269] See news article "Değirmenin suyunu HES yuttu" downloaded on 15.July.2015 at http://İkizdere.net/degirmenin-suyunu-hes-yuttu/.

had filled the channel and the sediments needed to be removed regularly during high flow months. Removing the sediment from the channel was easy and could be done by one person. However, when the company took the land and constructed the pool, the channel was damaged. The company therefore agreed to build a new waterway for the watermill. They constructed a waterway in the form of a closed system made of pipes. This new waterway is not functional, however, because sediment fills the pipes and cannot be removed easily. When the owner of the watermill complained about the dysfunctional waterway, the company made an offer to purchase the watermill. The owner, however, does not want to sell. Thus the issue remains unresolved.

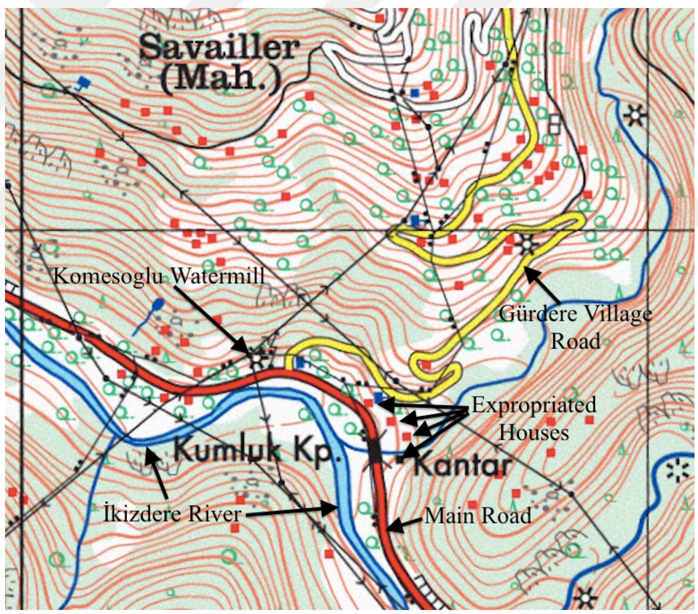

Figure 8.2. The location of the Komesoğlu watermill and the expropriated houses before the construction of the water intake facility of the Cevizlik HES. Source: Harita Genel Komutanlığı.

During the land possession and construction phases of the projects, the firms followed a "sunk cost" strategy that Plater describes its object as follows,

> To push a project until it exists as a concrete reality. Citizens get demoralized, and project promoters can say, 'It's too late to turn back now' (2013:112).

The firms spent as much money as possible and tried to get the project done as fast as possible by being responsive to the emerging problems and sensitive to requests of the locals. The people whose houses were damaged by the explosions during the construction of the underground water tunnels and the settlements and whose roads were damaged by the construction vehicles were compensated quickly, before they could bring their issues either to state authorities or could organize to file court cases. Some local residents were hired as temporary construction workers. During construction, construction materials were given away to individuals, villages, and municipalities. Scholarships were distributed to local university students. During Ramadan, the companies distributed food packages to the households. The companies gave money to *hodjas* for the maintenance of the mosques.

These newly established relations between the local people and private hydroelectricity companies were aimed at resolving potential disputes. However, the agreements were verbal and open to misinterpretation, misunderstanding and misuse. When the plants were put into operation, the amount and variety of contributions dropped, the requirements for scholarships were tightened, then reduced, and finally cancelled. Moreover, the goods and services were short-term and unreliable; some locals described them as, *bir defa süs olarak*[270], *teatral*[271] and *işini aşırana kadar*[272], emphasizing the timing and one-time nature of the distributions. Corruption occurred on both sides and local clientelism and patronage relations emerged and were sustained, as I discuss in the following section.

8.5. The Transformation of the Moral Economy in the İkizdere Valley

An analytical gaze over the emerging relations of production of hydroelectricity development informs the transformation of the moral economy of the İkizdere Valley. The concept of moral economy was first used by E.P. Thompson and later elaborated by James C. Scott. It can be defined as a consensus of local communities on legitimate activities that are

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[270] Only once as an ornament (Translated by the author).
[271] Theatrical (Translated by the author).
[272] Until they cross the hill (Translated by the author).

based on fairness and economic justice (Scott, 1976). The moral economy is predicated on two notions, economic justice and exploitation. This concept is useful in my attempt to describe and explain the changes in the behavior of local people in response to changes in the relations of production of hydroelectricity.

8.5.1. Emergence of clientelist relations and patronage networks in the İkizdere Valley

The İkizdere HES has been perceived as an industrial plant because of its electrical and mechanical workshops with technical equipment and tools. While it was built as a state entity, the locals approached it with personal requests. The managers and the workers in the İkizdere HES were mostly local people. Family, kin and neighborhood ties allowed the local people to access to the plant with ease. People came seeking help to repair a broken lever on a watermill, for help with a car, or for welding. These relations were driven by the motivation to help a relative or individual in need, and were non-monetary. The Zorlu Holding kept this already established mode of relations after the company took the management of the state plant in 2008.

However, after privatization the character of the relations between the locals and private owner started to change. Requests extended from simple help with repairs to material and monetary requests as the profile of the requestors changed from individuals to village heads. The shift in relations of the İkizdere HES with the local communities was an indication of the clientelism and patronage that emerged after the privatization of hydroelectricity production.

The roots of the clientelist and patronage relations in the İkizdere Valley can be traced to political clientelism and patronage in Turkish society and politics (Kudak, 1970; Buğra, 2002, 1999; Sayarı, 2011). Patron-client relations are face-to-face relations and involve parties of unequal wealth and status. The disparity in the status and wealth of the parties invokes the norm of reciprocity. The patron provides protection and benefits to the client. The client supplies personal services, loyalty, assistance and general support to the patron. The stability and durability of patron-client relations depends on two factors: the magnitude of the difference between the status of the parties and the nature of resources available to the parties (Kudat, 1970).

The privatization of hydroelectricity sector has caused the establishment of clientelism and patronage relations in the İkizdere Valley. Private companies engage in profit-maximization behavior, whereas the state-owned and operated İkizdere HES produced electricity, a public utility, for the benefit of the country. The general perception of the local people in the İkizdere Valley is that the private companies benefit from the hydroelectricity production, not the locals. The village heads and mayors approach private companies with various requests, such as "*beton*" for road construction, food for *Kuran Kursu*[273], money for the construction of toilet for a local mosque, garbage truck to collect trash, sponsorship to the local sport teams, money to repair damaged roof of another local mosque, scholarship to college students and cloths to local students. In return they become instrumental in contacting the landowners in the villages and assisting the companies in land negotiation and persuasion activities.

News that has appeared in a local newspaper[274] confirms how widespread the clientelist and patronage relations are in the hydroelectricity sector. News article has stated that the governor of Giresun prohibited the village heads and the mayors to from approaching to hydroelectricity firms in the province to request *beton*[275] in 2012.

8.5.2. Leading roles played by local actors

In constituting, normalizing and sustaining the clientelist and patronage relations, local actors have played important roles.

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[273] They are school like places, where school aged children learn to read Quran.

[274] Giresun Haber Al is a daily newspaper published on the internet. The news was posted on 25.July.2012. It was downloaded from http://www.haber-giresun.com/hes-firmalarina-genelge-korumasi/ on 19.July.2014. Giresun is a province in the Black Sea Region

[275] Cement.

Muhtarlar[276] are the points of contact of the state in the villages. Therefore, they have connections to the systems of power. As the residents in their villages, *muhtarlar* know other residents, their personal status and financial needs; they are also aware of the common needs of the village. As official representatives of the village, they have easily justified their patron-client relations with economically powerful companies and turned these relations into a norm. The *muhtar* is equipped with three legal rights that have importance for the hydroelectricity companies. The first is that he manages the common land of the village with the council of elders and decide to sell it or rent it to external parties. Secondly, the *muhtar* assists the state officials in cadastral survey activities. He forms a group of residents and leads the group. The group shows location of *zilyet* property and marks its borders, decides on its land use category and identifies the owners. Finally, at time of expropriations, the expropriator sends the official price negotiation calls to the *muhtar* and in the same manner, the court orders are sent by registered post to the *muhtar*. Then, the *muhtar* must notify the residents in his village immediately due to timing restrictions applied in legal procedures. The ways the *muhtarlar* are involved in these activities and the ways they use the information about locals have created issues that I discuss in the following section.

There were three municipalities in the İkizdere Valley, when the hydroelectricity companies arrived there: İkizdere, Güneyce[277] and Kalkandere. The engagement of the municipalities in clientelist and patronage relations was shaped by the position of the mayors toward the hydroelectricity projects. The company approached the İkizdere municipality with the request to rent a place for its workers and equipment. The mayor, who was the ex-manager of the İkizdere HES before privatization, and who was respected for his knowledge of hydroelectricity production, opposed the project on the grounds of its potential environmental impacts. Thus, the municipality did not allocate a place for the company. Later, the other municipality, which is in the impact zone of the Cevizlik HES and whose mayor was in favor of the project, provided the land. The mayor of Kalkandere was a strong supporter of the projects that are within the borders of district of Kalkandere and was a key

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[276] *Muhtar* means "village head" in English. *Muhtarlar* is plural form.

[277] Güneyce lost its municipality status in 2014 and has a village status since 2014.

actor in representing the hydroelectricity companies as patrons who could provide services and money to the local people.

State officials acting in the districts intentionally or unintentionally normalized and reproduced the clientelist and patronage relations. For instance, when the *muhtarlar* come to apply for state aid for any project in their villages requiring money, the state officials suggest that they first to contact the hydroelectricity companies. Another case revealed in Antalya[278] indicates that the state approves the clientelist and patronage relations in hydroelectricity development in general[279]. The villagers lost their houses when their lands were expropriated in emergency for the Kasımlar Dam and HES project. The hydroelectricity company promised to construct new houses for them, but did not keep the promise. The lawyers visited the villagers and commented that the state officials did not help the villagers, and instead, encouraged them to contact the company for their demands.

8.5.3. Social exploitation

The emergence of the clientelist and patronage relations in the İkizdere Valley has led to drastic differences in the land prices paid to the local landowners and as well as in the distribution of goods and services to the individuals, families and villages. I explain the implications of these differences by mobilizing the notion of exploitation as suggested by James C. Scott in his book *The Moral Economy of the Peasant: Rebellion and Subsistence In Southeast Asia*. Scott studied the peasant communities in Southeast Asia and analyzed the relations of peasants with entities holding power, the landlords and the state, from the perspective of exploitation, and stated, "Patronage opens the way to exploitation" (1976: 170). He provides a definition of exploitation as "some individuals, groups, or classes benefit unjustly or unfairly from the labor of, or at the expense of, others." (1976: 157-158). Scott's definition sees exploitation as a relational concept between two parties, an exploiter and an exploited party. Further, he describes the exploitation as "an unfair distribution of effort and

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[278] A province in the southern Turkey.

[279] The news article titled "Devlet köylüyü şirkete mahkum etti" was reached at http://www.ulusalkanal.com.tr/yurt/devlet-koyluyu-sirkete-mahkum-etti-h63074.html on August 27th, 2015.

rewards" (158) and links it to the existence of justice.

How can we assess whether a relation is exploitive or not? Scott emphasizes the difficulty here and suggests using a fair relationship as a standard; any relation that does not fit into this mold is thus exploitative. His method evaluates each relation one by one. It is not in the scope of this thesis to evaluate each relation from the perspective of exploitation. What I am interested is to examine whether these relations create exploitation in general, and I suggest that the significant differences in economic benefits strongly indicate that they do.

I call this type of exploitation "social exploitation" in order to separate it from the other widely known type of exploitation, environmental exploitation. In social exploitation, the stronger party takes advantage of the needs of the weaker party. I suggest that the social inequalities of age, gender, and political status lead to social exploitation, as I discuss in the next section.

8.5.4. Social inequalities

Official bureaucracy and legal procedures demand written words and expect timely responses and actions from the citizens. They place the local people of the İkizdere Valley in a position where they must use their capabilities in order to exercise power in the context of hydroelectricity development. The local residents are required to be attentive to the official documents sent by the state and the courts, and follow official procedures in a timely manner; if required, they must pay the legal fees and bear the cost of travelling between their homes in the village and cities and towns where the official meetings are organized or the offices of state institutions are located. In a similar manner, in their relations with the hydroelectricity companies over land or compensations, the local people need to exercise their agency in the negotiations. They are expected to articulate their needs and problems within existing systems of power.

However, in the İkizdere Valley, the illiteracy rate is high and the population is aged (Table 8.1; Figure 8.3, 8.4, 8.5). In particular, the illiteracy rate of the female population is

18%, drastically higher than the 3% the illiteracy rate of the male population. Drawing on the survey data, 82.6% of women interviewed were either illiterate or had only a primary school education. For the men, the percentage is 55%. The analysis of age distribution of the population gives that 61% of the interviewees were 50 years old or older.

Table 8.1. The literacy per centages of total, male and female populations[280].

Literacy (%)	Total	Male	Female
Illiterate	10	3	18
Literate	83	90	75
Unknown	7	7	7

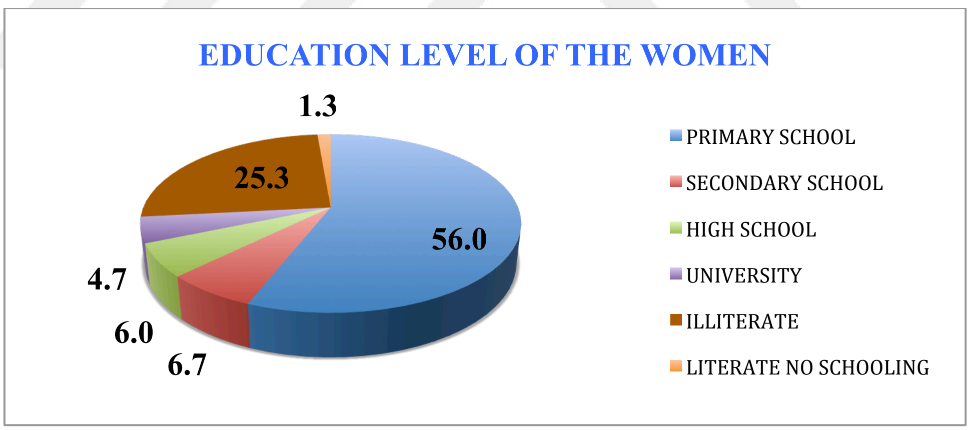

Figure 8.3. The education level of the female population based on the survey data.

These findings direct our attention to the questions of what people are able to do or whether they possess the means or instruments or permissions to pursue what they would like to do in exercising their civil rights and their agency in their relations with the state and the hydroelectricity companies. Examining the relations of local people with the state and with the private companies from the capabilities perspective (Sen, 2005) opens a window to understanding how gender, age, socio-economic status and education level put people in a

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[280] Based on 2011 data published by the Turkish Statistics Institute.

position of disadvantage (Sharma and Gupta, 2006).

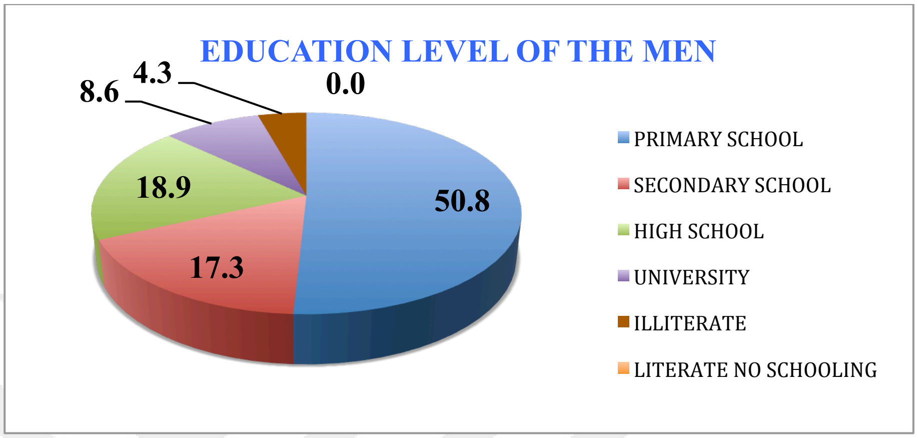

Figure 8.4. The education level of the male population based on the survey data.

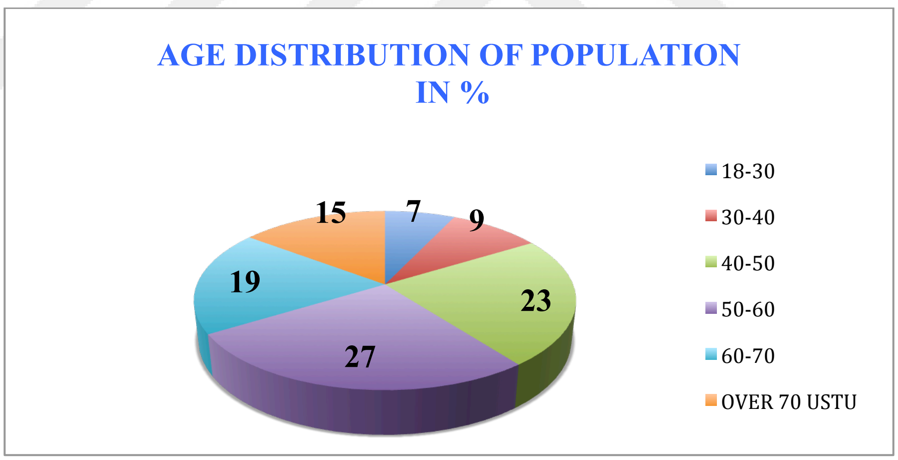

Figure 8.5. The age distribution in percentages based on the survey data.

8.6. Conclusion

In this chapter, I focused on three groups of relations of production; the state - private sector, the state - local people and the local people - private sector, and examined the changes in relations of production in the hydroelectricity sector since the launch of the "sustainable development" of hydroelectricity program in 2003. I argued that the changes in relations of productions have remade the state in several areas: state-business relations, natural resource governance, state institutions, and interactions between the state institutions and the private sector.

This chapter suggests that the interventions of state in the licensing, natural resource governance of the rivers and the river basins, and in the role and responsibilities of DSİ and EİEİ, were driven by the principles of deregulation and reregulation. The deregulations allowed the private companies to enter the hydroelectricity sector, served to establish and grow new business segments in the hydroelectricity sector, and nourished the construction and electromechanical sectors. When contradictions and conflicts rose, the deregulations were followed by reregulations to maintain the capital accumulation of the private sector.

The trajectory of transformation in property ownership in the İkizdere Valley reflects the strong presence of the state in privatization and commodification of land. The cadastral survey carried out in the İkizdere Valley has made land appropriation easy for continued development. Additionally, the emergency expropriation has become a regular practice to access the private land for the hydroelectricity development.

The findings of this chapter also suggest that emergency expropriation and public welfare instruments were made standard procedures for "sustainable development" of hydroelectricity program to provide land for the hydroelectricity projects. The authority of the cabinet in making cases for emergency expropriation for hydroelectricity projects was transferred to EPDK to expedite the process; however, the Council of State later canceled it. This case of the transfer of authority can be considered as another form of deregulation.

The relations between the local population and the private sector have been centered on access to land. The private companies have appropriated land from landowners through expropriations and negotiations, and in addition to monetary payments have also mobilized non-monetary payment methods.

This chapter demonstrated that the transformations in the relations of production not only have opened new ways for capital accumulation for the private sector and kept them open, but also produced social exploitation on the local level. The emergence of hydroelectricity companies has changed the system of power in the İkizdere Valley, and has consequently transformed the moral economy of the valley. The hydroelectricity companies profiting from electricity production have been perceived as patrons, and the inequality in benefiting from the produced electricity invoked the norm of reciprocity. These conditions have allowed the hydroelectricity companies and the local actors to constitute, normalize and sustain the clientelist and patronage relations. The clientelist relations and patronage networks have created significant differences in economic benefits that individuals, familes and villages receive from the hydroelectricity companies. In the İkizdere Valley, the social inequalities driven by age, gender, socio-economic status and education level are significant, and the capabilities of the local people limit them in exercising their rights. In summary, the clientelist and patronage relations driven by power and agency have produced various forms of social exploitation and socio-economic inequalities on the local level.

9. CONCLUSION

On the second day of my fieldwork I visited the privatized İkizdere HES. The plant has produced electricity since 1961, and thus stands as a working museum. As I proceeded in my research, I realized that it has had become almost invisible, embedded in the landscape and in socio-cultural life of the İkizdere Valley, where the trees are given names and hives are a family's inheritance. In this geography and society, the İkizdere HES had accrued positive social capital as a state entity.

It was therefore ironic to see that the positive image of hydroelectricity production had collapsed after approximately a half century with the emergence of other hydroelectricity plants. The residents of the valley say this about the İkizdere HES:

İkizdere HES'in bir zararı yok.
The İkizdere HES does no harm.

However, for the emerged hydroelectricity plants, they say,

Zarar çok telafisi yok!
A lot damage with no recovery.

The İkizdere HES and the other group of hydroelectricity plants reflect and represent the institutional, political, economic, social and environmental contexts of their time. They also represent the "state" of their time, before and after the emergence of neoliberalism in Turkey as well as in the İkizdere Valley.

As I explained in Chapter One, my initial research question was "How has the "sustainable development" of hydroelectricity program worked in the İkizdere Valley?" This question was followed by a complementary question, "What were the outcomes?" When I became fully aware of the point of failure in the history of the hydroelectricity development in the valley, I added a third question: "How did hydroelectricity development work in the period starting with the establishment of the İkizdere HES and ending before the privatization of the hydroelectricity sector?" The other perspective which I have offered is that of examining the inevitable connection between producing hydroelectricity and transmitting and marketing it, asking "In what ways have the two sectors been interrelated and what were the issues that emerged from water-electricity coupling on the local level?" I seek to show that without a critical consideration of transmission and the marketing of produced electricity, the study of hydroelectricity development misses out a crucial explanatory power and rich insights into the understanding the program and its consequences.

Returning to the theoretical framework that I described in Chapter One, the hydroelectricity development together with the electricity transmission development detailed in the previous chapters can be conceptualized as production of space for privatized hydroelectricity production. The production of space is very useful concept in explaining the transformative action of social space over the biophysical space of the İkizdere Valley. This dissertation attempted to make these spaces concrete by exploring the processes, relations, and actors constituting these spaces and by examining how social space shapes the İkizdere Valley for hydroelectricity production and electricity transmission. In this dissertation, the social space is the policies, the program, the legislation framework and the practices of the state and the courts and the interactions with the local people. I utilized two analytical frameworks, the relations of production and the concept of infrastructure, in exploring the processes and relations with the actors involved and the consequences. The processes rely on the construction of knowledge in specific ways. The knowledge-making processes are basic forms of power and the constructed knowledge serves in particular ways for the privatization of hydroelectricity development and commodification of natural resources on the national level, and for legitimizing and maintaining the hydroelectricity plants on the local level. The Foucaultian notion of power-knowledge dynamics directs the attention to the state discourse toward neoliberalization.

In the following pages, I summarize key findings, address key themes that emerged in the dissertation in a broader context, and underline the contributions this study made. I then elaborate on future research perspectives.

9.1. Findings

In Chapter Two, I provided an outline of the interdisciplinary methodological approach of the study and discussed the key challenges of doing environmental research in rural Turkey. The spatial and temporal dimensions of the scope and conceptual framework of this dissertation required multi-sited fieldwork and the integration of qualitative and quantitative methods. With this research design, I aimed to cross the boundaries of the academic disciplines in order to understand and explain a complex and multi-dimensional problem. My primary focus was on the processes, both defined by the state on national level and emerging with the program in the local level, and I paid attention to the relations between the involved parties the processes constitute. The mixed method design allowed me to gain information from the involved people with different perspectives about the processes and the relations, and revealed hidden and invisible issues, problems, and concerns.

In Chapter Three, I introduced the key field-site the İkizdere Valley and provided a detailed historical background of the hydroelectricity development there. I developed a historical frame of reference by defining two periods. The coup in 1980 was accepted as the initiator of the state reforms toward privatization and liberalization. The first period referred to *before neoliberalism* covers the time frame before the coup in 1980. The second period follows the first period and is characterized by neoliberal hydroelectricity and energy policies of the state that were particularly intensified after the early 2000s (Kibaroglu et al., 2009; Baskan, 2011; Harris and Islar, 2013; Aydemir, 2013; Erensu, 2016, 2013). Furthermore, I divided the neoliberalization period into two periods from the perspective of the privatization of the hydroelectricity sector. The first half extends from the 1980 coup to the issuance of the Water-Use Right Agreement Bylaw in 2003. I characterized this period as privatization with *selective clientelism*. I called the period after 2003 privatization with *extensive clientelism*. In this chapter, I compared the İkizdere HES and the emerged private hydroelectricity plants with the privatized İkizdere HES using various criteria: institutional context, the reason for their construction, their engineering and economic features, their contributions to the household and local economies, how they are perceived by the local people, and their environmental and social impacts. My analysis shed light on the differences between the modes of hydroelectricity development "before the neoliberalism" period and "in the neoliberalism with extensive clientelism" period, and established a historical basis for the following chapters.

In Chapter Four, I explored the space of official development narratives, "scarce energy" and "abundant water", and discussed how they were constituted and coupled to justify the "sustainable development" of a renewable energy program - in particular, hydroelectricity production. I demonstrated that the state has constituted the scarce energy narrative by overestimating economic growth and projecting inaccurate electricity demand. In a similar manner, the abundant water narrative has been predicated on high hydroelectricity potential estimates. Additionally, in the early 2000s, the state used expectations regarding the energy crisis to legitimize the drive to use natural resources - in particular, the rivers - for electricity production. The development narratives had an integral role in extending state control to all the rivers of the country.

The Water-Use Right Agreement Bylaw together with the Energy Licensing Bylaw defined a licensing regulation and established a new state-private sector business model, allowing the private sector to penetrate the state-dominated hydroelectricity sector. The Water-Use Right Agreement Bylaw not only defines how the privatization of hydroelectricity development works, but also sets a regulation for governing the rivers by DSİ. The DSİ has two critical areas of authority, development of water infrastructure and allocation of water rights. By means of the Water-Use Right Agreement Bylaw, the state extended its control to all the rivers of Turkey by utilizing and expanding the authority of DSİ over water resources. Moreover, the state opened protected lands to electricity projects by means of the Renewable Energy Law in 2011. And nevertheless, the state was slow in setting a regulatory mechanism for the minimum water requirement, and the regulation was partially defined until 2012. In short, these policies and strategies of the state point to a paradigmatic shift in natural resource governance toward development.

The major emphasis of Chapter Four was that the contradictions of the abundant water narrative have become apparent in the form of various material water scarcity cases in the İkizdere Valley. The tunnel constructions of five private plants extending along the river for about 30 km caused the loss of springs, while diminishing the springs and streams. Villages near the tunnels have had to cope with the resultant drinking water problem by looking for alternative water sources and modifying their drinking water systems. The drinking water problem formed a negotiation space between the local people and the hydroelectricity companies without the presence of the state, and that pointed to a new system of power emerging with the private companies in the İkizdere Valley. The loss of the springs made the villagers a target of the Varda Project; when the project is completed, the local communities living in the affected settlements will have to start to pay for their drinking water.

The cascading order of the hydroelectricity plants in the İkizdere Valley has produced another material water scarcity issue among the hydroelectricity companies. The Cevizlik HES, as the largest plant with water holding capacity, regulates the river regime in its downstream and imposes its production schedule on the other plants operating downstream. This situation demands communication and negotiation between the hydroelectricity companies, and when everyday politics of water becomes complicated, it creates tension. I suggest that this issue points to an implicit planning weakness, which is a result of lack of comprehensive planning on the river basin scale.

In Chapter Five I examined the space of paper bureaucracy in terms of official documents that emerged with the hydroelectricity development program. Drawing on the historical evolvement of two mandatory documents, the energy license and the water use-right agreement, and on additional supplementary documents required by the state, I examined the regulatory framework of the "sustainable development" of hydroelectricity program they have established. I argued that the regime of bureaucratic documents of the "sustainable development" of hydroelectricity program - in other words, the regulatory framework - has established a mode of conduct that embeds a discursive formation toward neoliberalization.
In the beginning, application procedures for the licenses were simple, with a low level of control on the company and the project, and the required technical reports were kept short,

with a low level of technical specificity and detail and without critical technical information about the projects. Under these circumstances, private companies easily obtained the licenses. Over time, the state institutions restricted the license application by exercising more control over the project owner company and the project, as well as making the required technical reports more comprehensive and detailed while asking for new reports regarding the water rights.

Chapter Five suggests that the energy license dominates the water-use right license and EPDK has taken over a significant level of authority of DSİ on the management of water resources for hydroelectricity production. In the license mechanisms as defined in the licensing bylaws, DSİ's control of the hydroelectricity project and of the water resource has been reduced significantly and even eliminated as in the case of license renewal and license transfer. Additionally, license cancellation was not possible for any reason until 2013, and when it was made possible, the conditions were related to business only. The conditions of the water or other natural resources that the hydroelectricity companies use for electricity production and that are related to the social aspects of the electricity production were not considered.

I also explored the EIA regulation in relation with the energy and the water-use right license. Which projects are subject to the EIA regulation is a critical question for the private sector. This is because the regulation builds a bureaucratic barrier that must be passed before construction of the infrastructure can proceed. I illustrated two gaps in the EIA regulation of the hydroelectricity projects that caused the rise of the conflicts to the hydroelectricity projects and an increase in court cases opened against the EIA decisions. The first one is that EPDK and DSİ have not integrated the environmental impact assessment procedure into their decision-making processes related to hydroelectricity development for a decade, and only utilized the decision of EIA process as an external consent of another state organ. The second gap, the ministry in charge of the EIA regulation has modified it in such a way that in the period of 2003-2008 most of the hydroelectricity production and electricity transmission projects were excluded from the EIA regulation. The rise of opposition to hydroelectricity projects has pushed the ministry, EPDK, and DSİ to make revisions regarding the EIAP to fix these gaps.

On the other hand, the analysis of the historical evolvement of EIA legislation from the public involvement perspective has revealed that the public voice has weakened as a result of the restructuring of public information meetings and ineffective public announcement channels.

Chapter Six is situated at the intersection of environmental knowledge, power and neoliberal discourse; I explored the space of knowledge by analyzing the knowledge as a subject and how it is made using the Cevizlik HES court case as a case study. The central argument of the chapter is that the institutional and juridical knowledge-making practices have a political character that can lead to the overexploitation of rivers subject to run-of-the-river type hydroelectricity development. As I illustrated in the Cevizlik HES court case, different experts suggested different MWRs as outcomes of various problem definitions and solutions, contradicting and contending with each other. The analysis of proposed MWR has demonstrated how the experts engaged with the natural uncertainties and what forms of environmental knowledge they privileged. On the other hand, the courts have dominated the juridical knowledge-making practice by narrowing down its scope from the conflicted knowledge presented as truth in the EIA report to sustainability of the aquatic life and further to the water flow required by a single fish species.

The significant gap between the initial and final values of MWR made explicit the attempts of the state toward overexploiting the river flow for hydroelectricity production. Yet the same time, although the administrative courts have pushed back these attempts to overexploit the river flow by raising the MWR, they also approved significantly different MWRs. The different MWRs indicate a political intention in environmental decision- making toward overexploiting the rivers.

In the remaining section of Chapter Six, I demonstrated the discontinuities in the official knowledge production practice of the state institutions by analyzing the past technical studies and the EIA reports of the Cevizlik HES in a comparative way. The state institutions have approved the synthetic stream flows, which were determined by oversimplified deterministic models, and used a highly aggregated figure, the average of the flow, in all calculations and estimations. They have ignored the actual river regime of the İkizdere River, and represented it as a water resource with a constant flow. The state has "buried" the knowledge in sedimentation surveys of the İkizdere River, "disqualified" snow data and the existence of two precipitation regime in the İkizdere Valley that I refer as the inland and coastal. Furthermore, I addressed the issues related with validity and consistency of the knowledge presented in the official reports.

In Chapter Seven I explored the water- electricity nexus in the İkizdere Valley, and examined the interrelations of hydroelectricity production and electricity transmission with marketing on a national level and their manifestation as infrastructure on the local level. Drawing on historical background of the Turkish electricity sector, I delved into the liberalization of hydroelectricity sector in relation to liberalization of the electricity sector. While emphasizing the coexistence of nationalization and liberalization since the early 1900s, I demonstrated the intensification in the liberalization efforts of the state in both electricity and hydroelectricity sectors since the early 1980s through deconsolidating and privatizing the state institutions and by establishing the national electricity market in 2001. The reforms in the electricity market empowered the private sector and diversified market players, and initiated and completed the transformation of electricity from a public good to a commercial commodity that is in turn becoming a global financial commodity. Thus, I argued that electricity marketing applies "structural tensions" to hydroelectricity production and that these tensions are transmitted to the rivers and the river valleys through two types of infrastructure: water holding infrastructure and electricity transmission infrastructure. By emphasizing how the natural variability of river regime is perceived as a business risk, I suggested that the hydro companies seek to minimize it for profit maximization by erecting surge tanks and constructing pools in order to regulate the river regime to their benefit. Because of the cascading order of infrastructure, five individual hydroelectricity plants have to synchronize their production schedules and use of their water holding capacities. Eventually they form a body of infrastructure acting together in regulating the river regime for about 30 km.

In the remaining part of Chapter Seven I explored the present day tensions and concerns related to the expansion of the electricity transmission system in alliance with the hydroelectricity development boom. The analysis of two cases, the *154 kV İkizdere HES TM - Cevizlik HES TM Enerji İletim Hattı* project and Ormanlı Substation project, illustrated the planning faults, in particular regarding the physical proximity of the electricity transmission infrastructure to the settlements. In addition, there is no clear evidence in the official project documents as to what criteria were taken into account in the planning and how the human factor was integrated into the decision-making process. The electricity transmission infrastructure inherently threated to alter or eradicate existing ways of life in the İkizdere Valley. On the other hand, I discussed that the size of the expropriated land is much larger when the hydroelectricity and electricity transmission infrastructures are considered together. Hence the scale of impact on the local people is bigger. Additionally, from the perspective of the citizen rights, the expropriation process imposes burdens on the landowners such as enforcing them to pay the legal fees of the advocate of the expropriator.

In Chapter Eight, I explored the transformation of the relations of production in three domains - between the state and the private sector, between the state and the local people, and between the local people and the private sector - and examined how the state has been remade through this transformation. In Turkey, the state has politically supported the private sector development and, particularly since the early 2000s, provided business opportunities to a group of companies with limited business background through the neoliberal economic regulations (Buğra and Savaşkan, 2014). Hydroelectricity production has become a very lucrative business since the legislative reforms in the electricity and hydroelectricity sectors. The role and functions of DSİ have been redesigned and its presence has been pulled back to that of an "auditor," while some of its functions have been outsourced. The private companies penetrated the hydroelectricity sector either by direct investment to the hydroelectricity projects or by taking over the functions of EİEİ and DSİ and providing them as services to the investors, including project development, design, license application services and construction. DSİ's new role and extension of its authority to all the rivers of the country have created a loosely regulated space for the private sector to grow and to accumulate capital.

The hydroelectricity production requires two primary inputs, the stream flow and the land. I discussed how the state has extended its control to all the water resources and commodified the stream flow in Chapter Four. My focus in Chapter Eight was the land and how the state has intervened to expand its control over the rural land by initiating a cadastral survey and assisting the privatization and commodification of land. Once the land is privatized, its expropriation and sale to third parties become easy.

Furthermore, Chapter Eight demonstrated that the state has transformed two exceptional mechanisms, the emergency rule in expropriations and declaration of public good, into a routine practices for private development projects - in particular, hydroelectricity projects - to provide land for their infrastructure in a speedy manner.

Also, I suggested that the expropriation practice has demonstrated a new system of power emerging with the hydroelectricity development in the İkizdere Valley, and that the disputes in the form of court cases in relation to land can be considered as local responses to the new system of power. Therefore, I broadened the focus of my analysis to include an understanding of how the hydroelectricity companies have developed relations of production with the private landowners to acquire land. The hydroelectricity companies have accessed the land either through expropriation or by direct purchasing. In accessing the land, various forms of land and price disputes have occurred; negotiation and persuasion process played a key role in resolving these disputes. However, this process requires the articulation of the agencies of both parties and in many instances the hydroelectricity companies have exercised power over the local landowners. In order to resolve complaints of the local people, the hydroelectricity companies made verbal agreements; they have also made monetary and non-monetary contributions to specific individuals, families and villages. These contributions were demand-driven, short-term and unreliable and caused the controversies and corruption, establishing local clientelism and patronage relations.

I concluded Chapter Eight with a discussion of the local clientelism and patronage relations that have emerged and been sustained in the İkizdere Valley. I explained how local clientelism and patronage relations have transformed the relations of production and as a result has not only remade the state the but also transformed the moral economy of the İkizdere Valley. As a result, the changing moral economy has led to social exploitation and social inequalities of age, gender, and political status in the negotiation and persuasion processes and in the distribution of benefits.

9.2. Themes in a Broader Context

I reiterate several findings that emerge from this dissertation and articulate them in a broader context.

I used the infrastructure approach for the analysis, and this allowed me to challenge several myths of the small-scale hydroelectricity development. First, there is no linear relation between the installed capacity of a plant and its land requirement, and there is no linear relation between the installed capacity of a plant and its impact on the river, river basin or residents in the river basin. Therefore this study challenges the "small is beautiful" premise that is widely used by the hydroelectricity companies as well as by the state by demonstrating the nonlinear relation between the size of a hydroelectricity plant and its impacts.

Second, this study also challenges another fundamental myth of hydroelectricity development, which is that "the underground HES is environmentally benign." The empirical evidence presented in this study demonstrates otherwise: whether underground or on the ground, any run-of-the river hydroelectricity plant requires same infrastructure, and opening space for them has environmental and social consequences.

Finally, "They take water, use it to generate electricity, and release it back" is another premise of the run-of-the river technology that this study also challenges. This premise was used by the state to assure the local residents that the run-of-the river technology would not affect the river regime and that its impact would be limited to the diversion reach, leaving downstream users unaffected.

As a result, this study demonstrates that the principles, values and priorities in the design and planning of hydroelectricity and electricity transmission projects, and in the construction phase matter in keeping the impact on the environment and local communities significantly low.

Moreover, the infrastructural approach in the study of dominated space of infrastructure and the relations defined by the infrastructure in the İkizdere Valley demonstrates how a run-of-the river hydroelectricity plant interacts not only with the river but also with other hydroelectricity plants in the river basin, with the river basin itself, and with the residents of the river basin. The infrastructures of hydroelectricity plants in a cascading order are not stable concrete artifacts of technology but are pieces of man-made artifacts connecting to human and non-human world and establishing new relations with these worlds as well as forcing them to establish new ones (Star and Ruhleder, 1996; Carse, 2012;). These relations can be material, technical, social and political, and bundled together (Harvey, 2012). Moreover, these relations have temporal and spatial dimensions leading to an assemblage (Marcus and Saka, 2006), while transforming the natural river to a cyborg composed of natural and man-made entities extending into half of the İkizdere Valley (Haraway, 1991).

The local people have observed one of the most profound consequences of the hydroelectricity plants and how they interact with each other to form a system that is "more than the sum of its parts" (Ackoff, 1974: 13). "Dere kurudu" (River is dried out), is the most common complaint related to this system that I heard from the local residents living in the section of the İkizdere River that were impacted by the hydroelectricity plants. The observations of the local residents related to the decline in fish population, the disappearance of some fish species, and the missing morning fog over the river and odor coming from the river during summer months, are all consequences of the assemblage of infrastructures.

Throughout this dissertation I provided analysis of several cases illustrating the various ways and forms of neoliberalization in the context of hydroelectricity production. This study also provided a rich insight into how the Turkish model of neoliberalism has occurred. The neoliberal character of the "sustainable development" of hydroelectricity program has manifested itself in the episodes of "roll-back/ deregulation" and "roll-out/reregulation" (Peck and Tickell, 2002). The state withdrew or diminished its bureaucratic and regulative control in certain areas of hydroelectricity production and enabled companies to "freely" proceed with the construction of hydroelectricity plants. When the excesses of deregulation faced strong national and local opposition and created legal contradictions in a larger context of law, the state invented reregulation mechanisms to introduce new forms of regulation that accompanied and supplemented the initial deregulation episode. The deregulation and the reregulation episodes were not limited to the program. The analysis of evolvement of EIA regulation revealed that it had been made more inclusive by tightening it. This trend illustrates another episode of deregulation and reregulation neoliberalism on the policy level. These cases of neoliberalism in policy and program level are "top-down" type.

The Cevizlik HES court case demonstrated another type of neoliberalism that can be defined as "bottom-up" on the process level. I demonstrated the politics of knowledge and how the produced knowledge was used toward overexploitation of the İkizdere River for the hydroelectricity production. Drawing from Foucault's concept of governmentality (1978), I suggest that the MWR determined by the court has been used by the state for the social control of the plaintiffs and the opponents of the Cevizlik HES in the İkizdere Valley.

The findings of this dissertation have demonstrated that specific water and land resources are the subjects of the neoliberalization of nature in the context of a hydroelectricity development program. Extending state control from specific river basins to all the rivers of the country, commodification and privatization of the rivers through licensing regulation, commodification and privatization of the stream flow through MWR regulation, and allowing hydroelectricity development in protected areas indicate the transformation in the relations between the state and biophysical nature. I suggest that the hydroelectricity development program is a special case of "environmental governance" (Bridge and Jonas, 2002), which is defined as "the nation-state's project of securing hegemony[281] by regulating ecological

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[281] Robertson in his paper puts the concept of hegemony in a larger context inspired by Gramscian concept of hegemony. For Gramsci's concept of hegemony, see Gramsci's book *Selections from the Prison Notebooks,*1971, p.182.

relations within its territory so as to assure the stability of capitalist relations of power and accumulation" (Robertson, 2004).

It should be emphasized that the implications of this research go beyond neoliberalization of nature for the hydroelectricity development program as a singular specific project. The legislative and institutional setting, the political development narratives and market-led liberal electricity market set the ground for other renewable energy programs to flourish -- in particular, the development of wind power and geothermal energy. The boom in hydroelectricity production is replaced with another boom in wind power, and another one in geothermal energy under the "sustainable development" of renewable energy program. As private energy projects are appearing in the landscape, public concerns regarding planning faults, emergency expropriations, electricity transmission lines, environmental damage and damage to livelihoods are raised in other geographies of Turkey[282]. Moreover, the commonalities in deployment of "sustainable development" of renewable energy program in the context of other energy sources suggest that "environmental governance" is not restricted to the rivers and protected lands and but also extends to wind power and geothermal-rich lands.

9.3. Contributions

This study makes several important contributions to the existing literature. First, remarkably few studies have been carried out in Turkey in critically examining the "sustainable development" of hydroelectricity program, and those that have been done focused

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[282] "Ege'de rüzgar enerji santrali sayısı da, açılan dava sayısı da patladı" a news article on wind farms downloaded from http://t24.com.tr/haber/egede-ruzgar-enerji-santrali-sayisi-da-acilan-dava-sayisi-da-patladi,322053, on 13.February.2017. "Karaburun'da rüzgar türbini projesi durduruldu," a news article on a court case to halt a wind energy project, downloaded from http://www.birgun.net/haber-detay/karaburun-da-ruzgar-turbini-projesi-durduruldu-78503.html, on 13.February.2017. "Enerji, Çevre, Sürdürülebilirlik ve Diyalog Çerçevesinde Rüzgarın Getirdikleri," a news article on wind farms and their consequences, downloaded http://ekoiq.com/enerji-cevre-surdurulebilirlik-diyalog-cercevesinde-ruzgarin-getirdikleri/, on 13.February.2017. "Aydın'da jeotermal santrallere tepki büyüyor" downloaded at http://www.enerjihaber.com/aydin-da-jeotermal-santrallerine-tepki-buyuyor/4405/ on 13.February.2017. "Aydın'da jeotermal su çevre katliamına neden oluyor" a news article on the environmental damage caused by geothermal energy investments, downloaded at http://www.hurriyet.com.tr/aydin-da-jeotermal-su-cevre-katliamina-neden-oluyor-29325041 on 13.February.2017. "Aydınlıların jeotermal feryadı" a news article on concerns related to geothermal energy plants, downloaded at http://www.hurriyet.com.tr/aydinlilarin-jeotermal-feryadi-28377610 on 13.February.2017.

primarily on hydroelectricity production. I argue that this kind of examination overlooks the ways electricity transmission development influences and is influenced by the hydroelectricity production. Thus, I suggest that when production and transmittance of hydroelectricity are viewed together, interesting continuities are revealed, demonstrating the real spatial scale of the "sustainable development" of hydroelectricity production program and its environmental and social consequences on the local level. This study contributes to both hydroelectricity and electricity transmission development studies while shedding light on their interactions as well as on linkages to electricity market. Therefore, this study provides a full perspective by exploring the critical areas of concern in an under-studied area.

Second, this dissertation contributes to the study of space in several ways. Firstly, this study provides a multi-tier analysis of social space constituting and maintaining the "sustainable development" of hydroelectricity program and related policies. The studies on the interrelations between the scarce energy and abundant water narratives are almost none, and the focus on construction of abundance is rare. The analysis of how these development narratives have been constructed contributed to the study of social space on a discourse level. Further, the analysis of state laws, bylaws and regulations in a historical perspective framing the hydroelectricity development program contributed to the study of social space on a policy and program level. This dissertation further contributes the study of space by illuminating the relations between social space of discourse-policy-program on the national level, and biophysical space of the İkizdere River, the İkizdere River Basin with the socio-economic space of its residents on the local level. Finally, the analysis of space incorporates the temporal dimension of space construction by focusing on the transformation of the social spaces as well as biophysical space of the İkizdere Valley.

Third, this dissertation contributes to the infrastructure studies. The infrastructure analysis allowed to explain the structured tensions electricity marketing has imposed over the hydroelectricity production and to investigate how have these tensions manifested in the form of water storing pieces of infrastructure in the İkizdere Valley. Moreover, using the physical infrastructure as a subject of the historical inquiry has allowed me to understand and to compare the principles and the values dominated the design and planning practices of hydroelectricity development in two periods, before the neoliberalism and in the neoliberalism. The study of the İkizdere HES and past studies of EİEİ and DSİ in the İkizdere Valley has shed light to political and economic context of hydroelectricity development before the neoliberalisation. Similarly, the study of five private hydroelectricity plants and the privatized İkizdere HES has provided empirical evidence and insight framing the political and economic context of hydroelectricity development in the neoliberalisation period.

Fourth, this study makes a contribution to the literature in knowledge-power-discourse by illustrating how natural uncertainties of the river and its ecology are interpreted, assessed, acted on or ignored to serve particular political and discursive ends, as the analysis of Cevizlik HES court case demonstrated. The contest over MWR is still the soft spot of the hydroelectricity development program, undermining the accountability and credibility not only of state institutions, but also the administrative courts. This dissertation contributes to debates about MWR and run-of-the river hydroelectricity plants that are vital in reforming the knowledge-making practices that result in overexploitation of rivers, and to initiate discussion of how to improve the juridical knowledge-making practice for environmental cases involving uncertainty.

9.4. Future Research Perspectives

The hilly landscape extending inland from the coast is covered by tea gardens. When I was in the valley, I saw pieces of land cleared for tea cultivation, demonstrating the importance of tea cultivation for household as well as regional economies. The participants in my research have voiced their concerns on the future of tea cultivation. They have seen how the hydroelectricity plants have changed the ecology of their area: tealeaves that used to be soft and damp are now dry. The soil of the tea gardens lying by the river in the lower section of the valley is also dry. How tea cultivation will be impacted by hydroelectricity development in the long run stands as a significant area for research inquiry.

The analysis of the Cevizlik HES court case in Chapter Six indicated that the ministry and the courts have accepted different methods in determining the MWR for different hydroelectricity plants. This uneven aspect of MWR points to another political dimension of the construction of knowledge in which alternative forms of expertise can produce different results, and it raises concerns in relation to social justice. Future research can seek to explore how alternative methods for determining MWR have been validated and justified, and can seek to understand and compare the environmental and social implications of legitimized alternative methods of MWR.

The findings of this dissertation point to issues of human and citizen rights (in some cases the water rights). In the expropriation process and negotiations with the hydroelectricity companies, demographic characteristics of the local population such as illiteracy rate, gender, low socio-economic status and age, along with local living conditions such as distance to the cities and the access to transportation, can be barriers for individuals in assessing their situation and developing strategies to use their legal rights. To explore the social justice implications of the legislation and its practice from the perspective of human and citizen rights versus capabilities (Sen, 2005; 1985) can be a future research perspective.

I suggest that in contrast to discussion of Boyer "infrastructure's capacity for enablement" (2015: 4), infrastructure has the capacity to disable processes and relations. Focusing on the hydroelectricity infrastructure from the perspective of their capacity for disablement can open a new window to explore the politics of infrastructure as well as the environmental implications.

Clearly, from the evidence this dissertation has presented, even so-called "small-scale" run-of-the river hydroelectricity development can have an enormous impact. Since the early 2000s, hydroelectricity and electricity policies, the "sustainable development" of hydroelectricity program and its practice, have intensified and deepened the pressure of the state on the rivers, the river basins, and the residents of basins. This study hopes to contribute to the debates on sustainable development of hydroelectricity production and to initiate further debates toward improving the legislation and the institutional processes. There is no doubt that these debates can illuminate not only the future of the İkizdere River, the İkizdere Valley and the residents of the İkizdere Valley, but also the rivers, river basins and residents in Turkey, and elsewhere, that are under the pressure of hydroelectricity development.

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APPENDIX A. GLOSSARY OF TECHNICAL TERMS

AUTO PRODUCER: A company usually in manufacturautoing that requires electricity for its primary production activity and generates electricity, wholly or partly for its own use as a secondary activity.

AVERAGE FLOW (IN A WATER YEAR): Mean annual flow for the year (total of all daily discharge values divided by number of days in the year).

DIVERSION REACH: A section of river between water intake facility and tailrace that river flow has been diverted from.

HEAD: The vertical distance from the penstock to the power house that the water falls in the run-of-the river hydroelectricity plants.

HYDRAULIC TURBINE: A piece of equipment transfers the energy from flowing water to a rotating shaft. The flowing water turns turbine and turbine connected to a shaft, rotates it and electricity is produced.

HYDRODYNAMIC CAVITATION: Hydrodynamic cavitation is the outcome of a natural phenomenon of water flowing in tunnels. In the run-of-the river design, when a diverted stream flow enters a closed tunnel, the pressure it is subjected to rapidly changes from open-air pressure to closed-tunnel pressure. The sudden change of pressure on the flowing stream forms "cavitation bubbles," vapor cavities in a liquid with high pressure. As water flows down the slope, its weight and velocity decrease the pressure further in the tunnel and the "cavitation bubbles" grow. When the "cavitation bubbles" in flowing water reach the forehead, they accelerate while flowing down through the penstock and hit the metal surface of tribunes like rocks. They implode and generate a shock wave, causing wear on the tribunes.

INSTALLED CAPACITY: Maximum output of electricity that a hydroelectricity plant is designed to produce.

LEEVES: Artificially constructed embankment parallel to the course of the river to prevent overflow of the river to floodplain.

MAXIMUM (PEAK) FLOW: Maximum discharge in a water year is the momentary peak within the period of that water year.

MEANDER: It is a bend in a river.

MINIMUM FLOW: Minimum discharge in a water year is the momentary minimum within the period of that water year.

SECONDARY FLOW: The secondary flow occurs at river bends, where the water hits the banks, its velocity and pressure changes beneath the primary flow at the top of the water, and a secondary flow along the floor of the riverbed occurs. The secondary flow sweeps sand, silt and gravel across the river and deposits them near the convex bank.

STREAM FLOW: Amount of flow passing a specific point in the river in a time period. Time period is usually taken as second. Amount of flow is given in m^3 of water.

SYNTHETIC FLOW: It is the estimated stream flow at a specific point of the river. The stream flows are estimated for the ungagged streams.

WATER YEAR: Time period from October 1st of any year to September 30th of the following year.

APPENDIX B: THE SURVEY QUESTIONNAIRE

BOĞAZİÇİ ÜNİVERSİTESİ
DOKTORA ARAŞTIRMASI ANKET ÇALIŞMASI

İsmim .... Size nasıl hitap etmemi istersiniz? Boğaziçi Üniversitesi'nde yürütülen bir doktora çalışması için bu anketi yapıyoruz. Bize yardımcı olursanız çok seviniriz. Bu anketi İkizdere Vadisi'nde sudan elektrik üretme çalışmalarının çevre ve yaşayan halk üzerindeki etkilerini anlamak amacıyla yapıyoruz. İsminizi kesinlikle kayıt etmeyeceğiz. Vereceğiniz bütün cevapları isimsiz kullanacağız. İstemediğiniz takdirde köyünüzün ismini de kullanmayacağız. Sorularınızı doktora öğrencisi Ayşen Eren'e veya tez hocası Prof. Dr. Orhan Yenigün'e iletebilirsiniz.

ANKET NO:	
ANKET DOLDURANIN ADI SOYADI:	
ANKETİN YAPILDIĞI TARİH:	
ANKETİN YAPILDIĞI KÖY/ŞEHİR:	
EV NO:	

I – YERLEŞİM DURUM	
1.BURADA MI DOĞDUNUZ?	Evet □ Hayır □
2 HANGİ AYLAR BURADASINIZ?	……………… ay.
3. BAŞKA BİR EVİNİZ VAR MI?	Evet □ Hayır □
4. HANGİ EVİNİZİ ESAS EVİNİZ KABUL EDİYORSUNUZ?	Buradaki evimizi □
5. BURADA SÜREKLİ YAŞAYAN AKRABALARINIZ VAR MI?	Evet □ Hayır □
6. BURADA MEZARI OLAN AKRABALARINIZ VAR MI?	Evet □ Hayır □
7. MEZARLAR BAHÇENİZDE MI?	Evet □ Hayır □

8. İKİZDERE VADİSİ'NDE SİZİN İÇİN EN DEĞERLİ OLAN ŞEY NEDİR?	....
9. İKİZDERE VADİSİ İÇİN EN BÜYÜK ENDİŞENİZ NEDİR?	....

II - GEÇİM DURUMU	
10. ÇAYINIZ VAR MI?	Evet □ Hayır □
11. KAÇ DÖNÜM Bilmiyorsa KAÇ TON ÇAY KESİYORSUNUZ? Diye sorabilirsin.	.... DÖNÜM
12. BAHÇENİZDE NELER YETİŞTİRİYORSUNUZ ?	Hiçbirşey □ :……………………………………………………………........................ ***(BİRŞEY YETİŞTİRMİYORSA BURAYI BOŞ BIRAKIN)***
13. KAÇ MEYVE, CEVİZ, FINDIK AĞACINIZ VAR?	Yok □ **:……………………………………………………………..** **.** ***(AĞAÇLARI YOKSA BURAYI BOŞ BIRAKIN)***
14. İNEGİNİZ, KOYUNUNUZ, KEÇİNİZ, TAVUĞUNUZ VAR MI?	Evet □ Hayır □
15. AİLENİZ ARICILIK YAPIYOR MU?	Evet □ Hayır □
16.GELİR KAYNAKLARINIZ NELER?	Bal satışı □ Çay □ Kivi □ Fındık □ Çay fabrikasında işçi □ İnşaat işleri □ Şoförlük, taşıma işleri □ Emekli □ Memur □ Esnaf □ Diğer : **...**

III - DERE İLE İLİŞKİLER **Derede neler yapardınız, şimdi neler yapıyorsunuz bize anlatır mısınız?**

<table>
<tr><td>17. GEÇMİŞTE AİLENİZDEN HERHANGİ BİRİ DEREDE BUNLARI YAPAR MIYDI ?</td><td>Yüzerdik □
Balık tutardık □
Dere boyunda piknik yapardık □
Su değirmenlerimizde mısır öğütürdük □

Diğer
:..</td></tr>
<tr><td>18. GEÇMİŞTE NE KADAR SIK YAPARDINIZ?</td><td><table><tr><td></td><td>Sıkça</td><td>Bazen</td><td>Hiç</td></tr><tr><td>Yüzerdik</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Balık tutardık</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Piknik</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Un öğütürdük</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Diğer</td><td>□</td><td>□</td><td>□</td></tr></table></td></tr>
<tr><td>19. AİLENİZDEN HERHANGİ BİRİ ŞİMDİ BUNLARI YAPIYOR MU?</td><td>Yüzüyoruz □
Balık tutuyoruz □
Dere boyunda piknik yapıyoruz □
Su değirmenlerimizde mısır öğütüyoruz □

Diğer
:..</td></tr>
<tr><td>20. NE KADAR SIK YAPIYORSUNUZ?</td><td><table><tr><td></td><td>Sıkça</td><td>Bazen</td><td>Hiç</td></tr><tr><td>Yüzeriz</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Balık tutarız</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Piknik yaparız</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Un öğütürüz</td><td>□</td><td>□</td><td>□</td></tr><tr><td>Diğer</td><td>□</td><td>□</td><td>□</td></tr></table></td></tr>
</table>

<table>
<tr><td colspan="2">III - SANTRALLAR ve ELEKTRİK HATLARI – FARKINDALIK
Size yakınızdaki HESler, elektrik trafoları, yüksek gerilim hatlarıyla ilgili sorularım olacak.</td></tr>
<tr><td>21. EVİNİZİN CIVARINIZDA KAÇ TANE HES VAR?</td><td>1 □
2 □
3 □</td></tr>
<tr><td>22. SIZE EN YAKIN OLAN HES HANGİSİ?</td><td>..
(SÖYLEDİĞİ İSMİ YAZIN)</td></tr>
</table>

23. BU HES KAÇ YIL ÖNCE KURULDU?	………………………………… yıl
24. BU EVDEN HERHANGİ BİRİ SANTRALLE İLGİLİ ÇED TOPLANTISINA KATILDI MI?	Evet ☐ Hayır ☐
25. ETRAFINIZDAN HERHANGİ BİRİ SANTRALLE İLGİLİ ÇED TOPLANTISINA KATILDI MI?	Evet ☐ Hayır ☐
26. EVINIZIN YAKININDA TRAFO VAR MI? YÜKSEK VOLTAJ GERİLİM HATTI GEÇİYOR MU?	Evet ☐ Hayır ☐
27. EVET İSE KAÇ METRE ÖTENİZDEN GEÇİYOR? KAÇ METRE ÖTENİZDE?	....................................metre
28. TRAFO VEYA YÜKSEK GERİLİM HATTI KAÇ YIL ÖNCE KURULDU?	……………………………………yıl
29. BU EVDEN HERHANGİ BİRİ BU TRAFO MERKEZI VEYA ELEKTRİK HATLARIYLA İLGİLİ ÇED TOPLANTISINA KATILDI MI?	Evet ☐ Hayır ☐
30.BİLDİGİNİZ HERHANGİ BİRİ BU TRAFO MERKEZI VEYA ELETRİK HATLARIYLA İLGİLİ ÇED TOPLANTISINA KATILDI MI?	Evet ☐ Hayır ☐

IV- HESLERLE İLGİLİ ENDİŞELER **Şimdi HESlerle ilgili duygu ve düşünceleriniz hakkında birkaç soru sormak istiyorum.**	
31. BAZI KÖYLERDE YAŞAYANLAR HESLERİN DEREYE YETERİ KADAR SU BIRAKMADIĞINI, DERELERİN SUSUZ KALDIĞINI SÖYLÜYORLAR. SİZ NE DİYORSUNUZ?	Evet, katılıyorum ☐ Hayır, katılmıyorum ☐ Bilmiyorum ☐ YORUM: ....
32. HESLER DEREYE YAKLAŞIK NE KADAR SU BIRAKMALILAR?	Bilmiyorum ☐ ……………… (rakam söylerse buraya yazın)
33. SİZ VEYA AİLENİZDEN BİRİSİ DEREYE AZ SU BIRAKILMASININ BAHSEDECEĞİM ETKİLERİNİ GÖRDÜ MÜ?	Balık sayısı azalıyor ☐ Balık çeşidi azalıyor ☐ Derenin yakınındaki ağaçlar kuruyor ☐ Dereden pis koku geliyor ☐ Dere yatağında çöp birikiyor ☐ Böcek ve sineklerin sayısı artıyor ☐ Çayın kalitesini düşürüyor ☐ Çayın miktarını düşürüyor ☐ Arı ölümleri oluyor ☐

	Dere yatağında kum ve çakıl birikiyor ☐ Diğer……………………. (buraya yazınız)

V - ELEKTRİK İLETİM HATLARI VE ŞALT SAHASI İLE İLGİLİ ENDİŞELER **Şimdi yüksek gerilim hatları, HESler için yapılan elektrik trafoları hakkındaki duygu ve düşüncelerinizi öğrenmek birkaç soru sormak istiyorum.**	
34. AİLENİZ YÜKSEK VOLTAJ GERİLİM HATLARINDAN VEYA KÖYÜNÜZE YAKIN TRAFOLARDAN HERHANGİ BİR SIKINTIYI YAŞIYOR MU? NELER YAŞADINIZ? (AŞAĞIDAKİ ŞIKLARDAN İŞARETLEYİNİZ. SONRA 35. SORUYU SORUP BAHSETMEDİKLERİNİ SORARAK ÖĞRENİNİZ).	HAYIR, bir sıkıntı yaşamıyoruz. ☐ EVET, yaşıyoruz. ☐ Bilmiyorum. ☐
35. BAZI KÖYLERDE YAŞAYANLAR YÜKSEK VOLTAJ GERİLİM HATLARINDAN, KÖYLERİNE YAKIN TRAFOLARDAN SIKINTI DUYUYORLAR. SİZİN AİLENİZ HANGİLERİNİ YAŞIYOR?	Hatlardan yayılan dalgaların sağlığımızı olumsuz etkileyeceğini düşünüyoruz ☐ Yıldırım çekeceğinden korkuyoruz ☐ Yağmur yağarken elektrik hatları altında bahçelerde çalışırken korkuyoruz☐ Arı ölümleri arttı ☐ Arı kovanları çöküyor ☐ Çayın kalitesini düşürüyor ☐ Çayın miktarını düşürüyor ☐ Sürekli ses çıkarıyorlar ☐ Diğer……………………..................................... (buraya yazınız)

VI - HES İNŞAATLARI **HES inşaatlarıyla ilgili neler düşünüyorsunuz öğrenebilir miyim?**	
36. HES İNŞAATLARI SIRASINDA SIKINTI YAŞADINIZ MI? NELER YAŞADINIZ? (AŞAĞIDAKİ ŞIKLARDAN İŞARETLEYİNİZ. SONRA 37. SORUYU SORUP BAHSETMEDİKLERİNİ	HAYIR, bir sıkıntı yaşamadık. ☐ EVET, yaşadık. ☐ Bilmiyorum. ☐

SORARAK ÖĞRENİNİZ).	
37. BAZI KÖYLERDE YAŞAYANLAR HES İNŞAATLARI SIRASINDA SIKINTILAR YAŞAMIŞLAR. HES İNŞAATLARI SIRASINDA SİZ VEYA AİLENİZ BU SIKINTILARI YAŞADINIZ MI?	Dinamit patlatmalarından evimiz zarar gördü □ Dinamitlemeler gece yapıldı korktuk, uyuyamadık □ Evimizin suyu kesildi □ Evimizin suyu azaldı □ Deremizin suyu azaldı □ (İkizdere harici köyden geçen dereleri var ise) Deremiz kirlendi □ Deredeki balıklar öldü □ Su değirmenimiz çalışmaz hale geldi □ İnşaatlar sırasında yolumuz bozuldu, tamir etmediler □ Tozdan çayımızın kalitesi bozuldu □ Tozdan çayımızın miktarı azaldı □ Çok gürültü oldu □ Diğer…………………….....................................(buraya yazınız)

VII - KAMULAŞTIRMALAR – HES VE ELEKTRİK HATLARI İÇİN **HESlerle ilgili kamulaştırmalar hakkında birkaç sorum olacak.**	
38. BAZI KÖYLERDE HESLER İÇİN KAMULAŞTIRMALAR YAPILMIŞ. SİZİN AİLENİZİN EVİ VEYA BAHÇESİ KAMULAŞTIRILDI MI?	Evet □ Hayır □ ***EVET DERSE DEVAM ET.***
39. YAPILAN KAMULAŞTIRMA ACELE KAMULAŞTIRMA MIYDI?	Evet □ Hayır □
40. AİLENİZ İÇİN KAMULAŞTIRMA SIKINTI YARATTI MI?	**Hayır, sıkıntı yaratmadı**. □ **Bilmiyorum.** □ Evimizi kaybettik □ Çaylığımızı kaybettik □ Arazimizi kaybettik □ Aile büyüklerimizin gömülü olduğu yeri kaybettik. □ Kamulaştırma bedeli düşüktü □ Bize kamulaştırma davası açıldı □ Bilirkişi ücreti çok yüksekti, dava açamadık. □ Karşı tarafın avukat ücretini ödemek zorunda kaldık □ Diğer ……………..

41. BAZI KÖYLERDE ELEKTRİK HATLARI VE TRAFO İÇİN KAMULAŞTIRMALAR YAPILMIŞ. SİZİN AİLENİZİN EVİ VEYA BAHÇESİ KAMULAŞTIRILDI MI?	Evet □ **Hayır** □ ***EVET DERSE DEVAM ET.***
42. YAPILAN KAMULAŞTIRMA ACELE KAMULAŞTIRMA MIYDI?	Evet □ Hayır □
43. AİLENİZ İÇİN KAMULAŞTIRMA SIKINTI YARATTI MI?	**Hayır, sıkıntı yaratmadı**. □ **Bilmiyorum**. □ Evimizi kaybettik □ Çaylığımızı kaybettik □ Arazimizi kaybettik □ Aile büyüklerimizin gömülü olduğu yeri kaybettik. □ Kamulaştırma bedeli düşüktü □ Bize kamulaştırma davası açıldı □ Bilirkişi ücreti çok yüksekti, dava açamadık. □ Karşı tarafın avukat ücretini ödemek zorunda kaldık □ Diğer ……………..

VIII - EKONOMI – HESLER İÇİN **HESlerin inşaatı sırasında ve inşaattan sonra firmalar size veya köyünüze parasal yardım yaptılar mı öğrenmek istiyoruz.**	
44.VADİDE ELEKTRİK ÜRETİMİ, SİZİN AİLENİZE EKONOMİK BİR KATKI SAĞLADI MI? SAĞLIYOR MU?	HAYIR, sağlamadı. □ EVET, sağladı. □ **Bilmiyorum**. □
45. VADİDE ELEKTRİK ÜRETİMİ, SİZİN AİLENİZE, ŞU EKONOMİK KATKILARIN HANGİLERİNİ SAĞLADI?	İnşaatlar Sırasında İnşaat işi □ İnşaatlar Sırasında Taşıma işi □ İnşaatlar Sırasında Hizmet işi, örneğin yemek verdik □ İnşaat firmalarında iş verdiler□ HES'lerde iş verdiler □ Yolumuzu yaptı □ Evimize çimento verdi □ Köy camiine veya ortak kullanılan binaya çimento veya inşaat malzemesi yardımı yaptı □

<table>
<tr><td></td><td>Çocuğuma burs verdi □
Ramazanlarda yiyecek dağıttı □

Diğer…..</td></tr>
<tr><td>46. HES İŞİ KİMLERE FAYDA SAĞLADI?</td><td>..</td></tr>
<tr><td>47. HES İŞİ BUNLARA FAYDA SAĞLADI MI?

(BİRDEN ÇOK İŞARETLEYEBİLİRSİNİZ)</td><td>
<table>
<tr><th></th><th>EVET</th><th>HAYIR</th><th>BİLMİYORUM</th></tr>
<tr><td>Yöre Halkı</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Yaban hayvanları</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Dere</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Vadi</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Doğa</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Devlet</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>HES şirketleri</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Muhtarlar</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Belediye Başkanları</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Kaymakamlar</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Parti yöneticileri</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>İnşaat şirketleri</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Dükkan sahipleri</td><td>□</td><td>□</td><td>□</td></tr>
<tr><td>Diğer..............
....</td><td>□</td><td>□</td><td>□</td></tr>
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<tr><td>48. HES İŞİNDEN KİMLER ZARAR GÖRDÜ?</td><td>..</td></tr>
<tr><td>49. HES İŞİNDEN KİMLER ZARAR GÖRDÜ?
(BİRDEN ÇOK</td><td>
<table>
<tr><th></th><th>EVET</th><th>HAYIR</th><th>BİLMİYORU
M</th></tr>
<tr><td>Yöre Halkı</td><td>□</td><td>□</td><td>□</td></tr>
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İŞARETLEYEBİLİRSİNİZ)	Yaban hayvanları	☐	☐	☐
	Dere	☐	☐	☐
	Vadi	☐	☐	☐
	Doğa	☐	☐	☐
	Devlet	☐	☐	☐
	HES şirketleri	☐	☐	☐
	Muhtarlar	☐	☐	☐
	Belediye Başkanları	☐	☐	☐
	Kaymakamlar	☐	☐	☐
	Parti yöneticileri	☐	☐	☐
	İnşaat şirketleri	☐	☐	☐
	Dükkan sahipleri	☐	☐	☐
	Diğer..................	☐	☐	☐
50. YÜKSEK GERİLİM HATLARI VE ELEKTRİK TRAFOLARINDAN KİMLER FAYDA SAĞLADI?	....			
51. YÜKSEK GERİLİM HATLARI VE ELEKTRİK TRAFOLARINDAN KİMLER FAYDA SAĞLADI? (BİRDEN ÇOK İŞARETLEYEBİLİRSİNİZ)		EVET	HAYIR	BİLMİYORUM
	Yöre Halkı	☐	☐	☐
	Yaban hayvanları	☐	☐	☐
	Dere	☐	☐	☐
	Vadi	☐	☐	☐
	Doğa	☐	☐	☐
	Devlet	☐	☐	☐
	Muhtarlar	☐	☐	☐
	Belediye Başkanları	☐	☐	☐
	Kaymakamlar	☐	☐	☐
	Parti yöneticileri	☐	☐	☐
	İnşaat şirketleri	☐	☐	☐
	Dükkan sahipleri	☐	☐	☐
	Diğer..................	☐	☐	☐
52. YÜKSEK GERİLİM HATLARI VE ELEKTRİK TRAFOLARINDAN KİMLER ZARAR GÖRDÜ?	....			
53. YÜKSEK GERİLİM				

<table>
<tr><td rowspan="14">HATLARINDAN VE ELEKTRİK TRAFOLARINDAN VADİDE KİMLER ZARAR GÖRDÜ? NE KADAR? (BİRDEN ÇOK İŞARETLEYEBİLİRSİNİZ)</td><td></td><td>EVET</td><td>HAYIR</td><td>BİLMİYORUM</td></tr>
<tr><td>Yöre Halkı</td><td>☐</td><td>☐</td><td>☐</td></tr>
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<tr><td>Parti yöneticileri</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>İnşaat şirketleri</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Dükkan sahipleri</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Diğer..................</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>54. HES ŞİRKETLERİ GENEL OLARAK VADİYE BİR YARAR SAĞLADI MI?</td><td colspan="4"><table><tr><td>YOK</td><td>ÇOK</td><td>BİLMİYORUM</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>5. HES ŞİRKETLERİNİN GENEL OLARAK VADİYE ZARARI OLDU MU?</td><td colspan="4"><table><tr><td>YOK</td><td>ÇOK</td><td>BİLMİYORUM</td></tr><tr><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>56. GELECEK YILLARDA İKİZDERE VADİSİ'NDE NELER YAŞAYACAĞINIZI DÜŞÜNÜYORSUNUZ?</td><td colspan="4">………………………………...</td></tr>
<tr><td>57. BAŞKA NELER SÖYLEMEK İSTERSİNİZ?</td><td colspan="4">..</td></tr>
</table>

IX - GENEL SORULAR **İsminizi sadece size hitap etmek için öğrendim. İstemezsiniz yazmayacağım. Yazarsak hiçbir şekilde kullanmayacağız.**
58. ADINIZ:
59. NE ZAMAN DOĞDUNUZ?:
60. CİNSİYETİ: KADIN ☐ ERKEK ☐

61. MEDENİZ HALİNİZ: EVLİ □ BEKAR □ DUL □
61. ÇOCUĞUNUZ VAR MI? 1 □ 2 □ 3 □ 4 veya daha çok □ YOK □
62. NEREDEN MEZUNSUNUZ? İlkokul □ Ortaokul □ Lise □ Üniversite □ Okuma-Yazması Yok □
63. EVİNİZDE KAÇ KİŞİ YAŞIYOR? ....

APPENDIX C: THE DIMENSIONS OF THE TUNNELS, THE POOLS AND OTHER PIECES OF INFRASTRUCTURE WITH WATER HOLDING CAPACITY GIVEN IN THE ENVIRONMENTAL IMPACT ASSESSMENT REPORTS AND IN THE PROJECT INFORMATION FILES.

THE İKİZDERE HES-STATE

Demirkapı water intake station --→ 794 m(Diversion tunnel)→ Cimil water intake → 3327 m (Water transfer tunnel) → Volume=32 m^3 (Headpond) →320 m (Penstock) → Power plant → The İkizdere River

Total length of tunnels (not including the diversions from river to water intake and others) = 4,441 m.

Number of reservoir structures = 3

Total volume of reservoir structures = A + 32 m^3

A is the total volume of sedimentation pools of Demirkapı and Cimil water intake facilities.

THE İKİZDERE HES-REHABILITATION PROJECT

Demirkapı water intake station --→ 794 m (Diversion tunnel)→ Cimil water intake → 3327 m (Water transfer tunnel) → Volume=570 m^3 (Headpond) →320 m (Penstock) → Power plant → The İkizdere River

Total length of tunnels= 4,441 m.

Number of reservoir structures = 3

Total Volume of reservoir structures = A+538 m^3

THE CEVİZLİK HES

CEVİZLİK water intake station → 64 x 23, depth is not given (Water intake and sedimentation pool)→ Surface area = 10,357 m^2, V=147,000 m^3, Active V=127,000m^3 (Regulation pool) → 7,800 m (Water transmission tunnel) → R=18 m, H=71.5 m, V= 18,185

m^3 (Surge chamber in the form of a tank) → 182 m (Penstock) → Power plant → 114 m (Water tunnel to the river) → The İkizdere River

Total length of tunnels water flows =8,096 m.

Total length of tunnels= Total length of tunnels water flows + approach tunnels (required for the construction and maintenance of the tunnels) + Tunnel connecting underground power plant to outside = 8,096 +400+735+1,280+300+75 = 10,886 m

Number of reservoir structures = 4

Total volume of reservoir structures= 165,185 m^3+ volume of sedimentation pool

THE KALKANDERE / YOKUSLU HES

The Kalkandere HES water intake station (The riverbed was modified as the reservoir, dimensions are not known) → 56.43 m (Transmission tunnel, 3 tunnels function like a sedimentation pool) → Dimensions are not given (Stilling pool) → 6,932 m (Water transfer tunnel) → R_{bottom}=4 m, R_{top}=15 m, H=244 m (Surge chamber in the form of a tank) → 242.5 m (Three tunnels of penstock) → Power plant → THE KIZILAĞAÇ HES

Total length of tunnels water flows = 7,230.93 m.

Total length of tunnels water flows + approach tunnels (required for the construction and maintenance of the tunnels + sediment discharge tunnel + derivation tunnel used during construction)= 7,230.93+116.69+411.96+215.26+258.87+346.87+137.45+69.25+ 114.90 (sediment discharge tunnel) + 215.99 (derivation tunnel) = 9,118.17 m

Number of reservoir structures = 3

Total volume of reservoir structures= 53,402.89 m^3 + Volume of stilling pool + Volume of water intake reservoir

THE KIZILAĞAÇ HES

KALKANDERE HES → 1,345 m (Water transmission tunnel) → 20 x 40 x 14.25= 11,400 m^3 (Loading pool) → 20 m (Penstock) → Power plant → The sizes are not provided (Water channel to release water to the Ikizdere Riverbed).

Total length of tunnels water flows = 1,365 + connection to the Ikizdere Riverbed.

Total length of tunnels= 1,365 + connection to the Ikizdere Riverbed

Number of reservoir structures = 2

Total volume of reservoir structures= 11,400 m^3

THE İNCİRLİ HES

KIZILAĞAÇ HES → The sizes are not known (The section of the Ikizdere riverbed between the Kizilagac HES power plant and the Incirli HES water intake facility Ikizdere Riverbed was modified as the water holding reservoir of the Incirli HES)→ The İNCİRLİ HES water intake station → 5 x 5 x 120= 3,000 m^3 (Sedimentation pool)→ 5,090 m (Water transmission tunnel) → The dimensions are not provided (Loading pool)→ 60 m (Penstock) → Power plant → THE SARAY HES

The project information file of the İncirli HES states a different configuration in page 21 as follows;

THE KIZILAĞAÇ HES → The sizes are not known (The section of the Ikizdere Riverbed between the Kizilagac HES power plant and the Incirli HES water intake facility Ikizdere Riverbed was modified as the water holding reservoir of the Incirli HES)→ İNCİRLİ water intake station →Derivation tunnel → Sedimentation pool → 5,385 m (Water transmission tunnel) → Loading pool → 150 m Penstock → Power plant → THE SARAY HES

The design had been modified. Report does not provide the current configuration. The plant has a surge chamber not a loading pool.

Total Length of Tunnels water flows = 5,150 m.

Total Length of Tunnels= Total length of tunnels water flows + Approach tunnel +Derivation tunnel used during construction= 5,150+ 250 + Dimensions are not given only stated "8,000x3" = 5,400 + length of derivation tunnel open during construction.

Number of reservoir structures = 3

Total Volume of reservoir structures= 3,000 m3 + Dimensions are not provided (the İNCİRLİ HES reservoir)+ the dimensions are not provided loading pool (it is a surge chamber actually).

THE SARAY HES

İNCİRLİ HES water flows →121 m (Water transmission tunnel) → 3,692.72 m (Water transmission tunnel) →Height=47.2 m (Difference between 52.5 m and 5.30 m.), R=22 m (Surge chamber) → 279.1m (Penstock) → Power plant→75 m (Tailwater tunnel → The İkizdere River

Total Length of Tunnels water flows = 4,167.82 m.

Total Length of Tunnels= 4,167.82 + Sizes are not provided (The lengths of the approach tunnel 1 and 2 (For the construction and maintenance of transmission tunnel)

Number of reservoir structures = 1

Total Volume of reservoir structures= 71,732.672 m^3

APPENDIX D. THE MAIN TITLES OF THE PRELIMINARY REPORT THAT WILL BE PREPARED FOR A TYPE PROJECTS, AS LISTED IN BYLAW RG # 25150, JUNE 2003, EK-4

EK-4

In 2003 regulation, the knowledge required from the private companies:

1- Project Specification
   - 1.1.1. The location of the project
   - 1.1.2. Hydraulic Properties
   - 1.1.3. Geological Properties
   - 1.1.4. The Characteristics of the Infrastructure

2- The Proposed Infrastructure
   - 2.1. Dam and the Other Facilities
   - 2.2. Water Intake Infrastructure
   - 2.3. The Water Transfer Infrastructure (Power tunnel, transfer channel etc.)
   - 2.4. Power Plant
   - 2.5. The Installed Capacity and Power Production

   Supplement: The general plant layout, showing locations of facilities, which are contained by the energy project (The map scale is 1/25000).

APPENDIX E. MAIN TITLES OF FEASIBILITY REPORT OF A HYDROPOWER ELECTRICITY PRODUCTION PLANT, AS LISTED IN BYLAW RG #25150, JUNE 2003, EK-3

EK-3

BÖLÜM –1. ÖZET

1.1. Projenin yeri

1.2. Teklif edilen tesisler

1.3. Proje Karakteristikleri

BÖLÜM -2. PROJE SAHASININ TANITILMASI

2.1. Coğrafi Durum (Kesin koordinatlar ve topoğrafya, genel jeoloji, deprem, iklim,)

2.2. Sosyal Durum (Nüfus, kültür, sağlık, ulaşım, haberleşme)

2.3. Ekonomik Durum (Tarım, sanayi, turizm, ticaret, madencilik)

2.4. Arazi Mülkiyeti, Araziden Faydalanma Durumu

2.5. Varsa Daha Önce Yapılmış Etütler Hakkında Bilgi

BÖLÜM -3. GELİŞME PLANI

3.1. Gelişmeyi gerektiren sebepler

3.2. Mevcut tesisler

3.3. Teklif edilen tesisler

3.4. Gelişme Planı Etki ve Sonuçları

BÖLÜM -4. İKLİM VE SU KAYNAKLARI

4.1. İklim (Meteorolojik durum, yağışlar, sıcaklık, buharlaşma)

4.2. Su Kaynakları (yerüstü suları)

4.3. Sulardan Yararlanma Şekilleri ve Su Hakları

4.4. Su ihtiyacı (Sulama, enerji, içme-kullanma ve endüstri suyu, diğer su ihtiyaçları)

4.5. Dönen sular

4.6. İşletme çalışmaları

4.7. Proje Taşkın Durumu

4.8. Sedimantasyon Durumu

4.9. Gözlemler ve Sonuçlar

4.10 Sorunlar

BÖLÜM -5. JEOLOJİK DURUM

5.1. Genel Jeoloji

5.2 Baraj yeri ve ilgili yapıların jeolojisi

5.3. Rezervuar sahası jeolojisi

5.4. Malzeme etütleri

5.5. Depremler

BÖLÜM -6. KURULACAK TESİSLER

6.1. Rezervuar işletme politikası ve Optimizasyon

6.2 Baraj tipi ve yükseklik seçimi

6.3. Dolusavak ve Dipsavak

6.4. Kurulu Güç Optimizasyonu

6.5. Enerji su alma yapıları (regülatör, iletim tüneli, iletim kanalı, yükleme havuzu, cebri boru)

6.6. Santral binası ve kuyruksuyu kanalı

6.7.Türbin tipi, ünite gücü ve adedi

6.8. Generatör tipi ve kapasitesi

6.9. Transformatör adedi ve tipi

6.10. Şalt sahası

6.11. Enerji İletimi

6.12. Ulaşım yolu

6.13. Teklif edilen tesislerin karakteristikleri

BÖLÜM -7. ÇEVRESEL ETKİLER

7.1. Mevcut şartlardaki çevrenin özellikleri

7.2. Projenin çevresel etkileri ve alınacak tedbirler

BÖLÜM -8. TESİS MALİYETİ

8.1. Giderlerin hesaplanmasındaki esaslar

8.2. Keşif özeti

8.3. Keşif, tesis, proje ve yatırım bedeli

8.4 Yatırım Programı

BÖLÜM -9. EKONOMİK ANALİZ

9.1. Yıllık Faydalar (sulama, taşkın, enerji ve diğer faydalar)

9.2. Yıllık Giderler (faiz-amortisman, işletme ve bakım ve yenileme giderleri)

9.3. Gelir/Gider oranı

9.4 İç Karlılık Oranı

BÖLÜM -10. ÇOK MAKSATLI PROJELER İÇİN MALİYET TAKSİMİ

BÖLÜM -11. ALTERNATİF ÇÖZÜMLER

11.1 Depolama Tesisleri İle İlgili Alternatifler

11.2 Enerji Tesisleri İle İlgili Alternatifler

APPENDIX F. THE MAIN TITLES IN THE FEASIBILITY REPORTS OF B AND C TYPE PROJECTS, AS LISTED IN BYLAW RG #26428, FEBRUARY 2007, EK-3A

EK-3A

DSİ/EİE PROJELERİNDE İSTENECEK FİZİBİLİTE RAPORUNDA YER ALACAK ANA BAŞLIKLAR

BÖLÜM – 1. ÖZET

1.1. Yönetici Bilgilendirme Formu (Ek-7)

1.2. Projenin yeri

1.3. Projenin havzadaki diğer tesislerle ilişkisini gösterir şematik plan

1.4. Teklif edilen tesisler

1.5. Proje Karakteristikleri

BÖLÜM – 2. PROJE SAHASININ GENEL TANITILMASI

BÖLÜM – 3. GELİŞME PLANI

3.1. Mevcut ve mutasavver tesisler

3.3. Teklif edilen tesisler

BÖLÜM – 4. İKLİM VE SU KAYNAKLARI

4.1. İklim (Meteorolojik durum, yağışlar, sıcaklık, buharlaşma)

4.2. Su Kaynakları-Su temini (Yılların ortalaması özet tablo ve grafik olarak)

4.3. Sulardan Yararlanma Şekilleri ve Su Hakları

4.4. Su ihtiyacı (Sulama, enerji, içme-kullanma ve endüstri suyu, diğer su ihtiyaçları)

4.5. Dönen sular

4.6. İşletme çalışmaları (özet tablo)

BÖLÜM – 5. JEOLOJİK DURUM (GENEL)

BÖLÜM – 6. KURULACAK TESİSLER (GENEL)

BÖLÜM – 7. ÇEVRESEL ETKİLER (GENEL)

BÖLÜM – 8. TESİS MALİYETİ (GENEL-Özet tablo)

BÖLÜM – 9. EKONOMİK ANALİZ

9.1. Yıllık Faydalar (sulama, taşkın, enerji ve diğer faydalar) (Özet tablo)

9.2. Yıllık Giderler (faiz-amortisman, işletme ve bakım ve yenileme giderleri) (Özet tablo)

9.3. Gelir/Gider oranı

9.4 İç Kârlılık Oranı

BÖLÜM -10. ÇOK MAKSATLI PROJELER İÇİN MALİYET TAKSİMİ (GEREKTİĞİNDE)

BÖLÜM -11. ALTERNATİF ÇÖZÜMLER

11.1 Depolama Tesisleri İle İlgili Alternatifler

11.2 Enerji Tesisleri İle İlgili Alternatifler