IMPACTS OF CONSTRUCTION BOOM IN ANKARA WITHIN THE WATER METABOLISM FRAMEWORK

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY
GÖKSU CAN ÇELİK

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF SOCIAL POLICY

MAY 2024

Approval of the thesis:

IMPACTS OF CONSTRUCTION BOOM IN ANKARA WITHIN THE WATER METABOLISM FRAMEWORK

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ABSTRACT

IMPACTS OF CONSTRUCTION BOOM IN ANKARA WITHIN THE WATER METABOLISM FRAMEWORK

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May 2024, 89 pages

This thesis will analyze the rift in the water metabolism of Ankara by examining the construction boom focusing mostly on the last 24 years. During this study, the metabolic rift, previously used by Marx to show changes in agriculture and urbanization, will be shown with various examples. Main theoretical framework will be urban metabolism and environmental sociology to understand the relationship between urban and nature as a social process, each affecting each other and in a dialectical relationship. We will try to create a framework that understands the city as a metabolic formation, with inflows and outflows of materials including capital, labor, and nature. This framework will help to discuss the impacts of urban sprawl and unplanned construction on more than one level on water. Water will be understood as both a variable and determinant; as a dependent being impacted by anything, and as a powerful resource shaping lands and everyday life.

Keywords: urban metabolism, environmental sociology, urban politics

ÖZ

SU METABOLIZMASI ÇERÇEVESINDE İNŞAAT SEKTÖRÜNÜN ANKARA'DAKI ETKILERI

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Bu tez, Ankara su metabolizmasındaki kopuşu, özellikle son 24 yıldaki inşaat sektöründeki genişlemenin etkilerini araştırarak ele aldı. Çalışmada, Marx'ın kentleşme ve tarımdaki değişiklikleri göstermek için kullandığı "Metabolik Yarık" kavramına örnekler su ve kent kullanılarak gösterildi. Kent metabolizması ve çevre sosyolojisi kavramları temel olarak alınarak, kent ve doğa arasındaki ilişki diyalektik bir biçimde ele alındı Bu ilişki birbirlerini iki yönlü olarak etkileyen, dönüştüren ve biçim veren organizmaların ilişkisi olarak ele alındı. Kent de başlı başına girdi ve çıktılarıyla, kendi işleyişleri olan, sermaye, emek ve doğayı içeren, adeta yaşayan bir metabolizma olarak incelendi. Bu sayede, kentin doğa üzerine yayılması, plansız inşaatlar ve doğaya olan müdahale birden fazla düzeyde araştırmaya açık hale geldi. Bu müdahaleyi suya olan etkileri üzerinden, ancak sadece suya bağlı kalmadan araştırmaya çalıştık.

Anahtar Kelimeler: kent metabolizması, çevre sosyolojisi, kent siyaseti

To my dad, whom I miss so much.

ACKNOWLEDGEMENTS

This thesis would not be written without the support of many people that I'm thankful to work with. I would like to express my great appreciation to Dr. Antoine P. C. Dolcerocca, whose support and assistance improved my viewpoint and knowledge to write this thesis. His endless support helped me to continue and develop this work and encourage me to complete it. I'm also indebted to examining committee members and my other supervisor; Dr. Ayşe İdil Aybars and Dr. Mehmet Barış Kuymulu. Their support and sharing of their valuable times helped me a lot in this journey.

I'm also very thankful to Onur Bektaş, who spared his time and shared his detailed and valuable studies with me, helping to understand Ankara, and trying to make Ankara a city that we deserve. His works and archive assisted me to a great extent.
My beloved mother, Nezahat Arslan, and my sister İrem Can Çelik have always been there with me, supporting and loving. This journey would be impossible to take without their lovely presences.

My dear partner, Bilal İnci has been a great support since the beginning of this journey. His good heart supported me endlessly, and whenever I'm overwhelmed, he was there for me.

My lovely friend Selin Aksoy has always been the one that I ask something about this work. Her endless friendship and standpoint on different topics helped me a lot through this period. I also thankful for Uğur Can Kocabaş for all of his support.

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LIST OF ABBREVIATIONS

ABB	: Ankara Metropolitan Municipality
ASKI	: Ankara Water and Sewerage Administration
ASU	: Ankara Water Administration
BAKAY	: Greater Ankara Sewerage and Rainwater Project
DSI	: General Directorate of State Hydraulic Work
CCE (İMO)	: Chamber of Civil Engineers
CCP (ŞPO)	: Chamber of City Planners
CHM	: Camp-Harris-Mesara
TMMOB	: Union of Chambers of Turkish Engineers and Architects
TOKİ	: Mass Housing Development Administration

CHAPTER I

INTRODUCTION

1.1. Background

Today, several humanitarian and ecological crises are happening everywhere on earth due to the problems with accessing and benefiting resources. Privatization of resources and lands is limiting their equal benefit while climate change is also worsening the situation. As a result, the availability of resources differs through politics. Since all components of nature are in a common relationship between themselves and also humans, researching this situation on unequal access and benefit to resources through a single resource, water in our example, which is crucial for all living, can be useful.

Water stands as a good example to understand and investigate this relationship because it is needed for everyone on the planet, is affecting everyday life, and is in a relationship with other resources. The presence or absence of water impacts plants, animals, and climate. Any change in water changes all balance on earth. Also, water moves from the earth to the atmosphere, and returns to the earth again. It does not disappear, but it changes its location and physical condition. Therefore, it moves in a cycle and can be thought of as a metabolism, which is affected by its surroundings and affecting them. It shapes the geography, habitat, and climate while it creates and destroys habitats. During its movement, any impact on water reflects on the whole process due to its nature. As a result, water is vulnerable to external interventions, and influences all its surroundings. It is a resource that is vulnerable yet powerfully impactful on all its surroundings. Today, water has become one of the central problems of life all around the world. Rivers are polluted, resources are exploited, and several water and food insecurities are experienced. Although it moves around

the earth and does not disappear in fact, it is also scarce and is one of the most important resources.

On this day, there is no place on earth that stands independent from human intervention. Turkey, and its natural habitats and waters are also subject to this intervention. With the growth attempts beginning from the declaration of the Republic, and the increased privatization mindset after the 1980s, natural resources and lands have been used as potential profit opportunities. Now, all the natural places are in danger of destruction, rented one by one to companies to make a profit. The exploitation of natural resources became a problem so big that today, Turkey is not able to provide its citizens the equal benefit of resources. Other living creatures are already in danger of destruction.

1.2. Example of Ankara

The situation of Ankara, the capital of Turkey, is not an exception to this ongoing situation. With a population over 5,000,000 and counting, most of the empty areas have been declared as construction zones, and its natural resources providing the city are so unsustainable that it has not been able to provide one of the most basic needs, water, safely and equally accessible. People have been experiencing water-related problems such as droughts, water insecurity, floods, and a lack of sustainable infrastructure and water services. Tap water is unsafe to drink, people are experiencing water supply problems and natural habitats are hurt. As a result of this massive destruction, the environment in Ankara was damaged. Unplanned urbanization and profit-driven municipality understanding created a city that does not include nor protect its inhabitants and creates unequal access to any good and resource.

Today, water management in Ankara has become unsustainable and the city experiences water insecurity due to the possible water scarcity and flood damage. Being a city that was built on land with valleys and hundreds of streams and rivers, Ankara is vulnerable to experiencing more water-related problems. There are more than a hundred streams in Ankara, connected to the three bigger rivers; İncesu, Hatip,

and Çubuk creating one major river: Ankara River. This major river connects with the Sakarya Watershed, which takes up almost 7% of Turkey's total area. These rivers are wild and fast-paced; which makes them hard to tame and control (Akyar, 2019; as cited in Asfaltın Altında Dereler Var, 2019). Taming efforts of rivers have been made for years by creating canals, dams, and water infrastructures. However, taming a river completely is not a possible thing since a river will flow as its path, disregarding whether any space for it to flow was left or not. If a water body needs to move, it will move to any space it can find.

These rivers started to be polluted by the lack of sewage infrastructure in the 1930s after the sudden population increase with the declaration of capital. Rivers were so polluted that the smell and health hazard became insurmountable. As a result, these rivers started to be put underground, as an outcome of the understanding that "If the problems are not visible, there will be none!". After these actions, the rivers became a main part of the sewage system since they were already there and polluted (Tekeli, 1991). With the continual pollution of rivers, the water resources became unsustainable to use. Population increase did not help the situation; while the water demand was increasing, the already used water became unusable again. As a result, water resources started to be used excessively. To solve the water needs of Ankara, new water resources were started to be used. After the situation worsened, there was not enough water to provide Ankara. Starting from the 2006-2007 drought, the Kızılırmak River which is located in a different watershed started to be used as a water resource. This created two problems: firstly, Kızılırmak water is not recommended for drinking due to its high amount of hazardous ingredients such as sulfur and there were not any sufficient treatment plants to make that water drinkable (CCE, 2020). Secondly, all of the water resources in Ankara except Kızılırmak are located in the Sakarya Watershed. So, any water withdrawn could be able to return its resource watershed. Withdrawing water from another watershed and pouring it into Sakarya Watershed upset the balance in the watersheds. Another problem caused by overall water management in Ankara is that most of the rivers are forced to flow underground, providing no habitats and assumed as part of the city's sewage system (Tekeli, 1991). This situation also interrupts the natural movement and metabolism of water.

Today, the quality of tap water in Ankara is quite low and it also differs in different parts of Ankara. Even in the areas with higher water quality, drinking tap water is not recommended. Due to this situation, people living in Ankara experience severe water insecurity since the only way to drink safe water is to buy bottled water. However, only the ones who are able to buy bottled water can access safe drinking water. Today, the bottled water industry has grown so big that the companies are able to gain the right to rent the whole water source for 49 years to create dams and hydroelectric plants and sell bottled water simultaneously. Also, instead of creating sustainable infrastructure, municipalities also sell bottled water and make profits.

At the same time tap water prices are increasing regularly too. Due to the high prices of tap water, it is also unequally accessible. While municipalities claim that they provide almost free water (a symbolic price of 1 TL) for a limited amount to the ones who have less or no income, the inequality does not change since the limit is so low that any family of four could exceed that amount. So, while all the citizens pay for tap water including taxes, loss and leak costs, distribution, and infrastructure costs; supplied water is unsafe to drink or cook. However, this potential health problem is only prevented by the ones who are able to pay higher amounts of money to buy bottled water. At the same time, the ones who can afford higher bills are free to use excessive water.

In addition to unsafe tap water and unequal access to safe drinking water, the privatization of land and the creation of construction zones in all the empty spaces increases the possibility of floods since the asphalt and concrete decrease the amount of water absorbed by the earth and obstruct the already ruined water metabolism. Increasing non-permeable areas block the way of rainwater to get back to earth. As a result, accumulated water creates floods. However, water needs to be absorbed by the earth, surrounded by plants. Wetlands are great mediums to absorb the water and channel it underground. Since there are no wetlands left in Ankara, the filtration process is lacking too. Even if the asphalt were permeable and water could have been absorbed, it would have been polluted by the gas emissions in the city. Furthermore, due to climate change, floods and droughts are experienced more and more impactful each year. The destructive power of these natural occurrences increases each year.

These problems also increase the potential risk for specific groups such as those who have to work outside and live in the cheaper basement floors as well as all the citizens who are there in any event of flood. People die or lose their homes and material goods more and more each year.

Not limited to people, but also the whole living in Ankara experience water-related problems, due to decreasing wildlife habitat. While some parts of Ankara such as İmrahor Valley, Lake Eymir, Lake Mogan, and METU campus provide a large ecosystem for birds, mammals, amphibians, and several species of butterflies; they have been destroyed one by one to construct luxury apartment complexes and roads. The Unceasing construction boom, with new buildings and roads constructed over rivers impacts all cities including the natural habitats. As a result, migratory birds and local species leave the ecosystem or simply vanish. As well as the animals, the plants that increase air quality and improve the climate have also been destroyed by the destruction of very valuable wetlands. Ankara became a city that is hard to live for all the living creatures.

However, while there are different examples around the world with more sustainable water management, factors like wild rivers and population increase cannot be the real reasons for the unavailability of safe water. Cities have been historically built near rivers due to water supply potential. So, why are Ankara's rivers problematic, and how is the water not enough?

Until the 1930s, Ankara was a city of approximately 30,000 people, with ancient water systems left from the Roman Era. There were several rivers, and supplying the society was not a very hard thing to do. Most of the problem was about transferring the water to higher elevations, near the Ankara Castle. The water problem in Ankara started right after the city became the capital of the Turkish Republic. With the rapid population growth, the already in-use water management system became incapable of supplying the city. Since then, the need for more water resources has become the main problem while there are several rivers and underground water resources available and could be enough in a different situation. In the early republican era, people were moving to Ankara, new government buildings and living spaces were

being constructed, and the urban area was widening. Due to different reasons like pollution and flood risks, rivers flowing in the city started to be closed, and a need for more water was a new problem. This situation was known in 1969 and the increasing need for water with the projected population growth was in the water management plan made by Camp-Harris-Mesara (CHM) (Köle, 2014). According to this plan, in the following years, the population would grow rapidly, and finding new resources was a must. However, resources were limited but the population was growing.

The main reason for the ongoing water problem is that the management of water is unsustainable. While Ankara was known for its wide river system and did not face any problems with water for centuries; due to the ways of collecting and using water, water demand from other resources has been increasing. Water comes from different rivers, gets lost for several different reasons by 37.94% (ASKİ, n.d.) in distribution, and is disposed of to another river. While water for people's use is managed in this way, rivers flowing freely were tried to be tamed by trapping them in concrete tunnels. Directing rivers under the earth and trapping them in tunnels gave more land to be used for construction and less effort on management since rivers were not visible.

1.3. Research Question

The research of this thesis will be around the impacts of urbanization and privatization of lands and resources on the water of Ankara and the main framework of this research is shaped by the metabolism term. While the historical background will be given starting from the 1930s, the focus of the study will be shaped around after the 2000s since Turkey's economic and political atmosphere changed and the main wheel for economic growth became construction. In the following chapters, how the construction boom and privatization of land created a metabolic rift will be examined.

This thesis contributes to two fields of environmental sociology. Firstly, it offers an interdisciplinary exploration of Ankara's water resources, infrastructures, and usage

by focusing not only on hydrology and civil engineering aspects but also on sociological and political dimensions. This understanding helps to create a solid background to understand the relationship between society and nature. Secondly, this thesis contributes to the literature by applying the concept of metabolic rift (initially used to illustrate the rupture in the nutrient cycle resulting from intensive monoculture by Marx) to the water cycle. Water as a subject and explaining the disruption of balance in Ankara will be the main argument.

In the next chapter, a literature review of water systems and urban theories will be examined. Since examining the water independent from society would not provide a sufficient approach for the study, the water will be defined within both social and physical processes. Nature as a whole will be regarded as attached to humans, as well as humans are also attached to nature. So, it will be discussed that any social process also shapes natural processes. Firstly, to understand how water moves, literature about hydrology and the water cycle will be investigated. Secondly, to realize the relationship between society and nature, different approaches to nature and urban politics will be examined and discussed. Then, the main theoretical framework of this study, metabolism and the metabolic rift will be explained. Firstly, urban space will be regarded as a whole metabolism including inputs and outputs to sustain its being. Then, the metabolic rift concept will be examined. After different studies about water politics are discussed, the main topic, water metabolism will be explored. In this study, while Ankara is only an example, some bullet points can be interfered with for all urbanization processes.

The following chapters will be about Ankara’s river system and water management, and the historical background of Ankara, to understand which incidents have led to today's situation. Starting from 1923, the history of Ankara will be discussed around water. During this discussion, the construction boom and privatization of nature will be the focus points. While the historical background will go back to 1923, the construction boom will focus mostly after 2002. With this outline, the exploitation of water resources and unsustainable urban growth will be examined broadly including economic and government actions. In the analysis chapter, the urban water metabolism of Ankara will be analyzed with the given background and the thesis

statement, which aims to show the metabolic rift of water in Ankara through the construction boom will be examined.

1.4. Methodology

To acknowledge the impacts of the construction boom on Ankara's water metabolism, and to examine the metabolic rift, this thesis uses different approaches and methods. Putting Marx's Metabolism and Metabolic Rift concepts as the main framework, and regarding water within a dialectical approach, it can be said that the foundation of this thesis is Marxist.

During the literature review, different approaches to hydrology, water management, ecological sociology, and political ecology were examined and compared. Main standpoints are given with broad literature research to understand the theoretical background and recent discussions on water and urban politics, and environmental sociology. Later, to show the impacts of construction and urbanization on water metabolism, a historical background is given focusing on political ecology.

During the information collection for the historical background and water system of Ankara, not only several articles and journals were examined but also meetings with experts on the topic were held. To discover Ankara's river system and historical process of water management in Ankara, an interview was needed since there were not any useful documents online or on paper. Also, more detailed maps of rivers in Ankara were needed to understand the situation. After the approval of the METU Human Research Ethics Committee, the interview was held with a researcher. Thanks to the information and resources received, the next chapter was written easily. Also, older sources which cannot be found online that explain Ankara's water management in Ankara were found via the same interview. Since this thesis is mostly about analysis, no other interview was needed. However, several different people's ideas were asked throughout the study to lead to a more convenient way of the study. After getting information from various people, more examinations through articles and news sites were made and Chapters 4 and 5 were shaped.

Overall, this thesis was shaped mainly by articles, previous studies, and interviews with several people from different areas. Due to the nature of the study, no other methods were used to collect data or information. Putting Marx's concepts in the groundwork, the analysis was made from scratch.

CHAPTER II

LITERATURE REVIEW

In this chapter, different approaches will be examined regarding hydrology, urban and water politics, political ecology, and urban metabolism. Due to the selected topic of this thesis, all of these topics needed to be examined to put the analysis in solid ground. To tie water metabolism and the metabolic rift to the construction boom, different topics should be investigated. Since the metabolic rift term was not formed to be used for water, to attach water in metabolic rift, firstly literature about hydrology and water cycle was examined. Then, to analyze the impact of urbanization and the construction boom on water, a political background was found. Since there are different approaches to the politics of urban space and water, some discussions were made around these topics and why the metabolism approach suits this situation is justified. Lastly, our main framework was explained broadly and different articles about metabolism and water metabolism were examined.

2.1. Water Cycle

To understand how water moves, water cycles can be used at the most basic level. Hydrologic (water) cycle is a broad term to explain continuous movement of water on earth. It is the process where water moves from the surfaces of land and ocean to the atmosphere and gets back in land and ocean again (Chakravarty & Kumar, 2019). While surface water is evaporating because of the sun and transpiring from the trees, it condenses and forms clouds. The water vapor accumulated in clouds precipitates to earth's surfaces again. This process is a continuous movement of water, and it is used by several scientists to understand the water movement. According to Horton (1931), the cycle occurs naturally, with solar energy and gravity and it is a process independent of human involvement. This is the most basic form of understanding how the water moves around the earth.

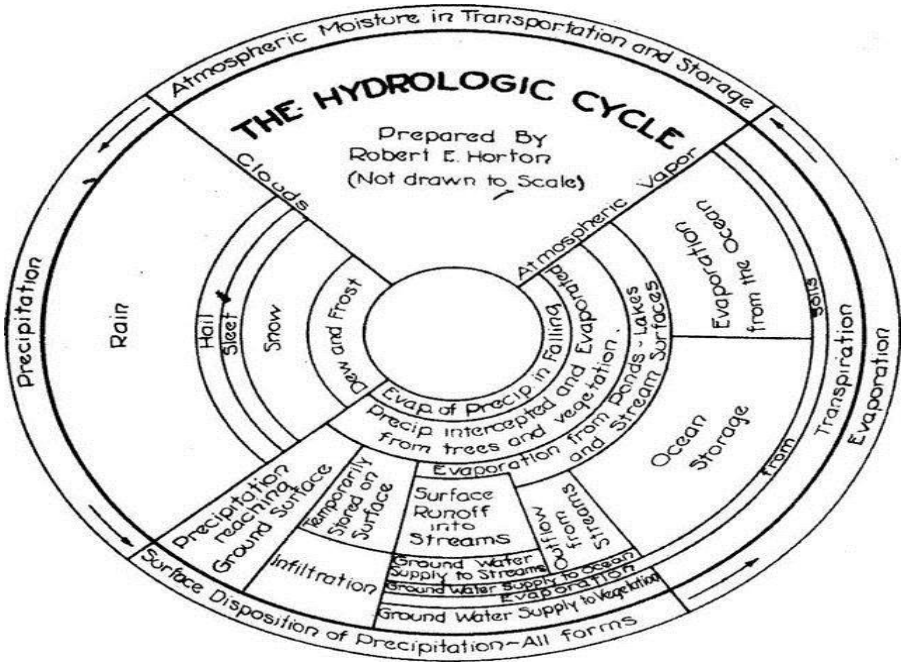


Figure 1. Horton's illustration of the hydrologic cycle.
Source: Horton 1931, 193). Copyright c 1931 American Geophysical Union.

However, as humans affect all their surroundings, these evaporation and precipitation processes are not limited to natural occurrences. Lack of the human factor in this hydrologic cycle causes the impacts of urbanization, industrialization, pollution of the environment and other human-led factors to become invisible in this hydrologic cycle. Without considering the human factor, the hydrologic cycle becomes incomplete. Water is not a thing that can be thought of as independent from the environment, and society. As Linton (2013) explains, representing and studying water without human interaction leads to an abstraction of water from social, local, and historical circumstances and reduces it to an identity that can be shown as "H2O".

Linton (2013) describes the understanding of water as an abstract thing as "modern water". According to Linton, modern water is a hegemonic way of understanding, having originated in Western Europe and the United States of America. It was a necessity to examine water in a purely "scientific" and mathematical way. Water became an independent thing that should be managed by the state. So, an understanding that a source that can be developed and controlled by the government bodies by engineering, controlling the supply, and constructing large scale

infrastructures is created by the reducing of water to "H2O". It led to an understanding that water can be used without creating any social or environmental impacts and led to water resources open for exploitation.

Linton and Budds are aware of the problem that the hydrologic cycle is not enough to understand the water movement and they explain the water process within the hydrosocial cycle term in the article titled "The hydrosocial cycle: Defining and Mobilizing a Relational-Dialectical Approach to Water" (2014). As the article explains, while the hydrologic cycle separates the water from its social context, a new approach can be useful by including social relations with water. Hydrosocial cycle is what they came up with, which is a socio-natural process in which society and water continually make and remake each other over space and time. As they suggest, seeing the hydrologic cycle independent of human presence leads to water being seen as a resource that can be exploited since human impact does not have a role in that approach.

The hydrosocial cycle can be used more effectively than the hydrologic cycle in the literature due to several reasons. Also, the relationship between society and water can be viewed as a hydro-social dialectic and can be useful to understand the water: Firstly, the necessity of water management has an impact on social organizations, as well as the disposition of water that can lead to new types of social organizations. So, including social relationships in the water cycle can help to understand the movement of water in a sociological way. Secondly, reminding the human relation, different kinds of social relations construct different kinds of water. So, it helps to understand how to treat water used for various purposes differently. Lastly, the physical character of water has a crucial impact on developing and destroying social relations. We can think of productive lands with water, or floods or droughts (Linton & Budds, 2014).

Due to the political and scientific changes around the world, hydrological science and the hydrologic cycle are also evolving. Hydrological science began to concern itself more about ecological processes. After the 1980s, when water issues became more visible, water management discourse shifted to a more human-centered

approach. In 1992, the Integrated Water Resource Management (IWRM) was formalized in the Dublin Statement on Water for Sustainable Development. IWRM suggests acknowledging the water problem within social, economic, and environmental aspects. After the development of IRWM, the new policies shifted by including human impact more and more. In the new nexus approach, energy, water, and food are considered interdependent (Carr et al., 2020).

Figure 2. Illustration from Kate Ely, 2008

Due to these new understandings, water started to be regarded as not an abstract being. By then, when we discuss water, we also discuss the availability, safeness, and impacts of supply and demand of water. Recent studies now include human institutions and impacts on the hydrological cycle. As Linton (2013) mentions, there is certain evidence now that shows society impacts the natural cycle of water. Society leads to changes in river basins with physical intervention, chemical and microbial pollution, climate change, and changes in biodiversity. However, taking society into account as a unit may lead to other problems. While some parts of the

society have a rich water supply, some parts do not. While some are polluting the water and environment, and having clean water, some people cannot reach safe water. Also, new approaches suggest that urban management is not successful in addressing environmental and social change regarding climate change and population increase (Serrao-Neumann et al., 2019).

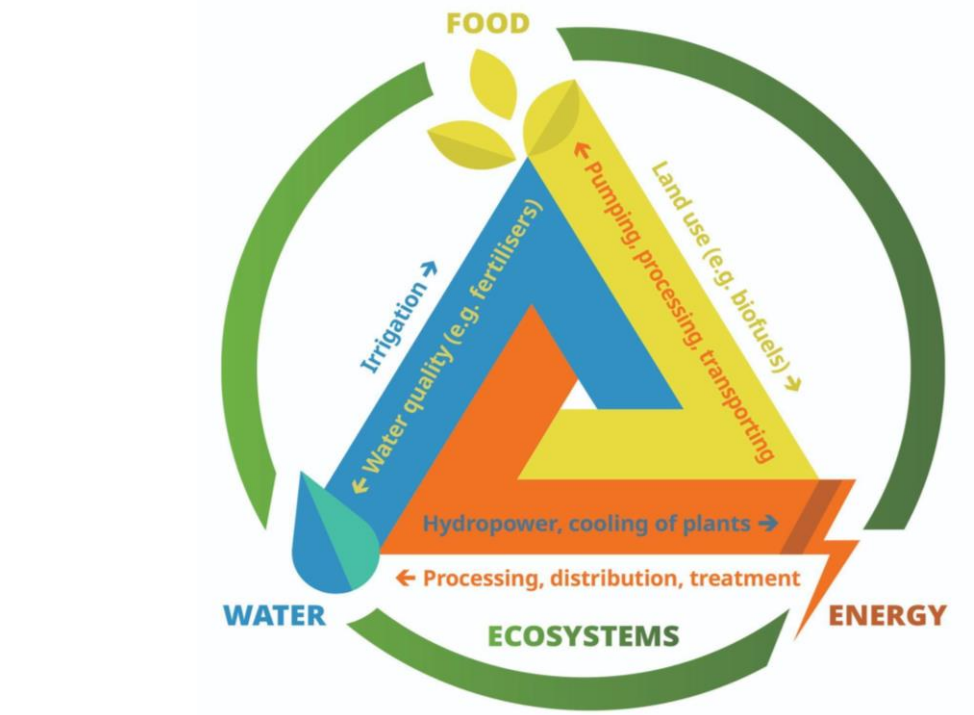


Figure 3. The nexus approach from Global Water Partnership (2019)

It suggests that food, energy and water are simultaneously dependent on each other.

2.2. Politics of Nature and Urbanization

While cities have evolved and science has developed, the relationship between nature and society has also changed. During the scientific improvement and starting of modernity in the 17th century, nature became a thing to be tamed and dominated, which is needed to show that humanity is capable of using it in its favor. During these improvements, nature was separated from society, and started to be seen as an independent thing that made it easier to study and use (Kaika, 2004). The ever-expanding capitalism supported this understanding, and it made nature a beneficial wheel to provide growth. As Marx and Engels (1856) explain this situation, the

domination of human beings also moves parallel to the domination of nature: While the capitalist mode of production uses technology by combining different processes into a whole, it also uses the original resources of wealth, being soil and labor (Kaika, 2004). With the understanding that nature and society are independent of each other, cities became places that are separate from "nature". However, when they are seen as separate identities, questions like where the resources come from, and how and in which way they are used, how are the goods and services made, where the waste goes become invisible and insignificant. While nature becomes a thing to be conquered and penetrated, or sacred; the city becomes a place that is a symbol of civilization and success of development, or an evil (Kaika, 2004).

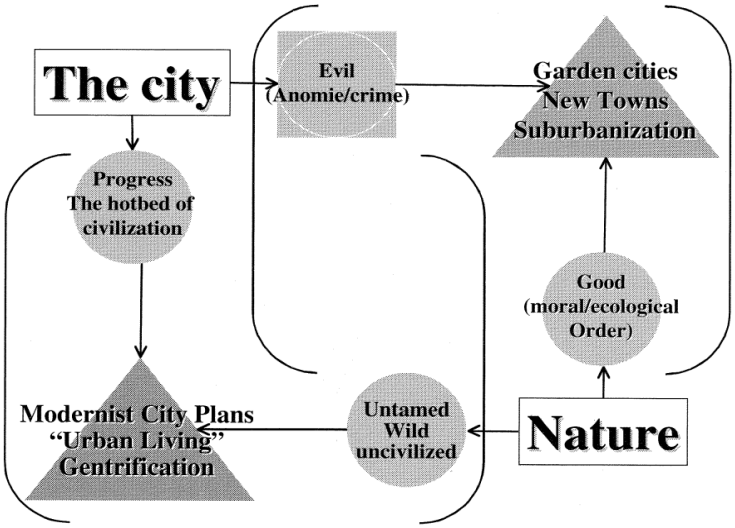


Figure 4. Modern duality of Nature and the City (Kaika, 2004).

As the cities have been expanding, their impact on nature has increased through the years. With the increased demand parallel to economic and population growth, the need for new resources also escalated. As a result, nature started to be limited by urban growth and the need for more places for production and consumption. The increasing need for resources. As Lefebvre (1970) states, with the rise of industrialism, the industry needed a marketplace, capital and capitalists, and labor. With industrialization, every source of a country became usable for that aim. So, industrialization formed a corporate rationality that can be used and extended to every aspect of a country's life (Lefebvre, 1970). As a result, urban components became subjects of profit, including nature.

With the exploitation of nature for the growing urban spaces, the opposite thoughts that want better environmental conditions arose. In the 19th century, new forms of cities that were more combined with nature were discussed. As these discussions led, the city started to be seen as "evil", which recreates the separation of nature and city. To improve the urban experience, new "green" areas were created as a symbol of nature. However, these green areas mostly became crime-ridden areas that children and women avoid. Also, suburban areas close to "nature" became places that are polluted with industrial wastes outside of the city and lack of services like sufficient water supply and sewage (Kaika, 2004). This situation is also valid in Ankara too and will be discussed in the next chapters. Dividing nature and society as separate identities leads to two major problems: First of all when nature is regarded as independent from society, society's impact on nature as a form of exploitation becomes invisible and is justified since it stands as a thing that should be benefited to sustain the growth. Secondly, in an opposite way, it makes the urban space and the creations by human creations as evil, and unnatural. The city becomes the antithesis of nature, or the natural, organic things (Heynen et al., 2006). However, societies evolved into building cities and there is nothing unnatural in this situation also as Harvey (1997) insists. Cities have evolved "naturally" and organically as a result of social processes (Kaika, 2004).

Correspondingly to the issues above mentioned, it becomes significant to remember that ecology should be considered within the social process, regarding society and nature not independent from each other nor human progress is not an unnatural thing. Society itself has a mutual relationship with nature as they are shaping each other. While no human intervention is out of the natural process by its definition, it is impossible to divide urban process and nature. So, it should be understood that the human and nature relationship is a living, and reciprocal thing that is shaped by and shaping each other.

As Heynen et al. (2006) suggest, neither natural nor ecological conditions are shaped independently from social processes. The cities and impacted resources like rivers are the results of historical socio-environmental processes. So, nothing stands as unnatural in this situation, understanding cities as a result of ongoing processes.

Neil Smith also (1984) searches for nature and society relationships, while explaining nature and capitalism as interdependent ideas. Nature is considered as an external being; existing outside of the society, which is the raw material such as trees, rocks, and rivers, and it is also a universal thing where human nature is considered regarding human beings and behaviors as external aspects of nature. Nature, as a universal thing, includes the "external" identity of nature with human existence. However, no matter how much the "external" identity of nature does not involve human existence, it cannot emancipate humans from being subject to "natural" laws. So, as Smith suggests, this dualism of nature cannot be logical. Identifying nature as an external thing only helps to justify controlling nature for the sake of human intervention in nature. However, when Smith explains Marx's understanding of nature, he implies that nature which is independent from human society is not a thing since the relation with nature itself is a product of history, where the very act of examining nature needs a certain relationship with nature. However, one should keep in mind that nature is not particular to the subject (of human existence) only, it is both the totality that everything exists and an element of human existence.

Smith (1984) extends his statement later, as the production of nature: while nature is understood as the antithesis of human action, it becomes a material substratum of everyday life containing use value and exchange value. With capital accumulation and economic development, this material substratum becomes a social production. So, space and society, and use value and exchange value are fused in the production of nature. Nature is not excluded from society or urban life, but they are involved in each other. Neil Smith's way of understanding the production of nature leads to nature becoming a concept "internal to capitalism" as Castree (2015) says, and it can be interpreted that nature means nothing if there is no social relation. So, it becomes a one-sided view if nature is explained solely as a concept completely affected by social relations but nature's impacts on society are disregarded.

Foster and Clark (2016) investigate the nature and society relationship too and are opposed to the idea that nature is entirely subsumed within the social process. As they explain, nature was reduced to a thing that is passive, and affected directly by

capitalism, but the reverse process is not examined. As a result, while investigating the nature and society relationship, it should be reminded that while nature is impacted by society, it also shapes society. So, to get rid of this problem, this thesis will put metabolism as the main framework to understand nature and society's relationship.

2.3. Metabolism

To help to understand integrated relations, and avoid a one-sided examination of nature, we can use the concept of metabolism. Marx's ecological understanding helps us to integrate the material concept of nature and history; as a result, we can find a dialectical relationship between society and nature. In Marx's analysis of nature, even though there is not any pure nature unaffected by human social process, there is also no social process independent from natural and material consequences of human actions (Foster & Clark, 2016). In this approach, while society's potential to impact nature is taken into consideration, nature's role in creating social relations and impacts on society is not ignored at the same time. While Marx analyzes socioeconomic relationships, he understands the interchange of matter and energy between society and the environment (Clark et al., 2018).

As Foster (1999) states in the article titled "Marx's Theory of Metabolic Rift: Classical Foundations for Environmental Sociology", the term metabolism started to be used in the 1840s to understand the relationship between organisms and their environments. An organism gets materials and energy from its environment and uses it to sustain its living. It was firstly started to understand the relationship between a cell and its surroundings as a biochemical process in the nineteenth century. Metabolism helped physiologists to examine the interactions and exchanges occurring between an organism and its biophysical environment. Afterwards, Ronald Daniels expanded the metabolism concept to all organisms and extended the metabolism concept to become useful in environmental analysis (Clark et al., 2018). With this widened understanding of metabolism, a chemist, Justus von Liebig, started to use metabolism to examine the exchange between humans and other living beings and the Earth. For plants to grow, they need nutrients in the soil, and they use

these. Those nutrients that are removed from the soil should be returned to their place to retain the process. So, any material removed from somewhere, soil in this example, should return one way or another to its resource to the processes to be sustained. This understanding showed a new way of thinking to understand the higher levels of organizations and interdependency, such as the exchange between societies and the environment they are surrounded by. Marx, following the contemporary scientific thoughts of his time, found the metabolism concept useful in his studies, so he adapted and extended it to examine the relationship between humans and the environment. He recognized that humans are dependent on nature and that nothing can be produced by humans without nature. As Marx states, the earth itself is the universal instrument that provides material and a place for workers to employ its process (Foster & Clark, 2016). As metabolism explains, the metabolic interchange between humans and nature creates and recreates all of the social dynamics, labor, food, and energy.

Marx explains the metabolism concept by dividing it: Firstly, he uses "universal metabolism of nature", for a wide-ranged biophysical world which includes processes and cycles to continue ecological conditions. In the universal metabolism of nature, particular cycles, like the water cycle, and processes recreate ecological activities. Secondly, Marx examines the "social metabolism" where humans constantly interact with the external nature while producing goods, services, and needs as a result of social dynamics. Labor is formed as a result of processes within the social metabolism. However, social metabolism occurs within the universal metabolism of nature since humans are not independent or excluded from that process. So, the universal metabolism of nature includes all the relationships between organisms and their surroundings (Foster & Clark, 2016).

Marx uses this term to understand the relationship between human beings and nature as a social-ecological metabolism through the labor process:

> "Labour is, first of all, a process between man and nature, a process by which man, through his own actions, mediates, regulates and controls the metabolism between himself and nature. He confronts the materials of nature as a force of nature. He sets in motion the natural forces which belong to his

> own body, his arms, legs, head and hands, in order to appropriate the materials of nature in a form adapted to his own needs. Through this movement he acts upon external nature and changes it, and in this way he simultaneously changes his own nature (Marx 1976, pp. 283-290).”

So, as we can infer from Marx’s definition of metabolism, all components of nature are in a dynamic relationship between nature and humans, as a result of human labor; while labor is an outcome of this dynamic relationship too. This relationship is interdependent and two sided since there are material and energetic exchanges (Foster, 1999). Metabolism helps to avoid reducing nature as a sole subordinated thing by society. In Marx’s metabolism, humans and nature are in simultaneous interaction, as an outcome of reciprocal influences and consequences. Nature is transformed through human production, under conditions inherited by natural and social history (Foster & Clark, 2016).

In a nutshell, a metabolism needs inputs to sustain itself and it has outputs of the metabolic process. The input needed to preserve the livelihood of the metabolism can be anything that turns into energy, and there is always an output of that action.

2.3.1. Metabolic Rift & Urban Metabolism

Any obstacle in the process of production affects the whole metabolism. As Marx explains, large-scale property and industry created by the capitalist mode of production led to an irreparable rift in the interdependent relationship between humans and nature. Marx examines this in agricultural terms: In most of the pre-capitalist societies, farm animals and agricultural production were symbiotic to each other. Animals were fed the grains produced on the farm, and their nutrient-dense manure was reunited with the same soil. Also, people living in these places were mostly fed by the food and used the fibers to create clothing produced in the same place, and their waste was also returned to the same place. So, the nutrient cycle would be completed within this local production, consumption, and waste processes. With the new social dynamics created by capitalism such as large land property ownership, enclosure of lands, and industrialism this metabolic exchange was disrupted. The population in agricultural areas decreased while the urban industrial

population became dense and a divide between urban places and the countryside occurred. As a result, the production and consumption of food were divided by large distances. The food and fiber, and also the nutrients in the soil that are used to produce it, started to be produced in the countryside and transferred into cities. Being consumed in the cities, the outcome of food, "waste", was accumulated in the form of pollution in the cities and rivers. Liebig (1862) described this situation as a systemic robbery of the soil in terms of nutrients. This situation created by the progressive large-scale capitalist production led to an "irreparable rift" in the interdependent relationship between humans and nature. Destroying the long-lasting sources that are needed to improve the productivity of soil by "robbing" it, violated the universal metabolism associated with the nutrient cycle as Marx (1867) explained in The Capital (Foster & Clark, 2016). This "rift" occurred in social metabolism and affected the universal metabolism.

Marx (1867) explains the metabolic rift as a result of capitalist mode of production above mentioned in the Capital, Volume I:

> "Capitalist production collects the population together in great centers and causes the urban population to achieve an ever-growing preponderance. This has two results. On the one hand it concentrates the historical motive force of society; on the other hand, it disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing; hence it hinders the operation of the eternal natural condition for the lasting fertility of the soil… But by destroying the circumstances surrounding that metabolism… it compels its systematic restoration as a regulative law of social production, and in a form adequate to the full development of the human race… All progress in capitalist agriculture is a progress in the art, not only of robbing the worker, but of robbing the soil; all progress in increasing the fertility of the soil for a given time is a progress toward ruining the more long-lasting sources of that fertility… Capitalist production, therefore, only develops the techniques and the degree of combination of the social process of production by simultaneously undermining the original sources of all wealth—the soil and the worker. (Marx 1976, pp. 637–38)"

The metabolic rift can help understand the relationship between the social metabolism of capitalism and the environmental issues of oceanic, hydraulic, and forest systems. For example, coal and natural gas burning to sustain the growth breaks the solar-income budget due to the massive quantities of carbon released.

Simultaneously, continual deforestation decreases the carbon hold potential of nature, contributing to carbon dioxide accumulation. As growth-driven capitalism accelerates, the interaction between nature and society becomes intensified, disregarding the natural limits. As a result, socioecological rifts within various natural cycles and systems become more visible (Clark et al., 2018).

The metabolic rift can be seen anywhere in cities too: To sustain transportation and plastic production, petrol is extracted from the earth, and as a result, it creates pollution in the forms of solids or gas. To create electricity, rivers are trapped in dams, and do not return to their birthplaces, or other means of production are used in the same way. Today, cities receive massive amounts of resources from outside, and after using them, they are collected in the forms of waste and dumped somewhere.

With the help of metabolism, a city can be understood as an enormous socio-environmental process within the simultaneous transformations of the socio-physical metabolism of nature. As Heynen et al. (2006) explain, cities are formed by close networks of interdependent socio-spatial processes at both local and global, cultural and organic levels. All the components of a city; money, energy resources, food, transportation, etc., and all the human bodies; migrants, workers, and capitalists, are considered to be interconnected and their impacts can be examined within the urban metabolism term. Nature, society, and city develop simultaneously and affect each other.

These socio-environmental processes are in circular flows. We can think of the energy process: all the city lights are fed by energy obtained from power plants. Simultaneously, cars, factories, and heating systems are dependent on some energy resources and pump CO2 into the air. These energy needs and gas blowouts impact the urban lives: of people, other animals, and plants. So, urbanization can be considered as a process of de-territorialization and re-territorialization organized through these social and physical metabolic flows. (Heynen et al, 2006). Urban metabolism analyzes the process within countless numbers of transactions between humans and the environment. While major inputs in a city are water, food, and fuel; the major outputs are sewage, solid refuse, and air pollutants.

This thesis will examine the metabolic rift in Ankara focusing on urban and water metabolism, to analyze the impacts of the urbanization process on the Ankara River Basin.

2.4. Politics of Nature

2.4.1. Debates Around Water Politics

Water, as a component of nature, and a component of everyday life, stands for a great example in the nature and society relationship. This connection helps us to understand the intertwinedness of society and nature and creates a field to explore. Any impact on nature affects water, and water affects society. The opposite is also true: society has an impact on water, as well as water impacts nature. Mollinga (2008) explains the relationship between water and society as: "a natural resource; it is also a resource in societal processes, actively deployed and regulated, shaping people's lives and livelihoods, and the development of cultures and political economies" (p.11). So, water cannot be thought of as an external, independently moving phenomenon. Water is influenced by and influences society. Controlling water has been an issue since time immemorial for humans. It includes any human intervention in the water cycle. So, water resource management is an ancient problem. So, water cannot be independent from politics. Yet, Mollinga (2008) states that water resources management is inherently political. Since water is a necessity for all living beings, its resource management should ensure that its distribution is equal and sufficient.

Despite having plenty of underground and groundwater, the world is struggling with finding safe and enough water. As statistics show, there is more than enough water to supply the water needed for the entire population. A question arises here, how can a crucial thing for life be so scarce while it can be seen almost anywhere in the world, or as in our example, in a city that is built on multiple rivers? The answer to the question is that the fundamental problem is not the scarcity of water but its distribution. Water is not in short supply, but its management is the problem itself. The World Water Report of 2014 mentions that "the crisis is essentially a crisis of

governance". The water crisis is not a natural occurrence and the population increase is not a sufficient answer to the problem (Gonzalez & Yanes, 2015). However, rising debates around water governance led the water issue to be reduced to a "technical" thing, which caused depoliticization of the water problem. Speaking of governance, the problem becomes instrumental as Jenkins (2001), Ferguson (1994) and Harriss (2001) contributed (Mollinga, 2008). Focusing on the water problem as a governance issue reflects the issues around ecological problems while excluding sector-focused understanding of water management, which is the recognition of socio-political aspects. As a result, mainstream water governance can be shaped as an allocation of rights such as technology, decision-making, and water rights; as well as the resources like water itself but also the funds to maintenance and investment of it in some interest groups who have social power (Mollinga, 2008).

Controlling water can be examined in three aspects: technical, organizational, and socio-economic. These aspects include manipulation of its flow, controlling the behavior of the society, and creating legal and administrative bodies. Through the water control debates, contestation around different interest groups rises and is shaped by the political power of these interest groups (Mollinga, 2008). The politics of water can be investigated on several levels: First of all, everyday politics of water examines daily struggles on water use and management, such as local use and access to water for households and agriculture. Yet, water access can be controlled by dams or canals far away from these local uses. The second aspect of water politics is in the context of sovereign states which is used to understand state instrumented water policies and their interactions with different groups of interest. Inter-state water politics stands as a third aspect to explain the contestation among different states for water use and access, particularly for interstate water resources. Lastly, water politics can be investigated on a global level which is a relatively new phenomenon. It refers to global political actors such as the World Water Council and the Global Water Partnership (Mollinga, 2008). While the following paragraphs will focus on mostly global levels of water politics to understand the mainstream understanding of water, our main study area will be mostly about every day and sovereign state-level politics due to its specific study area.

2.4.2. Evolution of Global Water Politics

In the late 20th century, the water demand increased sharply with the industrial and agricultural developments. Water became not only a thing to be drunk or used for cleaning, but it also started to be used for other things such as agriculture and industry. While just 10% of global water is used in domestic consumption, industry and agriculture became the dominant consumers of it since it is used in various sectors to produce goods and make a profit. So, water is not only consumed but it is also polluted as an outcome of these sectors. While industrial production can produce poisonous chemicals as end products, chemicals used to increase productivity in agriculture contaminate the water. With the increased consumption and pollution, debates about the scarcity of water have started to be formed. The water turned into a "profitable good" and found its place in the market. Water itself became a thing that can be channeled, transferred, bottled, and sold (Gonzalez & Yanes, 2015).

The debates around water scarcity raised questions about its common property status. Privatization of water was justified by emphasizing its value: If water were free, it could be easily wasted. To prevent wasting water, managing costs of water could be covered by the citizens but not by the government. As a result, water became a thing that can be accessed by the ones with the money. While a wealthy family holds the right to waste the money, the poor cannot access it (Holland, 2005). People who can afford it could waste the water as long as they want.

Over time, the supply of water was privatized globally. The water business became so big that the members of the "World Commission on Water for the 21st Century" formed by the World Water Council, the United Nations and the World Bank's collective business were businesspeople, CEOs of the biggest water companies, and former presidents of banks. The understanding in the forums made by the UN, or in later instances by the EU, was that water is subject to the laws of the market like other natural goods, and competition is needed. Due to the marketization, the water business needs a lot of investment that can be made by private companies so that the access to "capital" can be owned by them (Holland, 2005).

Turning water into a commodity rather than a public good with the dispossession of people can be explained as water grabbing. It happens in many ways such as privatization of water services such as infrastructure and distribution. While efficiency and reduced costs were given as reasons for this, water services became profit driven. Secondly, water grabbing can be seen in water resources. With enclosures of water resources, companies can rent the water for a time for mining or other industrial usage, or to sell bottled water. Due to water insecurity, bottled water became a highly profitable commodity (Bieler & Moore, 2023).

2.4.3. Water Grabbing

Today, different actors like states and big corporations enclose lands. This enclosure happens in favor of large-scale industrial and agricultural profits; without local peoples' benefits or equal access being taken into consideration. When access, and right to the use of a land is taken over by specific interest groups such as big-capital owners, land grabbing occurs. During the land grabbing, its valuable resources such as water is also controlled (TNI, n.d.). In these large-scale land grabbing, the resources belonging to that land, such as water, are also grabbed. Due to the nature of water itself, its availability changes through time and space. As a result, its control gains significant importance for the different groups. So, water grabbing occurs in various places, limiting public access and threatening the food and water security of local people. There is plenty of evidence that shows land grabbing for agriculture is strongly connected to the water dimension. In a nutshell, water grabbing occurs when powerful actors can take control of water resources used by locals or flowing freely, providing habitats for wildlife. It is not only controlling water but also having the power to choose the use of it: such as to decide who will use the water how, and for how long, and what aims. So, it occurs not only for agricultural produce but also for economic purposes and it is important to emphasize the capital involved in the process. As an example, the property of rivers can be bought for 49 years in Turkey, to channel rivers and use them for hydroelectric power, and also bottled water for sale (Franco et al., 2013). One way of water grabbing occurs in this way: Renting rivers and building dams and hydropower plants. Dams were seen as profitable since massive investments are needed to build them and they are also a way to supply

energy. However, dams created several problems. First of all, to build a dam, rivers should be directed and there needs to be a place to contain the water collected. It causes displacement of humans and animals. For example, several villages and some historical cities have been flooded with dams in Turkey. Since there is a high-profit potential, the local population's oppositions were silenced. Secondly, building a dam causes the accumulation of the silt in dams that have flowed into deltas and floodplains of rivers naturally. This leads to changes in the river's flow rate and water quality. Also, over time, the amount of water in the reservoir decreases as a consequence of stagnant water. While dams are built faster and bigger to supply a growing population, water cycles are disrupted (Gonzalez & Yanes, 2015).

To conclude, water grabbing happens in different forms of agro-economic contexts, made by state-capital actors on global and local levels, extends its effects from the solely geographical context, and has various impacts on societies and the environment (Franco et al., 2013).

2.5. Water Metabolism

The concept of water metabolism is broadly used by water management engineers in urban planning within a water cycle. It can be included in urban metabolism too: According to Wolman's (1965) explanation of urban metabolism, it involves countless amounts of input and output within a city. While water, coal, oil, natural gas, and motor fuel are inputs, several chemicals like sulfur dioxide, nitrogen oxides, and others occur as an output of the urban system. So, thinking about the value of water and other resources, management of these urban flows becomes crucial. Also, discussed in previous chapters, the water problem can be discussed in various ways in different dimensions. Yet, to understand the water problem as a whole, metabolism stands as a useful concept since it explains the impacts of the intervention of water in a multidimensional way.

Water impacts residents in various ways; as a crucial need for life, as a part of sewage and drainage systems, as a natural power such as floods or droughts, as an

ecological habitat, and lastly as a recreational object. Water is one of the biggest inputs for an urban area (Wolman, 1965). So, it is crucial to understand the flow mechanism and its relationship between urban, people, and nature. Employing the urban water metabolism term will be useful to understand the expansion of an urban area, Ankara in our example, and its impacts on water.

Water has been an important resource in different ways: it has economic value due to the need for energy and the privatization of it. Also, the water ecosystems are crucial for several species and have cultural values too. As Stuart Oliver (2005) explains in the article titled "The Desire to Metabolize Nature", water, and a river, is a contingent form of a cultural landscape where culture is the agent and the natural area is the medium. Rivers, one of the main water supply bodies, have been tried to be controlled by humans for a long time. Many efforts and resources have been put into controlling rivers to sustain the water supply for drinking, cleaning, and irrigation.

To understand the urban water metabolism, we need to clarify it. An ecosystem has inputs and outputs in the process of labor. Water from several different sources, such as rain, rivers, or underground, is collected and used by the urban components. Unlike other energy flows, such as fossil fuels, water metabolism is "reversible", which means water can be reused and returned to its source after interaction with the society. As an example, water is used to create energy in the form of hydropower, and it can return to the rivers. So, we can think of water metabolism as a circle. After it is withdrawn from the natural ecosystem and used by society, it is able to return to the natural ecosystem (Madrid-López & Giampietro, 2015). So, in this water cycle, any change in water and climate will impact the whole system since it does not run out. Since impacts of rapid urbanization are not limited to urban areas and humans themselves but extended through nature, it has impacts on water metabolism too. Consumption of water is connected to water production and wastewater emission, so it is a major indicator of understanding how water use behavior during rapid urbanization pollutes and disturbs the environmental water system. Water usage impacts the water chemistry with the changes in nutrients and contaminants as a result of urbanization (Huang et al., 2013).

As urban areas are growing and being populated, it leads to loss of farmlands, forests, diversity and increases the pressure on air and water quality. While urbanization leads to water scarcity and water pollution, it also increases the risk of flooding (Huang et al., 2013). Today, the water crisis can be explained in two dimensions: the human health and development dimension, and the environmental dimension. The first problem stresses that almost 10% of the global population does not have access to regular safe water. Lack of safe access has multiple levels affecting human life including waterborne diseases, girls missing school to collect water, and million deaths per year. The second dimension of the water crisis emerges as water stress caused by droughts, floods, and increased desiccation of water bodies such as rivers and lakes. In this dimension, agriculture is responsible for the major withdrawal of water as it constitutes two thirds of whole water withdrawal. Since this withdrawal of water is used in goods that are produced to be long-distance trade, it disturbs the water balance in its resource area, leading to desertification and biodiversity loss (Hargrove, 2021). So, withdrawal of water to uphold mass production, and transferring it to several places stands as an example of the rift in the water metabolism. In addition to mass-produced agricultural goods, building dams, and canals, municipal water systems have impacted the water metabolism as a side effect of economic growth as a result of this process made through capital accumulation.

As urban metabolism concept helps to understand, water both impacts and is impacted. An example in the article titled "Water and the Political Ecology of Urban Metabolism: The Case of Mexico City" by Gian Delgado (2015) can be shown: Mexico City. In the city, there are four different water basins, which are not related naturally. While three of them are used for water inflow, one basin is for outflow that is mostly untreated. Upon this unnatural system, the city's history as being a lake did not help the Mexico City citizens. With construction, climate change, and the location of the city, Mexico City is faced with floods, as well as droughts in some parts. In addition, bottled water usage is high in the city. So, while water metabolism is impacted, it also impacts the citizens.

The theory and examples in different areas are valid in Ankara too. As Çetiner and Şahin (2020) explain in the article titled "An Ecological Status Analysis of Urban

Streams Using the Example of Ankara River," water ecosystems in Ankara play important roles in the formation of city habitats for different kinds of animal species and ecologies, in shaping the city culture by creating recreational areas and creating microclimates and decreasing the air pollution. Also, they are sources of drinking water, irrigation water, and income. A water system holds the rainwater, collects it, and redistributes it into the rivers again. However, with growing population and urbanization, the water ecosystems are impacted and the natural water circles are interrupted. While deforestation and construction interrupt the water cycle, chemicals used in agriculture and industry are poured into underground water. As a result, water metabolism is disrupted.

CHAPTER III

WATER OF ANKARA

3.1. Natural River System

Ankara is constructed between Sakarya, Kızılırmak and, Konya River Sheds (Sancar, 2022). Ankara is called a "calyx" (Yavuz, 2018), or depression zone, to refer to its geographical features: with Sakarya River Basin located in the west and Kızılırmak River Basin in the east as water bodies, and with the Hüseyin Gazi Hills in the east, Çal Mountains in the South, Keçiören Hills in the North, Ankara is surrounded by hills, mountains and naturally with lots of water streams. In this calyx, there are three main rivers that flow all year long: Çubuk River is the river with the most flow and it runs from north-east. It. The second one is the Hatip River which originates from the south east of Ankara. With the last one being the İncesu River, they meet at a point and form the Ankara River. Ankara River connects with the Sakarya River and it flows into the Black Sea in the north of Turkey (Sancar, 2022).

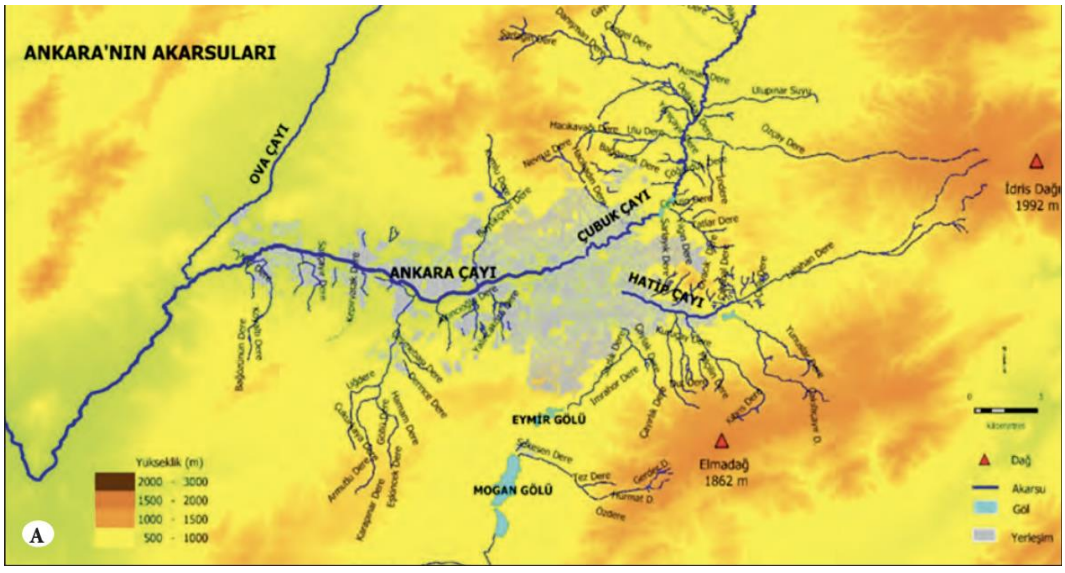


Figure 5. (Kazancı et al. 2018; Note: "Çay/Dere" refers to "River")

Ankara River has an important role in creating Ankara's geomorphological landscape. The river includes several minor rivers, and it can be said that it is the main body of water in Ankara (Çetiner & Şahin, 220). These other rivers do not flow all year long, but they flow depending on seasons and rains. In summer, most of the minor rivers do not have any flow. 60% of rain comes from the south of Ankara, and almost 80% of rivers in Ankara flow into the Ankara River (Sancar, 2022).

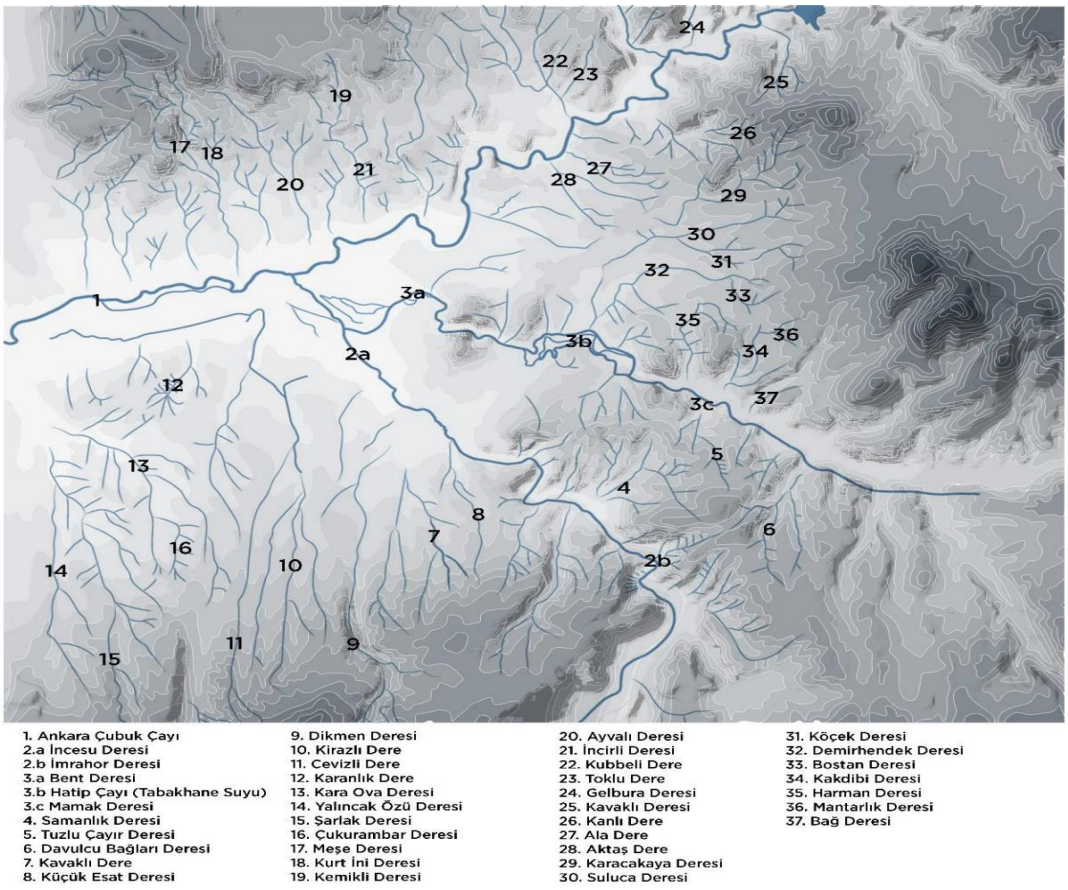


Figure 6. Another visual shows at least 37 rivers by Irmak Yavuz's Master's Dissertation (2018)

3.2. History of Ankara Through Water

As of today, we cannot see any rivers in or around the city. However, Ankara has been a city famous for its river ecosystem for centuries. So, what happened to these rivers is a question in mind. Ankara still has a lot of rivers in the urban center, and the Ankara River still flows around the city, but they were trapped under concrete tunnels or directed into the sewage system without any action taken. Ankara's rivers

were important for local people as a supplier of drinking water and recreational usage, even for fishing (Yılmaz & Ercoşkun, 2020).

3.2.1. Before & Early Republican Era

As Özand explains (1967), the water system in Ankara was built by the Romans, and includes canals, galleries, and underground wells. Some canals were 15 km long and a water gallery in Kayaş built by the Romans was in use until the republican era. So, the water system built by the Romans was a successful one and was in use for centuries. In 1890, the water system was developed by Abidin Paşa, and new pipes were started to be used ("ASKİ", n.d.). With the development of railways, technology became more accessible, so the water pipes were developed and the transfer system of water became easier and safer.

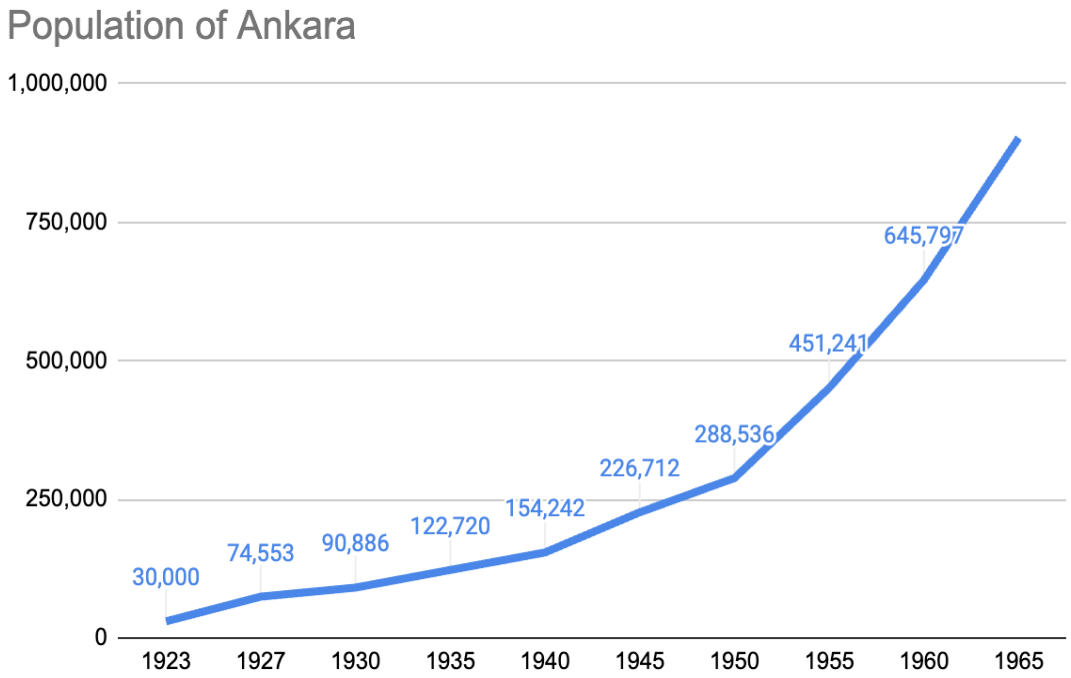
After Ankara was declared the capital of the new republic in 1923, the population of 30,000 increased suddenly to 75,000 in 1927. So, the existing water system became incapable of managing the growing population. New plans started to be made to transport the water to the city with new pipelines and a Belgian company was assigned by the municipality. An expert, Bonnet, was hired and he started his first projects in Ankara.

In 1931, Ankara's water management authority was taken from the municipality and Ankara Şehri İçme Suyu Komisyonu (Commision of Drinking Water of Ankara) was established by the government. With the commission established, Hermann Jansen's urban plan for Ankara was taken into account and his projects for a city with 160,000 people were started to be used. Jansen planned to collect rainwater into the rivers via pipelines while letting green areas near the rivers stay. So, in any event of heavy rainfall, natural formation would hold the excess water. Also, by separating the wastewater with different pipes and cleaning it in a treatment center, the residue could be used as fertilizer as part of Jansen's plan. So, rivers could stay clean while any flood from rainfall would be prevented (Tekeli, 1991).

In 1933, "İller Bankası" (Bank of Provinces) was founded to fund the municipalities for the development of infrastructure. Drinking water and sewage services started to

be funded by the İller Bankası (Acar, 2012). New dam projects were made, maps of existing water resources were created and the Çubuk Dam, new water tanks, and new pipelines were built between 1931 and 1936. However, since the population increase was faster than planned, and there were not any backup plans, these projects became insufficient when the population exceeded 160,000 in a very short time. With migration from rural areas, the population started to rise sharply in the 1940s. Also, WWII was another factor in the population rise. Due to the lack of planning, Ankara had water problems between 1940 and 1950 ("ASKİ", n.d.). In 1945, new wells were drilled and the water supply increased slightly. However, with the continuous population increase, the search for new water resources became continuous too (Özand, 1967).

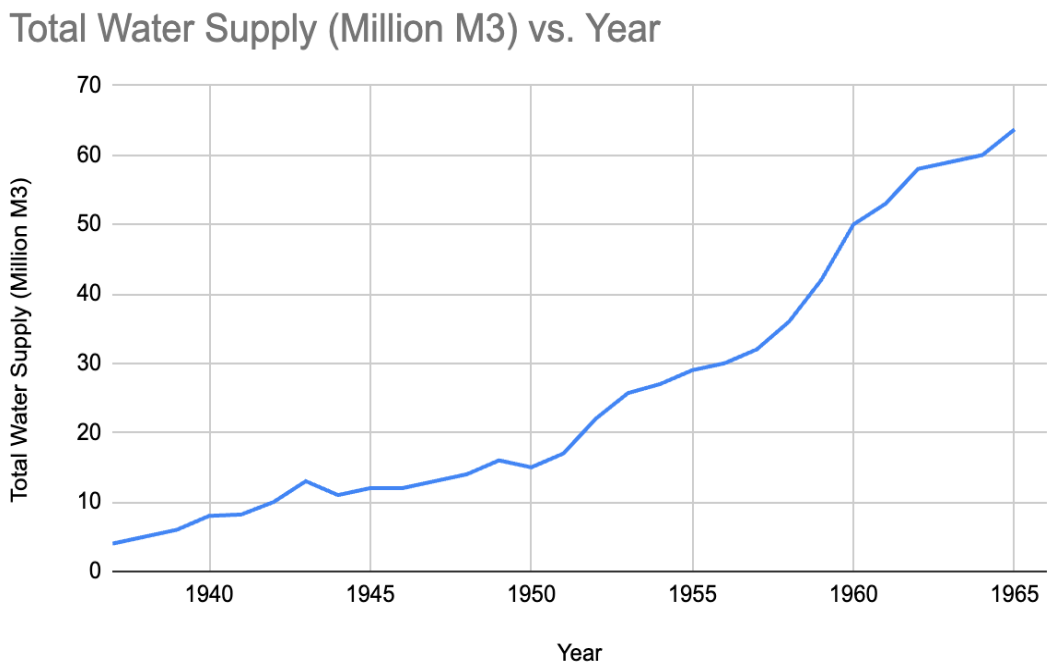
Table 1. Rapid population increase in the city (Data: Özand, 1967)



While water use was increasing, the wastewater was still spilling into rivers and rivers were getting more polluted. A company from Germany was hired to create and carry out new plans about wastewater but due to WWII, all connections with Germany were cut. So, new sewage system developments were started but they were insufficient. As new buildings were made, sewage systems had to be dug deeper.

These problems were increasing the cost of infrastructure development, so it was a very slow process (Tekeli, 1991).

Table 2. Yearly Amount of Water Supply to Ankara (Data: Özand, 1967)



3.2.2 ASU Era & Closing Rivers

In 1949, water management changed again. Under the auspices of the municipality of Ankara, Ankara Sular İdaresi (ASU) was established. So, the water management became more institutional and organized and things began to change more rapidly.

In the following years, the municipality opened tenders to private companies to build the sewage system. However, these were still not enough to create a healthy water management system, so rivers continued to be polluted (Tekeli, 1991). The authority of water management changed with the establishment of DSİ (General Directorate of State Hydraulic Works). So, the state became the main actor in managing water issues all around the country.

The Bentderesi, a part of the Hatip River in the city center, can be an important example of the changes in Ankara. Until the declaration of the republic, Bentderesi was a recreational place for people to meet and enjoy the riverside. Also, Jansen

suggested developing the city with a focus on rivers in his urban development plan for Ankara. He planned a water system with new dams and recreational areas near rivers which included bridges, cafes, and living spaces near Bentderesi. Since Bentderesi's name comes from an ancient Roma weir (“Bend " in Turkish), Jansen tried to protect that historical area for the new capital city. However, the last weir ruins of the Roman Era were destroyed in 1935, it was built again and demolished again in 1957 (Özand, 1967).

With the population boom, shantytowns emerged on riversides with the migration to the city center. However, due to the lack of infrastructure, Bentderesi started to get polluted since wastewater was directed into rivers.

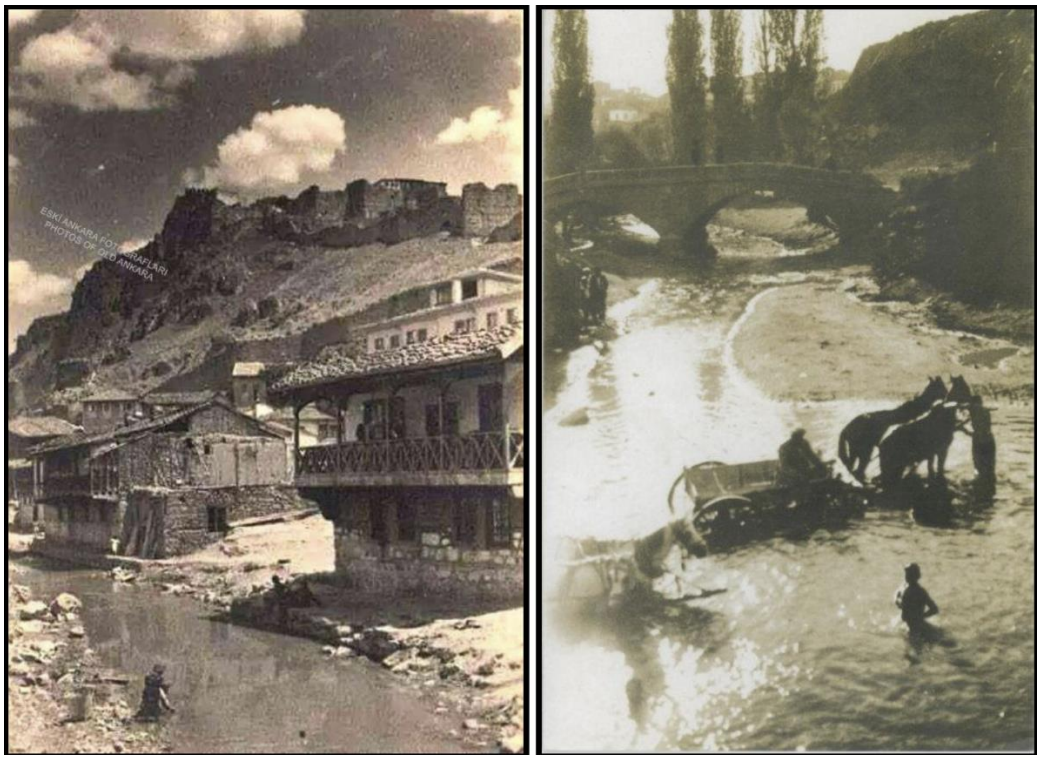


Figure 7 . People swimming in Bentderesi.
Source: Ercoşkun & Yılmaz, 2020

As mentioned in a 1951 report, Ankara River was so polluted that there were no fish left and swimming in the rivers became impossible (Tekeli, 1991). Shantytowns were held responsible for the problem and the municipality warned people in the shantytowns that the Bentderesi River would be expropriated, and people needed to

be evacuated from these houses. The new plan was to put Bentderesi into a canal and build a 50 meters wide road.

In 1957, Bentderesi was flooded and 130 people were killed since they thought that the flood warnings from the municipality were to evacuate these people from the shantytowns. (Yılmaz & Ercoşkun, 2020). In a 1967 report by İbrahim Batukan, the reason for this flood was the new constructions and deforestation (TMMOB, 2022).

Figure 8. Büyük Ankara'ya Doğru, (1957) Basın Yayın ve Turizm Umum Müdürlüğü (Onur Bektaş's archive) Explanation: "The Bentderesi Operation": Bentderesi River will be closed after 1950 since it smells and has frogs. The river will be a road as an example of Turkish urbanization.

So, rivers started to be canalized under the earth or connected to the sewage in order to get rid of shanty towns with flood risk reasoning. Closing Bentderesi meant several things: Firstly, people in the shantytowns were replaced. Also, the wastewater problem was solved without developing a new sewage system. If nobody sees, or smells it, wastewater could be certainly directed into a river. It also led to another thing: construction started to be seen as the main wheel for economic growth. Roads and buildings were now the symbols of development. However, the

enclosure of Bentderesi changed the flow of the river, and the river was connected to the İncesu River with different canals.

Figure 9. Bentderesi now. Mustafa Taşkın's Archive, 2020.

In the following years, the city's water problem got bigger. The water needs were tried to be solved with new dams, wells, and canals through the expanding city. Rivers became a part of the sewage since there was not any wastewater management.

While these rivers were put in the ground, Ankara became vulnerable to floods. Several floods have been recorded in the city center for years. As the "Ankara Su Baskınları Raporu" (2022) by TMMOB shows, between 1946 and 1961, at least 6 floods were reported which caused the death of more than 172 people, and the destruction of many houses. It should be kept in mind that the report was published right after a flood in 2022, to address an ongoing problem since the1940s. Also, the report claims that, while there have been several new construction plans for new roads and buildings, infrastructure development has been insufficient. The reason for floods and losses is not heavy rainfalls but unplanned constructions without any infrastructure progress.

As Hasan Akyar explains in an interview, the river flows were restricted due to the high amount of construction and concentration of the population (Sancar, A., 2020).

Even though the rivers were put underground, their flow still continues. So, floods started to occur in the areas where there were rivers flowing freely.

In the following years, search for new water resources continued. On the other hand, sewage systems were not very developed. Several dams were built in the late 1950s and 1960s: Çubuk 2 Dam in 1964, Bayındır Dam in 1965, and Kurtboğazı Dam in 1957. As the report by Camp-Harris-Mesara shows, while the population was 919,000, only 470,000 people had access to sewage in 1968. Also, the sewage system in use was not qualified enough. Pipes were off grade, the slope was not calculated and there were many other things that showed poor engineering. Also, 70 of sewage canals were put directly into rivers, while 20 of them were put into enclosed canals. Due to this system, both drinking water, and water resources were polluted (Tekeli, 1991).

3.2.3. Camp-Harris-Masera Plan

In 1968, the above-mentioned Camp-Harris-Mesara (CHM) plan was made with a population projection for the following 50 years. According to the projection, in 2020, the population of Ankara would be between 3.71 million and 5.25 million. In 2020, the population in Ankara was 5.66 million according to TÜİK. In the same years, DSİ made a water plan too but its population projection was wrong: it claimed that Ankara's population in 2015 would be 2.2 million, while the real population was 5.27 million. So the CHM plan showed how well-studied it was. In the plan, the sewage system was planned to provide service for 3.8 million people through the main rivers. It also suggested diverting rainwater and wastewater pipes. Also, the plan included possible flood scenarios, water treatment systems, and running new dams and canals simultaneously with the population increase. However, this plan was not implemented fully. New dams were built, but the sewage system was not developed. Instead of developing a wastewater management system, already polluted rivers were put underground in the 1970s (Tekeli, 1991).

3.2.4. 1980 Military Coup & Neoliberalization

The 1980 military coup changed the political atmosphere in Turkey. Neoliberal, private sector led policies started to be implemented. In 1984, the "Metropolitan

Municipality Law" was passed and İstanbul Water and Sewerage Administration (İSKİ) was founded. After the foundation of İSKİ, ASU was formed into the Ankara Water and Sewerage Administration (ASKİ). With these changes, water service was privatized. According to the Metropolitan Municipality Law, the administration holds the right to buy, rent, or sell any goods according to their potential profit. Also, an understanding of "the one who uses the water should pay for it" was developed. As a result, the jurisdiction of İller Bankası was narrowed down and the municipalities became responsible for infrastructure (Acar, 2012).

In 1984, according to a study by Devlet İstatistik Enstitüsü (The Institute of Statistics), 82.5% of buildings in Ankara were connected to the sewage system. This percentage increased to 84% in 1989. While the sewage system was developed until these years, the divided rainwater and wastewater system did not progress enough. All the wastewater was still being directed into rivers and it could be seen only wastewater was flowing in the seasons when rivers dry. In 1989, 28.99% of all flows in the Ankara River were from domestic use while 10.14% came from industrial use. It should be noted that there was not any water treatment center. Compared to 1968 measurements, the pollution increased by 250% (Tekeli, 1991). Pollution was one ongoing reason for rivers being put underground.

3.2.5. From BAKAY to Today

In 1989, "Büyük Ankara Kanalizasyon ve Yağmur Suyu Projesi" (BAKAY, Greater Ankara Sewerage and Rainwater Project) was made to create a sewage system with a water treatment center and a separate rainwater collection system and to make Ankara's sewage and water management system a more sustainable one. The project was planned to be completed in 1998. However, the project has not been completed. According to the Ankara Metropolitan Municipality report, 34% of wastewater management and 29% of rainwater collection of BAKAY was completed (ABB, 2009). In 1997, Ankara Merkezi Atıksu Arıtma Tesisi (Ankara Wastewater Treatment Plant) finally started to be used. After this time, the wastewater in the river was treated, and discharged into Ankara River again. In 2000, the Sakarya River, whose basin forms 7.46% of Turkey's area, was regarded as stage 4 polluted:

very polluted (Köle, 2014). Neither Jansen's plan in the 1940s, nor CHM plan in the 1960s, nor BAKAY project in the 1990s was completed.

After a drought in 2006, a major water problem in Ankara occurred and it continued in 2007. The water supply for Ankara decreased sharply and some cuts in water supply had to be made. While climate change was one of the reasons, according to the TMMOB report in 2008, the potential water problem was predictable. Almost for 100 years, no sufficient infrastructure was made for water management while the city was expanding and municipalities were developing. As a result, the ongoing problematic water management became unable to provide water for the residents in Ankara. Experts and several organizations warned official authorities, well-organized plans were made, and big amounts of money were spent. However, neither drought seasons nor heavy rainfalls were managed successfully.

In 2007, the water supply of Ankara was so insufficient that a new water resource from the Kızılırmak River was started to be used. However, as the Chamber of Civil Engineers (CCE) indicates in the report titled "Ankara Water Situation Report" published in 2020, Kızılırmak is not recommended as a drinking water resource. Containing higher amounts of pollutants like sulfur, Ankara's water treatment center at that time failed to meet the need for drinkable tap water since it was not constructed to treat that kind of water. With the use of the Kızılırmak River, tap water in Ankara became undrinkable. Residents in Ankara had to use bottled water. Bottled water should be paid for and carried. Unavailability of safe drinking water is still a major problem today.

Also, prime minister R. Tayyip Erdoğan suggested a solution for the water problem: privatization. Starting from these years, the use rights of rivers and lakes were started to be sold to the private sector. So, private corporations started to build dams and sell water and energy to the public. This started a new era in Turkish public services: "build, operate, transfer" (Haspolat, 2008). However, these privatizations did not solve any problems in contrast, they led to the exploitation of natural resources more. With the right to usage of natural resources held by the private sector, citizens' right

to water was grabbed. Companies have the right to redirect, channelize, bottle, and sell the water without any restriction right now.

Today, Ankara has 8 active water resources and 9 water treatment centers as ASKİ (Ankara Water and Sewerage Administration) indicates. One of the water resources is not from the Sakarya River Basin though. While Kesikköprü Dam is located in the Kızılırmak Basin, the other dams are connected with the Ankara River and the Çubuk River. So, Ankara uses water from two different river basins. Also, the potential of Kargali Dam is so small that the Chamber of Civil Engineers does not include it in the data. You can see all of the active water resources in Ankara in the maps below.

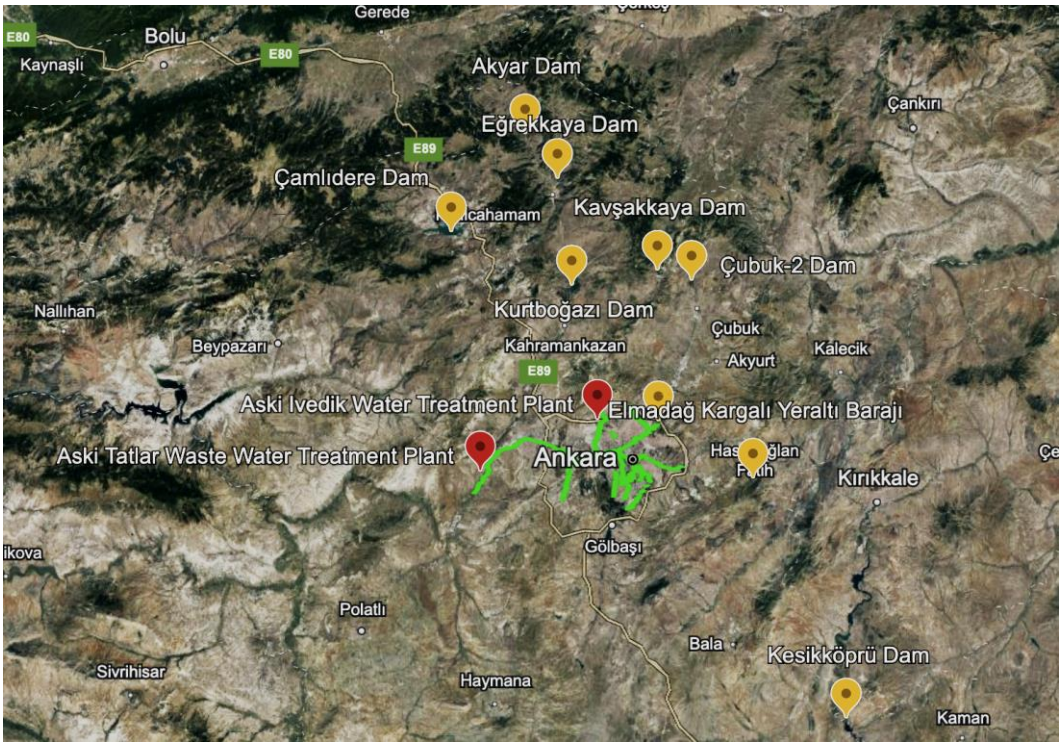


Figure 10. All Dams are shown with yellow pins. Two major water treatment plants are shown with red pins. The green paint shows the rivers in Ankara, created by Onur Bektaş. All other data is from Google Maps.

All water resources except Kesikköprü are located in the north of Ankara and they flow with gravity, without any energy need. Water flows from the Akyar Dam into the Eğrekkaya Dam, and with the Kavşakkaya Dam's water is directed into the Kurtboğazı Dam. Water coming from Kurtboğazı and Çubuk dams is treated in the

İvedik Water Treatment Plant and distributed to the city. Ninety-five percent of Ankara's drinking water is supplied this way. However, Kesikköprü Dam is out of this calculation since CCE does not consider it as a safe water resource. (Chamber of Civil Engineers, 2020 & ASKİ).

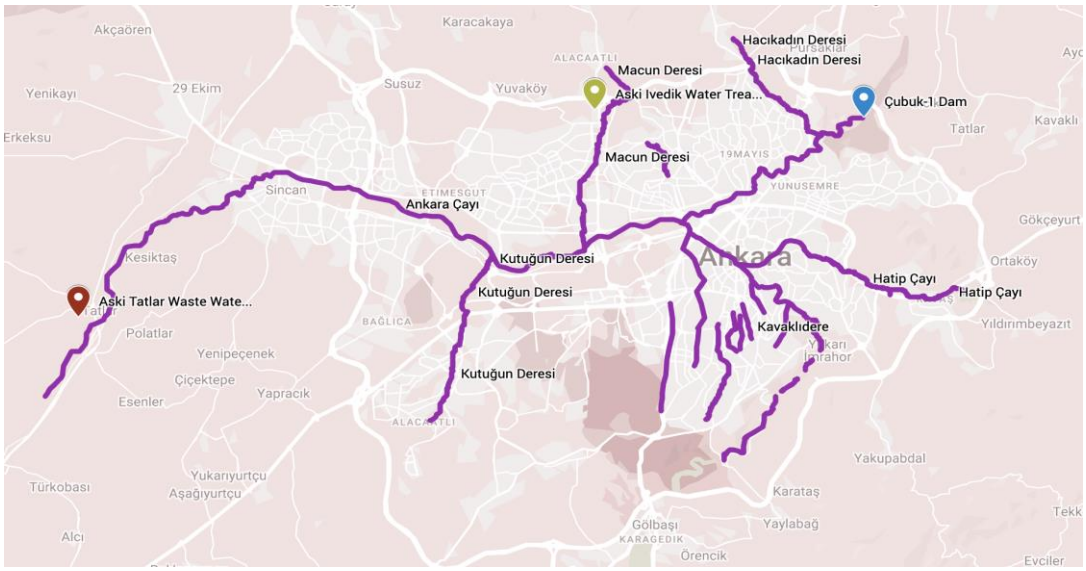


Figure 11. More detailed look for the main Ankara rivers. Even though we cannot see them, the city was built with their presence. Marked by Onur Bektaş, created on Google Maps

There are several problems today in the use of water resources. One of the things that affects water prices in Ankara is that almost 85% of urban water is needed to be pumped to 850 to 1300 meters of altitude. Due to the height differences, İvedik Water Treatment Center used electricity worth 1,5 Million Turkish Liras in a day, in 2019.

Also, lost and leaking water in Ankara is more than 40% of all water resources in Ankara. CCE suggested that if this ratio can be decreased to 30%, it will help the system as much as the Akyar and Eğrekkaya Dams' water potential. As an example of lost water in Ankara's system, while an individual uses 105 liters of water in a day, the gross amount of an individual consumption is 255 liters. 58% percent of water disappears by leaks and irrigation for public spaces. Also, the study shows that, in 2018, enough water to supply Ankara's population for three weeks was evaporated (CCE, 2020).

One of the most important reasons for the undrinkable water supply in Ankara is that from Kesikköprü Dam, Kızılırmak water comes as a water resource. Kızılırmak was seen as a last resort for Ankara and according to the DSİ's master plan, it can be used in 2034. Kızılırmak has high amounts of sulfur, sodium and chloride and is also polluted with domestic wastewater. The İvedik Water Treatment Center is not qualified enough to treat the water from Kızılırmak. However, due to the lack of water, Kızılırmak water started to be used in 2007 whereas a project called "Işıklı-Gerede" was planned in 2001 and still is being constructed. This project was shown as a cheaper and safer solution by the experts and has a lot of potential to supply water (CCE, 2009).

CHAPTER IV

CONSTRUCTION BOOM & PRIVATIZATION OF NATURE

4.1. State Driven Policies: 1940-1980

To understand the conditions these days, the political atmosphere of the past should also be examined. As mentioned earlier, Ankara's population increased rapidly with migration from rural to urban, starting from the 1940s. Newcomers to the city settled in shantytowns as a cheap and easy way of living. Since the government was not able to supply adequate housing for the settlers, shantytowns became legal entities (Köroğlu & Ercoşkun, 2006). During the 1960s, giving title deeds to people in shantytowns worked as an election promise, and several amnesty laws were passed. So, shantytowns were growing in the cities and led to unplanned urbanization and several pollution problems due to the lack of municipality services provided to them. In 1971, a military coup happened and shantytowns were seen as a threat to military order with the changing political atmosphere. So, a conflict between the military and people in the shantytowns started. The next local elections happened in that environment in 1973 in which Vedat Dalokay was elected as the minister of the municipality of Ankara. In the years of Dalokay, policies in Ankara were more public-focused. First underground metro construction started, new plans available for the working class were made, and public services for shantytowns were developed (Batuman, 2010).

4.2. Military Coup & Privatization

Following the repeated change in the political atmosphere, unfortunately, public-focused development plans did not continue. After the 1980 military coup, public management in Turkey transformed into a more right-wing, neoliberal way. The power of the state was decreased and the private sector strengthened. Expectedly,

productive markets became the center focus, so the relationship between the state and the capital was reshaped. The capital not only filled the spaces emptied by the residual of the state but also penetrated spaces created by the state itself for the capital. These changes also took a toll on nature. Nature and water started to be seen as goods that have profit potential. As a potential energy resource, and agriculture and industry input, also a crucial need for continuity of life; water started to be in the intersection of market and everyday life (Erensü, 2016).

In this time, the private sector became the main actor in the urban process. However, as Gülhan (2021) explains, state intervention did not disappear but took on a different form which can be explained with two terms: neoliberalism and neo-dirigisme. While the private sector wants non-intervention of the state, it seeks particular government services to sustain growth. So, the state became an actor for the private sector to open up spaces by privatizing lands for construction. While urban rents were enjoyed by small-scale entrepreneurs, little property owners, and "yapsatçı" (builder and seller); large corporations and mafia started to take interest in urban rents (Kubin, 1994). Simultaneously, state actors such as TOKİ (Mass Housing Development Administration), KİPTAŞ, and Emlak Konut emerged as the redistributive agents in the production of residential spaces for the construction market. These actors play an important role in the privatization of land, the land being opened up as a construction zone and production of residential spaces and the foundation of these actors was in different eras when privatization gained importance. So, urban areas started to be privatized and played an important role in economic profit and growth.

In the 1980s, lands of institutions that were privatized, and lands of public institutions such as TCDD (Turkish State Railways), General Directorate of Highways in Turkey or Pension Fund (Emekli Sandığı) could be sold by Privatization Administration (Özelleştirme İdaresi Başkanlığı). Also, the Directorate General of National Property was able to sell forest, agricultural lands, pastures, or coastal embankment areas to municipalities or TOKİ (Mass Housing Development Administration). These actions were taken by central authority. Also, local authorities changed too. Through a law passed in 1985, urban infrastructure supply

was left to the private sector. To cope with the increased cost of infrastructure, public transportation was privatized with most of the other urban services and municipalities becoming corporations. So, a new era of privatization of lands and services and then selling them to the construction corporations, real-estaters, investors and many other market actors started. After the 1980s, the market became the leading actor which decides the future projects and induces the government (Yazgan, 2018). However, during this area, the emergence of new urban dynamics has led to gains for certain social classes while causing losses for others; creating a widened class division (Özdemir, 2010; as cited in Şahin, 2015). This situation is mostly caused by the displacement of the local residents to the peripheries of the cities since they are generally unable to pay for higher-priced new buildings. Poverty, dispossession, destroyed neighborhoods and neighborhood cultures, gentrification and displacements are the costs of urban transformation shaped around the profit (Şahin, 2015).

Ankara, as the capital city, has been the host of public institutions since the early republican era. However, after the 1980s, due to this feature of Ankara, it was considered limitedly developed in the industrial sector. So, this consideration led to a decrease in the public sector's role. Ankara as a capital and home for public institutions, started to be seen as deficient for the private sector. Initially, with the rise of private car ownership, and change in public transportation, middle and high class people started to move to the more peripheral places such as Çayyolu, Ümitköy while lower classes moved to places like Batıkent. In the center, slums were demolished by small-scale contractors within a rapid urban transformation wave. Urban transformation projects were so effective that the population living in shanty towns decreased to 60% in 1990 while the rate was 75% in 1980. These projects were a profit opportunity since the shantytowns were located in the city center, in the most valuable land of the city. For the areas that are non-profitable or too big for the private sector, the state intervened. Shanty towns and empty lands were included in urban transformation projects while disaster risk was shown as the reason for them. During this period, Ankara started to expand through the peripheries such as Batıkent, Eryaman, Ümitköy. While this expansion was continuing, new malls

started to be built. Areas which were once villages, Dikmen and Balgat, were swallowed by the city (Yazgan, 2018).

The privatization of land and nature was not limited to the empty spaces but also the water services were privatized too. Due to the arisen concerns about water scarcity and water security, water management changed. In 1984, Water and Sewerage Administrations were created in Ankara, İstanbul and İzmir. In these administrations, at least 10% of profits were aimed to benefit from the World Bank's funds. In these years, water services, which were previously funded by government institutions, were started to be managed by external funding (Pehlivan & Susam, 2022).

4.3. From the 2000s to Today

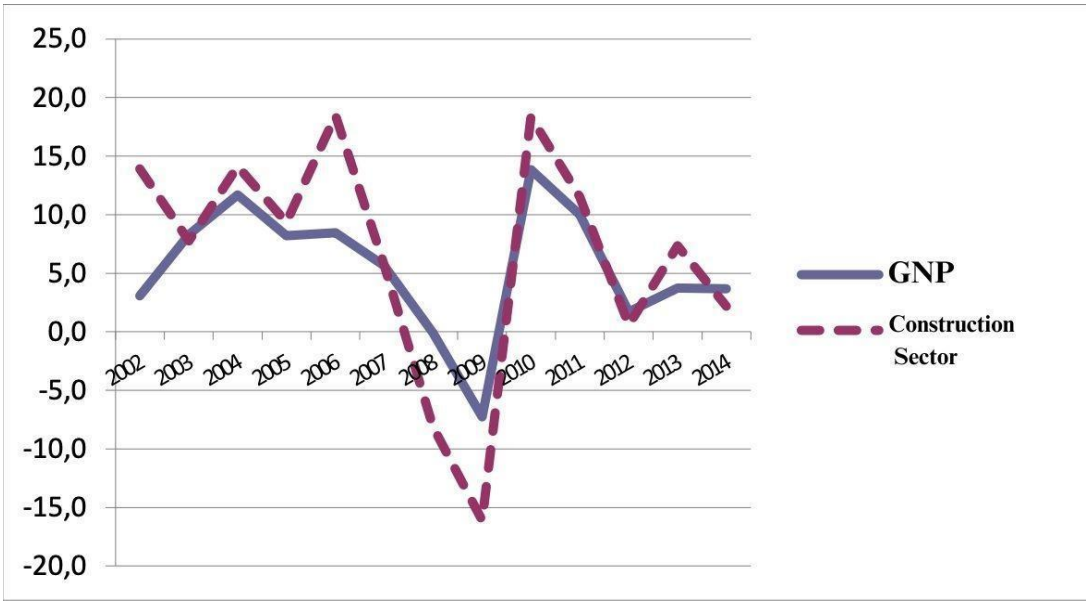
After 2000, redistribution of the land changed shape: public lands were commodified by the state and new lands opened for construction companies. After the elections in 2002, AKP (Justice and Development Party) came to power and Turkey's construction frenzy started. AKP did not focus only on construction projects, but it led to continued neoliberalization after the 1980s. Unsuccessful efforts in neoliberalization until 2002 due to the political instability gained speed with the new, united, right-wing party. AKP became a powerful symbol of traditional right-wing, and constructions became the symbol of AKP.

Since economic growth could easily be made with constructions, the party became dependent on them. As a result of urban expansion, all resources, natural habitats and unoccupied spaces started to be assumed as a potential for profit, and economic growth. As can be seen in the graphic below, construction and GNP moved parallel to each other.

To succeed in this process, TOKİ's role in the construction was made visible. Between 2002 and 2008, TOKİ's jurisdiction was expanded and TOKİ gained rights to give planning permissions, privatization of land, and declare places as available for urban transformation. Also, not only limited to TOKİ, but the overall mechanism and rights of public actors changed. The Ministry of Environment, Urbanization and

Climate Change, the Ministry of Culture and Tourism of the Republic of Turkey and other ministries in Turkey have changed and transformed into agencies that remove obstacles to new construction projects. New permissions for constructions were given quickly, without any barrier and in contrast, they were encouraged (Yeşilbağ, 2016). Today, while TOKİ's exact jurisdiction limits are ambiguous, it is also not inspected by the Court of Accounts. Also, while TOKİ's main aim of the establishment is to produce social housing, 80% of the buildings built by TOKİ is luxury housing (Şahin, 2015). This construction and economic growth relationship was not the first one in Turkey, but it was a continuation of the previous construction boom in the 1980s. So, while AKP was, and has been, a main actor for construction, as following other political parties in charge of municipalities showed, construction has been seen as a main actor regardless of political party but in the capitalist mode of production.

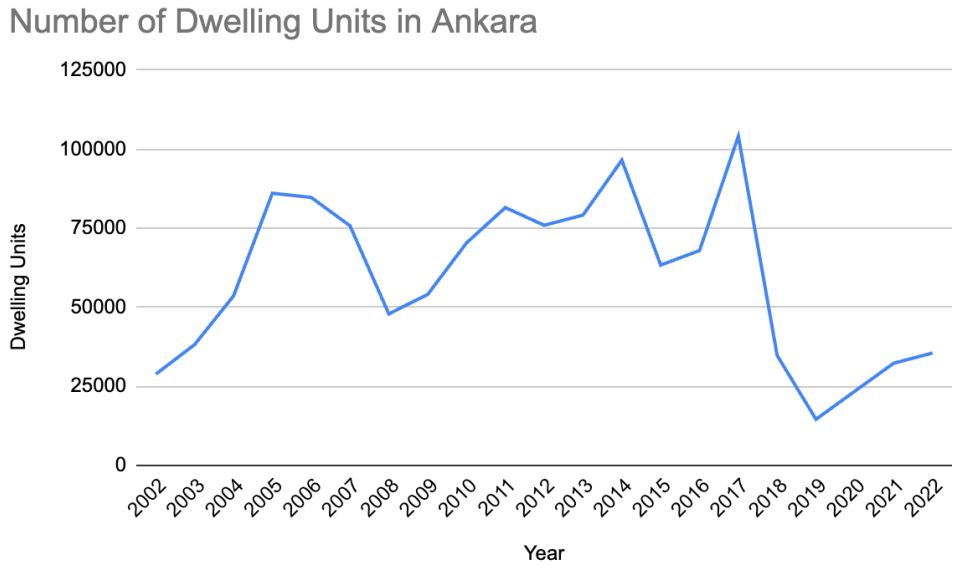
Table 3. (Yeşilbağ, 2016)



During this wild expansion, Ankara, as well as other cities in Turkey, became a giant building site. Since Ankara's city center is limited to production of massive projects, the new construction projects were expanded to peripheries: Eskişehir Road, Gölbaşı and İncek. Especially places near the city center of Eskişehir Road became a playground for construction firms that had close relationships with the AKP government. On this day, Eskişehir Road still stands as an important place to gain

ground rent for the companies that are in close relations with the executives in charge. However, constructions focused upon a single road increased the traffic and pollution in the city center.

Table 4. New building construction permits as dwelling units in Ankara. (TUİK)



The mayor of the time, Melih Gökçek sold the “BelBeton" company belonging to ABB to a company named “Genç Şirketler Grubu". While BelBeton company had a capital worth 15 million Turkish Liras, it was sold to Genç Şirketler Grubu for 12 million Turkish Liras. The owner of Genç Şirketler Grubu, Hüseyin Genç was a member of the General Administrative Board of Democrat Party, of which Melih Gökçek was a member too. Genç İnşaat, which belongs to Genç Şirketler Grubu, started to earn enormous amounts of ground rent starting from 2002. It should be also mentioned that Genç Şirketler Grubu constructed dams, roads and bridges, factories, and big scale building projects in Turkey. State and private sector relationships can easily be examined within the context of Genç Şirketler Grubu during the AKP era. However, our focus will be Ankara. Genç İnşaat became the monopoly in the production of pavement, asphalt, concrete, barriers, and tombstones in Ankara (Bulut, 2021).

Currently, the construction sector plays a significant role in Turkey's overall employment rate, employing a substantial portion of the workforce. The construction

sector employs more subcontractor labor than any other sector except for coal. Almost 15% of total employment in Turkey is within the construction sector. However, concerning workplace safety, the construction sector also faces challenges. It accounts for 9% of all workplace accidents and is responsible for 28% of all fatal work accidents in Turkey. (Şahin, 2015).

While these constructions were being built, the limited available space became insufficient. Intervention to the Middle East Technical University's (METU) lands can be an example of construction and rent potential for the people in charge and their impacts on nature. The land of METU was standing as the last natural habitat in the city center with two lakes, seasonal streams, meadows, steps and forests (Özel & Ercanlı, 2022). This protected habitat allows a wide biodiversity of more than 800 plant species while 50 of them are endemic, hundreds of butterfly species, mammals, reptiles, and birds. Also, 249 bird species stopover in METU's forest, while 6 of them are in danger of extinction worldwide. More than half of the bird species in Turkey live or accommodate temporarily on the METU campus (Yalçın & Yavuz, n.d.). In 2014, even though METU's land is legally first-degree protected area, a road of 4.5 kilometers long and 50 meters wide were made by cutting more than 3000 trees. 225.000 square meters of land was impacted directly. This road was built to be a solution for Ankara's traffic and accessibility problems due to the rapid urbanization. However, with the construction of this road, not only traffic problems were not solved but also 3 neighborhoods (Çiğdem Mahallesi, Çukurambar and 100. Yıl İşçi Blokları Mahallesi) were impacted by the noise, air pollution and concrete jungle (Ercoşkun & Gölle, 2020).

Figure 12. Transformation of METU land in 2014. (Ercoşkun & Gölle, 2020)

In 2017, another part of METU land was destroyed again to build a road between Eskişehir Road, Bilkent and İncek. Lands in these places were being opened for construction since Ankara started to expand through this axis. After the big trees were cut, the project did not continue due to the local elections. This road is called "The Rent Road" since it provides access to new construction projects as a way of ground rent profit. As a result of the state and private sector partnership, most of the profit would have belonged to Melih Gökçek, mayor of that time. In general, while constructing more roads can be seen as a public investment, it is evident that they are built to create profit by connecting the new building complexes to the city center. In addition to that, they increased the traffic and traffic related pollution.

However, destruction did not end with the change of the political party in power after the local elections. Although the opposite party became in charge of the ABB with the promise of protection of natural lands of METU, construction of the road still continues. With the new mayor, Mansur Yavaş and the rector of METU, Verşan Kök agreeing on the project, the Rent Road started to be built again in 2022. Even though big trees were already cut in the area, the habitat started to regenerate itself with new steps, trees and plants. While there were not any roads in the area, Genç İnşaat constructed several luxury buildings in these areas.

Figure 13. METU land has several natural ponds and is a habitat for different species in the middle of the metropolitan area. The buildings seen in the image are "Park Joven", built by Genç İnşaat. (Hasanoğlu, U., 2020)

These projects are promoted with so-called “special” opportunities for their residences: private pools, high securities, a gated community life far away from the chaos of the city and recreational areas which include ponds and forests (Yazgan, 2018).

As a result, the rest of the city became more vulnerable to natural disasters and increased air pollution due to the blockage of the airflow by these projects. Also, the more concrete and impermeable area means that more of the rainwater or flooded water cannot be returned to the earth, without completing the hydrosocial cycle.

The last natural habitats in Ankara are in danger of construction, pollution, and destruction. With the construction expanding, the rivers freely flowing left in Ankara continued to be put underground too. In 2008, one of the last signs of rivers in Ankara, Çayyolu, was destroyed by cutting of trees near the Kutugün river (Hurriyet Haber, 2008).

Several zoning plan changes have been made in Ankara’s more fragile ecological areas. The Chamber of City Planners (Şehir Plancıları Odası) have been publishing these zoning changes and trying to take action against them for several years. As these reports explain, lands belonging to the state in Ankara have been opening to construction and privatization by the state and the municipality itself.

One of the most important areas that control pollution and provide habitat for wildlife and protect the water cycle is in danger of destruction too. The pollution caused by different indicators such as urbanization or agriculture can be minimized through wetlands. The wetlands improve water quality naturally by filtering the sediment and nutrients and detoxifying the chemicals. The pollutants created by urbanization and agriculture such as nitrogen, phosphorus, and pesticides are removed by wetlands. While plants in the wetlands convert nitrates and other elements such as ammonium, other particles such as phosphorus and some metals are attached to the wetland’s sediment and settle on the bottom of the wetlands. With the cycle of nutrition completed by plants, wetlands have such an important role in filtering pollutants naturally (Miller, n.d.). One of the most important wetlands in

Ankara is formed by Lake Eymir, Lake Mogan, and İmrahor Valley. These wetlands provide biological diversity, improve air and water quality, decrease the flood risk and hold carbon. The polluted rainwater by the contaminants in the air is filtered through wetlands. So, these wetlands stand as very important filters in an urbanized area. After the 2000s, starting from the areas near Lake Mogan, several residences, factories, and businesses were built. While the concrete structures spread, the sensitive ecology of Lake Mogan started to be impacted. One of the endemic plants called "Love Flower" started to disappear as well as the other plant species impacted by shrinking habitat, humans, pesticides, and animal husbandry. Also, the construction and urbanization near Lake Mogan decreased the water quality, impacting the animals too. Lake Mogan has been so polluted that mass fish deaths have become regular. While Lake Eymir has better production due to its protection by the university land status. However, since both lakes and İmrahor Valley are connected to each other, any impact on one of them affects others (Uğurlu, 2020). Thankfully, some parts of this wetland are protected with the status of "Special Environmental Protection Area" (SEPA) by the General Directorate for Protection of Natural Assets, which is called Gölbaşı SEPA. This valley area, Lake Eymir and Lake Mogan included, has been regarded as an important natural area that should be strictly protected since the Jansen plans. While each protection area is protected by laws due to their importance, some of the SEPAs are opened for construction and destruction by the state itself disregarding the laws. Also, areas which are not included in SEPA have been zoned for construction of buildings and roads. However, the ecosystem was not regarded as a unit, and not including some areas that do not seem as "green enough" impacts the whole area.

The Imrahor River in the İmrahor Valley, one of the last river ecosystems still providing biodiversity in Ankara, has been trapped in a concrete channel and forced to flow underground like the other rivers. The upper sides of Imrahor Valley opened to construction. In 2011, with the approval of the Council of Minister and Ankara Metropolitan Municipality, the biggest private-public sector partnership in Turkey was created. While more than 2200 beneficiaries were in the area, with the approval, the land became a property of Ankara Metropolitan Municipality and opened for Sinpaş's construction. The natural habitat was privatized and announced as an urban

transformation area. One of the biggest construction firms in Turkey, Sinpaş, built a giant apartment complex called "Sinpaş Altın Oran" including more than 2500 housing units while occupying 1,850,000 square meters. This project was built on the valley ridge, blocking the airflow and the ecosystem. Also, since the ground foundation was not suitable for construction, large efforts were made and large amounts of excavations were created (Ercoşkun, 2015). So, with a single corporation, and support of the government bodies, the last valley in Ankara has changed completely. Aside from the lack of calculation of impacts of that much housing in that area, the last standing river ecosystem in Ankara was destroyed with the state and private sector partnership.

Figure 14. These big apartment complexes are now everywhere in the İmrahor Valley.

Source: Google Earth

Destruction of nature to gain profit caused several problems and destroyed the water metabolism too. The latest biggest flood was on 11th & 12th June of 2022 with 4 deaths and lots of material hazards. After this big flood, the Chambers of City Planners published a briefing about the management of Ankara and its water problem named "Asfaltın Üstünde de Dereler Var!" (2022). As they made a summary of the last years' management problems, they explained that the heavy rains are not rare anymore and still the municipality or the governing agents do not take action about the dangerous flood risks. As they explained, management of water did not develop with the change in the political parties in charge. After 28 years of construction projects and destruction of the city, the changed opposition party acted in the same way. Even though the power in charge changed, profit driven urban management did

not. In 2022, İmrahor Valley, Dikmen Valley and Hacıkadın Valley were opened for construction and for some places in these valleys, construction permits were given to build up to 30, 40 and 49 storeys for buildings. Also, shown as urban transformation, building permits for 40 storey buildings were given in İskitler, located in Ankara River's floodplain (TMMOB, 2022). Birds' migration paths, the climate change and water ecosystem were not considered during these projects. Also, this important area is at risk of other constructions: two plans called "Millet Bahçesi" and "Kanal Ankara" will block the last airflow corridor of Ankara if it is made, according to the Chamber of City Planners (2020). However, the situation of these projects are uncertain due to the political instabilities.

A study by Aliefendioğlu et al. (2017) shows that, in 2020, 34,1% of Ankara's total area is covered with human-made structures; roads, and buildings. While the population has been increasing with human-made coverage, green spaces, empty lands, and water areas decreased.

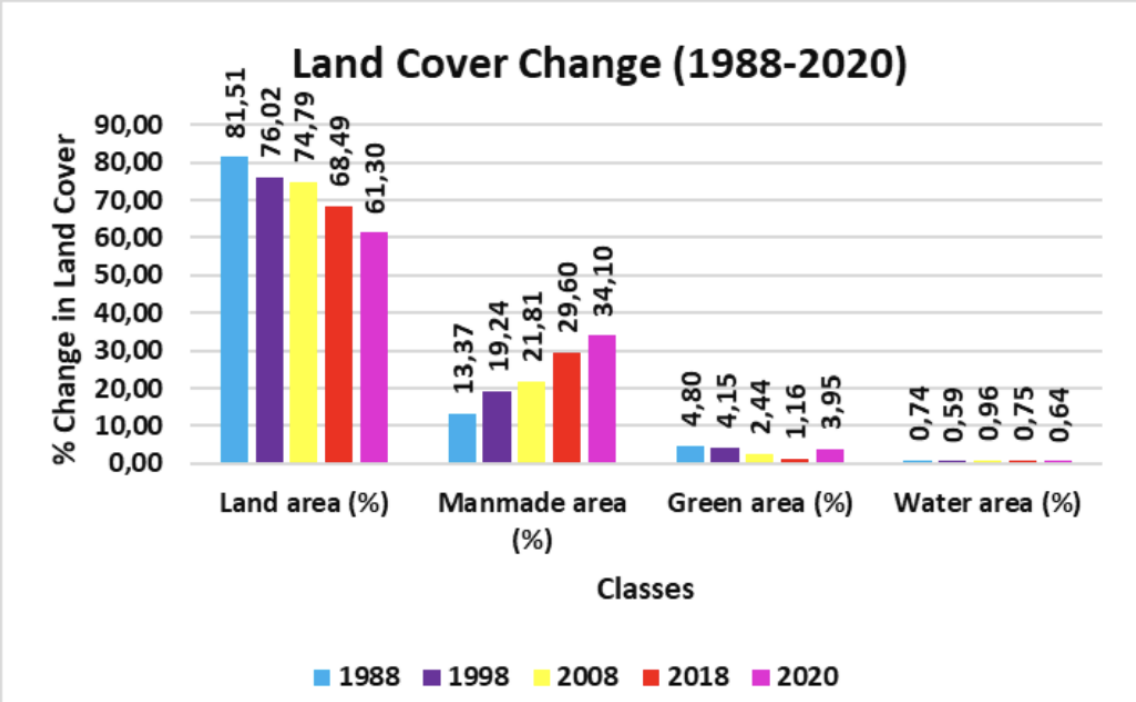


Figure 15. Since the water area covers a very small amount in Ankara, small changes also show a significant amount of load on the environment. 13% of Ankara's overall water area is lost.

Source: Aliefendioğlu et al., 2017

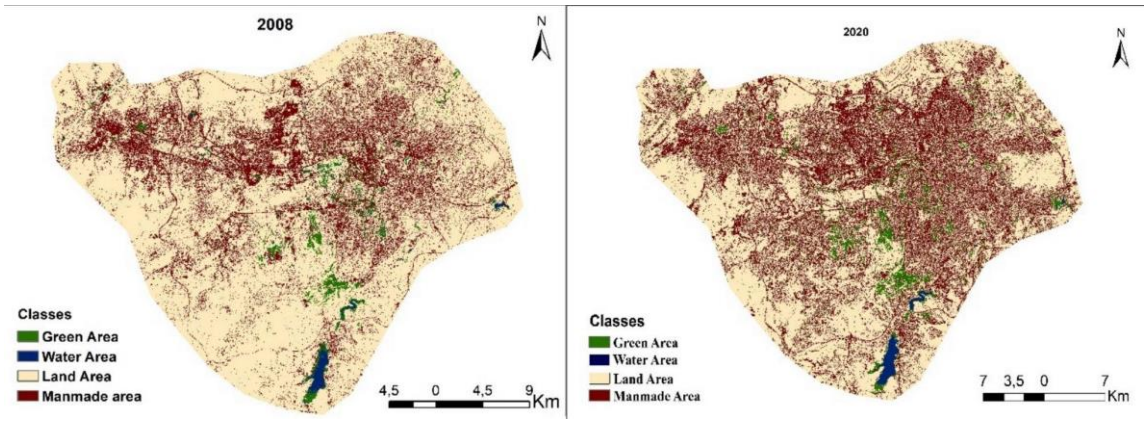


Figure 16. Land use change between 2008 and 2020. It can be easily seen that human-made structures are dominant in Ankara, with no place left for empty lands or green areas.

Source: Aliefendioğlu et al., 2017

If we try to sum up Ankara's current situation, it can be said that there are still rivers flowing in Ankara. Both in the city center and more peripheral neighborhoods, a person may pass over 20 rivers in a day, without seeing or feeling the rivers. However, these rivers are blocked and trapped under canals and roads. The use of these rivers is limited to the sewages, so the water resources are polluted every day causing increased costs in treatment and redistribution. Natural habitats that play a crucial role in sustaining water metabolism are in danger of destruction to open new ways of gaining profits. With the state and corporate partnerships continuing, nature and empty spaces in Ankara have been opening for construction one by one. Left without any urban planning regarding the well-being of the community and ecology, all actions have been taken to gain profit. While political actors are changing, profit-driven urban management does not. As a heaven for concrete and asphalt producers with massive amounts of profits, Ankara became vulnerable to natural disasters. Privatization and building permits are given without any regulation (in contrast, they are reinforced) for each empty space, including river beds, forests, valleys, and steps leading to more and more problems every day for all the habitats of Ankara.

CHAPTER V

ANALYSIS OF WATER METABOLISM IN ANKARA

Water metabolism in Ankara is disrupted by the sprawling of urban space upon nature and water by constructions, changed water directions, and the inability of water to return to the earth. Starting from the first urbanization attempts, the disturbance of water metabolism accelerated especially in the last two decades.

Controlling water has been an ongoing action for centuries to use water more effectively. Water is needed and used for different things such as irrigation, mills, fishing, livestock, etc. So, settling near rivers has always been a thing. In spite of the continual water controls, their presences were also respected (and needed to be respected) to sustain the process. Rivers are mostly wild entities that need to be tamed. Floods may happen, or in droughts, streams may dry up. In this irregular water supply, people needed to have systematic access to water. So, channelizing the river and straightening it are seen as a way to control the river, and use it effectively. New water corridors and artificial flows have been created for a long time. As well, dams have been built to store water and create energy. However, taming water completely has never been a successful thing. Whenever a natural occurrence is changed, other things are always affected by that change. These taming efforts often resulted in natural disasters, floods and ecological problems (Knoll et al. 2017). Also, dams create problems too: most of them are in lack of enough green spaces, in addition to experiencing erosion and landslides, as well as they are polluted with different wastes (ASKİ, 2023).

An intervention in a river changes several things: the impacts of straightening rivers and putting them into canals can be shown as an example. When a river is straightened and directed into a concrete canal, the river's pace increases. Because of

the concrete surrounding blocks' permeability, water cannot be absorbed by the earth. Any increase in water flow results in flood hazards. Also, the water ecosystem disappears completely within the concrete canals. Several species including fish, birds, mammals, amphibians, and plants leave the ecosystem. So, one of the most common ways of controlling a river destroys the ecosystem, independent of whether the water flows on the ground or is directed underground.

Channelizing water in box culverts, and demolishing natural habitat also leads the surface to be impermeable. With the increased impermeable surfaces, water quality changes. Rainwater concentration decreases, soil water content and surface runoff change. Since groundwater cannot be filtered and the surface flow increases, floods occur more frequently (Adobati & Garda, 2020). Also, since a river impacts its surroundings, we cannot think of it as only flowing water. It naturally creates wetlands and grasslands and enriches wildlife. Trapping a river destroys the wildlife that flourishes near it and the role of wetlands disappears completely.

Urbanization impacts water metabolism even though the river was already put in an underground concrete tunnel. Decreased permeability restricts the rainwater absorption by the earth. The only way for rainwater to flow became the sewer grates. It costs money and time since the municipality needs to take care of the grates regularly. Also, asphalt and concrete impact the environment as much as decreased permeability. With surrounding asphalt and concrete structures, the sun's heat is absorbed and re-emitted more. As a result, urban areas became "heat islands". In a heat island, surface and air temperatures generally are higher. This increases the need for energy and overall air pollution. Also, since rainwater runoff can also be heated due to this heat island effect, rivers that the water flows into become warmer (EPA, n.d.). In addition to the heat island impact, since the production of asphalt in Ankara is monetized and provides profits for a couple of companies, the roads are built less durable. So, roads are periodically renewed. Pouring asphalt is a harmful process of its own. It produces heat and poisonous gasses and affects both humans and animals. Workers are affected by it directly. Also, one should keep in mind that if there is any new building, there needs to be roads to supply transportation, water, and energy for the continuity of life in the building, and there will be waste. Since the infrastructure

does not develop parallel with the constructions, more buildings mean more problems. Also, as a result of the car-focused urbanization, Ankara became a city for cars. Thus, while new roads for cars were constructed, empty spaces became car parking lots with concrete and asphalt grounds. In 2013, 7,500,000 tonnes of asphalt were poured in Ankara (CCE, 2020).

5.1. Metabolic Rift in Ankara

To understand the rift in Ankara, water can be followed in several different ways. First of all, the river's path through the city can be examined. The majority of water supplied to Ankara comes from the Ankara River, a part of the Sakarya River. However, one of the water supplies, the Kızılırmak River, is located in a completely different watershed. So, water with different characteristics is added to the system. Water is treated in İvedik Treatment Center located in the north-east of Ankara and chemicals are added to make water safe. Then, it is distributed throughout the city. During the distribution, 30% of water is lost and leaked (ASKİ, 2022). After it goes to the buildings to be consumed, it becomes wastewater. However, because of insufficient sewage systems and lack of a separate rainwater collecting system, the wastewater goes to the rivers flowing under the city. Most of the rivers now flowing under the city are used as sewage. Directing into the Tatlar Wastewater Management Plant located in the west, used water goes back to the Ankara River. So, water from two different watersheds; Sakarya and Kızılırmak meet, is used and polluted, and goes to the west. During its journey, water coming from the Kızılırmak River is not able to return to its source. So, the water cycle in Kızılırmak River cannot be completed. Water is only withdrawn without any return. Besides, the Sakarya Watershed receives water from the Kızılırmak Watershed, a different water with different characteristics. However, in the end, all of them are wastewater. Moreover, during their journey, rivers do not provide any habitat to the wildlife and are not filtered through the soil and are treated as sewage. Their natural entities are completely destroyed and they become flowing wastewater in concrete channels underground.

When rainwater's path is followed, the rift can also be seen. When rainwater falls into the ground, it does not connect with any river, nor it is not collected separately

from sewage water. Even though there are some rivers still flowing in daylight, they are trapped in canals and they do not have any stream beds. Since the excess water cannot be absorbed by the earth, the only places to flow left are the manholes. After it goes to the manholes, its path continues the same as the wastewater. As if it wasn't enough, due to the pollutants in the industrial and urban areas, rainwater is also polluted with several chemicals. Rainwater that can be absorbed by the earth is potentially polluted by heavy metals, total suspended solids, nitrogen, and phosphorus (ASKİ, 2023). Normally, these pollutants infused in rainwater are cleaned through wetlands since they provide natural filtration to pollutants, from rainwater caused by urbanization and agriculture. These areas effectively remove pollutants like nitrogen, phosphorus, and pesticides through plants, bottom sediments, and their natural physical conditions. So, wetlands play a crucial role in completing the nutrient cycle and effectively filtering pollutants (Miller, n.d.). Destruction or pollution of wetlands also impacts the water metabolism by destroying the nutrient cycle. Gölbaşı SEPA is an example of the wetlands of Ankara in danger and was examined in the previous chapter. So, even if the rainwater can be evacuated faster and directed into the rivers by several pipes, it will continue to obstruct the water cycle.

Figure 17. Floods in 2023. Image on the left shows AnkaMall, where Hatip, İncesu and Çubuk River intersect. Image in the middle shows a building constructed on a riverbed, the flood destroyed the windows and followed its path through the house. (Kronos News, 2023)

Floods and droughts started to occur more frequently, and densely due to this visible rift in water metabolism. While climate change is also a variable, asphalt and concrete and insufficient infrastructure are the main reasons for the floods. Since no space is left for rivers to flow or ground to absorb excess water and natural floodplains, any rainfall ends up as floods.

The rift is not limited to ecological disaster, but it also impacts everyday life in Ankara and creates unequal access to water and water services. As the open data of ASKİ shows, while population increase and wastewater discharge per capita are increasing, water treatment centers have become insufficient. This leads to a decrease of the population who is served by wastewater treatment plants. With these statistics, it can be mentioned that pollution increase in the following years is expected. Also, the lack of efficient infrastructure leads to bad smell problems in central districts like Çankaya, Altındağ, Keçiören, Mamak, and Sincan. While the smell problem is caused by several indicators like old pipelines, pour of waste oil and animal feces and factories; the major source of smell in some districts was shown as the over-polluted rivers (ASKİ, 2023).

Table 5. When ratio of population served by wastewater to total population, it can be easily seen that increasing population creates an increasing need for wastewater treatment. (TÜİK)

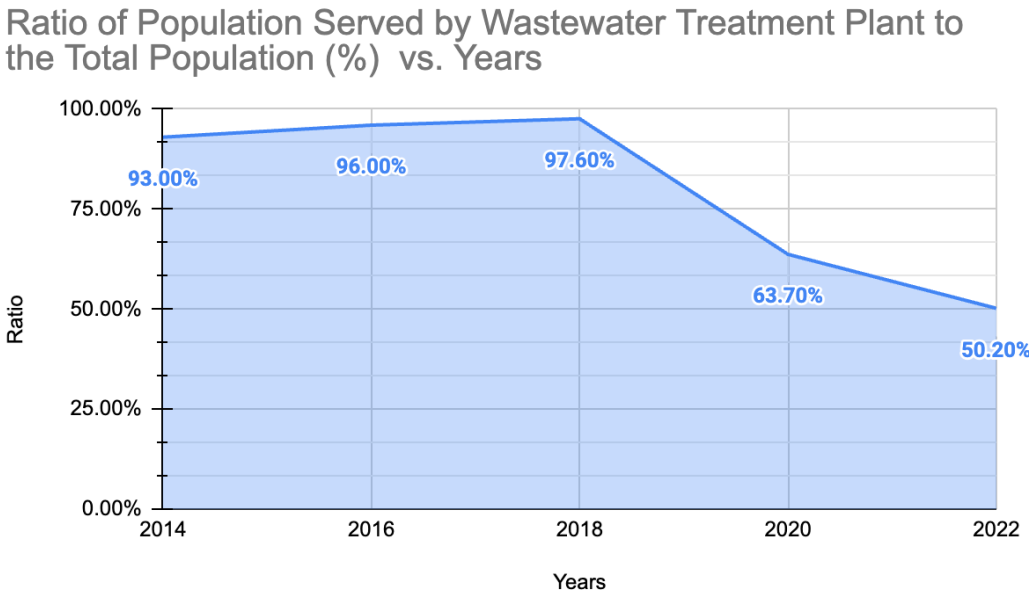
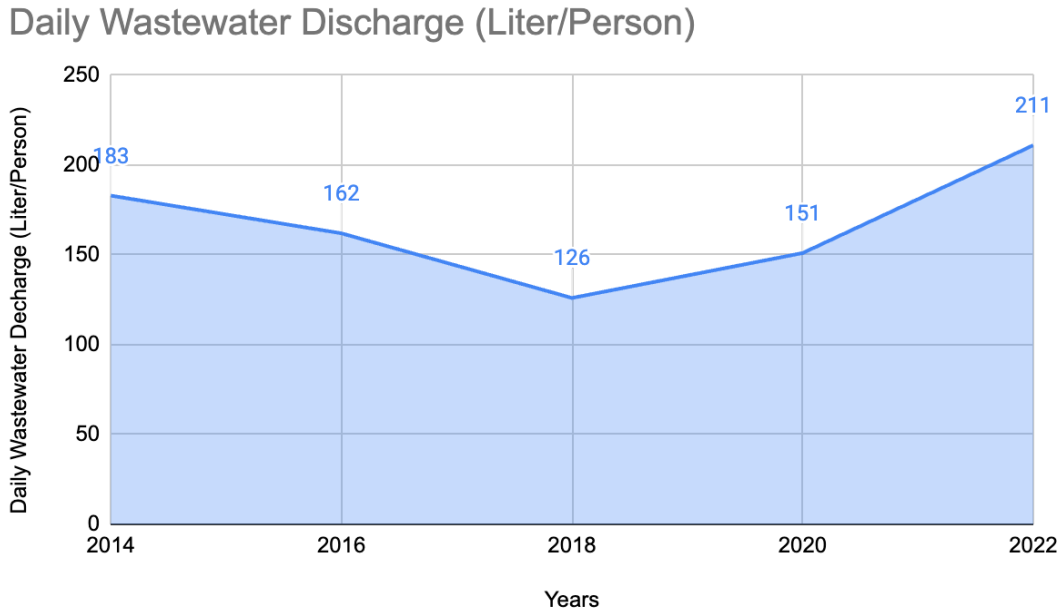


Table 6. Daily amount of wastewater discharge per person in Ankara (TÜİK)



In addition to insufficient sewage systems, tap water is not safe to drink. Chemicals added to make water safe to drink are not healthy for human health and they impact the whole river system. However, only the ones who are able to pay this amount can use bottled water. As a study by Kemal Ünlü (2014) shows, the rate of bottled water use in Ankara changes by the wealth of the families in Ankara were compared: Çankaya, Keçiören and Mamak. While in Çankaya, a relatively high-class district with an average income of 2272 dollars in 2014, all of the families in the study group use bottled water. In Çankaya, an average of 6 cubic meters of tap water is used monthly. In Keçiören, with an average income of 909 dollars, 70% percent of the study group use bottled water. Also, 7 cubic meters of tap water use was calculated in the study. In Mamak, where low-income families live with an average monthly income of 681 dollars, the amount of bottled water use falls to 20%. With the decreased amount of bottled water use, use of tap water increased to 9 cubic meters. (Ünlü, 2014). In addition, as the publicly available data of ASKİ shows, on the 10th of February 2024, amounts of chloride levels both in Mamak, Keçiören, and Çankaya were higher than the recommended amount. To conclude this study, it can be shown easily that while households with higher incomes are able to drink safe water, low-income families have to use tap water to drink. Due to high prices of bottled water and possibly lack of water-efficient devices, usage of tap water increases in the lower

income districts. However, the bottled water industry has grown so big that more than 250 bottled water brands are selling water in Turkey right now, including multinational companies like Nestle and Coca-Cola and municipality companies like Hamidiye (belongs to the İstanbul Metropolitan Municipality) and Çene (belongs to the Eskişehir Metropolitan Municipality). So, not providing safe tap water is also a way to profit for several different companies. Also, it is also worth mentioning that the resources of bottled water are located in highly sensitive, in need of protection ecosystems (Narin, 2016).

Also, loss in water pipes and energy consumption to sustain the system increases water prices. Today, 13% of a water bill is allocated to taxes. Also, ASKİ shares the water tariffs employed in Ankara. The current water tariff is progressive: while students, people with disabilities and war veterans are billed by 50 % less than normal tariffs without any limitation, families who are provided social assistance are billed 1 TL/cubic meters limited to 10 cubic meters usage of a month. However, after the usage of 10 cubic meters is exceeded, these families are billed as the same amount of the standard tariff.

Table 7. 2024 Water Tariffs, Taxes not included. (ASKİ, 2024)

Subscriber Type	Water	Wastewater	Total
General Household			
0-15 m³	14,57	7,29	21,86
16-30 m³	20,41	10,21	30,62
More than 30 m³	26,39	13,20	39,59
Household Receiving Social Assistance			
0-10 m³	0,67	0,33	1,00
11-15 m³	14,57	7,29	21,86
16-30 m³	20,41	10,21	30,62
More than 30 m³	26,39	13,20	39,59

Table 7. (continued)

Workplace, Industrial Zones and Embassies	37,13	18,57	55,70
Gardens and Parks Belonging Municipalities	14,57	0,00	14,57
Organized Industrial Zones	20% Discount		
Student Households	50% Discount		
Families of Martyred, Veteran and Disabled	50% Discount		

Income and water consumption per capita are parallel to each other, as the various studies created by different writers such as Hussien et al. (2016), Ayaz Bıyıklıoğlu (2013), Oyerinde & Jacobs (2022) show. However, another study shows that the size of the household decreases as wealth increases and the household size is an important component of household water consumption (MacDonald & Lapworth, 2020). Therefore, normally a good implementation, progressive tax may become a burden on low-income families whose household population is generally higher, have to use tap water as a drinking water, and have cheaper devices with higher water consumption.

To make a better comparison, the water bill to income can be useful. Another study made by a group of researchers from the University of Amsterdam and the Munich Center for Technology in Society can be shown as an example: higher income households spend lower percent of their total incomes on water, lower-income families have to spend more on the water while they use less amount per capita (Winata, 2017). While higher-income families can spend money on water without affecting by it, the case is not true for lower income families. In Ankara, lower income families' Bill/Income ratio was higher than the UNDP's suggestion of 3% ratio and almost four times higher than the higher income families in 2015, lowered to 2.95% in 2018 as a study by Güven et al. (2024) shows.

Table 8. Water usage in Ankara in 2015, according to different income groups. While Group 1 indicates the lowest income group, group 5 stands for the highest. (Güven et al., 2024)

Income Groups	Water Consumption (M3)	Price (TRY per M3)	Bill/Income (%)	Household Size
1	9.45	4.45	3.93	2.75
2	9.39	4.45	2.16	3.13
3	10.65	4.45	1.77	3.53
4	11.07	4.45	1.37	3.37
5	13.05	4.45	0.96	3.62

As a result, urban water metabolism in Ankara is obstructed in several ways. Rivers do not flow freely, sufficient sewage systems are not provided, and any empty space left for nature is under threat of zoning changes. Neither humans nor wildlife can access the safe water, and the whole river basin, 7% of Turkey's total area is affected too. Also, lower-income families are mostly affected by this situation. While being a city famous for its rivers for hundreds of years, rivers and water metabolism in Ankara have been destroyed since the first years of the Republic. With the profit-driven sprawl of urban, last standing ecosystems were also destroyed.

To conclude, residents of Ankara including trees and steps, animals, and humans, are trapped in a city that lost its several rivers and water resources. As a result, the vulnerable water metabolism was disrupted in a way that destroyed the whole water security. This process became so tense that there is not any safe tap water to drink for the citizens nor any visible natural habitat left in the city center. The rift begins here: water comes from different rivers in the Sakarya River Basin and although it returns to the basin, it became so polluted that all living in Ankara rivers were destroyed. The returned water is polluted, and full of chemicals used in treatment. Even though there are still more than 40 rivers in the city center, a person or animal cannot use them.

CHAPTER VI

CONCLUSION

This thesis examined the impacts of the construction boom on Ankara's water metabolism by employing Marx's metabolic rift concept, while water and urban politics were also considered.

Firstly, a brief information about hydrology was given to explain the movement of water around the earth, called the hydrological cycle. However, since the hydrological cycle was insufficient to understand the impacts of the sociological process, the relationship between nature and society was examined. After the discussions around the interconnectedness of this relationship, nature was considered in a two-dimensional way: while it is affecting and shaping the society, it is also affected and shaped by the society. As a result, urban development was regarded as not an unnatural nor evil process, but as an outcome of historical development. To create a more inclusive background and analysis, the metabolism term was used to develop the discussion. The metabolism includes all things about urban space: energy, water, and food needs for the citizens, the outputs such as refuse, excavation earth, used goods, heat, and pollution. With these components, the relationship between humans and nature is explored in a more wholesome way: Any impact on a component affects other components directly or indirectly. As a result, all of the components in nature and society become interdependent things. So, regarding the urban space as a whole, metabolism helps us to create an analysis without excluding other things. All components of this metabolism can be investigated separately and can be regarded as metabolisms on their own: such as water metabolism or urban metabolism. As in our example, Marx introduced the urban metabolism and metabolic rift terms to examine urbanization and its impacts as a result of the mass production of crop products and transferring them to the cities. Marx's metabolic rift

explains the urbanization and large-scale property's impacts on the metabolism. When the population increases in urban areas, the need for food also increases. Since food is no longer produced in urban areas, it became a necessity to supply food from other places like rural areas. The food produced in rural areas goes to the urban area and it cannot be returned to its production place. So as nutrients; the nutrients in the rural space cannot be got back. In the same process, the waste increases in urban places. As a result, an irreparable rift started to develop. Not only nutrients but also all inputs start to flow into the urban while nothing goes back. This understanding helped us to create a foundation to analyze the construction in a multi-dimensional way. When this concept is employed in urban water metabolism, the core reasons behind the water problems become easily noticeable. After the examination of metabolism, discussions about water politics were also included to understand today's problems of water such as water grabbing and the privatization of resources.

After the literature review in Chapter Two, the natural water system of Ankara was examined to demonstrate the water-related problems and water potential due to its geography. After the geographical examination, a brief historical background was given starting from the early republican era to today. In the Water of Ankara section which is the third chapter, an overall historical and geographical background was given and how the water in Ankara became unsustainable was explained.

Chapter Four examined the construction boom in Ankara, divided into three main eras: state-driven policies before the 1980 military coup, neoliberal policies of the post-coup era, and starting from the 2000s to today era. In that chapter, the privatization of nature and the construction boom were examined.

In the next chapter, metabolic rift in Ankara's water metabolism was explained in three dimensions: by following the river's path, by following the rainwater's path, and by examining the everyday life of the residents in Ankara.

Ankara, as an urban space, was regarded as a metabolism with the inputs and outputs, like a living creature. Ankara, being famous for its wild and plenty of rivers, started to have water problems with the population boom. Due to the high

availability of water resources, no efficient planning was implemented. While the rivers were being put underground to open space for roads and constructions, wastewater started to be directed into the underground rivers. Over time, all empty areas, including rivers became spaces that potentially can bring profit to the private sector and the government. While the inefficient sewage and rainwater collection system was already a problem, announcing "empty" spaces as construction zones became a way for economic growth and profit especially after the 2000s.

Since water cannot be thought of as an individual and constant thing, water metabolism includes many aspects of life. The metabolic rift can be seen in different places: Firstly, the water cycle has already broken, water in rivers and underground is polluted by waste, trapped in concrete and it does not provide any ecosystem. Secondly, human relationships with water also have rifts. Even though humans have been controlling the water for a long time, this control should be planned to be sustainable. Water can be directed, channelized, and used for different things as a normal process in society. However, when water management focuses on only profit, it becomes impossible to have sustainable water management. As a result, water started to be unequally distributed and benefited. Rift is visible in another dimension: as well as humans control water, water controls humans. Rivers have always been hard things to tame. They have enormous power in shaping land and society and their natural borders should be respected. In a city with wild rivers, floods are normal and should be expected. So, urbanization should be shaped by the floodplains and rivers' power. Putting rivers underground does not change their power and potential. The rift is also visible in everyday life: as a result of unsustainable water management, a significant number of inhabitants in Ankara are not able to access safe drinking water and sufficient wastewater service, while being affected by continuing floods and droughts. As a result, residents of Ankara experience different levels of water safety and service benefits.

6.1. Suggestions

While urbanization and population increase are expected outcomes in Ankara, water resource management should have been different. There are still different solutions

for the current situation. The most visible and easy-to-make solution is to separate rainwater and wastewater pipes. This will separate the rainwater, preventing the mixing of the valuable clean water from wastewater. During discharge, it will also decrease treatment costs and burdens. However, in the long run, separating the water pipes does not solve the problem or rift. Demolishing the concrete upon rivers, and daylighting them will be another solution. Rivers should flow freely and need space for flood and absorption. When a river moves as it should, its damage will decrease. Also, it will bring advantages such as climate regulation, creating habitat for wildlife and recreational areas. A healthy river will change the availability of drinking water too. Also, regarding rivers as living, shaping things will lead to respect for them. By restoring the original river area, and releasing soil; ecological conditions recover, the urban experience gets well, and flood safety improves. Even though uncovering rivers is opposed by authorities due to their costs and locations, it will provide more benefits in the long run. Flood damages and cleanup efforts, droughts, and bringing water from Kızılırmak cost more. Also, there are examples of uncovering rivers worldwide, which created ecological and recreational areas, and led to caring about rivers (Adobati & Garda, 2020). When a river is visible, its problems become visible too. Another possible solution is to increase urban permeability like creating permeable pavement and roads and abandoning concrete and asphalt as rapidly as possible. To prevent floods, there are several examples of "sponge cities", which are creating little wetlands around the city and using permeable material building ground, which helps the meeting of water with soil, completing its cycle. It is a relatively cheap and basic solution. So, the love for asphalt and concrete in Ankara should end. Moreover, green areas in the urban area should be protected. Given the population increase and new house demand, the need for construction is undeniable. However, urban planning should be made regarding the ecosystem of nature and urban residents.

Also, many policies can be implemented to decrease the inequality of accessing water. While there is already a progressive tax implemented on water bills, it is inefficient. First of all, only the ones who receive social assistance, students, and families of martyred, veteran and disabled can benefit from it in a limited amount. However, to ensure both social justice and environmental balance, a generalized

progressive tax can be implemented where the tax is collected in parallel with both income and consumption. Since the water distribution is made by the municipality and there should be no profit aim, it can be implemented. While accessing water should not be dependent on social status, it should also be discouraged to the ones who have the ability to pay higher money to use excessive water. So, to create sustainable water management, both the public character of water services and water resources should be protected. This can be done by creating a community based and public water management that the authorities and citizens cooperate with each other (Transnational Institute and Corporate Europe Observatory, 2009). Sweden can be given as an example of reducing inequality of accessing water. In Sweden, the municipalities are prohibited to make a gross revenue more than the total expenditure. As a result, water tariffs are set in focus of fairness and prime cost principle that is equal to cost of raw materials and labor (Andersson et al., 2018). Another example can be given for Vienna, Austria. While the water and sewage services are provided by the city administration and directly controlled by the city council, there is a high priority on protection of environment and sources. The services are strictly non-profit and focusing on environmental sustainability. As a result, the water cycle can be protected. Another example is from Turkey. In Dikili, a small city, along with the cheap bread, free buses and affordable public health, water services were also changed with a mayor named Osman Özgüven. In that time, ten cubic meters of water per household were provided freely to ensure that everyone had access to water regardless of their income as well as the unpaid water bills were canceled. As many other examples show, publicly controlled water management services can ensure the water security of people, protect the environment and also can be effective (Transnational Institute and Corporate Europe Observatory, 2009). To conclude, water should be accessible for every person, regardless of their income or social status. So, administrative bodies should ensure to provide the needed amount of water for each resident. While accessing safe water is a basic right, protection of the water resources also guarantees the access to water for the future generations. As a result, usage of excess water and destruction of water resources should also be prevented. Progressive taxation based on income and consumption can be implemented with strict protection efforts on water resources. This can be made through a powerful democratic governance, with the communication of the

residents and the governors in charge, with the understanding of water as a human right.

This thesis can lead to further studies in the improvement of social policies regarding urban space and water metabolism. Providing the needed background and situation, this thesis can contribute to the possible solutions for everyday life problems of citizens in Ankara, and in other cities as well.

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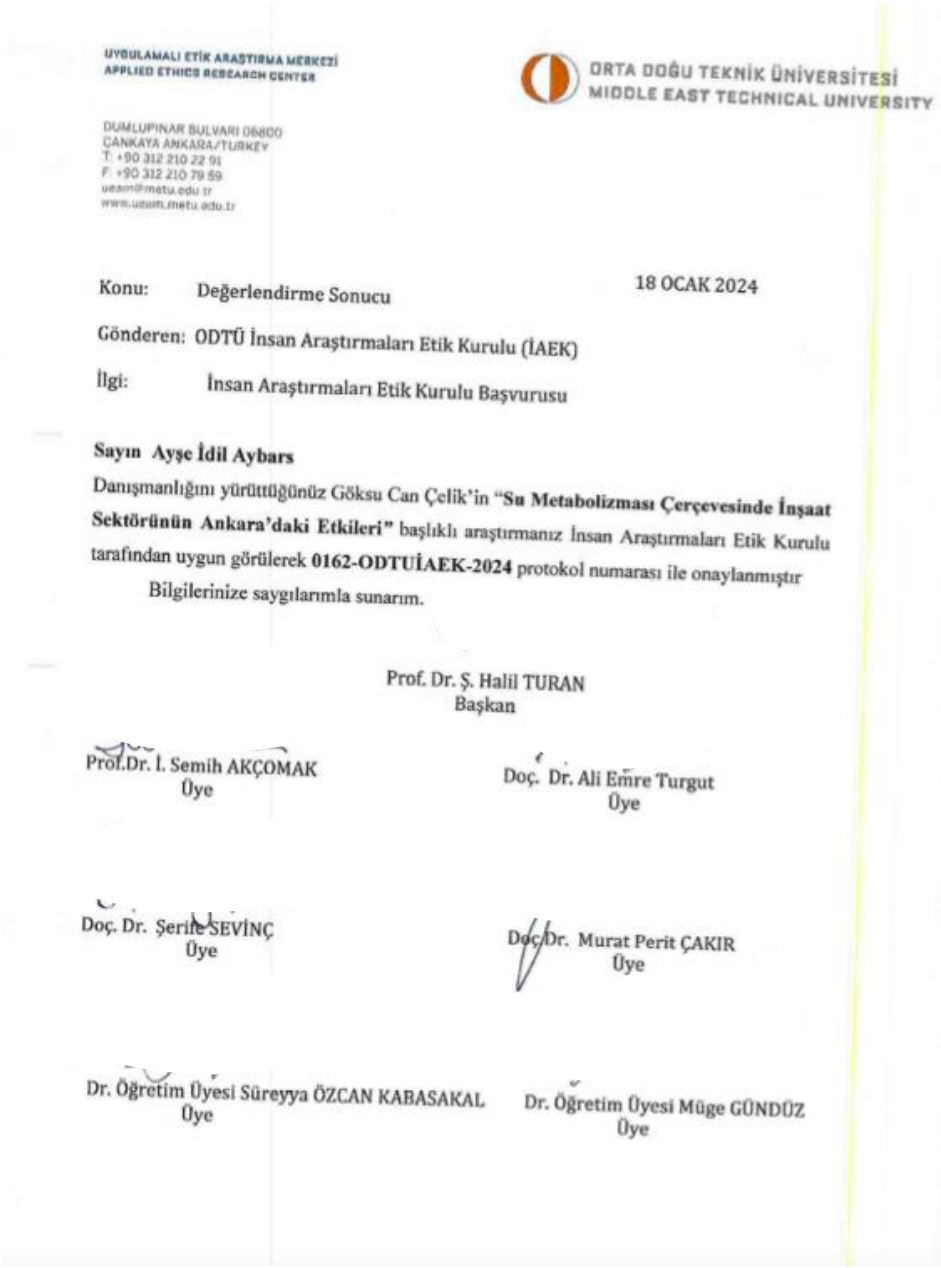
APPENDICES

A. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE



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Konu: Değerlendirme Sonucu

18 OCAK 2024

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Ayşe İdil Aybars

Danışmanlığını yürüttüğünüz Göksu Can Çelik'in **"Su Metabolizması Çerçevesinde İnşaat Sektörünün Ankara'daki Etkileri"** başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülerek **0162-ODTUİAEK-2024** protokol numarası ile onaylanmıştır

Bilgilerinize saygılarımla sunarım.

Prof. Dr. Ş. Halil TURAN
Başkan

Prof.Dr. İ. Semih AKÇOMAK
Üye

Doç. Dr. Ali Emre Turgut
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Doç. Dr. Şerife SEVİNÇ
Üye

Doç.Dr. Murat Perit ÇAKIR
Üye

Dr. Öğretim Üyesi Süreyya ÖZCAN KABASAKAL
Üye

Dr. Öğretim Üyesi Müge GÜNDÜZ
Üye

B. TURKISH SUMMARY / TÜRKÇE ÖZET

Giriş

Günümüzde doğal kaynakların sürdürülemez kullanımı ve eşitsiz dağılımı nedeniyle birçok insanı ve ekolojik kriz yaşanıyor. Kaynakların ve arazilerin özelleştirilmesi, eşit faydalanmayı sınırlarken, iklim değişikliği de durumu kötüleştiriyor. Sonuç olarak, toplum ve doğa bu mevcut durumdan etkileniyor. Doğanın tüm unsurları ve toplum arasında bir bağlantı olduğundan bu mevcut durumu tek bir kaynak üzerinden araştırmak bu durumu anlamak için yardımcı olabilir. Bu tezde insanın ve doğanın suya olan etkisini, ve aynı zamanda suyun insana ve doğaya etkisini araştıracağız.

Su, bu ilişkiyi anlamak ve araştırmak için iyi bir örnek teşkil ediyor çünkü dünya üzerindeki herkesin ihtiyacı vardır, günlük hayatı etkiler ve diğer kaynaklarla da ilişkilidir. Suyun varlığı veya yokluğu bitkileri, hayvanları ve iklimi etkiler. Sudaki herhangi bir değişiklik, tüm dengeyi değiştirir. Ayrıca, su yerden atmosfere ve tekrar yeryüzüne hareket eder. Kaybolmaz, ancak konumunu ve fiziksel durumunu değiştirir. Bu nedenle, bir döngüde hareket eder ve çevresinden etkilenir ve etkiler. Coğrafyayı, habitatı ve iklimi şekillendirirken habitatları oluşturur ve yok eder. Hareketi sırasında su üzerinde herhangi bir etki, doğası gereği tüm sürece yansır. Sonuç olarak, su dış müdahalelere karşı savunmasızdır ve çevresini etkiler. Savunmasız ancak çevresindeki tüm unsurları güçlü bir şekilde etkileyen bir kaynaktır. Bugün, su dünya genelinde yaşamın merkezi sorunlarından biridir. Nehirler kirletiliyor, kaynaklar sömürülüyor ve birçok su ve gıda güvensizliği yaşanıyor.

Bugün, insan müdahalesinden yoksun hiçbir yer bulunmamaktadır. Türkiye ve doğal habitatları ve suları da bu müdahaleye tabidir. Cumhuriyetin ilanından itibaren başlayan büyüme girişimleri ve 1980'lerden sonra artan özelleştirmelerle, doğal kaynaklar ve araziler potansiyel kar fırsatları olarak kullanılmıştır. Şimdi, tüm doğal alanlar birer birer şirketlere kar elde etmek için kiralanıp yok edilme tehlikesi altındadır. Doğal kaynakların sömürülmesi o kadar büyük bir sorun haline gelmiştir

ki bugün Türkiye, vatandaşlarına kaynaklardan eşit faydalanma imkanı sağlayamamaktadır. Diğer canlılar da yok olma tehlikesi altındadır.

Türkiye'nin başkenti olan Ankara'nın durumu, bu duruma bir istisna değil. Beş milyondan fazla nüfusuyla Ankara, boş alanların çoğu inşaat alanı olarak ilan edilmiş ve şehre hizmet eden doğal kaynakların sürdürülemez bir şekilde yönetildiği bir kent olmuştur. Dolayısıyla, en temel ihtiyaçlardan biri olan suyu güvenli ve eşit erişilebilir bir şekilde sağlayamamıştır. Ankara'daki insanlar kuraklıklar, su güvensizliği, seller ve sürdürülebilir altyapı ve su hizmetleri eksikliği gibi sorunlar yaşamaktadır. Musluk suyu içilemez durumdadır, insanlar su temini sorunları yaşamakta ve doğal habitatlar zarar görmektedir. Plansız kentleşme ve kar amacı güden belediye anlayışı, sakinlerini içermeyen ve korumayan bir şehir yarattı.

Bugün, Ankara'da su yönetimi sürdürülemez bir hale gelmiştir ve şehir, olası su kıtlığı ve sel hasarı nedeniyle su güvensizliği yaşamaktadır. Ankara'da yüzden fazla akarsu bulunmakta olup, üç büyük nehir olan İncesu, Hatip ve Çubuk'a bağlıdır ve bir ana nehir oluştururlar: Ankara Nehri. Bu ana nehir, Türkiye'nin toplam alanının neredeyse %7'sini kaplayan Sakarya Havzası'na bağlanır. Bu nehirler vahşi ve hızlıdır; bu da onları dizginlemeyi ve kontrol etmeyi zorlaştırır (Akyar, 2019; Asfaltın Altında Dereler Var, 2019'da alıntılanan). Nehirleri dizginleme çabaları yıllardır kanallar, barajlar ve su altyapıları oluşturularak yapılmıştır. Ancak, bir nehrin tamamen dizginlenmesi mümkün değildir çünkü bir nehir kendi yolunda akar, akması için yer bırakılmış olmasa da.

Bu nehirler, 1930'larda kanalizasyon altyapısındaki eksiklik nedeniyle kirlenmeye başladı ve o kadar kirlendi ki koku ve sağlık riski çok büyük bir problem haline geldi. Sonuç olarak, bu nehirler yer altına alınmaya başlandı, "Sorunlar görünmezse, hiçbir sorun olmayacak!" anlayışının bir sonucu olarak. Bu eylemlerden sonra, nehirler kanalizasyon sisteminin ana bir parçası haline geldi (Tekeli, 1991). Nehirlerin sürekli kirlenmesi ile birlikte, su kaynakları kullanılamaz hale geldi. Nüfus artışı durumu iyileştirmedi; su talebi artarken, zaten kullanılan su tekrar kullanılamaz hale geldi. Sonuç olarak, su kaynakları aşırı kullanılmaya başlandı. Ankara'nın su ihtiyacını karşılamak için yeni su kaynakları kullanılmaya başlandı.

Durum kötüleştiğinde, Ankara'ya yeterli su sağlamak için yeterli su yoktu. 2006-2007 kuraklığından itibaren, farklı bir nehir havzasında bulunan Kızılırmak Nehri su kaynağı olarak kullanılmaya başlandı. Bu iki soruna neden oldu: İlk olarak, Kızılırmak suyu, kükürt gibi tehlikeli bileşenlerin yüksek miktarda bulunması nedeniyle içme suyu olarak önerilmiyordu ve bu suyu içilebilir hale getirecek yeterli arıtma tesisleri yoktu (CCE, 2020). İkincisi, Ankara'daki tüm su kaynakları Kızılırmak dışında Sakarya Havzası'nda bulunmaktaydı. Bu nedenle, çekilen herhangi bir su kaynağı, kaynağının havzasına geri dönebiliyordu. Başka bir havzadan su çekmek ve Sakarya Havzasına boşaltmak havzalardaki dengeyi bozdu. Ankara'daki su yönetiminin neden olduğu başka bir sorun, nehirlerin çoğunun yeraltına yönlendirilmesi ve doğal habitat sağlamaması ve şehrin kanalizasyon sisteminin bir parçası olarak kabul edilmesidir (Tekeli, 1991). Bu durum aynı zamanda suyun doğal hareketini ve metabolizmasını da kesintiye uğratır.

Günümüzde, Ankara'da musluk suyunun kalitesi oldukça düşüktür ve farklı bölgelerde değişmektedir. Daha yüksek su kalitesine sahip alanlarda bile musluk suyu içmek önerilmez. Bu durum nedeniyle, Ankara'da yaşayan insanlar güvenli su içmenin tek yolu şişelenmiş su satın almaktır. Sadece şişelenmiş su satın alabilenler sadece güvenli içme suyuna erişebilir. Bugün, şişelenmiş su endüstrisi o kadar büyümüştür ki şirketler, barajlar ve hidroelektrik santralleri oluşturmak ve aynı zamanda şişelenmiş su satmak için 49 yıllığına tüm su kaynağını kiralamayı başarabilmektir. Ayrıca, sürdürülebilir altyapı oluşturmak yerine belediyeler de şişelenmiş su satmaktadır ve kar etmektedir.

Aynı zamanda musluk suyu fiyatları da düzenli olarak artmaktadır. Musluk suyunun yüksek fiyatları nedeniyle eşit şekilde erişilemez hale gelmiştir. Belediyeler, az veya hiç geliri olmayanlara neredeyse ücretsiz su sağladıklarını iddia etse de (sembolik bir 1 TL fiyat), bu eşitsizlik değişmez çünkü limit çok düşük olduğundan dört kişilik bir aile bu miktarı aşabilir. Bu nedenle, tüm vatandaşlar kayıp ve sızıntı maliyetleri, dağıtım ve altyapı maliyetleri dahil olmak üzere musluk suyu için ödeme yaparken, arz edilen su içilebilir değildir. Bu potansiyel sağlık sorunundan sadece şişelenmiş su satın almak için daha yüksek miktarlarda para ödeyebilenler kaçınabilir. Aynı zamanda, daha yüksek faturaları karşılayabilenlerin aşırı su kullanımı serbesttir.

Güvensiz musluk suyu ve eşitsiz suya erişime ek olarak, tüm boş alanlarda arazinin özelleştirilmesi ve inşaat alanlarının oluşturulması, asfalt ve betonun toprak tarafından emilen su miktarını azaltması ve zaten bozulmuş su metabolizmasını engellemesi nedeniyle sel olasılığını artırır. Geçirgen olmayan alanların artması, yağmur suyunun toprağa geri dönmesini engeller Sonuç olarak, biriken su sel oluşturur. Ancak, suyun bitkiler tarafından emilmesi gerekmektedir. Sulak alanlar suyu emmek ve yeraltına kanalize etmek için harika ortamlardır. Ankara'da artık sulan alan kalmadığı için, filtreleme işlemi de eksiktir. Asfalt geçirgen olsa ve su emilebilseydi bile, şehirdeki gaz emisyonları tarafından kirletilecekti. Ayrıca, iklim değişikliği nedeniyle, sel ve kuraklıklar her yıl daha etkili bir şekilde yaşanmaktadır. Bu doğal olayların yıkıcı gücü her yıl artmaktadır. Bu sorunlar, dışarıda çalışmak zorunda olan ve daha ucuz bodrum katlarda yaşayan gruplar için potansiyel riski artırır. Ankara'daki maddi ve can kayıpları her yıl artmaktadır.

İnsanlarla sınırlı olmamakla beraber Ankara'da yaşayan tüm canlılar, yaşam alanlarının azalması nedeniyle suyla ilgili sorunlar yaşıyor. İmrahor Vadisi, Eymir Gölü, Mogan Gölü ve ODTÜ kampüsü gibi Ankara'nın bazı bölgeleri kuşlar, memeliler, amfibiler ve birçok kelebeğin türlerine ev sahipliği yapıyor ve bu türler lüks siteler ve yollar inşa etmek için birer birer yok ediliyor. Bitmeyen inşaat trendi ve nehirler üzerine yeni binaların ve yolların inşası tüm şehri ve doğal habitatları etkiliyor. Sonuç olarak, göçmen kuşlar ve yerel türler ekosistemden ayrılıyor veya yok oluyor. Hayvanlar kadar, hava kalitesini artıran ve iklimi iyileştiren bitkiler de çok değerli sulak alanların yok edilmesiyle yok edildi. Ankara, tüm canlılar için yaşamı zor bir şehir haline geldi.

Ancak, daha sürdürülebilir su yönetimi olan farklı örneklerin dünyada var olmasına rağmen, vahşi nehirler ve nüfus artışı gerçek nedenler olamaz. Şehirler, su temini potansiyeli nedeniyle tarih boyunca nehirlerin yanına inşa edilmiştir. Peki, Ankara'nın su durumu neden sorunlu ve su neden yeterli değil? Ana sorun, suyun yönetiminin sürdürülemez olmasıdır. Ankara uzun yıllar boyunca nehir sistemleriyle tanınırken ve suyla ilgili hiçbir sorun yaşamamışken; suyun toplanması ve kullanılması biçimleri nedeniyle, su talebi diğer kaynaklardan artmıştır. Su farklı nehirlerden gelir, dağıtımda farklı nedenlerle %37.94 kaybolur (ASKİ, s.y.) ve başka

bir nehirle boşaltılır. İnsanların kullanımı için su bu şekilde yönetilirken, serbestçe akan nehirler beton tünellere hapsedilerek dizginlenmeye çalışıldı. Nehirleri yeraltına yönlendirmek ve tünellere hapsederek, nehirler görünmediği için daha fazla inşaat için kullanılacak arazi vermiş ve yönetimde daha az çaba harcanmıştır.

Araştırma Sorusu

Bu tezin konusu, kentleşme ve arazi ve kaynakların özelleştirilmesinin Ankara'nın suyuna etkileri etrafında şekillenmiştir ve ana çerçevesi, metabolizma terimidir. Tarihî arka plan 1930'lardan başlayarak verilecek olsa da, çalışmanın odak noktası, Türkiye'nin ekonomik ve siyasi atmosferinin değiştiği ve ekonomik büyümenin ana itici gücünün inşaat sektörü olduğu 2000'lerin sonrasında şekillenmiştir. Ana hedef olarak inşaat sektörünün ve arazinin özelleştirilmesinin nasıl bir metabolik ayrışma yarattığı incelenmiştir.

Yöntem

Bu tez, Ankara'nın su metabolizmasına inşaat sektörünün etkilerini anlamak ve metabolik ayrışmayı incelemek için çeşitli yaklaşımlar ve yöntemler kullanıyor. Marx'ın Metabolizma ve Metabolik Ayrışma kavramlarını ana çerçeve olarak alıyor ve suyu diyalektik bir perspektifle ele alıyor. Literatür taraması, hidroloji, su yönetimi, ekolojik sosyoloji ve siyasal ekoloji alanlarına farklı yaklaşımların incelenmesini ve karşılaştırılmasını içeriyor. Sonrasında, inşaat ve kentleşmenin su metabolizmasına etkilerini göstermek için politik ekolojiye odaklanarak bir tarihî arka plan sunuluyor. Ankara'nın su sistemine ve tarihine dair bilgiler, çeşitli uzmanlarla yapılan görüşmeler ve daha detaylı haritaların araştırılması yoluyla elde ediliyor. Genel olarak, tez başlıca makaleler, geçmiş çalışmalar ve uzman görüşmeleri ile şekillendiriliyor ve Marx'ın kavramları temel alınarak analiz yapılıyor.

Sonuç

Ankara, yaşayan bir varlık gibi girdi ve çıktıları ile bir metabolizma olarak kabul edildi. Vahşi ve hızlı nehirleriyle ünlü olmasına rağmen, nüfus patlamasıyla su sorunları yaşamaya başladı. Su kaynaklarının fazlalığı nedeniyle, etkili bir planlama uygulanmadı. Nehirler, yollar ve yeni yapılara alan açmak amacıyla yer altına

hapsedilirken, atık su yeraltı nehirlerine yönlendirilmeye başlandı. Zamanla, nehirler de dahil olmak üzere tüm boş alanlar, özel sektöre ve hükümete kar potansiyeli taşıyan alanlar haline geldi. Verimsiz kanalizasyon ve yağmur suyu toplama sistemi zaten bir sorundu ve "boş" alanların inşaat bölgeleri olarak ilan edilmesi özellikle 2000'lerden sonra ekonomik büyüme ve kâr için bir yol haline geldi.

Su bireysel ve sabit bir şey olarak düşünülemez, bu yüzden su metabolizması hayatın birçok yönünü içerir. Metabolik ayrışma farklı yerlerde görülebilir: İlk olarak, su döngüsü zaten bozulmuş durumda, nehirlerde ve yeraltında bulunan su atıklar tarafından kirletilmiş, betona hapsedilmiş ve herhangi bir ekosistem sağlamıyor. İkinci olarak, insanların suyla ilişkilerinde de ayrışma görünebilir. İnsanlar uzun süredir suyu kontrol ediyor olmalarına rağmen, bu kontrol sürdürülebilir olmalıdır. Su, toplumda normal bir süreç olarak farklı amaçlar için yönlendirilebilir ve kullanılabilir. Ancak, su yönetimi sadece kâra odaklandığında, sürdürülebilir su yönetimine sahip olmak imkansız hale gelir. Sonuç olarak, su eşitsiz bir şekilde dağıtılmaya ve kullanılmaya başlandı. Ayrışma başka bir boyutta da görünüyor: Nehirler her zaman dizginlenmesi zor şeyler olmuştur. Araziyi ve toplumu şekillendirmede büyük bir güçleri vardır ve doğal sınırları saygı gösterilmelidir. Vahşi nehirlerin bulunduğu bir şehirde, sel normaldir ve beklenmelidir. Bu nedenle, kentselleşme, nehir yatakları ve nehirlerin gücü tarafından şekillendirilmelidir. Nehirleri yer altına koymak, onların gücünü ve potansiyelini değiştirmez. Ayrışma günlük hayatta da görünür: Sürdürülemez su yönetimi sonucunda, Ankara'daki önemli bir nüfus, güvenli içme suyuna ve yeterli atık su hizmetine erişim sağlayamazken, sürekli olarak sel ve kuraklıklardan etkileniyor. Sonuç olarak, Ankara sakinleri farklı düzeylerde su güvenliği ve hizmet eşitsizliği yaşamaktadır.

Ankara'da kentleşme ve nüfus artışı beklenen sonuçlar olmasına rağmen, su yönetimi farklı olmalıydı. Mevcut durum için hala farklı çözümler bulunabilir. İnsanların suya eşit erişimini sağlamak için yetkili kanallar birçok farklı politika üretebilir. Aynı zamanda, daha sürdürülebilir bir su yönetimini sahiplenmek uzun vadede su kaynaklarını korurken, toplumun da suya erişimini güvene almak için gerekli bir şeydir.

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TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English): Impacts of Construction Boom in Ankara Within the Water Metabolism Framework

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master ☒ **Doktora** / PhD ☐

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