

# Around Water: A Research-Based Landscape Design Studio

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**Abstract:** Water is the source of life for our planet, guided the ancient civilizations, and formed its current footprint on the earth. Water has always been a crucial element of our biological survival; consequently, humankind has permanently settled around it while carrying the responsibility of protecting it. To understand the water pattern in various cities throughout history and analyze how the emerging problems were overcome, Istanbul Technical University Landscape Architecture Department Graduate Level Design Studio was held under the theme of "Around Water". Despite the adverse effects of the Covid-19 pandemic on education, international researchers contribute to the studio in a beneficial and diversified manner with the effective use of online tools. As a result of the literature review and the online, multidisciplinary education, and research-based design requirements, a new studio method was developed. Water-based case studies worldwide produced enriched outputs. While creating new discussion environments, the diversified outcomes of the studio "Around Water" contributed to the creation of cumulative studio knowledge.

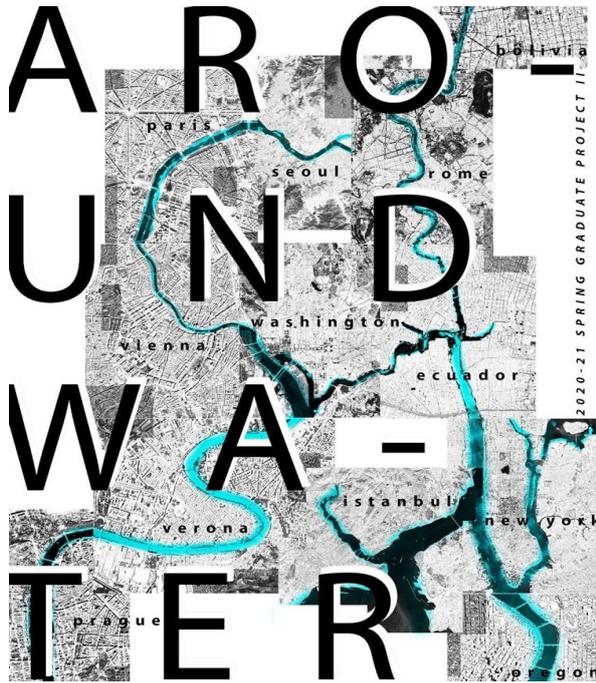
**Keywords:** COVID-19 pandemic, Landscape architecture, Research-based design studio, Water-based design, Water-based planning, Water history.

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## 1. Introduction

Water is vital for our planet, especially for living beings. Since the beginning of time, human beings have constantly searched for water resources. They built their civilization near water sources. From small settlements to large societies established near water, they improved themselves by supporting large populations. On the other hand, cities hosted by civilizations have been the centers of many significant exchanges in history. In cities, people shared their natural resources as a community and their ideas as individuals.

Since water forms the basis of cities, its presence or absence has significantly affected the morphology of the cities. Water problems resulting in crises have always had a growing effect on the development of civilizations. Today's urban challenge is water scarcity caused by climate change, inadequate urban planning, and unplanned population growth.



*Figure 1: Project Poster*

Through historical case studies, water patterns were studied in the Graduate Level Landscape Studio "Around Water" in the 2020-2021 Spring Semester Term at Istanbul Technical University Landscape Architecture Department. In the studio, the students sought to understand how the cities overcame the water-related challenges to be resilient and sustainable and how they occupied a place in water history. Conducted online due to the pandemic conditions, the studio aimed to find new and creative solutions for 21st-century cities. The studio projects explored water-related issues, seeing water as the twenty-first century's most significant design and planning challenge. Also, water is one of the most significant factors in tackling the climate crisis, with the Conference of Parties (COP) contract signed for the 26th time.

While water is an element of nature around which life is shaped and civilizations are established, today, it is in a position where cities are under the threat of flooding due to water surplus or suffering from its absence. Within the scope of this studio, the discussions investigated water in every aspect and every scale, from today's design parameters to the

importance and meaning of water in different religions in the spiritual dimension. Since the study was handled as part of a graduate studio project, it was not carried out around a single focus. As a method, students were asked to design a research project. Research topics were diverse, and they ranged from cisterns to sinking cities, from basin to water footprint, from spiritual status to games and technological innovations.

## **2. Methodology**

Due to Covid-19 pandemic conditions, the 2020-2021 Spring Fall Semester Graduate Level Project Studio was conducted online. Within the circumstances of online education, new education techniques were applied to the studio. Simultaneously, to follow a research-based design studio process, a new studio method was required to face the needs of the online education system. This research aims to discuss the newly applied studio method results and contribute to the literature with the outcomes. To conduct the study, the research article was structured as follows. Firstly, a literature review was done to examine research-based design studio, online, and multidisciplinary education systems worldwide under the title of "landscape architecture graduate-level studio education". Secondly, a new studio method was developed under the "Around Water" theme. Finally, the outcomes of the studio were presented with the selected various case studies and discussed. Projects as studio outcomes are categorized as "Water History", "Water-Based Planning", and "Water-Based Design".

## **3. Landscape architecture graduate-level studio education**

### **3.1 Research-Based Design Studio**

Developing an idea in a research project often stems from the experience of practical problems (Trochim and Donnelly, 2001). As a method in this graduate-level studio project, students were asked to carry out a research project. They started their projects by studying the literature in their fields. Conducting a literature review is essential to general knowledge of the relevant research topic.

Each process has been planned subjectively in this project since the theme, scope, and desired result of each research is different. In a study, variables direct the research, and each variable can be considered an entity that can take different values (Trochim and Donnelly, 2001). Within the scope of this studio work, the variables of each study differ from each other depending on the concentrated theme. In the systematic design method, the design process is mainly in the form of "*Analysis, Synthesis, and Evaluation*". In both design and research, the perspectives of the literature reveal different views according to the field of use. In evaluating the various contextual objectives of the research project, the researcher's questions inevitably arise. "*What is the motivation for this research?*", "*Who is the target audience of the study?*" and "*What is the potential or intended impact of this research when completed?*" questions can be taken as examples (Groat and Wang, 2013). In this framework, it should be noted that the reason for choosing "water" as the scope of this study is to increase the recognition and importance of water in every stage and scale of our lives and to include it in the education system. As a multidisciplinary architecture faculty team that values its environment and natural resources, it is imperative to understand the unique needs of the societies of our age and that we do not offer the right solutions. Therefore, as a designer, knowing that our life is highly dependent on water and giving importance to water-related works has been our priority within the scope of this research project.

The education method applied in design studios has a deep-rooted tradition in architectural disciplines. Studios, which provide a platform where students interact with the instructors, are exemplary in other disciplines (Boyer and Mitgang, 1996; Kvan and Jia, 2005). Similarly, in this research-based design studio, the projects for which the graduate students created their research questions under the main title of "*Around Water*" were discussed with the lecturer and other students in each lesson. The process progressed, and the projects were discussed.

### **3.2 Online and Multidisciplinary Education**

With the appearance of the Covid-19 epidemic in the recent past, many studies focused on examining its impacts, consequences, and confinement periods. This phenomenon affected education deeply through the schools' closure. Several studies examine the negative impact of unusual routine and online learning on various levels of education. According to the existing literature, e-learning brought about psychological issues such as anxiety, tension, and concerns about future education and careers, to both teachers and students. Poor internet connectivity, particularly in digitally underdeveloped countries, inadequate study areas at home, lack of face-to-face contact with classmates and tutors, and consequently low morale and enjoyment lead to a loss of real-time transmission of ideas. (Adnan, 2020; Hasan & Bao, 2020; Toquero, 2020; Vaez Afshar et al., 2021).

While the issues are comparable to the previously stated distance learning ones, Adnan (2020) claims a greater concern for tactile learners, who are the subject of this research as art and design students. Despite their proficiency in using online educational technology due to the related knowledge they acquire, thanks to their major, art and design students confront a variety of problems in their applied classes (Dilmaç, 2020). According to the interviews conducted in Dilmaç's (2020) study, the participants mentioned that these types of practice courses require face-to-face practical training with enjoyment and some apparatus in the sessions that they do not have at home. Additionally, the Covid-19 period's anxiety impacted their intention and inventiveness in creating artworks.

Almost all academic institutions now use video call sessions on platforms like Zoom, which are tedious for students to attend. However, considering classes being held online as a mandatory consequence of Covid-19 and the mentioned subsequent issues, the instructors and students noticed the inevitability of the situation. Hence, they tried to focus on the bright sides of widespread e-learning. We let

students manage the time to avoid the downsides of a poor internet connection in the studio. When the students were available and felt comfortable, the presentations and the critiques were made. In order to just discuss the students' projects due to lack of face-to-face meetings, we tried to have various conversations related to news around the world. Students were allowed to discuss and interact to provide a chance for every student to receive required critiques. Students were asked to consider their interests each week to keep studio morale high. The studio allows students to enjoy their interest topics, which gives extra motivation to the studio. Despite turning negative impacts into positive ones, the online studio was beneficial to invite international colleagues to the studio. Juries from La Sapienza University and Columbia University listened to the students' presentations and gave valuable critiques to them. Additionally, watching related videos during the class was one of the notable activities leading to interactive conversations and brainstorming by students on online whiteboard platforms such as Miro (URL-1).

Most of the time, carrying out a project takes place with the collaboration of people from different disciplines on the scale from implementation to design. When scholars of various disciplines cooperate to use each other's tools or knowledge, multidisciplinary occurs (Youngblood, 2007). Considering the students' approaches to dealing with the water issue, the class had a multidisciplinary theme. The orientations and productions of this group, which included students from different nationalities and disciplines such as architecture, interior architecture, and landscape architecture, were also different from each other. They had technological, historical, cultural, and educational points of view for tackling the water issue of the planet.

#### **4. New studio method: "around water"**

It is unthinkable for humans to survive without being around water. They need fresh water to survive biologically and to maintain their physical health. Without water, humans can only survive for a few days. Also, water affects

societies, including setting up their settlements around the water besides the physical health dimension. Cities are born, developed, and collapse around water. Water is one of the essential elements; it has been the source of life and civilization throughout history and has been culturally and geographically influential on architectural, construction, and management styles. Systems have been established, and facilities have been built to deliver water, which is an important need for living things to survive, from past to present. Sometimes artificial, sometimes naturally occurring waterways told the story of water and the surrounding lives. Water carried to the cities by canals and aqueducts came to cisterns to be stored and reached fountains and pools through pipes.

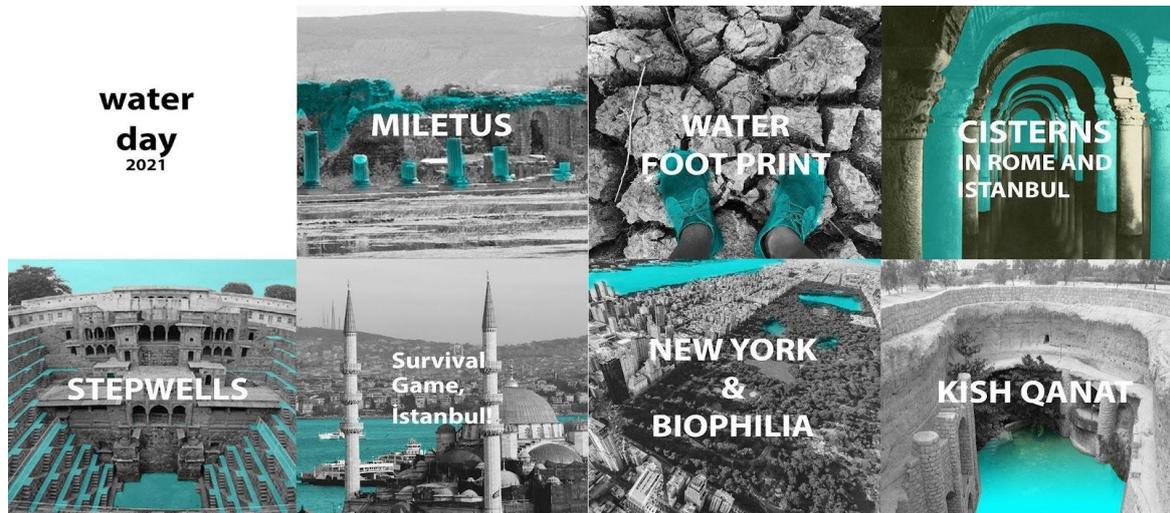
On the other hand, a changing water story has been shaped differently in every society. Every life that has developed around water has been specialized in terms of water use. Each civilization has developed its own ancestral water culture collection and uses techniques considering its nature, land, and climate variables. Today, because of climate change and the water shortage crisis, it is first needed to understand the water ancestral culture. So, in this studio, we first become testimonies of water cultures throughout history, from Qanat systems to aqueducts, stepwells, and cisterns.

Within the scope of this research-based design studio, the main title of "*Around Water*" was adopted, and graduate students traced the story of water in various parts of the world. The field of study to be chosen in these projects was left to the students, and the final output was not subject to a specific format. While some students decided on the project area based on their observations about the water they live in their hometowns, some focused on areas at risk of submersion or countries with water access problems. As the theme selection, while some projects focused on architectural structures culturally shaped by water management, such as stepwells, cisterns, and ports, a more futuristic perspective was dominant in some projects. Game design and futuristic architectural solutions were produced. In

addition, the scale of the research projects has varied from the biophilic approach at the human scale to the mapping of the city and representation with illustrations.

Furthermore, World Water Day, organized by the UN with a different theme every year since 1993, has been among the subjects discussed in the studio, having similar aims. Closely related to "Around Water", 21 March 2021, World Water Day was celebrated by sharing a video work consisting of the visuals describing the relationship between the selected case studies and water on the social media account of the landscape architecture department (Fig. 2).

Students participated in three jury sessions and received required critiques. They submitted a booklet section at the end of the semester. The studio calendar was divided into three sections with three jury days: General research about water and the case study areas, physical and non-physical analysis of the areas, and proposed research design discussions. Each section contained its own data visualization techniques. In the end, it has been evaluated how the case studies can be read through analysis and how successfully these readings can be transferred to a planning or design scale proposal.



*Figure 2: World Water Day 2021 Works of The Studio*

#### 4.1 Studio Method

The Graduate Project I studio follows a 15-week, 3-hour-a-day program. During the 15 weeks, students selected a topic under the title of "Around Water" and chose their case study area depending on their interests within the framework of the subject. Students analyzed the selected case studies in-depth and proposed a research-based design or planning approach. Students presented the information they had gathered every week as part of this process. All the studio participants were responsible for stating their critiques to all presentations.

#### 4.1.1 General Research About Water and the Selected Case Studies

The first four weeks were devoted to the general research approach. After introducing the subject in the first week, the "Around Water" theme was discussed. As a result of the discussion, one week period was given to the students to choose a case study in which they will work on water depending on their interests.. The information through the water they gathered was presented to the studio audience by visualizing with the mapping techniques which provided significant contributions to the research-based design thinking. At the end of the first phase, the

"Around Water" information was transferred to the first guest jury through visualization techniques such as mappings, illustrations, or diagrams.

#### 4.1.2 Physical and Non-physical Analysis of the Selected Case Studies

After visualizing the decided subject through a literature review, Figure 3 focused on the case studies selected from various parts of the world. Performing the analysis of areas with different geographies worldwide through water and sharing it with the studio members diversified the analysis and enriched the field reading ability. First of all, searching physical factors such as climate and landscape formations and then adding social and cultural factors such as human relations or education as layers were essential steps in specifying the relation of the case study with water.

#### 4.1.3 Proposal Research Design Discussions

Depending on the analysis, each project developed its own specific proposals. Case study diversity and students' multidisciplinary approach informed projects as varied as a conservation plan and an educational digital game. Such diversity enabled projects outputs discussed by everyone in the studio. In the last jury, an international guest joined the studio

and gave the students critiques on their proposals.

At the end of the three stages, determined at the beginning of the semester, students submitted their projects in a booklet format by converting them into a publishable form, as a result, developing proposals depending on a detailed analysis created research projects around a specific subject and case study that dealt with the subject of "Around Water" .

### 5. Results and discussion

Landscape Architecture graduate-level studio, which took place in the spring term of 2020-21, was conducted as a research-based project in line with the education level of the students, and each of the diversified projects under the "Around Water" theme offered new discussion environments. In the studio with multidisciplinary participation, water, which is the most significant design and planning challenge of the 21st century and one of the most important natural factors to be addressed against the climate crisis in the 26th COP agreement, was discussed. The fact that a specific project area was not given for the projects carried out within the studio's scope and that research and project making in any part of the world was left to the students resulted in a rich and diverse output.



*Figure 3: Case Studies Around the World*

By discussing a multidisciplinary team about the water topic, multiple layers around the water were discovered, leading us to the cumulative knowledge of the studio. Afterward, the variation of the ideas exchanged in the class enabled us to become aware of diverse water issues. While the topic, around water, limited the scope of the research, it was enlarged by letting the students select their approach towards tackling it. Hence, the students gained research-based design ability in their graduate-level education. Moreover, each case study as the studio's output can turn into academic research.

## 5.1 Studio Outcomes: Case Studies

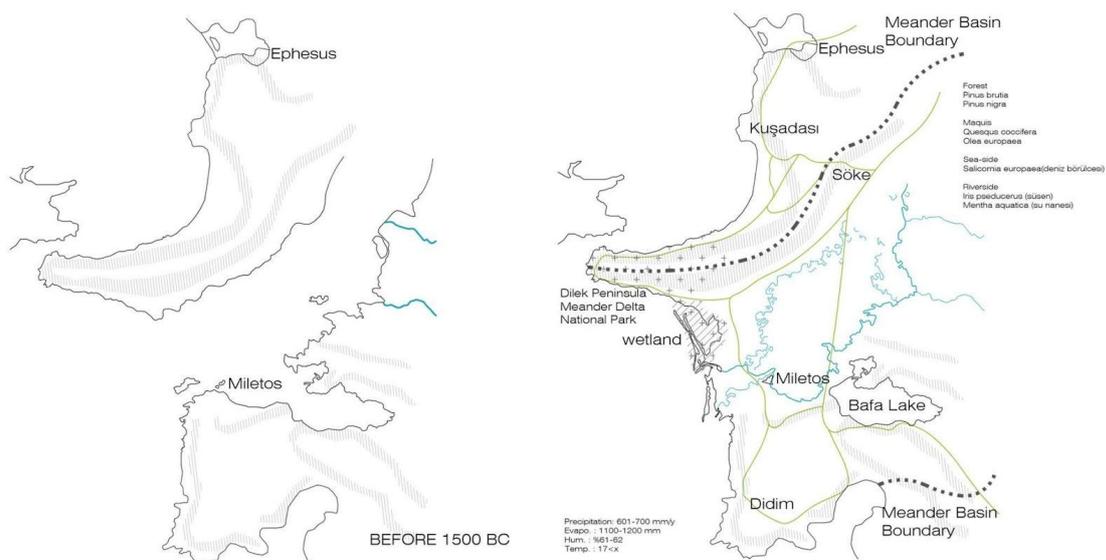
### 5.1.1 Water History

#### 5.1.1.1 Ancient City Miletus in Büyük Menderes Basin

The story of water begins long before history. Water shaped the structure of today's cities thousands of years ago, which is carried to the present through cultures throughout history. Reading the water story over Miletus, an ancient Ionian port city in the Büyük Menderes Basin (Fig. 4), adds an entirely different aspect to the landscape. Due to its cultural heritage value with a substantial historical background,

it is a first-degree archeological site in the basin. Once a port city in the Aegean Sea, Miletus has become separated from the sea more than ever to the point of being inland, influenced by the meander. Bruckner et al. define Miletus as "from the archipelago to flood plain" (2006), which shows its direct relation to water. The meander is the key to the morphology of Miletus City, which dates back to prehistoric times. The meander shaped and changed the city during its history. The conservation methods for an ancient city in a meander basin are investigated within the scope of landscape change.

Through literature, landscape change is examined through five concepts concerning water: time, coastal change, cultures, architecture, and water technologies. The five concepts are mapped onto a timeline and modeled in three-dimensional ways. In the created timeline, it is seen that before 1500 BC, there was seawater instead of a meandering riverbed in the Büyük Menderes Basin. The shoreline was located further in the eastern part than it appears today. Lake Bafa was a part of the Aegean Sea. Miletus was an archipelago. With the formation of a delta in the Aegean Sea by the alluvium brought by



**Figure 4:** *Büyük Menderes Basin*

meander, the coastline has moved westward over time. Miletus became a peninsula. In the Modern Age, Miletus becomes a land not adjacent to the sea and is surrounded by the meander. Today, it is under flood risk of the Menderes River (based on visualizations in the timeline). Second, the research was about the existing protection status of the area through archeological sites, urban sites, natural sites, significant natural areas, or heritage sites. By combining landscape change in Miletus City and Büyük Menderes Basin and existing protection maps, a conservation master plan including a protection zone and a buffer zone is developed for the meander landscape character atlas.

### 5.1.1.2 The Management of Water in Istanbul from the Past to the Present (Cisterns of Istanbul)

Istanbul is a water city with its Bosphorus, shores to two seas, streams, fountains, and spring waters. Within the scope of the class project, water has been used in many different ways, both above and underground in Istanbul City. Plenty of structures have been built for the use of water in history. Because Istanbul city hosted many empires, tackling water

management with various methods and history, this study was first examined water management from the past to the present. For instance, cisterns with transmission lines were designed to store and carry water throughout the city. Also, with the advancing age and the historical process, other water structures such as dams were built around the cisterns to enable water portability instead of using cisterns just as storage. In this study, the definition of cisterns, their distribution according to periods, typology, and their current status, are extensively investigated by predominantly examining the cisterns.

The result section of the research examined the Byzantine and Roman period cisterns in the Historical Peninsula in detail. A water source excursion route was proposed and presented in the Historical Peninsula in line with the connections between water resources. This route, which is created to narrate the link between water resources and their historical background, aims to understand and reinvent the relationship between superstructure and infrastructure in the city. The route is planned (Fig. 5) to guide both citizens and tourists in the context of public, history, architecture, and tourism. In addition, the study intends to bring



Figure 5: Proposed Map for Cisterns of Istanbul

new functions to underground structures by considering their historical identities and establishing new links between the past and the future.

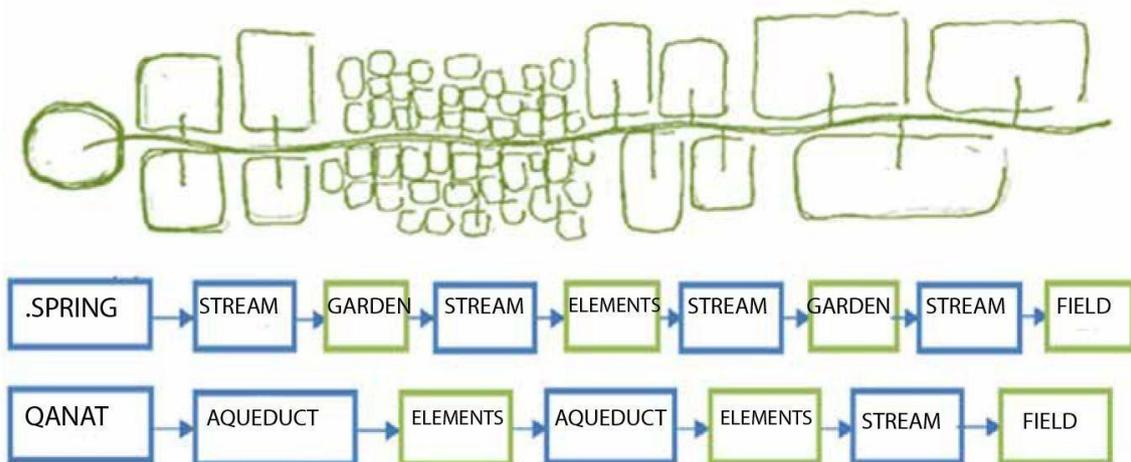
### 5.1.1.3 Water and Its Importance During History in the Case Study of Iran's Qanat System and Gardens

According to the undeniable place of water in human civilization from past to present and in the future, the project tries to examine the importance of water in Iranian cities based on descriptive-analytical methods using historical library documents. It focuses primarily on its arid and semi-arid regions, examining the strong relationship between the shaping of Persian gardens and water. Finally, it explores different types of water usage and its function in gardens named the Qanat system, known as Iran's cultural heritage nowadays.

Iran is a mountainous, arid, and semi-arid country. People have tried to find a solution for the water management issue for a long time. Consequently, the Qanat system that played a fundamental role in water management and shaping Persian gardens in Iran's harsh environmental conditions is one of the most important systems invented by Iranians (Fig. 6). Indeed, Qanat is not only a general and efficient structure for water transfer, but also it

is a water resource for other systems like cooling systems, water reservoirs, and land irrigation. When it comes to gardens, water circulation defines the geometry of the gardens and their location. Hence, it can be stated that water has been used for two purposes; While the first one is functional, the second one is decorative with various running structures, such as basins, streams, water creeks, and fountains. Also, gardens use water with its multiple aspects such as liveliness, brightness, cleanliness, light, inertia, and motion, bringing numerous feelings in the human soul and enhancing mental comfort (Fekete and Haidari, 2015).

The study shows that nowadays, according to fast urbanization in Iranian cities, the function of the Qanat system is decreased, and some of them are destroyed. As a result, the gardens and green spaces irrigated by Qanat are at risk of deterioration, and cities face different problems in water management. All these problems are ringing alerts for understanding the importance of water in daily life and finding ways to manage it before it becomes much more critical.



*Figure 6: Qanat System*

## 5.1.2 Water-Based Planning

### 5.1.2.1 Water, Biophilia, and New York City

In metropolitan areas where human density is high and intense construction, designs should be made harmonious with nature to ensure human health and welfare and sustainable urban infrastructure. The goal of creating cities with high human density reveals a perspective that questions the existence of a relationship with nature in the urban environment. In this framework, the question arises, "Can a sustainable and biophilic city that maintains its connection with nature be created by designers?" The human need for nature is inevitable. Connecting with nature in the city is necessary for societies where human health and welfare can be achieved.

In this context, New York's city has been considered one of the cities with the highest urbanization and dense human population. Manhattan Island has been determined as the study area for investigating water management systems and the city's green infrastructure. This study aims to relate and explore the connection between New York, Manhattan Island, and "water", both as part of nature and

as a system to manage, under the concept of biophilic design. First, the term biophilia was introduced to establish the link between them, and water was emphasized as a design element in terms of biophilic design. Secondly, current usage percentages were given to understand the movement of water. Thirdly, the history of urbanization of Manhattan Island was introduced in connection with schemes and critical historical events. Then, the waterways and water systems built to bring water to the city are examined by comparing with green infrastructure systems and assessing its biophilic dimension. Another aim of this research is to trace the link between being in harmony with water and being a biophilic city. Water and green infrastructure systems in Manhattan Island, one of the most extreme examples of urbanization, are examined under the title of biophilia to reveal the water management of this settlement and examine the efforts to bring people together with nature. The city's relationship with water at the user and city-scale could be monitored and presented by mapping (Fig 7).



Figure 7: Manhattan Island Water-Related Parameters Map

### 5.1.2.2 Water Footprint: Burundi, Kirundo

Water, an essential source of life on Earth, is running out day by day due to human and natural factors. Although water is a matter of rights, it cannot be fully applicable worldwide. Many African countries are dealing with very long drought seasons, and their infrastructure systems are not developed due to the lack of adequate financial support. Even some countries in Africa do not have an infrastructure system. That is why people living in these dry regions have serious difficulties accessing water and have lost their fundamental rights. Since life in African countries is entirely based on water, many people do not have the right to food, shelter, washing, and education if there is no water. As a result, the landscape of one of the African countries is investigated depending on the lack of water, which is so significant and not on the agenda much around the world. Burundi, which has the world's unhappiest African countries and the second largest freshwater resource globally (Assessment, 2007), is focused on throughout the study. After investigating water footprints worldwide, Burundi is analyzed depending on the spatial access to water. For the Kirundo Region, where it is found that the access to water is the

most sensitive in the country, spatial water access scenarios are created. Besides the scenarios with low cost and low maintenance requirements, accessible installation structures that supply water to the city are proposed to adapt local people to spatial water access. Kirundo city is the pilot study area for Burundi (Fig. 8). Decisions made for Kirundo are transformed into planning strategies applicable within the entire country of Burundi.

### 5.1.3 Water-Based Design

#### 5.1.3.1 Su: A Serious Game for Water Management - Based on Istanbul

Due to the crucial role of clean and fresh water for the planet and the inhabitants, its lack impacts their physical, social, and economic well-being. However, the steadily increasing urban population growth and their water demand generate a fateful threat considering the decay of available water resources (Van Leeuwen & Sjerps, 2016). As a consequence of this phenomenon, society may face water insecurity and fail fulfilling its water need for a long time. Besides, the aridity of a region aggravates human condition by endangering the food resources, natural ecosystem, and health. Hence, for the sake of the next

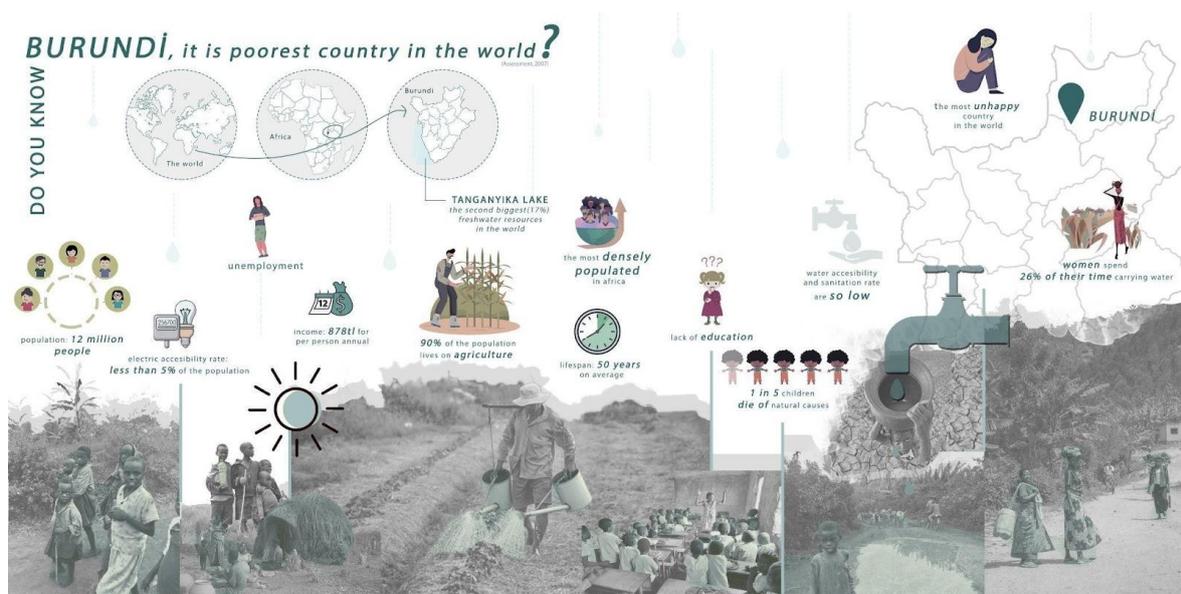
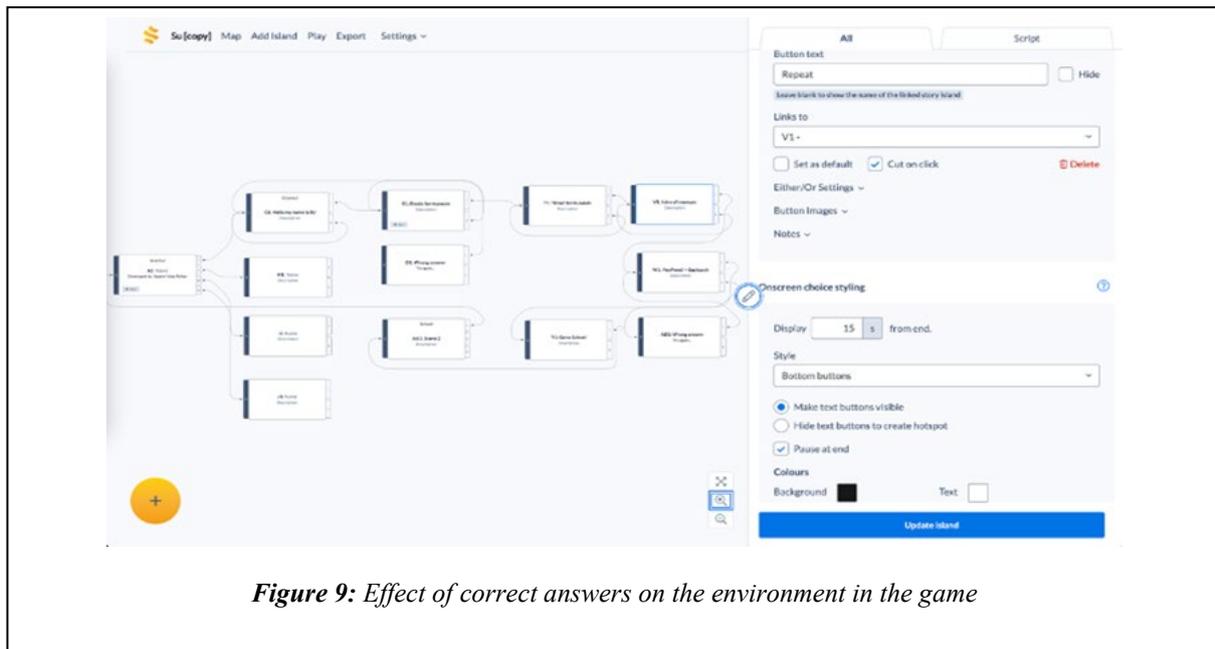


Figure 8: Water Footprint, Burundi



*Figure 9: Effect of correct answers on the environment in the game*

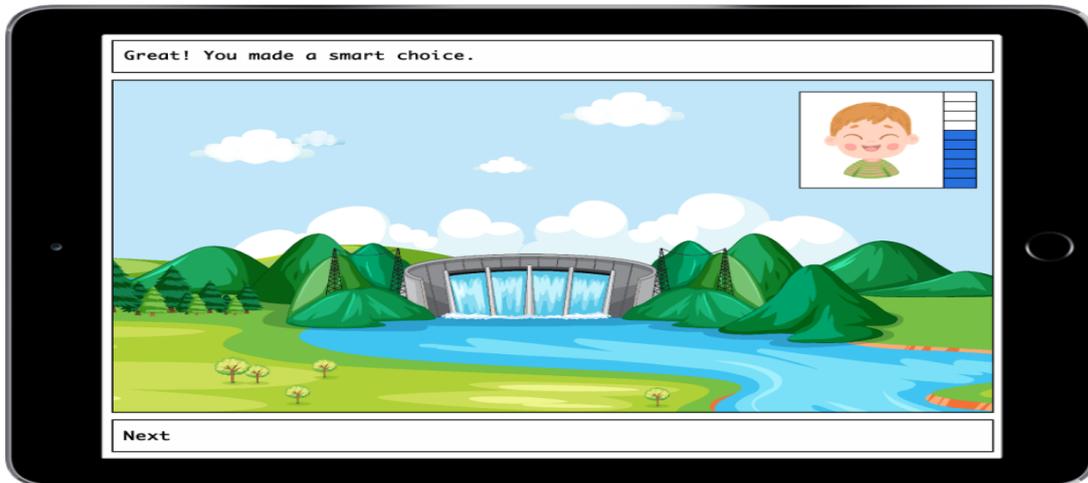
generations' life quality and economic growth, water management plays a crucial role in dealing with the water issue (Savun-Hekimoğlu et al., 2021). Water consumption of a region includes the used water for any type of production and its direct use as freshwater. Hence, production trade amongst countries enables a virtual water flow, an alternative solution regarding water scarcity in the arid regions (Hoekstra & Mekonnen, 2012). This study aims to deal with Istanbul's water management issue, a metropolitan city with a high population growth pace. Istanbul faced water-related threats during its history (Savun-Hekimoğlu et al., 2021; Van Leeuwen & Sjerps, 2016). The most recent drought in 2020 that the city experienced caused an extreme shrinkage in its reservoirs, falling to almost only 20% of their capacity (Yılmaz et al., 2020).

Public awareness has a crucial position regarding the sustainability of ecosystems. Hence it is vital to inform the citizens of the possible challenges, specifically from their early ages (Vaez Afshar et al., 2021). Additionally, UNESCO (1980) drives the attention of contemporary literature encompassing environmental education to endorse promising approaches towards public awareness. Educational software, also called edutainment, a term generated from education

and entertainment, is a digital game designed for tutoring. It serves academic content to the user through a digital medium, using entertainment. These games, also called serious games, have been attracting players since 2002 (Eshaghi et al., 2021). Thus, this study introduces a serious game based in Istanbul to raise the upcoming generations' awareness concerning water shortage (Fig. 9).

While the scholars focused their studies on the serious games considering water management (Morley et al., 2017), the game developed in this study is explicitly based on Istanbul's reservoirs and their water level. Also, The game depicts Istanbul's future while suffering from a harsh drought (Fig. 10). It asks the players to survive despite the water shortage problem, and it demonstrates the effects of their decisions on the landscape and the environment. This research was presented at the SIGraDi 2021 conference (Vaez Afshar et al., 2021).

A documentary named 25 Liters (Dilara, 2019), cast by National Geographic Turkey, inspired the narrative of this game. The main intention of the game is to educate the children about the concepts of actual and virtual water usage, its efficient use, and the effect of its usage pattern on the environment.



*Fig. 10 The development process of the game in the Stornaway.io platform. Source: [www.stornaway.io](http://www.stornaway.io)*

### 5.1.3.2 Rising Water Sinking Cities

According to the information obtained from the "Intergovernmental Panel on Climate Change (IPCC) Report on Oceans and Cryosphere in Changing Climate" (Pörtner et al., 2019), climate change causes ocean temperatures to rise, glaciers to melt, and sea levels to rise. It is predicted that the methane gas released into the atmosphere by the thawing of billions of tons of frozen land will rise ten times faster than the previous century by 2100 unless emissions in the world are reduced within the framework of combating climate change. As a result of the melting of

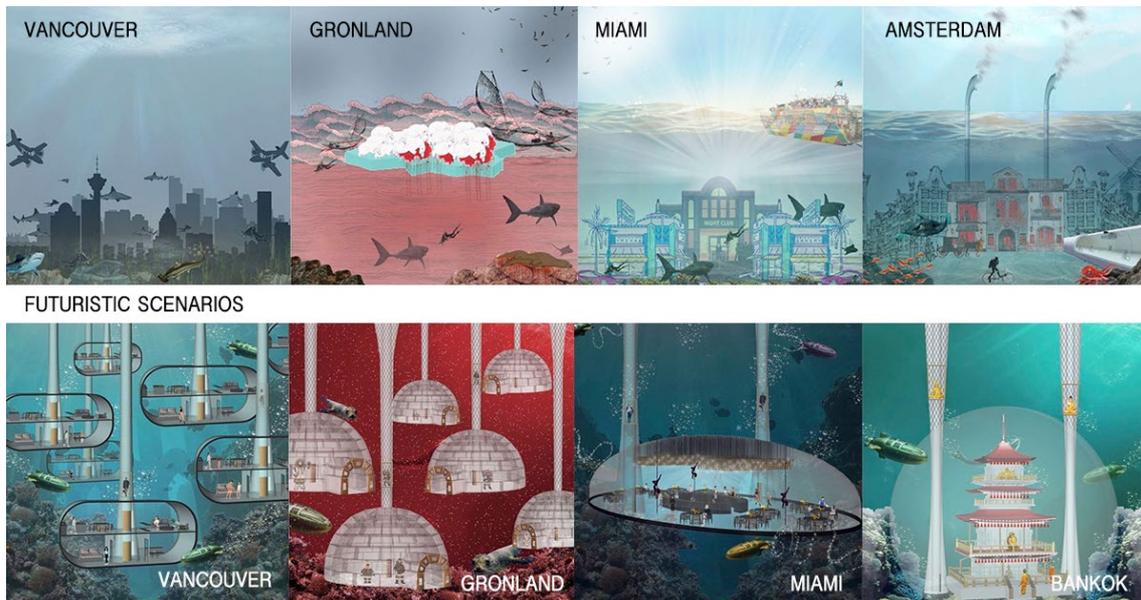
the Greenland and Antarctic ice sheets, more than 400 billion tons of water is added to the ocean annually. According to the European Environment Agency, the sea level has risen by 3 millimeters every year since 1993. Studies show that sea level rose 19.5 centimeters in the last century, and this rise is not a gradual increase but a rapidly growing graph. How much water levels will increase after this day depends on how much we can reduce the progress of global warming from now on.

As a result of the literature review, the research focused on the cities expected to be flooded in

#### RISING WATERS SINKING CITIES



*Figure 11: Selection of The Cities*



*Figure 12: Illustrations of The Cities*

the future, particularly 11 cities presented in Figure 12. In this context, why selected cities were predicted to sink and how they planned to deal with this situation in the future were investigated. This project aimed to raise awareness through dramatic visual information and projections about the flooded cities. The project, which tries to reflect excessively what we would see if the selected cities were flooded "right now", was aimed to increase the sensitivity and awareness of the subject by creating utopian visuals. In this aim, general topics such as climate change, melting of glaciers, the collapse of soils were mentioned, selected cities were researched, and then utopian underwater projects designed with future scenarios were examined.

As a result, awareness-raising visuals (Figure 12) were designed by being inspired by the literature research outputs and the cities' unique cultural structures and iconic features. In addition, the geomorphological systems of two towns, Maldives and Venice, were examined in detail, and the soil structures, formations, and geographical features were supplemented with descriptive visuals.

## 6. Conclusion

Within the scope of this study, carried out under the landscape architecture graduate-level

studio of Istanbul Technical University, the theme "*Around Water*" is to increase the recognition of water in every stage and scale of our lives and encourage students to conduct research in this direction. It is precious that researchers from different disciplines, who value the environment and natural resources, aim to protect the environment and natural heritage, conduct research with social value, and generate solutions. In this study, designers aware of social and environmental needs concentrate on water and production.

Each project produced within the scope of this studio project has gone through the stages of identifying environmental problems in the context of water, researching and delivering solutions, and creating unique discussion platforms. Through the projects, how water was transported and shaped the city in ancient times was handled through the example of a city such as Miletus. In contrast, the course presented and discussed the development of water management systems over today's metropolises, such as New York and Istanbul. When the research subjects are handled specifically, "water" has been studied worldwide, from cisterns to sinking cities, from basins to water footprints, from the value of holy water to its technological aspect with game design. In addition, some studies have

been developed from student projects that started with this studio work, which have been developed into various international articles and international book chapters. These studies, which started and developed with studio work, reveal successful outcomes from this discussion, research, and educational environment.

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