

# AVCILAR GREEN CITY ACTION PLAN



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*a city of beautiful people*

# Contents Table

Mayor's Message	
<b>1 INTRODUCTION</b>	<b>1</b>
1.1 Efforts Against Climate Crisis In The World .....	3
1.2 Efforts Against Climate Crisis In Türkiye .....	4
1.3 Efforts Against Climate Crisis In Avcılar and Green Action Plan.....	6
1.4 Method .....	7
<b>2 GREEN INFRASTRUCTURE AND ECOLOGICAL LANDSCAPE DESIGN</b>	<b>8</b>
2.1 Green Infrastructure.....	9
2.1.1 Effective Water Use in Green Infrastructure Applications.....	10
2.2 Sustainable and Ecological Landscape Design in Urban Spaces .....	12
2.2.1 Sustainability Approach in Landscape Design .....	12
2.2.2 Ecological Approach in Landscape Design .....	14
<b>3 ACTION PLAN</b>	<b>16</b>
3.1 Green Action Plan .....	18
3.1.1 Sofia Green City Action Plan .....	20
3.1.2 Vancouver “Greenest City” 2020 Action Plan .....	22
3.1.3 Southampton City Council Green City Plan 2030 .....	25
3.1.4 İzmir Green City Action Plan .....	29
3.2 Section Assessment .....	34
<b>4 AVCILAR GREEN CITY ACTION PLAN</b>	<b>35</b>
4.1 Avcılar Municipality Current State .....	36
4.1.1 Geographical Location and Population .....	36
4.1.2 Current Socioeconomic State .....	38
4.1.3 Current Ecological State .....	39
4.1.4 Current Administrative State .....	41
4.1.5 Stakeholders .....	43
4.2 Avcılar Green City Action Plan .....	43
4.2.1 SWOT Analysis .....	44
4.2.2 Avcılar Green City Action Plan .....	47
4.2.2.1 Avcılar Green City Action Plan .....	48
4.2.2.2 Medium Term actions .....	49
4.2.2.3 Short Term Actions .....	50
4.2.3 Monitoring and Assessment .....	51
<b>5 BIBLIOGRAPHY</b> .....	<b>53</b>
APPENDIX-1 Short Term Actions’ Business Plan .....	55
APPENDIX-2 Plant Species Compatible With İstanbul’s Nature .....	68

## Abbreviations

<b>IMM</b>	<b>İzmir Metropolitan Municipality</b>
<b>IPCC</b>	<b>Intergovernmental Panel on Climate Change</b>
<b>LED</b>	<b>Light-emitting diode</b>
<b>SWOT</b>	<b>Strength, Weakness, Opportunities, Threats</b>
<b>UN</b>	<b>United Nations</b>
<b>TEMA</b>	<b>The Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats</b>

## Message from Mayor

Dear Avçılarians,

The amount of gases that should be present in our atmosphere at certain rates to make sunbeams usable by the living beings on earth increased rapidly after 1800s due to various factors including changing production methods, fossil fuel use, conventional agriculture, deforestation policies, unplanned industrialization, and urbanization. This increase is causing a rise in earth's average temperature, which was 15°C before the industrial revolution, and endangering the lives of all species.

Scientists' studies published in 2021 report by the Intergovernmental Panel on Climate Change indisputably demonstrate that the amount of these gases in the atmosphere increased because of human activity. This finding means that the climate of our world is changing and its major reason is our choices as modern people. We are now in a critical time frame where we need to show respect to the whole planet because an additional surface temperature increase of 0.5°C will be the beginning of an irreversible process for our planet which already got 1°C warmer.

While we, humans, are the cause of the problem, we also hold the key to the solution in our hands. Paris Climate Agreement, put into effect in 2016 aims to prevent the surface temperature increase from rising beyond 2°C and keeping it at 1.5°C until 2030, expecting the nations to develop policies and take actions in accordance with the identified targets. On the other hand, Paris Declaration signed by local governments in 2020 paves the way for the local governments to transition to a governance approach of immediate action and inclusion of the youth in the process within the framework of stopping the climate crisis and adaptation to occurred changes.

It is our responsibility towards the world and Avçılarians to prepare Avçılar for the potential effects of global climate change while making our current actions adapt to this change at the same time. We did not limit this responsibility of ours on the local level and shared it with the world. We drew the target year 2030 of the Paris Declaration, to which we are a signatory, one year back and committed to reduce our carbon emissions by 40% until 2029.

## Message from Mayor

Avcılar Green City Action plan developed in light of all these developments involves developing a methodology specific to Avcılar through the use of our own resources, leaving a positive trace on the planet and mitigate the effects of the climate change with our actions and projects including the green spaces we are currently building and will build, as a result of a thorough examination of action plans developed by various cities around world, using various methods of funding. I'm proud to share with you that our Green City Action Plan developed for Avcılar with this consciousness of responsibility together with our stakeholders will contribute to our 2029 Vision and act as a complementary to our other action plans.

Through our Green City Action Plan, we aim to make the green space quality of Avcılar sustainable and improve it within the framework of ecologic landscape design criteria; increase urban resilience against climatic vulnerabilities; and creating a cleaner and healthier Avcılar with a higher rate of environmental consciousness. While I want to underline that we will resolutely move on our path to achieve our goals, I also believe that Avcılar's Green City Action Plan we developed will be a source of inspiration for other cities both in and out of our contry and I want to state once again that we will keep working with all our power to create a better world and a better future.



**Turan Hançerli**  
Mayor of Avcılar Municipality



**1**

# **INTRODUCTION**

Gases found in the world's atmosphere in certain amounts such as carbon dioxide, methane, water vapor, ozone, nitrogen dioxide etc. (called collectively as greenhouse gases) enable the formation of the living environment of humans, flora and fauna by sending back a certain amount of sunlight reflected from the earth's surface. As a result of the production modes changed by the Industrial Revolution; fossil fuel use, change of land use, deforestation, conventional agriculture and unplanned industrialization increased the amount of greenhouse gases emitted to the atmosphere. Greenhouse gases increased in the atmosphere cause the heat hold in earth to increase. Consequently, world's average temperature, which is 15°C, increases.

According to the Intergovernmental Panel on Climate Change report published in 2021 each of the last 40 years was hotter than the previous decade; global surface temperature increased more rapidly than all the other 50-year periods in the last 2000 years; melting of glaciers accelerated starting from 1950; global average sea level rose more rapidly since 1980 than any century in the last 3000 years; and oceans got warmer more rapidly. Combined weather events<sup>1</sup> increased along with the frequency and intensity of severe precipitations. The report clearly demonstrates that the increase in greenhouse gases is due to human activity. (Climate Change Physical Science Basis Report, 2021)

According to the World Meteorological Organization's State of the Global Climate report, global average temperature increased by 1.1°C since before the industrial age (between 0.8 and 1.2°C according to IPCC), and increased by 0.2°C from before the industrial age until 2011-2015 period. (Global Climate in 2015-2019: Climate change accelerates, 2022) If no significant reduction can be achieved in terms of carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions in the coming years, the critical threshold of 1.5°C is thought to be crossed between 2030 and 2052; and the 2°C threshold is thought to be crossed in 21st century. (Climate Change Physical Science Basis Report, 2021); (Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts, 2018)

According to the World Meteorological Organization's State of the Global Climate report, global average temperature increased by 1.1°C since before the industrial age (between 0.8 and 1.2°C according to IPCC), and increased by 0.2°C from before the industrial age until 2011-2015 period. (Global Climate in 2015-2019: Climate change accelerates, 2022) If no significant reduction can be achieved in terms of carbon dioxide (CO<sub>2</sub>) and other greenhouse gas emissions in the coming years, the critical threshold of 1.5°C is thought to be crossed between 2030 and 2052; and the 2°C threshold is thought to be crossed in 21st century. (Climate Change Physical Science Basis Report, 2021).

<sup>1</sup> Heat waves and drought, various types of inundations (river flooding and storm surge in sea), various weather events that cause fire (dry, hot air and wind), and simultaneous extreme events in different places can be counted as the examples of combined weather events.



While more than half of the world's population lived in urban areas at the end of 20th century, this rate is expected to rise over 62% by the end of 2050. (Çolakoğlu, İklim Değişikliği, Sürdürülebilir Kentler ve Kentsel Planlama Etkileşimi, 2019) According to the IPCC report, cities increase human-induced warming. If the critical threshold of 1.5°C is crossed, it is predicted that excessive temperatures, heat waves, severe precipitations and related flow intensity will increase and sea level rise and inundations in coastal cities will become more likely due to the effects of urbanization. (Climate Change Physical Science Basis Report, 2021).

All these data show that cities and urbanization are both factors of climate crisis and also its most greatly affected components. For this reason, they become prominent as the starting point of the solution. To limit the human-induced global warming, CO<sub>2</sub> emissions must be restricted, net zero objective must be reached and the emissions of other greenhouse gases must also be significantly reduced. (Climate Change Physical Science Basis Report, 2021).

### 1.1 Efforts Against Climate Crisis Around the World

Although several agreements were made for the protection of earth's atmosphere and climate in different years since the 1980s, the provisions of these agreements could not be completely brought to life due to various reasons. The Kyoto Protocol within the scope of the UN Framework Convention on Climate Change opened for signature in 1992 in Rio Environment and Development Conference and put into effect in 1994 is one of the most well-known international agreements in this matter. The countries mainly responsible for the climate change did not adequately commit to the Kyoto Protocol, whose purpose was determined as reducing the greenhouse gas emissions and mitigating their effects, and some developing countries did not achieve their objectives with regard to the protocol. As a result of these events, the protocol was unsuccessful (Çolakoğlu, 2019).

Efforts towards a new climate agreement that will direct the activities with regard to climate change were continued in the post-Kyoto period. As a result of the 21st Conference of the Parties (COP 21) Paris Climate Agreement was unanimously approved by 196 countries party to the UN Framework Convention on Climate Change and the EU (Çolakoğlu, 2019).

One of the current issues caused by the climate crisis is heat waves. The term indicates the hot days when people are exposed to a dangerous level of heat. World Meteorological Organization defines it as "periods defined by three consecutive days of extremely hot weather conditions (based on weather station measurements) due to local climatic conditions (using minimum, maximum and daily average temperatures) and hot thermal conditions recorded above the determined threshold during the hot seasons of a year in a region." (Aydın & Aydın, 2020) As a meteorological phenomenon, this situation not only seriously threatens public health but also increases the risk of loss in agricultural activities, forest fires and power outages. World Health Organization recommends that Heat Action Plans are prepared on national and regional levels in order to take protective and preventive precautions against heatwaves' increasing effects on human health. (Şahin, 2019)

Paris Agreement's long term temperature goal is to restrict the global average temperature rise to 2°C increase over the pre-industrial period temperature and even paying efforts to reach the level of 1.5°C. Paris Climate Agreement states that adaptation actions including those to reduce the pace and severity of the long term climate changes to occur must be adopted as national policies. This adaptation must be addressed from local, national, regional and global aspects to protect all living beings and inanimate objects from the effects of the climate change. Efforts paid towards the local solutions in the fight against the climate crisis in accordance with the agreement are considered important (Çolakoğlu, 2019).

Within this scope, achieving the goals of Paris Declaration and Paris Climate Agreement, signed by Mayors of Paris and Los Angeles and opened to signature for other mayors in the Zero Carbon Forum hosted by the Paris Municipality on 11 December 2020 as a result of the Council of European Municipalities and Regions' attempts, is aimed.

The programs in the Chapter 7 titled "Promoting Sustainable Human Settlement Development" in the Agenda 21 adopted in the 1992 Rio Environment and Development Conference are pointed out as goals for the concept of urban development used for the first time in the United Nations Environment Conference of 1972 in Stockholm and also mentioned in its declaration. (Çolakoğlu, 2019) Sustainable Development Goals adopted in 2016 politically and financially has guided the United Nations Development Program's operations in more than 170 countries and regions for 15 years.

Especially the European Union's European Green Deal, issued in 2019 against the challenges of climate crisis, extinction of species, and polluted seas and oceans aiming at bringing the greenhouse gas emissions in the Union countries down to zero and creating a fair and prosperous society where economic growth is decoupled from resource use until 2050, transformed both spatial and political planning of cities.

## 1.2 Efforts Against Climate Crisis In Türkiye

Mediterranean region including Türkiye is one of the most sensitive and risky regions in terms of the effects of climate change. A change of 1.5°C equals to an increase of up to 5°C for Türkiye in comparison with the pre-industrial period. This means that the precipitation in the west and south of the country will decrease by 30%, precipitation regimes will change, and the number and severity of the disasters such as drought, forest fire and ecosystem disruption caused by climate change will increase (IPCC 1.5 Degree Report, 2018).

National Climate Change Strategy Document was issued on 3 May 2010 as part of the fight against the effects of the climate change. The Climate Change Action Plan was prepared in accordance with this document, whose vision is described as “...becoming a country that integrated its climate change policies with its development policies, increased its use of clean and renewable energy sources, actively participates in the fight against climate change within the framework of its special conditions and providing a high quality of life and prosperity to its citizens with a low carbon intensity.” The Action Plan includes goals, targets, actions and adaptation actions that cover energy, buildings, industry, transportation, wastes, agriculture, land use and forestry sectors and cross-sector issues (İklim Değişikliği Ulusal Eylem Planı 2011-2023, 2012).

Today, minimizing the vulnerabilities caused by the climate crisis and creating cities in conformity with the changing climate are among the important duties of local governments. Central governments draw a general roadmap with their strategic plans and action plans. The Republic of Türkiye’s 11th Development Plan Sustainability of Environment and Natural Resources 2023 Goals are identified as:

- Creating a climate friendly, low-carbon development model,
- Increasing national and sectoral capacity and awareness of sustainability, environment and natural resources,
- Using resources efficiently and generalizing efficiency practices,
- Developing research and development (R&D) and innovation strategies focused on good environmental state and generalizing the practices,
- Addressing the issues of environment, climate change and sustainable use of resources considering the balance of protection and use,
- Generalizing and developing the effective waste management system,
- Adapting to Sustainable Development Goals, identifying all strategy and action plans created in the planning period in conformity with the Sustainable Development Goals, with an approach that takes the 11th Development Plan and other national and strategical plans into consideration,
- Identifying the current state of the environment and natural resources on the national level, developing the monitoring and data management capacity with the purpose of monitoring the changes in the future. (On Birinci Kalkınma Planı Çevre ve Doğal Kaynakların Sürdürülebilir Yönetimi Çalışma Grubu Raporu, 2018).

Türkiye became a party to the Paris Climate Agreement, which it signed in 2016, on 7 October 2021. After the Agreement had been approved by the Grand National Assembly of Türkiye, the name and duty structure of the Ministry of Environment and Urbanization was changed.

The ministry was renamed and reorganized as the Ministry of Environment, Urbanization and Climate, and fighting against desertification and erosion was added to its duties and powers. Urbanization and Climate, and fighting against desertification and erosion was added to its duties and powers (Stratejik Plan (2022-2023) Hazırlık Programı, 2019). These goals demonstrate Türkiye's direction in its fight against the climate crisis. However, the most rapid and effective results of the solutions will become apparent through the measures taken on the local level.

### 1.3 Efforts Against Climate Crisis In Avcılar and Green Action Plan

In accordance with the processes summarized above, climate crisis adaptation efforts are also continuing in Avcılar as they are on the national level. Within this context, Avcılar Municipality became a party to the Paris Covenant of Mayors in 2019 and committed to reduce the carbon emissions in the city by 40% by 2029.

Sustainable Energy and Climate Action Plan that aims for preparedness against the effects of climate change and adaptation in the process was drafted in 2020, and Resilience Action Plan aims at improving the physical and social resilience of the city was drafted in 2021.

This study was conducted by the Avcılar Municipality Strategy Development Directorate as a complementary for the mentioned action plans with the aim of strengthening Avcılar's green infrastructure, making it sustainable and adapting it with the changing climate. It covers the strategies and actions to achieve the adaptation to the economic, social and climatic changes in the urban ecosystem services caused by the climate change.

The vision of Avcılar Green City Action Plan is “becoming the municipality with the highest quality environment in Türkiye with a strong green infrastructure.” In accordance with this vision, its aim is to improve the green space quality within the framework of sustainable and ecologic landscape design criteria, contributing to the ecosystem services, increasing resilience against climatic vulnerabilities, and creating a cleaner and healthier city with a high level of environmental awareness.

Avcılar Green City Action Plan specifically focuses on green infrastructure. The basic principles of the plan are ecologic and sustainable landscape design. The plan directly contributes to SDGs 11 Sustainable Cities and Communities and 13 Climate Action; indirectly contributes to SDGs 6 Clean Water and Sanitation and 7 Affordable and Clean Energy.

## 1.4 Method

Avcılar Green City Action Plan was prepared within the framework of the guide and methodology created in light of the Green Cities Program launched by the European Bank for Reconstruction and Development, although not directly in conformity with it. The major reason for this is the concern for avoiding reiterating former plans drafted in the Avcılar Municipality and creating a plan to be used as a guide for implementation by diversifying the actions identified in these plans. Accordingly, green plans of various scales from other countries were examined and a plan specific to Avcılar was created.

The plan primarily compiles information regarding green infrastructure, sustainability and ecologic landscape design, action plans and green action plan concepts and subsequently examines examples from other countries in addition to the only example in Türkiye, which is İzmir's Green City Action Plan. The three examples from countries outside Türkiye were selected at varying demographic scales, although the similarity of their environmental conditions and challenges to Avcılar's was diligently taken into consideration.



2

**GREEN  
INFRASTRUCTURE  
AND ECOLOGIC  
LANDSCAPE DESIGN**

Avçılar Green City Action Plan includes improving Avçılar's green infrastructure, and making green spaces conform with the sustainability and ecological design principles. Actions to be performed within this scope will also contribute to the improvement of ecosystem services. Knowledge of principles and action plan concepts mentioned in the plan and examination of the exemplary action plans will be guiding for Avçılar.

## 2.1 Green Infrastructure

Ecosystem services are products or services provided by the ecosystems in the world to the humans and other living beings that enable the continuity of life. Regulative ecosystem services, involving the benefits obtained to improve the climate adaptation and resilience are considered important. Each ecosystem service that constitutes the green infrastructure system varies according to the characteristics of the field.

Green infrastructure is defined as a network of green spaces consisting of interconnected natural, semi-natural and cultural areas protecting ecosystem values and functions. (Benedict, 2000; European Commission, 2013, Coşkun Hepcan, 2019)

Green infrastructure comprises of centers and corridors that include natural, semi-natural and cultural elements. Components of urban green infrastructure are:

- Meadows, bushes and forests covered with natural vegetation,
- Wetlands, river corridors,
- Parks, school yards and campuses of varying sizes that offer recreational opportunities,
- Squares and planted roads,
- Zoos, botanic gardens that include various species,
- Empty plots covered with herbaceous plants as green spaces rich in species diversity, gardens belonging to persons and organizations, roof gardens, vertical gardens,
- Agricultural lands and burial grounds. (Coşkun Hepcan, 2019)

Green infrastructures are planned implemented and managed at different scales. Region (river corridors, natural ecosystems), basin, city (city parks, wide boulevards with trees, shrubs), neighborhood (neighborhood and district parks, planted roads and streets) and space (rain gardens, vertical gardens, rainwater plant lanes) scales can be used as bases for planning. The implementation and management process is a high-cost, long-term process that requires the cooperation of many actors together in concert. (Coşkun Hepcan, 2019).

## 2.1.1 Effective Water Use in Green Infrastructure Applications

The amount of total potential usable water above and below the ground in Türkiye is 112 billion m<sup>3</sup> and the amount of potential water per person is 1500 m<sup>3</sup>/person per year. (Muhammetoğlu & Muhammetoğlu, 2017) These statistics show that Türkiye, currently in a state of water stress, is becoming water-poor and can be considered as a warning that suggests efficient and careful use of water resources.

Irregular and sudden precipitations as a result of climate change cause great problems for cities with almost completely closed grounds and very low levels of permeability. Impermeable surfaces, gradually increasing in cities, in combination with changing precipitation regimes cause dangerous surface flows. There are some research conducted with the aim of increasing permeable surfaces and effective water use. One of them focuses on the “sponge city” approach.<sup>3</sup>

Another prominent approach is rainwater systems. Rainwater management systems prevent the rainwater from flowing and the temporarily stored water is transferred to the soil through percolation. Rainwater can be stored to be used as drinking water or to be used in green spaces where water resources are limited and drinking quality is not needed. Green roof, separation of rainwater canals from waste waters, water holding tanks, natural rainwater drainage systems (biological rainwater ditches), rainwater receptacles, percolation gardens, permeable cover use and active landscaping (xeriscaping, use of native species, mulching etc.) methods within green infrastructure can be used together with this approach. (Avdan, Yıldız, & Çabuk, 2015)

Another method related to water use is xeriscaping. Xeriscaping is a method preserving water and protecting the environment, developed for effective use of water. It has 7 basic principles of appropriate planning and design, soil analysis and improvement, correct plant choice, convenient turf areas, efficient irrigation, mulching and appropriate maintenance. (Water Efficient Landscaping, 2020).

- Appropriate design and planning: Plants must be categorized according to their water needs, taking the regional and microclimatic<sup>4</sup> characteristics, current vegetation, topography, land use, and water needs of the area into consideration. In addition, plants’ sun or shade needs and preferred soil conditions must also be taken into consideration.

<sup>3</sup> Permeable roads and hard ground materials, roof gardens, rainwater collection systems, rain gardens, and permeable green spaces like pools and lakes are used for appropriate direction of rainwater in sponge cities designed to passively absorb, clean and use rainfall in an ecologically friendly way that reduces dangerous and polluted runoff.

<sup>4</sup> Microclimate is the set of atmospheric conditions in a small area different from the climate conditions of surrounding larger area (macroclimate).



- **Soil analysis and improvements:** Because soil types differ based on land structures, soil tests must be performed during the landscape planning stage. At the first stage, pH, nutrition levels (nitrogen, phosphorus, potassium), clay and organic material content of the soil must be determined. Soil's plant supporting or water holding capability can be improved through ventilation, soil improvements or fertilizer addition based on the results of the performed tests.
- **Correct plant choice:** Both climate and soil conditions should be considered for landscape design. Because current plants are already adapted to their environments, they require less water and care, which means they must be protected to the greatest extent possible. Choosing plants that are appropriate for the locality is important because they do not need additional irrigation and fertilizer, and are resistant to pests. If non-native (exotic) plants must be chosen, non-invasive ones should be preferred. Otherwise they consume the water needed by the native plants and cause them to be desiccated.
- **Convenient turf areas:** Turf areas require much more irrigation and care in comparison with other plants. Knowing how and where to use the turf areas in landscaping instead of creating wide and visually perfect turf areas helps significantly reduce the amount of water spent by the irrigation systems. While choosing the grass type, those that are resistant against drought and can easily grow in hot climates should be preferred. Reducing meadows and turf areas will reduce water consumption.
- **Effective irrigation:** Most of the water used in traditional irrigation methods are wasted and cannot be held by grass and other plants. Effective irrigation is a very important part of effective outdoor use of water. It is necessary for xeriscaping as much as it is for all other types of landscaping.
- **Mulching:** Mulch consists of tree bark chips, wood shreds, pine straws, walnut shells, small pebbles or ground landscaping scraps. It helps plants hold more water by minimizing evaporation, reducing the growing of weeds, regulating soil temperature and preventing erosion. However, its use must be avoided in sunny areas or around non-arid climate plants because the heat emitted by the mulch causes a water loss that may result in the plants' parching. In addition, mulching must be performed very carefully because too much mulching may prevent water from permeating into the soil.
- **Appropriate care:** Plants must be fed with sufficient amounts of water and fertilizer. Too much irrigation not only causes weak growing, but also increases the need for pruning and mowing. As the water efficient landscape matures, it requires less maintenance and water.

Another method is water efficient landscaping. Water that is fast or more than needed cannot be absorbed by the plants during the irrigation and is lost through evaporation, flow etc. (Water Efficient Landscaping, 2020)

The goal of efficient irrigation is to provide just enough water to the plants in order to keep them healthy. Irrigation of turfs and landscape areas is carried out manually or automatically. (Water Efficient Landscaping, 2020)

The installation of a programming system based on the season and weather conditions are the primary issues with regard to irrigation. Manual irrigation is not advised because it is difficult to adjust the correct amount of water. As for automatic irrigation, it is important to be careful about the important details. Sprinklers that create a thin mist or spray the water into air must be avoided to reduce the water loss due to evaporation and wind. System controllers such as rain sensors that prevent irrigation during or immediately after rains or soil moisture sensors that activate the irrigation systems only when the moisture level of the soil falls below the previously programmed level must be installed to make the automatic irrigation systems more efficient. Drip irrigation systems on the other hand are known as the most efficient of the irrigation methods because they deliver the water directly to the roots of the plants.

Alternative water resources such as greywater,<sup>5</sup> purified water and collected rainwater can be utilized to reduce water consumption. Recovered water is the water adequately purified for purposes other than drinking. Collected rainwater is collected in cisterns, barrels or storage tanks and can be used for irrigation. However, all collection receptacles must be covered in order to prevent entry of animals or children and breeding of mosquitoes.

## 2.2 Sustainable and Ecological Landscape Design in Urban Spaces

Landscapes are areas of natural and cultural characteristics that involve complex processes with natural, cultural, social and economic dimensions, created through the actions and interactions of humans and nature. The definition of the concept of landscape also encompasses cities that involve humans' shaping of the nature. Concepts like "sustainability," "energy efficient planning," "ecologic planning" and "green structure design" have been frequently used in the disciplines studying on urban areas within the scope of studies of adaptation with the changing conditions in the recent years. (Gürbey, 2018).

### 2.2.1 Sustainability Approach in Landscape Design

Sustainability is a concept related to development and it means the continuity of efficiency in its optimal conditions. In the Brundtland Report issued by the World Commission on Environment and Development in 1987,

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<sup>5</sup> Greywater is the unpurified household wastewater that comes from bathroom sinks, shower cabins, bathtubs and washing machines.

it was defined as “meeting the needs of the present without compromising the ability of future generations to meet their own needs” and simply it has been the determinant of the relations that revolve around environment, development and economy triangle. (Atıl, Gülgün, & Yörük, 2005)

Sustainability involves making development choices within the frame of economy, ecology and equality. Accordingly, economic activities should serve the common interests, be able to renew themselves, and create an environment of confidence by building local wealth. The concept of ecology includes humans’ being responsible for protecting and creating natural wealth because they are a part of nature. Equality of opportunity must be achieved for entire activity, utilization and social decision making processes. (Atıl, Gülgün, & Yörük, 2005)

Achieving sustainability in urban landscapes have certain necessary principles. These are:

- Using microclimatic data efficiently (using the elements such as insolation, wind direction, heat, radiation, etc. in a way that achieves energy conservation),
- Minimizing the energy use in the design of microclimatic environments’ lighting, heating, air conditioning etc.,
- Recovery of wastes,
- Using renewable energy (solar, wind, bioenergy etc.),
- Using the topography efficiently (utilizing land characteristics),
- Using natural resources efficiently (changing and improving natural resources such as current vegetation, flora and fauna, increasing the area of green spaces), and
- Utilizing the vegetation (using current vegetation and native plants). (Tunçer, 2008), (Yaşar & Düzgüneş, 2019)

## 2.2.2 Ecological Approach in Landscape Design

Ecological approach in landscape design involves creating self-sufficient sustainable areas in the urban ecosystem by taking the nature as an example and creating solutions related to the structural and ecological characteristics of the area in conformity with the natural processes. The goal is to build a sustainable system harmonious with its environment by keeping the consumption of natural resources and the amount of wastes created to a minimum. (Onur Erdoğan, 2012)

Within this scope, sustainable landscape arrangement involves practices and approaches that care for the environment and meet the future requirements while using natural resources in the projects to be carried out. (Gürbey, 2018) Sustainability and ecological perspective in landscape design provides various benefits to cities in several aspects (Onur Erdoğan, 2012):

### Environmental benefits

- Making contributions to the solutions of environmental problems (building sustainable urban green space systems, joining the surface runoff with the hydrological cycle, improving the environmental climate and air quality by using native species, controlling intraurban noise),
- Making contributions to protecting and supporting biological diversity (protecting biodiversity through integrated landscape planning),
- Making contributions to sustainable development (utilizing materials appropriate for the local conditions by using local resources, using renewable energy resources, taking culture and history into consideration),

### Economic benefits

- Low cost applications (reducing irrigation and maintenance costs by using local species, convenience in provision, voluntary works),
- Efficient spatial use,
- Regional economic mobility,

### Social benefits

- Improving quality of life,
- Creating educational opportunities and environmental awareness,
- Creating social bonds through social interactions.

Environmental sustainability, which is a constantly changing dynamic concept, can be achieved mainly through human actions and behaviors such as prevention of environmental pollution, efficient use of limited resources, and environmentally friendly arrangements of landscape design that damage the ecologic structure as little as possible. Environmentally conscious planning and design based on humans and nature is a requirement of ecologic and sustainable settlements. (Gürbey, 2018)

The basic principles of ecologic landscape approach are:

- Protecting the characteristics of the existing landscape,
- Design in conformity with the ecologic conditions and climatic data,
- Use of local resources in design,
- Water efficient landscaping, xeriscaping,
- Energy efficient landscape design,
- Sustainable agriculture (permaculture),
- Use of renewable energy resources,
- Green roof and green wall applications,
- Creating alternative green spaces (Korkut, Kiper, & Üstün Topal, 2017, as cited in Aklanoğlu, 2009),
- Streuobst<sup>6</sup> method (Yaşar & Düzgüneş, 2019).

Adopting the ecologic approach is an essential condition of applicability of the actions involving adaptation to climate crisis.

<sup>6</sup> The method of planting fruit trees in the middle of the designed permaculture areas, known as Streuobst method, supports sustainability by drawing birds and insects to the environment through the fruit trees to improve the taste of produced foods.



# 3 ACTION PLAN

Action plan is a planning document that explains how to actualize various goals, targets and strategies identified for a certain subject/organization/structure. Identified goals and targets are addressed; how, when and with which methodologies they will be actualized is examined; and individuals responsible for them and necessary resources are described. (Çubukçu, 2020)

Action plans include a set of actions agreed upon in order to obtain the desired results. Action plans have three steps: analysis, choice and implementation. Analysis step includes identifying the organizational capacity, stakeholders and the environmental factors affecting the organization. The goal of identifying the organizational capacity is to determine the organization's or the institution's strengths and weaknesses. Stakeholders include everyone to affect and be affected by the action plan. Environmental factors affecting the organization are economy, central government policies, health, labor, transportation etc. All of these elements can affect the organization's goals and targets. (Clarke, 2010)

The second step is choice. After a full and frank analysis of the organization, the goals to be reached and issues to be addressed must be listed. The choice is a process of preference in order to reach a conclusion with regard to the goals determined to improve/develop or change the state revealed in the analysis step. This is the step where strategies must be chosen objectively. Stakeholders' participation must not be forgotten. (Clarke, 2010)

The implementation step is considered as the most difficult part of the plan. This step requires strength, resilience, tact, and an absolute belief that what is being done is right. A successful implementation is a process where stakeholders are equally included from the first stage, all aspects are regularly monitored and timetables are observed. Celebrating the team as they successfully perform the actions must be remembered in order to keep their motivation high. (Clarke, 2010)

Action plans generally include:

- Actions that must be performed to reach the goal (from most important to least important),
- Persons and teams responsible for performing each duty,
- Deadlines for actions,
- Resources required to complete the actions,
- Measures necessary for the continuation of the progress,
- Criteria required to assess the process and results of actions. (Çubukçu, 2020)

Action plans must have defined final goals because they are action oriented. Clearly defined goals based on SMART<sup>7</sup> criteria also help actions to be clearly described. The steps to be followed must be listed in the action plan, the whole team must be included in the process and given access to it. Milestones must be determined to identify and measure the progress, and deadlines must be determined for the final goals and intermediary steps of the actions. Resources must be clearly identified and criteria for monitoring and assessing must be set. Consequently, action plans must be flexible and open to updates. (Çubukçu, 2020)

### 3.1 Green Action Plan

Action plans can have multiple goals or focus on a single issue. (Clarke, 2010) Because the world is on the verge (or according to some, in the process) of a global climate crisis, many organizations and institutions including central and local governments are changing their policies and devising new plans to contribute to the solution of this problem.

Especially the European Union's European Green Deal, issued in 2019 against the challenges of climate crisis, extinction of species, and polluted seas and oceans aiming at bringing the greenhouse gas emissions in the Union countries down to zero and creating a fair and prosperous society where economic growth is decoupled from resource use until 2050, transformed both spatial and political planning of cities. Green plans became prominent within the scope of this new approach.

Green plans include strategies and actions to describe how to achieve cities' conformity with the occurring economic, social and climatic changes in a holistic manner. Green Cities Programme launched by the European Bank for Reconstruction and Development, founded in 1991, has been the most important source of funding for the preparation and implementation of these plans. The programme that covers the Central Asian, African and Mediterranean cities in addition to European cities aims at improving resilience against current challenges such as insufficient infrastructure investments, demographic changes, poor air quality, high energy demand and carbon intensity as well as those to be imposed by the climate crisis. Green Cities Programme includes preparing action plans, making sustainable infrastructure investments and developing capacity to help more sustainable and resilient cities of the future overcome these challenges. The programme has more than 40 participants. İzmir is the only city from Türkiye that joined the programme and issued a plan. (EBRD Green Cities, 2021)

<sup>7</sup> SMART is an acronym consisting of the words specific, measurable, attainable, relevant and timely. It is a standard used to ensure that goals have targets that meet the desired performance criteria.



Green City Action Plans (GCAPs) involve assessing and prioritizing environmental challenges, policy interventions and sustainable infrastructure investments. Sustainable infrastructure investments include investments in water and wastewater, urban transport, district energy, energy efficiency in buildings, solid waste and other interventions that improve the city's adaptation and resilience to climate shocks. The programme encourages these investments and provides funding for them. Programme also includes providing technical support to city administrators and local stakeholders to ensure that infrastructure investments and policy measures identified in GCAPs can be developed, implemented and monitored effectively. (EBRD Green Cities, 2021)

Cities that desire to join the programme commit to

- Preserve the quality of environmental assets and use these resources sustainably,
- Mitigate and adapt to the risks of climate change,
- Ensure that environmental policies and developments contribute to the social and economic well-being of residents (İzmir Green City Action Plan, 2020)

It is required to develop a GCAP to join the Green Cities Programme. European Bank for Reconstruction and Development created a methodology for developing a GCAP. Plans are developed in 4 steps. The first step is preparation and organization. At this step, cities wishing to join the programme need to both initiate a GCAP and commit to a trigger investment project that meets the EBRD's investment criteria. In order to develop the action plan, cities must identify relevant stakeholders, set up institutional structures for preparation and implementation, establish timelines and ensure compliance with all relevant laws, regulations and policies. (Green City Action Plan Methodology, 2020)

The second step is identifying and prioritizing challenges. As a result of the meetings with key stakeholders, a pressure-state-response analysis is conducted to reveal the current state of the city with regard to the environmental challenges. (Green City Action Plan Methodology, 2020)

The third step is planning the green city actions. This step includes the green city vision (15 years), strategic goals (10 to 15 years), list of actions (1 to 5 years), and medium term targets (5 to 10 years). Actions must ensure that the city reaches the vision and goals in its strategic plan (Green City Action Plan Methodology, 2020). Stakeholder participation must be ensured during the identification of the actions. The plan is submitted to the municipal council after the obtained data is examined, actions are determined and draft is created. The approved plan is then put into effect.

The fourth and final step is the implementation and monitoring step. The government determines whether the GCAP is progressing as planned and contributing as expected to the established goals by regularly and methodically tracking all Green City actions and their impacts on the environment. At this step, impact monitoring plans and implementation monitoring plans that measure the implementation progress and impacts on environmental performance can be developed. (Green City Action Plan Methodology, 2020)

Cities from various countries are developing GCAPs. While cities in the Green Cities Programme use the methodology described above, cities that are not in the programme can develop other methods involving local features, similar to the programme's methodology. Avclar's Green City Action Plan examines GCAPs developed by other cities of various scales in order to take them as examples:

### 3.1.1 Sofia Green City Action Plan

Sofia, capital of Bulgaria, is also the most populous city in the country according to 2017 data, with its population of 1,236,000 people. Sofia Municipality developed a Green City Action Plan within the framework of Green Cities Programme by the European Bank for Reconstruction and Development in 2020. The plan's mission is creating a "green and clean municipality full of life" and aims to develop a good management of physical environment, air quality, and all other natural assets through visible and concrete improvements. (Sofia, The Green City Action Plan, 2020)

Challenges Sofia faces are listed under 5 main categories in the current state analysis as part of the plan. The first of these is heating of residences. Prevalence of solid fuels and low efficiency heating system in the city reduces the air quality during winter seasons. Despite the presence of mechanic and biological waste facilities and recovered solid waste production facilities in the city, the amount of generated waste is high and recycling must be increased. Another issue is that the area of green spaces in the city is not evenly distributed. It is determined that the wastewater system in the city must be redesigned and human active modes of transport must be utilized. (Sofia, The Green City Action Plan, 2020)

Within the framework of these challenges, developed plan is expected to;

- Improve air quality and reduce gas emissions,
- Increase the physical activity and improve the mental health of people living Sofia,
- Achieve ecological restoration with the help of green spaces, green corridors and river beds,

- Increase the land value through improved urban space quality and contribute to growth and tourism. (Sofia, The Green City Action Plan, 2020)

Three basic strategic goals were determined for the plan and each of them has medium term targets:

### Strategic Goal 1

#### Green Strategic Targets

Sofia Municipality will make visible and concrete changes in the physical environment of the city and protect the biodiversity levels:

- Increasing the green space area across the city and improving existing green spaces,
- Integrating the green infrastructure in the city,
- Supporting transit-oriented development.<sup>8</sup>

### Strategic Goal 2

#### Clean Energy Strategic Targets

Sofia Municipality will improve air quality and reduce carbon footprint:

- Increasing the use of public transport,
- Promoting the use of vehicles with cleaner energy,
- Increasing energy efficiency in buildings,
- Increasing the rate of utilized renewable energy and reducing solid fuel use in the heating of buildings.

### Strategic Goal 3

#### Responsible Use of Resources Strategic Targets

- Improving surface water management and enhancing the city's resilience against climate change,
- Reducing the amount of regularly stored wastes by optimizing solid waste collection and removal.

In accordance with the long term strategic goals stated above, 17 actions in 5 prioritized sectors are planned to be performed in the short term. (Sofia, The Green City Action Plan, 2020):

#### Energy

- Improving the energy efficiency program of the municipality building,
- Renewing the public lighting system,
- Developing geothermal energy.
- 

#### Residences and Communities

- Improving residential spaces,

<sup>8</sup> Transit-oriented development is a planning approach that includes applications such as walkable neighborhoods, renewal of suburbs and vivifying cities. It aims to create a pedestrian oriented city with combined use, developing around quality rail systems in order to create vivid, livable and sustainable communities.

- Increasing energy efficiency in multiflat residencies,
- Building repair&reuse centers for communities,
- Building pocket parks in busy settlements.

#### Urban Planning

- Transit-oriented development,
- Regeneration of brownfield lands thought to be used and polluted for various reasons (industrial or commercial).

#### Blue-Green Infrastructure

- Conducting climate change risk assessments and flood models,
- Preserving, increasing and developing green corridors,
- Surface water management,
- Optimizing recycling and waste management in buildings sector.

#### Transportation

- Promoting bicycle use and walking,
- Tram renewal program,
- Car park management,
- Promoting electric vehicles.

The monitoring of the plan was planned on two levels. The first level includes the coordination of implementation monitoring. The coordination team to be formed assigns each action to the responsible department. Impact monitoring on the other hand includes yearly reports. Whether the strategic goals of the plan have been successfully achieved is checked. (Sofia, The Green City Action Plan, 2020).

### 3.1.2 Vancouver “Greenest City” 2020 Action Plan

Vancouver, a port city, is the biggest city in the British Columbia State in the west of Canada, with its population of 675,218 in 2017. The Green City Action Plan was approved by the City Council in 2011 with the goal of becoming the greenest city in the world by 2020. The plan has 4 principles: Vision, leadership, action and partnerships. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

The vision of the plan is becoming “a pioneer of sustainability.” Within this scope, the components of this vision are identified as creating a strong local economy, vivid and inclusive neighborhoods, and a city that can meet the needs of future generations while also creating opportunities in the present (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015).

The leadership principle covers a wide range of stakeholders from central government, city administrators and technocrats to organizations operating in various sectors and city inhabitants. The Green City Action Plan states that the plan demonstrates the prevailing state realistically. The plan includes actions and strategies to build a city running on renewable energy before 2050. The partnerships principle points to the pluralism in the development and implementation of the plan. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015).

The preparations for the plan, developed in 2011, started in 2009. A group of experts developed goals and targets in order to make Vancouver the greenest city in the world and prepared the “Quick Start Report” suggesting 44 immediate actions along with the “Vancouver 2020 A Bright Green Future Plan” including 13 goals. 35,000 people from various places around the world contributed to the development of the plan through face to face or online meetings/workshops and events. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

When the actions performed from 2011 to 2015 with the aim of becoming the greenest city are examined, it can be seen that greenhouse gas emissions across the city were reduced by 7%, residences built in Vancouver use 50% less energy than others in the state, intraurban sustainable transportation rate is increased to 50% and the Greenest City Fund was established together with Vancouver Foundation to increase the participation from the community. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

The action plan, updated in 2015, includes more than 50 new actions to make Vancouver the greenest city until 2020. Updating efforts conducted with the participation of more than 46,000 Vancouverites went on for a year. The action plan has 5 goals in the areas of climate and renewable energy, green buildings, green transportation, zero waste and access to nature. High priority actions of these goals are aimed to be completed by 2020. 9 (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

2015-2020 high priority actions of the **Climate and Renewable Energy** goal are:

- Continuing the operations with partners to renew the existing heating network and develop new energy systems,
- Developing a renewable energy strategy. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

9 2020 In January 2020, Brad Badelt, Sustainability Deputy Manager of the city, stated in an interview in January 2020 that although some successes were achieved thanks to the plan (reducing the carbon emission by 33% compared to 2007, increased number of low emission buildings, etc.) actualization of several actions lagged behind. (<https://www.cbc.ca/news/canada/british-columbia/vancouver-planned-to-be-the-greenest-city-in-the-world-by-2020-it-probably-isn-t-1.5414502>, Retrieved: 18.08.2021).

2015-2020 high priority actions of the **Green Buildings** goal are:

- Updating the Vancouver Building Regulations to reduce the energy use and greenhouse gas emissions,
- Developing Green Condominium and Green Home Owner programs,
- Launching Energy Efficiency Reinforcement and Home Energy Technology programs for residences,
- Making yearly energy comparison reports for large residences and commercial buildings,
- Designing programs for green industry partners,
- Developing building strategies to achieve net zero carbon emissions,
- Reconfiguring the binding criteria for the new buildings through the city's Green Building Redevelopment Policies in accordance with the target of reducing greenhouse gas emissions,
- Updating the minimum energy requirements for new buildings in the Vancouver Building Regulations (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

2015-2020 high priority actions of the **Green Transport** goal are:

- Developing the intraurban bicycle infrastructure on a punctate basis, improving existing walking and bicycle paths,
- Generalizing bicycle sharing applications,
- Improving public transportation. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)
- 

2015-2020 high priority actions of the **Zero Waste** goal are:

- Continuing to support the spread of food waste recycling to all sectors,
- Supporting 2015 disposal ban for Metro Vancouver's organic material dump and incineration facility through training and practices,
- Expanding the Construction and Demolition Waste (CDW) Direction Strategy to increase the reuse and recycling of such wastes,
- Distancing waste wood storing from incineration processes,
- Reducing street wastes in public areas, implementing a comprehensive garbage management system,
- Developing training and practice strategies for all sectors, focusing on attempts at waste prevention and reuse of materials. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

2015-2020 high priority actions of the **Access to Nature** goal are:

- Completing the parks under construction and installing new park systems,
- Planning strategic development for street and park afforestation including private properties,
- Taking the inventory of the trees in the city,

- Determining the standards for practices such as plantation, fertilizer use, etc. by creating tree management plans,
- Developing additional policies to protect healthy and mature trees. (City of Vancouver Greenest City 2020 Action Plan Part 2: 2015-2020, 2015)

### 3.1.3 Southampton City Council Green City Plan 2030

Southampton is a port city with a population of 254,361 according to 2019 data and it's the biggest city in Hampshire on the southern coast of the United Kingdom. Although the city is not a part of the network, its "Green City Plan 2030" was developed by the the City Council based on the principles and methodology identified for the Green Cities program by the European Bank for Reconstruction and Development. (Southampton City Council Green City Plan 2030, 2020).

The vision of the plan is "creating a cleaner, greener, healthier and sustainable city; becoming prepared for challenges to be imposed by the climate change today and for the future." The plan includes measures such as a Youth Assembly and eco-schools that aim to include young people and increase awareness in accordance with its vision.

The plan includes the commitments in:

- **Sustainable Energy and Carbon Emission:** Becoming carbon neutral by 2030; making the best use of resources and reducing the energy consumption,
- **Clean Air:** increasing the quality of life in the city by reducing emissions and casualties attributable to air pollution,
- **Natural Environment:** protecting and enhancing the natural environment,
- **Resources, Wastes and Water Management:** make the best use of resources; minimizing energy consumption and wastes; ensuring repair, reuse and recycling; using products and services that support the plan's vision,
- **Sustainable Travel:** encouraging sustainable and active travel. (Southampton City Council Green City Plan 2030, 2020)

The plan contains the actions that include these commitments and the measuring criteria for the actions:

#### Sustainable Energy and Carbon Reduction

##### Actions

- Refreshing the Council Carbon Reduction & Energy Plan,
- Introducing a Housing Asset Management Strategy that incorporates measures to satisfy the Green City commitments,

- Introducing a Future Homes Standard to guide SCC (Southampton City Council) projects and ensure appropriate specifications for energy conservation, carbon reduction and use of renewables,
- Introducing a strategy to address predicted shortfalls and ensure annual targets are met,
- Creating a Clean Growth Fund capable of addressing carbon emissions from the Council's commercial (non-housing) stock and fleet,
- Introducing an investment plan to generate sustainable and renewable energy utilizing city assets,
- Developing a 5 year business plan for CitizEN establishing reinvestment programme of carbon reduction initiatives,
- Creating a new action plan by reviewing the transport infrastructure of the city,
- Developing Council Fleet Modernization and Sustainability Plan for transitioning to zero emission vehicles,
- Developing an Alternative Fuels Plan for heavy fleet vehicles,
- Introducing a staff awareness and training programme for Green City goals. (Southampton City Council Green City Plan 2030, 2020)

Success measures created for these actions are:

- Annual reduction in the carbon emissions in accordance with the targets identified in the plan,
- Increase in the number of zero and low emission vehicles in the city and the municipal inventory,
- Increase in the high energy efficiency standards of the city's building stock,
- Carbon emission reduced by 60% from 2019 to 2026,
- Achievement of the zero emissions goal by 2030. (Southampton City Council Green City Plan 2030, 2020)

## Delivering Clean Air

### Actions

- Developing local solutions with communities to reduce emissions and encourage healthy lifestyles,
- Updating the Air Quality Action Plan to align with the Green City Action Plan,
- Assessing the viability of larger, strategic opportunities such as workplace parking levies, emissions based parking charges etc.,
- Working with operators to develop further opportunities that will deliver ongoing improvements in taxi and public transport emissions,
- Delivering the Local NO<sub>2</sub> Plan by the end of 2022,
- Identifying measures to reduce air pollution exposure levels,
- Supporting the switch away from the use of traditional fuels,
- Creating exemplary projects for sustainable sea transport,



- Improving access to air quality information, extending the air quality monitoring network using innovative technologies,
- Including “cleaner air” initiatives in Citywide Green City Behavior Change Programme. (Southampton City Council Green City Plan 2030, 2020)

Success measures created for these actions are:

- Reduction in the mortality rates attributable to air pollution,
- Reduction in the particulate, NO<sub>2</sub> and SO<sub>2</sub> levels across the city,
- Reduction in proportion and number of older, more polluting vehicles operating within the City. (Southampton City Council Green City Plan 2030, 2020)

## Natural Environment

### Actions

- Establishing a citywide ‘Green Grid’. A green infrastructure network providing green and healthy routes for people and wildlife,
- Utilizing Council buildings and land to add to the ‘Green Grid’ through the creation of green walls and roofs, tree planting and wildflower verges,
- Working with private land owners to forming links in the ‘Green Grid’ and encouraging them to implement green infrastructure,
- Launching an Urban Canopy Project to focus planting on public land to encourage biodiversity and provide other benefits like flood reduction through the provision of shade,
- Increasing urban tree numbers by accessing the Urban Tree Challenge Fund,
- Reviewing Tree Preservation Orders to protect existing trees,
- Developing and implementing a Grassland Management Plan that will create at least 5 urban meadows a year in the city,
- Creating an interactive, live Green Space Map of important habitats and spaces to assist in measuring success and to promote public access to the outdoors,
- Measuring trends in the city biodiversity by undertaking a program of surveying and assessment. (Southampton City Council Green City Plan 2030, 2020)

Success measures created for these actions are:

- A net improvement in the biodiversity index across the city,
- Increase in the extent and quality of the managed habitats, reduction in the isolation index,
- Increase in the extent of tree canopy coverage,
- Increase in the area of green spaces,
- Introduction of sustainable drainage systems into all new major developments. (Southampton City Council Green City Plan 2030, 2020)

## Resources, Waste and Water Management

### Actions

- Introducing a new Social Value and Sustainable Procurement Policy Framework,
- Introducing a city-wide waste reduction and recycling initiative to address barriers to waste prevention, reuse and recycling,
- Encouraging businesses to adopt sustainable waste models which include schemes such as food waste models, waste stream audits, staff training and waste performance reporting,
- Supporting behavior change to encourage individuals to properly manage wastes,
- Introducing a single use plastics policy for all Council services,
- Extending the range of materials accepted by the Council's recycling services,
- Improving rates of recycling within the Council services and premises by working towards ISO14001 standard,
- Introducing a water conservation plan to Council services and premises, including utilization of greywater,
- Introducing the Green City Champions program to promote the uptake of sustainable and good practices,
- Supporting Southern Water conservation schemes,
- Integrating urban drainage systems, greywater management and green infrastructure. (Southampton City Council Green City Plan 2030, 2020)

Success measures created for these actions are:

- Improvement in the environmental impact score as measured by the Local Government Association's TOMs methodology,
- Increase in the recycling rate for domestic and commercial waste,
- Reduction in the Council's water consumption and increase in greywater use,
- Reduction in the use of single use plastic across the Council. (Southampton City Council Green City Plan 2030, 2020).

## Sustainable Travel

### Actions

- Establishing formal planning guidance, setting clear standards for the provision of sustainable transport measures,
- Developing Delivery and Service Plans for sustainable logistics solutions,
- Establishing robust methods for monitoring and evaluating travel plans,
- Introducing dynamic routing to guide HGV drivers onto optimal routes for their deliveries,
- Delivering a programme to support commuters to make more sustainable travel choices especially during periods of major road works,

- Establishing active travel zones in pilot areas,
- Encouraging more last mile deliveries to be made by bike, e-cargo bike or zero emission vehicles,
- Expanding the city's travel card to include other modes and methods of travel in the platform,
- Growing a local car club, lift sharing platform and cycle share scheme,
- Reducing the amount of parking provision in the city center to encourage more sustainable transport, enabling repurposing of space to support a more livable city. (Southampton City Council Green City Plan 2030, 2020)

Success measures created for these actions are:

- Increase in the percentage of people walking, cycling and using public transport,
- Increase in the length of trips made by walking and cycling,
- Increase in the use of public transport,
- Increase in the number of Electric Vehicle Charging Points. (Southampton City Council Green City Plan 2030, 2020)

### 3.1.4 İzmir Green City Action Plan

İzmir is located on the western part of Türkiye, and it's the third most populous city in the country with its population of 4,367,000. The city's Green City Action Plan (GCAP) was developed by İzmir Metropolitan Municipality in 2020 with Green Cities funding support by the European Bank for Reconstruction and Development. The plan includes contribution from more than 100 stakeholders and it's the first of its kind in Türkiye. (İzmir Green City Action Plan, 2020)

The aim of the plan, developed from May 2019 to August 2020, is to establish a strategic framework that will enable a greener future for Izmir by identifying environmental challenges and determining the most urgent ones among them. For the development of the plan, two governance bodies were created as the Technical Committee and the Steering Committee. The key roles and responsibilities put in place to implement the GCAP and track its progress included the Green City Coordinator, the GCAP Coordination Board and Green Champions. The plan proposes 46 actions across 21 baskets that include infrastructure investments, policy measures, capacity development and advocacy. Actions in the GCAP are proposals only - some may require additional detailed feasibility studies, funding or statutory approvals before implementation could commence. (İzmir Green City Action Plan, 2020)

The plan follows 4 main steps consistent with the Green Cities methodology by the European Bank for Reconstruction and Development. The first of these is GCAP Baseline, which involves the identification of a suite of 'Priority Environmental Challenges' (PECs) that include the critical issues undermining

Izmir's ability to become more sustainable. Compiled information include data related to demography, social problems, number of hospitals and universities, etc. from the social aspect; climate, vegetation, precipitation regime etc. from the environmental aspect; the state of sectors like industry, tourism, agriculture, etc. from the economic aspect; and duties of municipalities, municipal companies, etc. from the administrative aspect. (İzmir Green City Action Plan, 2020).

The state indicator themes to be monitored in light of these data are missions, Climate Adaptation and Disaster Risk, Green Space and Biodiversity, Air Quality, Soil Quality, Water Quality and Marine Biology. The state indicator themes identified as a priority are: Mitigation, Green Space & Biodiversity, Soil Quality and Air Quality. Based on the 'high priority' challenges determined across the state indicator themes, the following pressure and response sectors are recognized as the priorities: Land-use, Solid Waste and Buildings. (İzmir Green City Action Plan, 2020)

The second step of the plan is actions for Green İzmir. These actions are in accordance with the Izmir Metropolitan Municipality Strategic Plan and the Sustainable Energy and Climate Action Plan. Actions included within the GCAP fall under the categories of capital projects, policy measures, plans and strategies, behavioral, training and enforcement. There are 47 GCAP actions covering 9 different sectors and these 21 baskets:

- Accelerate transition to low emission vehicles,
- Develop more sustainable mobility options,
- Develop a more sustainable logistics sector,
- Commit to net zero energy and end the use of single use plastics in municipality buildings and encourage other organizations, business and institutions follow IBB's leadership,
- Installation of low and zero carbon and energy efficient technologies in Municipality owned buildings and land,
- Enhance evidence for action through studies / assessments,
- Facilitate more sustainable waste management,
- Develop Municipality funded subsidy schemes, grant programmes and/or investments,
- Move toward network/infrastructure level water cycle management,
- Support building level water cycle management,
- Review and update of existing local policies, regulations and guidelines,
- Support collaboration and/or partnerships with Municipality-wide stakeholders,
- Address the urban heat island effect,
- Implement strategies for urban greening,
- Protection, restoration and regulation of the natural environment and ecosystems,

- Reduce pollution,
- Foster cross-sector collaboration,
- Enhance the Municipality's adaptation planning and implementation,
- Understand the impacts of climate change on tourism,
- Raising public awareness across the municipality,
- Collaborate with the agricultural industry to become more sustainable.

Actions identified for each of the 9 sectors are listed below (İzmir Green City Action Plan, 2020):

### Buildings

- Review and update the local-level policies, planning regulations and guidelines for future municipality development around energy efficiency,
- Revise planning regulations and guidelines to ensure efficient water fittings in all new IBB buildings,
- Municipality to develop policy that commits to net zero in all new municipality-controlled buildings by 2030,
- Undertake circular (recycling-oriented) economy assessments on all Municipality refurbishment and demolition projects, encouraging uptake in private projects,
- Explore ways to support residential retrofits being undertaken to a higher and greener energy performance standard. (İzmir Green City Action Plan, 2020)

### Energy Supply

- Undertake necessary studies to connect municipality and industry buildings to geothermal heat network,
- Local renewable energy options study,
- Mass roll out of solar energy on municipality owned assets and land e.g. municipality buildings, road reserves, bus stops,
- Develop Izmir bioeconomy strategy and action plan,
- Replacing all poles owned/run by municipality by installing LEDs,
- Implement an environmental labeling scheme for companies within Izmir,
- Work with the local utility companies to understand capacity constraints and help facilitate a shift towards smart-renewable electric systems. (İzmir Green City Action Plan, 2020)

### Industries

- Further regulate fishing operations in the gulf aiming to achieve sustainability of fish stocks and habitats,
- Ensure that sustainable practices are adopted in port operations (international and national logistics),
- Support the implementation of low carbon farming techniques and climate-smart agriculture across the province,

- Increase farm biodiversity through appropriate techniques, such as increasing diversity in plant species and establishing nest blocks,
- Address emissions and pollution within industrial areas,
- Commission a study to better understand both the direct and indirect impacts of climate change on tourism: both positive and negative and recommendations to improve the industry's resilience. (İzmir Green City Action Plan, 2020)

### Land Use

- Identify and collaborate with stakeholders to lobby for the necessary amendments to regulations to enable the design and development of the 7 "Risk Areas" identified under Law 6306 (Transformation of Areas under Disaster Risk), covering 918 hectares,
- Encourage urban transformation, acting on the Urban Transformation and development areas declared by the Council of Minister's decision for the creation of healthy, livable urban spaces,
- Maintain, protect and enhance existing biodiversity and ecological habitats through the restoration of wetlands, lagoons and afforestation (incorporating natural ecosystem creation),
- Identify and implement techniques to mitigate the Urban Heat Island Effect,
- Review and update local-level policies, planning regulations and guidelines for future and new infrastructure development to ensure they consider climate projections and urban resilience in design and construction,
- Further develop the green and blue infrastructure strategy. (İzmir Green City Action Plan, 2020)

### Waste

- Establish a municipality-wide awareness campaign (schools etc.) for waste reduction and separation at a household level,
- Make separate collection of key dry recyclable materials mandatory, formulating policy at the district municipality level,
- Supplement and speed up investment in smart-waste separation facilities, (dry recyclables), a clean materials recovery infrastructure and composting facilities, building on the Integrated Solid Waste Management Strategy (2018),
- Partner and / or cooperate with relevant institutions and organizations that can act jointly in line with Zero Waste Regulation to develop and invest in the necessary smart-waste collection requirements (bins, trucks, routes etc.) and recycling infrastructure,
- Municipality to commit to banning the use of single-use plastics within their buildings, encouraging local businesses to do the same,
- Investigate potential to provide dedicated waste collection for restaurant / food industry traders in-line with management infrastructure and technology,

- Undertake an assessment of waste collection infrastructure (collection service, coverage rate, bins / containers, vehicles), including smart collection systems and route optimization software in collaboration with district municipalities. (İzmir Green City Action Plan, 2020)

### Transport

- Promote a step change in the uptake of privately/Municipality owned low emission vehicles,
- Municipal fleet and service vehicles: electric and low carbon vehicles,
- More sustainable urban mobility: mass transit and local mobility. (İzmir Green City Action Plan, 2020)

### Water Cycle Management

- Ensuring that it will be possible to access safe clean water in case of emergencies, such as disasters,
- Stormwater management storage systems for Municipality owned or operating Buildings and infrastructure at a building level, under-ground with links to green spaces,
- Integration of stormwater management techniques with urban greening e.g. sponge city principles,
- Implementation of a maintenance program for the existing water supply network of Izmir city center and its surroundings and construction of new additional water transmission lines,
- Review existing design and installation standards to increase efficiency of new water infrastructure networks,
- Incorporate SUDs (Sustainable Urban Drainage) and WSUD (Water Sensitive Urban Design) principles into all planned green areas and publicly owned buildings within the scope of green infrastructure,
- Upgrade the existing water management infrastructure to incorporate the separation of wastewater and stormwater lines,
- Incorporate sustainable water practices and design within existing municipal-owned buildings and municipality controlled open spaces through refurbishment and retrofitting,
- Conservation, protection and enhancement of marine biodiversity in Izmir Gulf, increasing the cleanliness of the Gulf,
- Initiate a flood protection scheme for high risk areas e.g. industrial, residential. (İzmir Green City Action Plan, 2020)

### Public Health

- Carry out awareness raising activities on the effects of climate change on human health. (İzmir Green City Action Plan, 2020)

## Administrative Organization Structure

- Establishing the necessary tools, mechanisms and management structure for the effective implementation of climate change adaptation strategies,
- Develop an administrative organizational structure for the implementation and monitoring of GCAP and SECAP actions. (İzmir Green City Action Plan, 2020)

The third step of the plan is implementation and the fourth step is reporting. The Green City Action Plan has 44 actions common with the Sustainable Energy and Climate Action Plan and it is stated in the plan that the implementation of 28 of them requires more detailed studies. Green City Coordinator, Action Plan Coordination Board and Green Champions, consisting of the government employees, have been made responsible for the implementation, tracking and reporting steps. (İzmir Green City Action Plan, 2020)

## 3.2 Section Assessment

Action plans are plans that demonstrate how and when the desired results will be obtained by whom and with what resources. Accordingly, Green City Action Plans are planning documents created with the purpose of mitigating the effects of climate crisis, adapting to changing seasonal characteristics and creating a livable world for the future. Although they are not legally binding, they are useful for achieving visible results when they are brought to life consistent with their implementation methodology.

Green City Action Plans examined within this study are from cities of varying scales, continents and sociocultural levels. The main reason for this diversity is to show different solution methods for different problems. However, when examined, it can clearly be seen that the emergence of these plans are based on one common challenge. This challenge is climate crisis. While examined cities created areas of actions within the framework of their own challenges, it is seen that they aim to adapt to climate change and leave a more livable world for the future in a common and superior framework.

As for the methodology of the plans, it is understood that the methodology developed for the Green Cities Programme by the European Bank for Reconstruction and Development was fully or partly utilized for the development of the action plans, regardless of whether the preparing bodies are a part of the programme or not. It can be seen that common actions in the developed action plans involve reducing carbon emissions, increasing clean energy usage, generalizing the principle of higher waste recycling/low waste generation, providing sustainable green spaces, improving wastewater systems, reducing water consumption, and establishing sustainable transport systems.





# 4

# AVCILAR GREEN CITY ACTION PLAN

## 4.1 Avcılar Municipality Current State

The first stage of an action plan is analysis process. Analysis process includes describing the current state, organization capacity, stakeholders and environmental conditions as well as demonstrating strengths and weaknesses. In the first stage of Avcılar Green City Action Plan, Avcılar's demographic, socioeconomic, environmental, and administrative current state is examined; the stakeholders of the plan are identified; and in light of these data, a SWOT<sup>10</sup> Analysis that includes analyzing strengths and weaknesses was conducted.

### 4.1.1 Geographical Location and Population

Avcılar is on the European side of İstanbul. It is surrounded by Küçükçekmece Lake and district on the east, Sea of Marmara on the south, Beylikdüzü and Esenyurt districts on the west and Başakşehir district on the north. It has an area of 42 million m<sup>2</sup>. TEM motorway and E-5 (D100) motorway goes through district borders.



Avcılar's Administrative Mapı

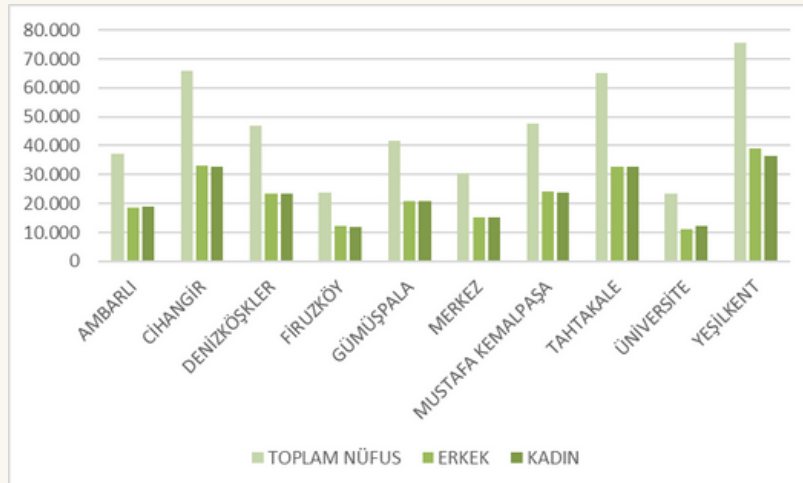
Avcılar's history dates back to prehistoric ages. The Ancient City of Bathonea was discovered in the excavations carried out on the Avcılar side of Küçükçekmece Lake basin. It was revealed during the excavations, which are presently ongoing, that the city was used even until the Byzantine Era. (Erbil, 2014) It is known that during and after the conquest of Constantinople Greek people were settled in the area now known as Avcılar.

During the population exchanges occurring after the proclamation of the republic, Greek people living in Ambarlı village consisting of 40 households and Turkish people living in Rumelia exchanged settlements.

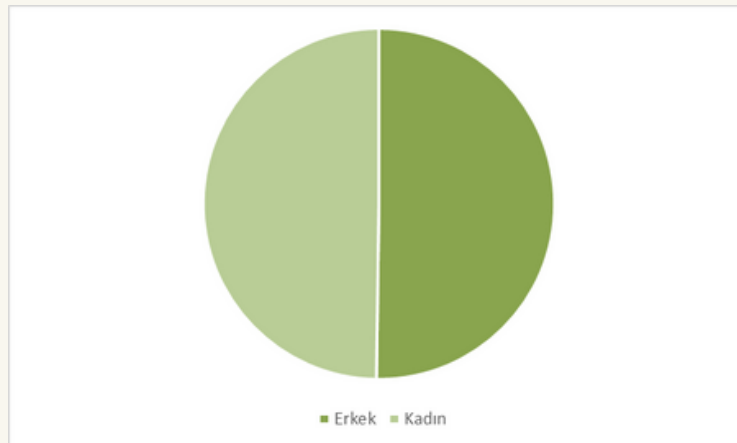
<sup>10</sup> SWOT Analysis is an analysis technique used to identify the strengths (S) and weaknesses (W) of an organization, technique, process or situation and detect opportunities (O) and threats (T) in the inner and outer environments in a plan or project.

In 1928, a group of immigrants from 35 households settled in the Amindos Ranch in the north of Avcılar. Until 1950s, the population increase of Avcılar had been lower than the country's average. The opening of the fuel filling facilities in 1959 and the establishment of the TEK Ambarlı Thermal Power Plant in 1964 accelerated the population increase in the area. The opening of the İstanbul University's Avcılar Campus was also another factor affecting the population increase rate in Avcılar. The population of Avcılar, which was used as a summer resort for a period, rapidly increased with the development of the industry.

According to TÜİK, the population of Avcılar is 457,981. Neighborhood population data show that the most populous neighborhood of Avcılar is Yeşilkent with 75,521 people and the least populous neighborhood is Merkez with 30,428. Data of population by age show that the majority is concentrated in the age group from 25 to 44. As for population by sex, the rate of men to women is even. (TÜİK, 2022) From 2012 to 2019, the change in demography points to an increase of 13.5% as a result of approximately 2% increase a year. This rate changes for each neighborhood. For example, these values for Tahtakale, Denizköşkler and Cihangir neighborhoods are respectively 32%, 19% and 16%. (Avcılar Municipality SECAP, 2020)



Avcılar District Population by Neighborhood



Avcılar District Female-Male Population Distribution

#### 4.1.2 Current Socioeconomic State

Traditional forms of production such as fishery, viticulture and agriculture were abandoned in Avcılar throughout the years and sectors like industry, commerce and entertainment&hospitality were developed in their stead. More than 250 industrial facilities from various sectors such as metalware, textile, and clothing are in operation in Avcılar. There is a fuel filling facility in the west side of Ambarlı and there are industrial facilities on the left and right sides of Firuzköy road. (Avcılar Belediyesi Sürdürülebilir Enerji ve İklim Eylem Planı, 2020)

According to the results of the Ministry of Industry and Technology's Socioeconomic Development Ranking Research 2022<sup>11</sup> that includes the assessments with regard to the development level and ranking of the districts in Türkiye in 2022, Avcılar is among the 1st Level districts, ranking 66th across Türkiye and 29th across İstanbul. (Acar et al., 2022).

According to the Human Development Index, Districts (İGE-İ) 2020<sup>12</sup> research by the İnsani Gelişme Vakfı (Human Development Foundation/İNGEV) based on the methodology of United Nation Development Program's reports, Avcılar ranked 28th among 138 districts in the blue group of High Human Development in terms of economy and education. (Şeker, Ozan, & Yaman, 2020)

Socioeconomic status in Avcılar differs by neighborhood. According to the Socioeconomic Development Index used in the Mahallem İstanbul (My Neighborhood İstanbul) research conducted in 2016, Merkez neighborhood was first with a score of 60.8 (out of 100 basis points) while Mustafa Kemal Paşa, Firuzköy and Yeşilkent neighborhoods were below the threshold of 35. (Mahallem İstanbul, 2016)

There are 6 kindergartens, 22 primary schools, 22 secondary schools, 18 high schools, and 6 other educational institutions in Avcılar, with a total of 74 official educational institutions along with 2 university campuses. (Kurum Listesi, 2020) As for education, majority of Avcılar's demography consists of high school graduates, and it is seen that primary school graduates constitute the majority in Yeşilkent and Tahtakale on the neighborhood level. (Avcılar Eğitim Düzeyi, 2021)

<sup>11</sup> It is conducted using 56 variables from 8 variable groups of demography, employment and social security, education, health, finance, competitiveness, innovativeness, and quality of life.

<sup>12</sup> It is conducted using 56 variables from 8 variable groups of demography, employment and social security, education, health, finance, competitiveness, innovativeness, and quality of life.

### 4.1.3 Current Ecological State

With the Sea of Marmara on the south and Küçükçekmece Lake on the east, Avcılar is an intersection point of marine and terrestrial ecosystems. Küçükçekmece Lake that falls within the borders of Küçükçekmece, Avcılar and Başakşehir districts is 10 km in length, 6 km in width, and 22 m in depth at its deepest point. During the times when sea level rises or the amount of lake water decreases, sea water pours into the lake which in turn causes the lake water to be slightly salty. Küçükçekmece Lake is designated as a Special Protection Area. (Avcı, 2008)

The basin of the lake is one of the seven designated natural areas of İstanbul and a Key Biodiversity Area (KBA)<sup>13</sup> with the highest level of priority. It is an important breeding and wintering point for birds and it harbors globally threatened animal species such as mammals, tortoises, butterflies, etc. For this reason, it is an internationally protected area and a Ramsar Area.<sup>14</sup> (Çelikoba, 2000)

In a more recent study conducted on the Ancient City of Bathonea in Avcılar, it was determined that although the part of the city that falls within Cerrahpaşa university campus area and the military area borders was partly preserved in terms of biodiversity, the flora of this area was significantly damaged due to intense settlement, waste disposal, unlicensed buildings, gardening, agricultural plant diversity, etc. and the natural vegetation was seriously harmed.

The basin is within the borders of West İstanbul Pastures, a Key Biodiversity Area. Rare and endemic plants were discovered in the archaeological site. 5 plant species that must be conserved pursuant to the Bern Convention was identified to be threatened. (Özcan) Because the river passing through the Yarımburgaz Valley pouring into the lake is not purified, it also hurts reeds and natural vegetation in the area, causing a loss of habitat.

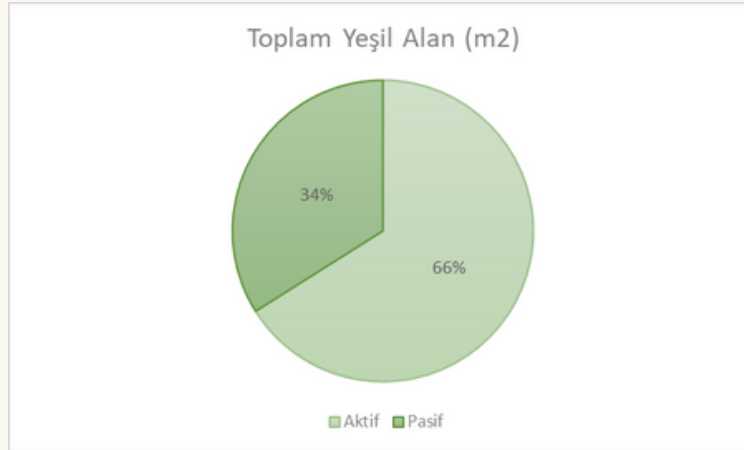
While the basin had been an area of vacation, recreation and agriculture with a low population, the natural characteristics of the lake were disrupted in time due to various reasons such as rapid population growth, deficiencies of infrastructure, the area being excluded from basin conservation site, sewage, disposal of household and industrial wastes into the lake, long-term presence of Halkalı dump site and its wastewater pouring into the lake, construction of the

<sup>13</sup> Key Biodiversity Area (KBA) is an aquatic area system that harbors different groups of species.

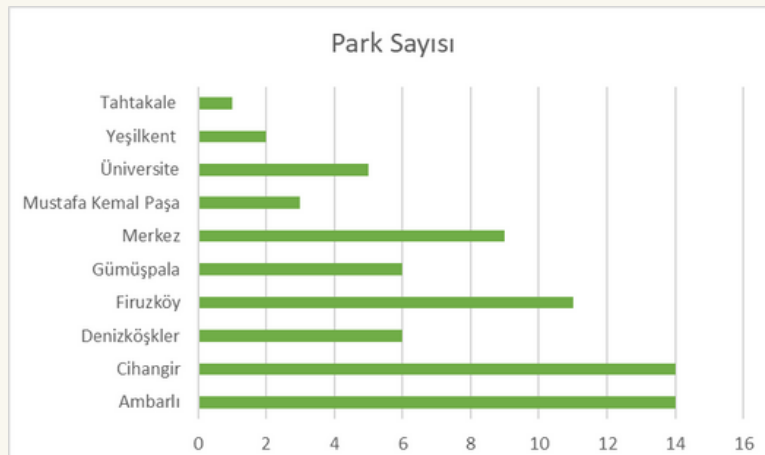
<sup>14</sup> The Ramsar Convention is an international treaty for the conservation and sustainable use wetlands. Ramsar Sites include wetlands designated to be of international importance as waterfowl habitats.

Sazlıdere Dam blocking the Sazlıdere River, the largest feeder of the lake, and preventing it from reaching it, and the Nuclear Research and Education Center dumping its liquid wastes into the lake. As a result of these factors, agricultural lands, forests and green spaces in the lake were replaced by settlements, transport networks and open spaces. (Ekinici & Ekinici, 2006)

When the green space presence in Avcılar is examined, it is understood that the total area of green spaces in Avcılar is 198,999.21 m<sup>2</sup> (19.90 ha) in the 71 parks, medians and recreational sites out of 301,268.76 m<sup>2</sup> (approx. 30 ha) total area within the jurisdiction of the Avcılar Municipality.



Avcılar District Active and Passive Green Areas



Number of Parks by Neighborhoods in Avcılar District

These green spaces are not distributed equally in 10 neighborhoods of Avcılar. The number of parks and other green spaces located in each neighborhood are as follows: 14 in Ambarlı, 14 in Cihangir, 6 in Denizköşkler, 11 in Firuzköy, 6 in Gümüşpala, 9 in Merkez, 3 in Mustafa Kemal Paşa, 5 in Üniversite, 2 in Yeşilkent and 1 in Tahtakale. A literature research was conducted to identify the plant species native to Avcılar. APPENDIX-2 shows these native species. According to 2020 data, the area of green space per person in Avcılar is 1.89 m<sup>2</sup>. This amount is far below the 10 m<sup>2</sup> threshold determined in the Construction Law.

In addition, Avcılar ranked 2nd out of 138 districts with a score of 78.19 in the Environmental Performance Index, which includes elements such as green space/forest presence, continuously irrigated areas, and surface of water masses. (Şeker, Ozan, & Yaman, 2020)

The amount of water potential in Türkiye is 1500 m<sup>3</sup>/per person a year. (Muhammetoğlu & Muhammetoğlu, 2017) This means that the status of the country is changing from under water stress to water poor and serves as a warning regarding efficient and careful use of water resources. Traditionally, besides the water filtered for daily use of people, local governments regularly engage with irrigation, especially in the seasons of low precipitation, to preserve the green texture of a city. The amount of water consumed in irrigation of green spaces via tankers in Avcılar is around 150 to 180 tons/day. The amount used for automatically irrigated green spaces on the other hand is 1 ton/day. The quality of the water used for these purposes equals to tap water.

The amount of greenhouse gas emission of Avcılar is 1,089,334 tCO<sub>2</sub>. Buildings account for 51.4% of these emissions; transport accounts for 38.1%, solid wastes and wastewater account for 10.4%, and the remaining 0.1% is emissions caused by agricultural irrigation and animal presence. (2020)

#### 4.1.4 Current Administrative State

Türkiye geographically consists of 81 provinces, which also consist of many districts. As of 2018, approximately 77% of Türkiye's population live in the areas of metropolitan municipalities. (İzmir Green City Action Plan, 2020) While the metropolitan municipality is the higher level of government that supervises macro services, district municipalities perform the micro services. Services such as street hygiene and maintenance, afforestation, creation and maintenance of parks and green spaces, household waste collection, developing implementation plans (on the scale of 1/1000), licensing of buildings, social municipality services (reducing poverty, social aids, training for the unemployed etc.) promoting amateur sports, education, sports and cultural services are among the duties of district municipalities. (5393 sayılı Belediye Kanunu, 2005)

Avcılar, which gained the municipal town status in 1966 and remained as a neighborhood of Küçükçekmece until 1987, became a district that consisted of 9 neighborhoods in 1992. Today, it covers 10 neighborhoods. These 10 neighborhoods are Merkez, Ambarlı, Cihangir, Gümüşpala, Denizköşkler, Üniversite, Mustafa Kemal Paşa, Firuzköy, Tahtakale and Yeşilkent.

2020-2024 Strategic Plan addresses environmental sensitivity in 2 strategic goals. Two performance goals, first of which is the Strategic Goal 4 "Developing

an action plan for mitigating the negative effects of climate change” and the second of which is the Strategic Goal 6 “Creating areas for physical activity and sports purposes in the parks, recreational sites and green spaces in the district” are seen as important strategic goals in the fight against the climate crisis.

Avcılar Municipality is aware of the climate crisis and takes rapid actions to become a part of the solution. The government signed the “Cities for Climate” declaration stating that signatory local governments commit to keeping global warming under the level of 1.5°C until 2030 and making cities just, egalitarian and livable. Avcılar Municipality is also a signatory of the Covenant of Mayors adopted by the European Commission, aiming to support and promote urban reduction plans to reduce greenhouse gas emissions caused by cities and encourage the use of clean energy resources. The covenant includes a commitment to reduce greenhouse gas emissions by 40% in 2030 (2029 as targeted by Avcılar) compared to the base year 2019 and operations towards this goal are ongoing. In addition, the Paris Declaration that underlines the commitment of keeping the temperature rise of global warming below 1.5°C was also signed in 2020.

Avcılar Municipality continues its operations on projects regarding providing training courses on nature, planting a forest through donations by newly wed couples, etc. as part of the cooperation protocol it signed with TEMA Foundation in 2021. With the “I’m Discovering Nature” project launched in 2022, training documents that contain information regarding plant, bird and butterfly species in Avcılar were shared with teachers of all kindergarten and primary schools in Avcılar to help them inform their students.

“Sustainable Energy and Climate Action Plan” by Climate Change and Zero Waste Directorate and “Resilience Action Plan” by Strategy Development Directorate were developed in 2021 in accordance with the Strategic Plan. Along with their specific goals in their specific areas, both studies include suggestions, goals and actions for achieving urban ecological restoration of Avcılar, creating a sustainable and climate-adaptive green texture in the city, and making both nature- and budget-friendly decisions in the implementation stages. Goals and actions that involve all directorates must be coordinated and implemented by certain directorates.

Permaculture and Resilience Departments established under the Strategy Development Directorate operate and carry out projects in coordination with other directorates to reduce the vulnerabilities of Avcılar and creating a more livable city for the present and the future.

Personnel structure of the Parks and Gardens Directorate, which is one of the fundamental implementers of the targets and actions within the plan, show that



there is a shortage of field personnel. This shortage causes some setbacks to the maintenance of a 20 ha green space area and it is stated that the number of employed personnel is not enough for the regular cleaning of empty lots, which are ample in Avcılar and give rise to complaints from citizens. This prevents the directorate from carrying out other projects.

#### 4.1.5 Stakeholders

Stakeholders are internal and external actors that include individuals or groups that affect or are affected by the achievement of an organization's goals and targets. Identified internal and external stakeholders of the Avcılar Green City Action Plan are alphabetically listed below:

##### Internal Stakeholders

- Avcılar Municipality Personnel and Directorates

##### External Stakeholders

- AVÇEDER (Avcılar Environmental Culture Development and Training and Disaster Assistance Association),
- Kent Kültür Kalkınma Derneği (City Culture Development Association),
- İstanbul Gelişim University,
- İstanbul University-Cerrahpaşa,
- City Council,
- Neighborhood Administrations,
- TEMA Avcılar Branch.

Meetings were held with all stakeholders where their opinions and assessments in accordance with the identified needs on the short, medium and long term actions were received.

#### 4.2 Avcılar Green City Action Plan

Avcılar Green City Action Plan was developed by the Avcılar Municipality Strategy Development Directorate as a complementary to other action plans with the purpose of strengthening Avcılar's green infrastructure, making it sustainable and adaptable to climate change. It includes strategies and actions that involve how to achieve the adaptation of urban ecosystem services to economic, social and climatic changes caused by climate change.

### 4.2.1 SWOT Analysis

In light of the current state data examined in the previous sections and stakeholder meetings, organizational, ecological, social and urban data revealed through the SWOT analysis conducted for the preparation and implementation processes of the Green City Action Plan are as follows:

- Strengths

Organizational	Ecological	Social	Urban
Environmental sensitivity in Avcılar 2029 vision and 2020-2024 Strategic Plan	Development of Sustainable Energy and Climate Action Plan, Avcılar Resilience Report, and Local Equality Action Plan in relation with the Strategic Plan	Sensitivity to citizens' requests and rapid solution production thanks to 24/7 service provision	
Presence of Strategy Development Directorate for coordination and motivation for actualization of the Green City Action Plan	Completed preliminary studies for several projects that can be linked to the Green City Action Plan		
Presence of experienced and trained personnel with strong technical background, proficient in their respective fields, able to work together			
Discipline in and harmony between the collaborating directorates			

- Weaknesses

Organizational	Ecological	Social	Urban
High costs of park restorations and lack of internal resources	Green space area per person being far below the world standards, uneven green space distribution across the district		Inability to plan new parks due to zoning plan problems, existing parks' nonconformity with accessibility standards
Shortage and inadequacy of field personnel, high rate of personnel turnover and positional changes	Lack of an Avcilar plant inventory		
Inadequate support for events like training symposium etc. which are necessary for personnel's professional development	Inadequate green and brown waste management		
Vehicle equipment shortage, maintenance and repair problems	Lack of wastewater and rain water management		
Deficiencies in the organizational memory documentation	Low renewable energy utilization		
Implementation plans being included in the action plans resulting in insufficiency of the allocated budgets	Low number of appropriate pieces of playing equipment in existing parks		

- Opportunities

Organizational	Ecological	Social	Urban
Strong ties with all external stakeholders through cooperation protocols	Presence of lake and sea ecosystems	Increased environmental awareness in citizens	Parks and recreational areas to be built in Yeşilkent and Tahtakale neighborhoods following the completion of these neighborhoods' zoning plans
Avclar Environmental Volunteers project	Avclar's biodiversity		Ancient City of Bathonea and historical excavation sites (preserved green spaces thanks to the official preservation area status)
European Green Deal and grants, etc. provided within its framework	Wide coastline and green band		
Possibility to lead in this field due to insufficient activity of local governments regarding environment and ecology			

- Threats

Organizational	Ecological	Social	Urban
	Severe effects of climate crisis (heatwaves, sever droughts or floods, fires, etc.)	Socioeconomic discrepancy between the north and south of the E5 (D100) highway, great extent of poverty	Avcılar’s location in the first degree seismic zone
	Exotic landscape plants across Avcılar		Zoning plan and infrastructure problems
	Presence of invasive plant species		Variance in needed services due to nonhomogeneous settling
	Inappropriate disposal of industrial wastes		Rapid and uncontrolled increase in migration and settlements

### 5.2.2 Avcılar Green City Action Plan

Avcılar Green City Action Plan is a complementary plan to the district’s Strategic Plan, Sustainable Energy and Climate Action Plan, and Resilience Report, progressing in parallel with the municipality’s other plans and principles. It directly contributes to the 2019-2024 Strategic Plan’s vision of “providing pioneering accountable municipal services protecting the urban culture based on universal sustainability principles, following social and economic developments, respecting all living beings’ right to live” and its strategic goal of “contributing to the development of sustainable environment.”

Avcılar Green City Action Plan’s vision is “becoming the municipality with the highest environmental quality with a strong green infrastructure”. The goals within the scope of this vision are improving Avcılar’s green space quality based on sustainable and ecologic landscape design criteria, enhancing resilience to climatic vulnerabilities, creating a cleaner and healthier city with

a high level of environmental awareness.

Avcılar Green City Action Plan especially focuses on the city's ecologic and sustainable landscape design. Basic principles of the plan are sustainability and climate adaptation. Within the framework of these principles, the aim is to create an Avcılar:

- with green spaces that meet sustainable and ecologic landscape design criteria of global standards,
- with high biodiversity,
- with low carbon emissions,
- with a reduced amount of wastes and an increased amount of recycled wastes,
- where wastewater recovery systems are generalized and excessive water consumption is limited.

This plan created to mitigate the effects of climate crisis, increase Avcılar's resilience, and make sure that sustainable and ecologic landscape design principles are always considered both in decision making and implementation stages has a total of 36 actions, of which 8 are long term, 16 are medium term and 12 are short term. As part of the Avcılar 2029 vision, the time frames for the actualization of proposed actions are 3 to 8 years for long term, 2 to 5 years for medium term and 6 months to 2 years for short term.

#### 4.2.2.1 Long Term Actions

1. Avcılar's Vegetation - Inventory Study: Taking a plant inventory of Avcılar in cooperation with universities and storing all related data (height, age, diameter, location, pruning, etc.) in ArcGIS,
2. Making arrangements to increase the green space area per person in the city within the framework of sustainable landscape principles,
3. Adopting the "Sponge City" approach by generalizing wastewater recovery systems,
4. Carrying out joint projects with academic organizations and municipalities in close proximity for the restoration of the damaged lake ecosystem,
5. Establishing the lake - sea connection through green corridors,
6. Recycling all wastes in the city,
7. Installing low or zero carbon, energy efficient technologies in the municipal buildings and lands,
8. Transitioning to using low emission vehicles across the municipality.

These actions are planned to be actualized until 2029 as part of the Avcılar 2029 vision. Each target must be given shape by the study groups to be formed together with relevant stakeholders.

In addition to the municipality's own resources, EU funds and grants must be followed and applied to where appropriate to source the targets' financing. Primary stakeholders in the actualization of these actions are Parks and Gardens Directorate, Climate Change and Zero Waste Directorate, Civil Works Directorate, Planning and Projects Directorate, Support Services Directorate, and Transportation Services Directorate.

#### 4.2.2.2 Medium Term Actions

1. Using playing equipment made of natural materials without lead paint, supporting children's imagination in all parks,
2. Replacing petroleum based flooring materials in existing parks,
3. Testing xeriscaping applications in potential planting areas and reporting the results,
4. Making relevant decisions for separating the upper layer of soil (approx. 0-30 cm) in the construction areas where the soil is rich in organic material and storing it to be subsequently used in landscaping applications,
5. Making pocket parks (parklets),
6. Identifying the presence and intensity of invasive species (*Ailanthus altissima*, etc.) and taking precautions against them,
7. Organizing joint activities with schools to raise awareness about the nature and increase climate literacy in the city especially in children and young people,
8. Building community gardens in accordance with the nature training given in schools in cooperation with TEMA,
9. Building permaculture community gardens in the district,
10. Storing rainwater, identifying pilot parks and conducting irrigation tests in them, reporting the results,
11. Reducing the use of chemical fertilizers and chemical drugs,
12. Installing cameras and emergency buttons in parks to increase safety in the city; increasing the lighting of streets, roads and parks; generating the required energy from renewable resources,
13. Improving communication with the academy to protect endemic species, producing plant catalogs to raise public awareness,
14. Organizing awareness raising activities about faunal diversity of Avçılar,
15. Carrying out joint projects with businesses across the district to stop the use of single use plastics,
16. Supporting restaurants, bars etc. businesses across the district in the food&drink sectors to compost their organic wastes.

These actions are planned to be actualized in 2 to 5 years. Each target must be given shape by the study groups to be formed together with relevant stakeholders. In addition to the municipality's own resources, EU funds and grants must be followed and applied to where appropriate to source the targets'

financing. Primary stakeholders in the actualization of these actions are Parks and Gardens Directorate, Climate Change and Zero Waste Directorate, Civil Works Directorate, Licensing and Auditing Directorate, Culture and Social Affairs Directorate, and Press and Public Relations Directorate.

#### 4.2.2.3 Short Term Actions

1. Updating the construction surveying and (structural and plantal) inventory of all the parks and green spaces and opening it to relevant parties' access,
2. Renewing parks in need of immediate maintenance or restoration in accordance with sustainable landscape principles,
3. Using harmonious native plants in plantal landscaping applications in Avcılar,
4. Using ground cover plants instead of turfs, which consume high amounts of water, in places of low visual interaction and usage (medians, etc.), using perennials instead of seasonal plants,
5. Making the use of native plants in landscape projects obligatory for zoning permits,
6. Creating a plant catalog and inventory for the municipal nursery, storing them online,
7. Improving the soil quality by composting marketplace wastes and green wastes within the framework of permaculture principles,
8. Composting organic wastes from municipality's service buildings and social facilities through various methods to be used in nature,
9. Organizing applied basic agriculture and gardening training courses to evoke a love of nature in citizens and raise their awareness,
10. Organizing "most beautiful balcony/garden" competitions to promote citizens' love of nature,
11. Working with environment volunteers,
12. Banning single use plastics in municipal service buildings and operations

These actions are planned to be actualized in 1 to 3 years. The work plan devised for this purpose can be found in APPENDIX-1 of this document. Primary stakeholders in the actualization of these actions are Municipality's relevant Directorates.



### 4.2.3 Monitoring and Assessment

Short term plans will be monitored through reports produced by relevant directorates every 3 months and their field observations, which will then be assessed in meetings with limited attendance. In light of the information received by the directorates, developments and results will be shared and reported by the Strategy Development Directorate every 6 months in meetings with a large attendance.

Directorate meetings will be held for medium and long term plans to identify the effect measurement criteria as well as the methods for how to progress and develop directorate capacities. Strategy development directorate will support the implementing directorates in coordination efforts. The schedule will start after the steps of actions are determined. Actions will be monitored through reports produced by relevant directorates every 3 months and their field observations, which will then be assessed in meetings with limited attendance. In light of the information received by the directorates, developments and results will be shared and reported by the Strategy Development Directorate every 6 months in meetings with a large attendance.



5

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**Appendix-1**  
**Work Plan for**  
**Short Term**  
**Actions**

### Action 1

Updating the construction surveying and (structural and plantal) inventory of all the parks and green spaces and opening it to relevant parties' access

Description		Updating the construction surveying and structural/plantal inventory of all the parks and green spaces in Avcılar, archiving them digitally, open solely to relevant parties' access
Reasoning		Updating the data in the archive instantaneously, quickly accessing the data with regard to areas of green spaces/structural landscapes and plant species, structural and artistic elements used in them
Implementation steps		1 Identifying the areas for inventory study
		2 Identifying the personnel to conduct the study
		3 Conducting construction surveying and inventory studies
		4 Entering the collected data in the related programs
		5 Archiving the data in the municipal information system
Type of action		Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	Data Processing Directorate
	Financing options	Municipal budget
	Time frame	2022-2024
Effect measurement		Number of parks and green spaces whose construction survey and inventory data have been digitized
Expected benefits		Contributing to organizational memory,
		Quickly accessing the data when necessary,
		Identifying the needs and deficiencies to take action accordingly.

## Action 2

### Renewing parks in need of immediate maintenance or restoration in accordance with sustainable landscape principles

Description		<p>Prioritizing sustainable landscape principles in the renewal of parks in need of immediate maintenance or restoration, according to the work schedule or identified in the inventory study. Such principles are:</p> <ul style="list-style-type: none"> <li>• Integration of water collection systems</li> <li>• Renewable energy use</li> <li>• Natural resource and material use</li> <li>• Plant selection</li> <li>• Permaculture (natural garden)</li> <li>• Minimization of water and maintenance needs through the use of native plants</li> </ul>
Reasoning		Making Avcılar adaptable and resilient to climate change as part of the 2029 goals, directorates adopting the sustainability principle
Implementation steps		1 Identifying parks that require immediate maintenance and renewal
		2 Identifying the means of renewal (service purchase file, own resources, etc.)
		3 Making sure that the design is in accordance with sustainable landscape principles, prioritizing sustainability and locality in material and plant choices
		4 Conducting inspections to make sure that all of the materials used in the implementation/control phases are consistent with the nature and within the framework of sustainability principles
Type of action		Investment and Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	
	Financing options	Municipality budget, national and international funds and grants
	Time frame	2022-2024
Effect measurement		Number of renewed parks
Expected benefits		Teaching citizens (especially children), who are the future of the society, about the local government's sensitivity regarding climate and environment through the principal transformation occurring in Avcılar,
		Reducing parks' irrigation and maintenance costs through the use of native plants.

### Action 3

Using harmonious native plants in plantal landscaping applications in Avcılar (see Appendix 2 for a list of native species)

Description		Avcılar, located in the Küçükçekmece Lake basin, is a district with a high level of floral and faunal diversity. However, the pressure of urbanization, present nearly everywhere in İstanbul; vegetative choices inconsistent with the local characteristics and the effects of climate change hurt this diversity in Avcılar and caused the loss of such characteristics.
Reasoning		The use of native plants that grow naturally in İstanbul and Avcılar will contribute to the ecological restoration and the fight against effects of climate change in addition to reducing the economic and labor costs arising from maintenance and irrigation requirements.
Implementation steps		1 Compiling conducted studies with regard to the identification of the native plant species (see Appendix 2, relevant theses and academic publications),
		2 Contacting academicians studying the Küçükçekmece Lagoon to learn from their experiences and knowledge
		3 Taking a plant inventory, issuing an online booklet of it and publicly announcing that the used plants will be limited to the species in this booklet
		4 Inspecting that this principle is observed in outsourced projects or projects carried out within directorates
Type of action		Plan and Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	Data Processing Directorate, External Stakeholders
	Financing options	Municipality budget, national and international funds and grants
	Time frame	2022-2024
Effect measurement		Confirmation of nativity of the used plants
Expected benefits		Ecological restoration, adaptation to climate change, reduction in the maintenance and labor costs.



#### Action 4

Using ground cover plants instead of turfs, which consume high amounts of water, in places of low visual interaction and usage (medians, etc.), using perennials instead of seasonal plants

Description		<p>Turf mixes are preferred because of their walkability and durability against force as well as their aesthetic views. However, they require regular irrigation and maintenance. This causes an excessive consumption of water resources, which are critical today, and an inefficiency of labor due to maintenance costs.</p> <p>Walkable ground cover plants are not limited to those among turf mixes. There are other ground cover plants with similar features.</p> <p>Seasonal flowers only last for a year and they must be replaced every season. This poses an obstacle to creating a sustainable landscape.</p>
Reasoning		Maintenance and irrigation requirements
Implementation steps		1 Identifying walked and unwalked turf areas in Avçılar
		2 Conducting an operational feasibility study and visual analysis
		3 Identifying appropriate perennial ground cover plants to be used in Avçılar
		4 Using appropriate perennial evergreens in inclined areas, shades, medians, etc.
		5 Using walkable ground cover plants consistent with the spatial characteristics in restoration and maintenance operations
Type of action		Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	
	Financing options	Municipality budget
	Time frame	2022
Effect measurement		<p>Reduction in the area of turfs,</p> <p>Reduction in or complete abandonment of the use of seasonal flowers,</p> <p>Reduction in the water bill payments.</p>
Expected benefits		Reducing the amount of used water through xeriscaping applications
		Reducing the turf area and seasonal flower bed maintenance expenses (labor, etc.),
		Contributing to climate change adaptation through the creation of sustainable green spaces that require less maintenance.

## Action 5

### Making the use of native plants in landscape projects obligatory for zoning permits

Description		Making landscape projects obligatory for buildings to be renewed as part of urban renewal and those over 1000 m <sup>2</sup> that will be newly built; making the use of native plants growing in Avcılar obligatory in these projects to reduce the irrigation and maintenance requirements; choosing climate adaptable, sustainable materials for the structural landscape elements
Reasoning		<p>Due to the necessity of considering climate change effects for the selection of plantal and structural materials to be used in the gardens of buildings to be renewed as part of urban renewal and those to be built;</p> <ul style="list-style-type: none"> <li>• Increasing permeable floorings</li> <li>• Increasing biological diversity</li> <li>• Choosing appropriate plants to mitigate urban heat isle effects</li> </ul>
Implementation steps		1 Forming a study team of landscape architects, architects and urban planners assigned by Zoning Directorate and Parks and Gardens Directorate
		2 Identification of the criteria to be used for granting zoning permits in Avcılar by this study team (plant species, structural materials, design criteria, etc.)
		3 Submitting this application that includes all the criteria to the municipal council for approval
		4 Publishing the list of materials to be used on the website after approval by the council
		5 Selection of personnel to be assigned to assess the projects' conformity with the identified criteria by relevant directorates and assessment of landscape projects
Type of action		Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate, Zoning Directorate
	Stakeholders	External stakeholders
	Financing options	Municipality budget
	Municipality budget	2022-2023
Effect measurement		Number of confirmed zoning projects
Expected benefits		Contribution to the creation of green inventory through keeping structural and plantal landscape information of buildings to be built in Avcılar in municipal archives
		Generalization of the use of structural and plantal landscape elements which is a necessary condition for adaptation to climate change
		Creation of sustainable landscape areas with the use of plantal and structural materials identified by experts

## Action 6

Creating a plant catalog and an inventory for the municipal nursery, storing them online

Description		Aveclar Municipality Parks and Gardens Directorate Nursery includes plants of various genus and species. These plants are used in the municipality projects where necessary. Cataloging genus/species, number, stem diameter, circumference etc. information of the plants in the nursery open to experts' access will accelerate plantal landscape projects and make the process of following the plant stock more convenient.
Reasoning		Observation and control of the plant inventory by the relevant personnel
Implementation steps		1 Taking a plant inventory of the plants in the nursery
		2 Recording and storing the obtained data in the municipality's digital infrastructure
		3 Updating the stock information regularly based on the use frequency
Type of action		Project and Implementation
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	Data Processing Directorate
	Financing options	Municipality budget
	Time frame	Within 2023
Effect measurement		Number of plants in the inventory
Expected benefits		Making number, diameter, etc. information of used plants and those in stock accessible and easy to follow,
		Accelerating projects,
		Contribution to organizational memory

## Action 7

### Improving the soil quality by composting marketplace wastes and green wastes within the framework of permaculture principles

Description		Permaculture is a portmanteau coined from the combination of the words permanent and culture. However, its meaning has changed in time and passed beyond the limits of an agricultural system to signify a design system that creates sustainable human settlements. Composting is a process through which organic materials are made stable through microorganisms under oxic or anoxic conditions. (Rona, 2017) Compost is a mixture that improves the structure of the soil. When a content rich in minerals is provided, a product that is richer and more beneficial than raw animal fertilizer is obtained. Basically, compost is produced through degradation of organic wastes in the soil through various methods.
Reasoning		<ul style="list-style-type: none"> <li>• Disposal of green and brown organic wastes such as turf, branch residue, etc. (due to labor and transfer costs, occupied area, etc.)</li> <li>• Revitalization of the natural cycle of soil, improving the quality and water retention of soil</li> <li>• Necessity to collect marketplace wastes separately in accordance with the Zero Waste Regulations</li> </ul>
Implementation steps		<p>1 Forming the necessary operational structure and providing required services (Collecting marketplace wastes, transferring all wastes to the relevant area, identifying the personnel to conduct the daily inspections, etc.)</p> <p>2 Composting the wastes with appropriate methods</p>
Type of action		Implementation
Implementation plan	Owner of action	Cleaning Works Directorate
	Stakeholders	Parks and Gardens Directorate, Climate Change and Zero Waste Directorate, External Stakeholders
	Financing options	Municipality budget
	Time frame	2022-2023
Effect measurement		Amount of compost obtained (ton/year)
Expected benefits		<p>Reduced fertilizers costs due to improved soil quality</p> <p>Reduced labor and irrigation costs due to the improvement in the soil's water retention capacity</p>

## Action 8

### Composting organic wastes from municipality's service buildings and social facilities through various methods to be used in nature

Description	Composting the organic wastes from municipal buildings where meals are prepared such as food kitchens, social facilities, children's homes, etc. to be used in green spaces ensures the continuation of the organic cycle through natural fertilizer production. There are various compost production techniques. Used techniques may vary according to the municipal buildings and departments based on daily waste generation.	
Reasoning	Utilizing municipality's organic wastes in natural environments, Contributing to municipality's Zero Waste goal	
Implementation steps	1 Identifying the field of study	
	2 Identifying the amount of average daily waste generation by departments	
	3 Identifying the method to be employed based on the average waste generation of departments (compost machine, Bokashi compost, etc.)	
	4 Forming a team that can rapidly make decisions and implement them with the participation of all stakeholder directorates	
	5 Providing Bokashi compost training to units that will conduct the process (Training documents will be procured by the Permaculture Department)	
	6 Daily waste collection from municipal departments <ul style="list-style-type: none"> <li>Embedding the filled Bokashi compost buckets under the ground after the appropriate waiting period and let them rest for 3 months</li> <li>Collecting the compost produced in the compost machine</li> </ul>	
	7 Mixing the compost with the soil and placing it in the appropriate areas	
	8 Informing citizens	
Type of action	Implementation	
Implementation plan	Owner of action	Cleaning Works Directorate
	Stakeholders	Climate Change and Zero Waste Directorate, Parks and Gardens Directorate, Social Support Services Directorate, Women and Family Services Directorate, Bathonea Yapı AŞ.
	Financing options	Municipality budget and national grants
	Time frame	2022 -
Effect measurement	<ul style="list-style-type: none"> <li>Amount of compost produced by each department (kg/year)</li> <li>Amount of each department's reduced organic waste (kg/year)</li> <li>Amount of compost used (kg/year)</li> </ul>	
Öngörülen faydalar	Generalizing the culture of waste sorting on site within the municipality,	
	Supporting the natural cycle by returning the sorted organic wastes to nature,	
	Creating a new opportunity to bring nature and humans together,	
	Improving communication and cooperation between organizations,	
	Supporting the Zero Waste project	

## Action 9

### Organizing applied basic agriculture and gardening training courses to evoke a love of nature in citizens and raise their awareness

Description		Intraurban production as a hobby on the balcony/garden scale will be supported through the distribution of beginner level materials (seeds, small rake, etc.) and provision of basic information to Avcular citizens, helping them take up balcony, terrace and garden farming. In addition, this application will create an environment for citizens to socialize easier and contribute to the development of neighbor relations.
Reasoning		Urban gardening is a practice to be (and should be) taken up by many people in the upcoming years. Local government support to this practice will ensure that citizens will be informed about it in the process of adaptation to climate change.
Implementation steps		Procurement of necessary materials (seeds, amateur gardening tools, etc.)
		1 Choosing and assigning personnel specialized in the matter
		2 Preparing the training documents in communication with other municipalities, public training institutions and CSOs providing this type of training courses
		3 Identifying the citizens who will attend training courses (applications can be received on social media and municipality web site under the categories of balcony, terrace and garden courses)
		4 Providing face to face (in municipality's cultural centers, information houses, etc.) or online theoretical training
		5 Identifying appropriate areas for practical training, conducting necessary arrangements, preparing plant beds and vases, preparation of the materials to be provided to attending citizens
		6 Providing practical training to those who completed theoretical training
Type of action		Implementation, Awareness-raising
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	Culture and Social Affairs Directorate, Private Secretariat Directorate, Press and Public Relations Directorate, CSOs, Public Education Directorate
	Financing options	Municipality budget
	Time frame	Within 2023
Effect measurement		<ul style="list-style-type: none"> <li>• Number of attending citizens</li> <li>• Number of courses provided</li> </ul>
Expected benefits		Improving the communication between the citizens and the local government
		Informing the citizens about climate change
		Providing free of charge training to interested citizens,
		Improving the neighbor relations by bringing citizens with common interests together

## Action 10

### Organizing “most beautiful balcony/garden” competitions to promote citizens’ love of nature

Description		A 2-stage competition in balcony and garden categories will be organized to evoke a love of nature in people living in gray cities overwhelmed by concrete, highlight and generalize the value people place on their living spaces, and raise awareness in citizens about landscaping.
Reasoning		Making the importance citizens attach to their living spaces visible, strengthening the relations between citizens and local government, contributing to the city’s aesthetic value.
Implementation steps		1 Forming a competition assessment team
		2 Information exchange and meetings by this team with other local governments organizing similar competitions
		3 Identifying the assessment criteria for the competition (assessment criteria can be based on global principles such as landscaping design criteria, sustainable landscaping principles, etc.) and announcing them transparently
		4 Identifying the awards for winners of the competition and making necessary purchases
		5 Announcing the invitation for the competition and taking applications (applications may be received on the municipality website)
		Identifying appropriate areas for practical training, conducting necessary arrangements, preparing plant beds and vases, preparation of the materials to be provided to attending citizens
		Providing practical training to those who completed theoretical training
Type of action		Implementation, Awareness-raising
Implementation plan	Owner of action	Parks and Gardens Directorate
	Stakeholders	Culture and Social Affairs Directorate, Private Secretariat Directorate, Press and Public Relations Directorate, CSOs, Public Education Directorate
	Financing options	Municipality budget
	Time frame	Within 2023
Effect measurement		<ul style="list-style-type: none"> <li>• Number of attending citizens</li> <li>• Social media interactions</li> </ul>
Expected benefits		Strengthening the relations between citizens and local government, contributing to city’s aesthetic value.

## Action 11

### Working with Environment Volunteers

Description		Environment Volunteers platform launched by the Avcılar Municipality in 2021 aims to establish collaboration between the municipality and the environmentally conscious citizens, helping them create joint projects in coordination with each other.
Reasoning		Raising a consciousness of environment in citizens, Generalizing the mentality of joint project development through collaboration between municipality and environmentally conscious citizens, Incorporating volunteer citizens' labor into major events.
Implementation steps		Implementation steps will be identified separately on the basis of projects to be carried out.
Type of action		Project, Implementation
Implementation plan	Owner of action	Climate Change and Zero Waste Directorate, Parks and Gardens Directorate
	Stakeholders	Avcılar Environment Volunteers, Culture and Social Affairs Directorate, Private Secretariat Directorate, Press and Public Relations Directorate
	Financing options	Municipality budget, national and international grants
	Time frame	Within 2023
Effect measurement		Number of instances of collaboration with volunteers (number/year)
Expected benefits		Creating a new and efficient channel of communication between citizens and municipality
		Raising a consciousness of nature and environment in citizens



## Action 12

### Banning single use plastics in municipal service buildings and operations

Description		Single use plastics are plastic utensils such as plates, forks, knives, cups or straws intended for single use. Considering that the recycling rate of plastic wastes is at 9%, it is understood that the burden they imposed on the planet is significant.
Reasoning		As part of the the Avcılar Municipality's climate change adaptation operations, the municipality will encourage its personnel to use their personal utensils (cups, glasses, straws, etc.) and the guests visiting municipal service buildings and restaurants to use utensils made of sustainable materials instead of single use plastics with the purpose of making a crucial attempt at reducing the stress of plastic wastes on the planet.
Implementation steps		1 Launching an awareness raising campaign about the damage inflicted on the human body and the planet by single use plastics, through posters post on visible places in municipal buildings
		2 Restricting the use of plastic products in municipal buildings
		3 Distributing sustainable multi use products such as cups and bamboo straws to municipal personnel for one time only
		4 Using glass cups when serving to customers in municipal restaurants, explaining the reasons why plastic straws, plates, forks, etc. are not used
Type of action		Project, Implementation and Awareness Raising
Implementation plan	Owner of action	Climate Change and Zero Waste Directorate
	Stakeholders	Parks and Gardens Directorate, Culture and Social Affairs Directorate, Private Secretariat Directorate, Press and Public Relations Directorate, CSOs
	Financing options	Municipality budget, national and international grants
	Time frame	Within 2023
Effect measurement		Amount of single use plastic wastes generated in the municipal service buildings and restaurants (kg/year)
Expected benefits		Reducing Avcılar Municipality's carbon footprint
		Setting examples for citizens



**Appendix-2**  
**Plant Species**  
**Compatible with**  
**İstanbul's Natural**  
**Environment**

Family	Latin Name	English Name	Type
Aceraceae	<i>Acer campestre</i>	Field maple	Shrub-Tree
	<i>Acer campestre</i> alttür <i>campestre</i>	Field maple	Shrub-Short Tree
	<i>Acer negundo</i>	Boxelder maple	Tree
	<i>Acer tataricum</i>	Tatar maple	Shrub-Short Tree
	<i>Acer trautvetteri</i>	Mountain maple	Tree
Anacardiaceae	<i>Cotinus coggygria</i>	European smoketree	Shrub
	<i>Pistacia atlantica</i>	Atlantic pistachio	Tree
	<i>Pistacia lentiscus</i>	Mastic tree	Shrub
	<i>Pistacia terebinthus</i>	Terebinth	Shrub
	<i>Rhus coriaria</i>	Sicilian sumach	Shrub
Amaryllidaceae	<i>Agave americana</i>	American aloe	Cactus
	<i>Galanthus plicatus</i>	Pleated snowdrop	Perennial herbaceous
Apocynaceae	<i>Vinca major</i>	Greater periwinkle	Perennial herbaceous
	<i>Vinca minor</i>	Common periwinkle	Perennial herbaceous
Aquifoliaceae	<i>Ilex colchia</i>	Black Sea holly	Shrub
Araliaceae	<i>Hedera helix</i>	English ivy	Trailing
Aristolochiaceae	<i>Aristolochia pallida</i>	Dutchman's pipe	Trailing
Asclepiadaceae	<i>Cynanchum acutum</i> subsp. <i>acutum</i>	Scammony	Trailing
	<i>Periploca graeca</i> var. <i>graeca</i>	Silkvine	Trailing
Asteraceae	<i>Bellis perennis</i>	Common daisy	Perennial herbaceous
	<i>Calendula suffruticosa</i>	Marigold	Perennial herbaceous
	<i>Senecio castagneanus</i>	Groundsel	Perennial herbaceous
Betulaceae	<i>Alnus glutinosa</i>	Black alder	Tree
	<i>Corylus avellana</i>	Common hazel	Shrub
Berberidaceae	<i>Berberis vulgaris</i>	Barberry	Shrub
Cannabaceae	<i>Humulus lupulus</i>	Şerbetçi Otu	Trailing
Capparaceae	<i>Capparis spinosa</i> var. <i>spinosa</i>	Caper bush	Trailing
Caprifoliaceae	<i>Lonicera caprifolium</i>	Italian honeysuckle	Trailing
	<i>Lonicera etrusca</i>	Etruscan honeysuckle	Trailing
	<i>Lonicera etrusca</i> var. <i>etrusca</i>	Honeysuckle	Trailing
	<i>Sambucus nigra</i>	Elder	Shrub
Celastraceae	<i>Euonymus europaeus</i>	European spindle	Tall Shrub-Tree

Family	Latin Name	English Name	Type
Chenopodiaceae	<i>Atriplex halimus</i>	Mediterranean saltbush	Shrub
Cistaceae	<i>Cistus creticus</i>	Pink rock-rose	Trailing
Convolvulaceae	<i>Calystegia sepium</i>	Hedge bindweed	Trailing
Cornaceae	<i>Carpinus betulus</i>	European hornbeam	Tree
	<i>Carpinus orientalis</i>	Oriental hornbeam	Tree
	<i>Corylus colurna</i>	Turkish hazelnut	Tree
	<i>Corylus avellana</i> var. <i>avellana</i>	Hazelnut	Shrub
Cupressaceae	<i>Cupressus sempervirens</i>	Mediterranean cypress	Tree
	<i>Juniperus oxycedrus</i>	Cade juniper	Shrub
	<i>Juniperus oxycedrus</i> subs. <i>oxycedrus</i>	Cade juniper	Shrub
Elaeagnaceae	<i>Elaeagnus angustifolia</i>	Silverberry	Shrub-Tree
Ericaceae	<i>Arbutus unedo</i>	Strawberry tree	Shrub
	<i>Calluna vulgaris</i>	Heather	Shrub
	<i>Erica arborea</i>	Tree heather	Shrub
	<i>Erica manipuliflora</i>	Heather	Shrub
Fabaceae	<i>Acacia dealbata</i>	Silver wattle	Shrub-Tree
	<i>Calicotome villosa</i>	Spiny broom	Shrub
	<i>Ceratonia siliqua</i>	Carob	Shrub-Tree
	<i>Cercis siliquastrum</i>	Judas tree	Shrub-Tree
	<i>Cercis siliquastrum</i> subs. <i>siliquastrum</i>	Judas tree	Shrub-Tree
	<i>Chamaecytisus albus</i>	Spanish broom	Shrub
	<i>Chamaecytisus austriacus</i>	Austrian broom	Shrub
	<i>Chamaecytisus hirsutus</i>	Clustered broom	Shrub
	<i>Chamaecytisus pygmaeus</i>	Cüce Keçitirfilı	Short Shrub
	<i>Genista carinalis</i>	Broom	Shrub
	<i>Genista lydia</i>	Boyacı Katır Tırnağı	Shrub
	<i>Genista tinctoria</i>	Boyacı Katır Tırnağı	Shrub
	<i>Gleditsia triacanthos</i>	Honey locust	Tree
	<i>Lupinus albus</i> subs. <i>albus</i>	White lupin	Annual herbaceous
	<i>Sophora jaubertii</i>		Perennial herbaceous
<i>Spartium junceum</i>	Rush broom	Shrub	
Fagaceae	<i>Castanea sativa</i>	Sweet chestnut	Tree
	<i>Fagus orientalis</i>	Oriental beech	Tree
	<i>Quercus cerris</i> var. <i>austriaca</i>	Austrian oak	Tree

Family	Latin Name	English Name	Type
Fagaceae	<i>Quercus cerris</i> var. <i>cerris</i>	Turkey oak	Tree
	<i>Quercus coccifera</i>	Kermes oak	Shrub
	<i>Quercus frainetto</i>	Hungarian oak	Tree
	<i>Quercus ilex</i>	Holly oak	Shrub
	<i>Quercus infectoria</i>	Aleppo oak	Shrub
	<i>Quercus petraea</i>	Sessile oak	Tree
	<i>Quercus robur</i>	English oak	Tree- Short Tree
Grossulariaceae	<i>Ribes rubrum</i>	Red currant	Shrub
	<i>Ribes uva-crispa</i>	Gooseberry	Shrub
Hydrangeaceae	<i>Philadelphus coronarius</i>	Sweet mock orange	Shrub
Juglandaceae	<i>Juglans regia</i>	Walnut	Tree
Lamiaceae	<i>Ajuga reptans</i>	Bugle	Perennial herbaceous
	<i>Lavandula angustifolia</i>	English lavender	Shrub
	<i>Lavandula stoechas</i>	French lavender	Shrub
	<i>Salvia sclarea</i>	Clary	Shrub
	<i>Salvia tomentosa</i>	Balsamic sage	Shrub
	<i>Salvia verbenaca</i>	Wild clary	Shrub
Lauraceae	<i>Laurus nobilis</i>	Bay laurel	Shrub-Tree
Magnoliaceae	<i>Magnolia grandiflora</i>	Southern magnolia	Shrub-Tree
Moraceae	<i>Morus alba</i>	White mulberry	Tree
Myrtaceae	<i>Eucalyptus camaldulensis</i>	River red gum	Tree
	<i>Myrtus communis</i>	Myrtle	Shrub
	<i>Myrtus communis</i> subsp. <i>communis</i>	Myrtle	Shrub
Oleaceae	<i>Fraxinus angustifolia</i>	Narrow-leaved ash	Tree
	<i>Fraxinus excelsior</i>	European ash	Tree
	<i>Fraxinus ornus</i>	Manna ash	Tree
	<i>Jasminum fruticans</i>	Common yellow jasmine	Shrub
	<i>Ligustrum vulgare</i>	Wild privet	Shrub
	<i>Phillyrea latifolia</i>	Mock privet	Shrub
Osmundaceae	<i>Osmunda regalis</i>	Royal fern	Herbaceous
Papaveraceae	<i>Papaver rhoeas</i>	Common poppy	Herbaceous
Pinaceae	<i>Pinus brutia</i>	Turkish pine	Tree

Family	Latin Name	English Name	Type
Platanaceae	<i>Platanus orientalis</i>	Oriental plane	Tree
Primulaceae	<i>Cyclamen hederifolium</i>	Ivy-leaved cyclamen	Perennial herbaceous
	<i>Primula vulgaris</i>	Primrose	Perennial herbaceous
Ranunculaceae	<i>Clematis cirrhosa</i>	Evergreen clematis	Trailing
	<i>Clematis flammula</i>	Fragrant virgin's bower	Trailing
	<i>Clematis vitalba</i>	Traveller's joy	Trailing
	<i>Clematis viticella</i>	Purple clematis	Trailing
Rhamnaceae	<i>Frangula alnus</i>	Alder buckthorn	Shrub
	<i>Rhamnus alaternus</i>	Italian buckthorn	Shrub
Rosaceae	<i>Amelanchier rotundifolia</i>	Chuckley pear	Shrub
	<i>Cerasus avium</i>	Cherry	Tree- Short Tree
	<i>Cerasus mahaleb</i>	Mahaleb	Shrub
	<i>Crataegus monogyna</i>	Hawthorn	Tree- Short Tree
	<i>Crataegus monogyna</i> subsp. <i>azarella</i>	Hawthorn	Tree- Short Tree
	<i>Crataegus pentagyna</i>	Hawthorn	Tree- Short Tree
	<i>Cydonia oblonga</i>	Quince	Shrub-Short Tree
	<i>Fragaria vesca</i>	Wild strawberry	Perennial herbaceous
	<i>Laurocerasus officinalis</i>	Cherry laurel	Shrub
	<i>Malus sylvestris</i>	European crab apple	Tree
	<i>Mespilus germanica</i>	Medlar	Shrub
	<i>Prunus divaricata</i>	Cherry plum	Shrub
	<i>Pyracantha coccinea</i>	Scarlet firethorn	Shrub
	<i>Pyrus amygdaliformis</i>	Almond-leaved pear	Shrub
	<i>Pyrus communis</i> subsp. <i>communis</i>	Pear	Tree
	<i>Rosa canina</i>	Dog rose	Shrub
	<i>Rosa gallica</i>	French rose	Shrub
	<i>Rosa sempervirens</i>	Evergreen rose	Trailing
	<i>Rubus canescens</i> var. <i>canescens</i>	Blackberry	Trailing
	<i>Rubus hirtus</i>	Blackberry	Trailing
<i>Rubus idaeus</i>	Raspberry	Shrub	
<i>Sarcopoterium spinosum</i>	Thorny burnet	Shrub	
<i>Sorbus torminalis</i>	Checker tree	Tree	
<i>Sorbus umbellata</i>	Whitebeam	Shrub	

Family	Latin Name	English Name	Type
Rubiaceae	Rubia peregrina	Wild madder	Trailing
Santalaceae	Osyris alba	Osyris	Shrub
Salicaceae	Populus alba	White poplar	Tree
	Populus tremula	European aspen	Tree
	Salix alba	White willow	Tree
	Salix caprea	Goat willow	Tree-Short Tree
	Salix fragilis ceresuscupress	Crack willow	Tree
Smilacaceae	Smilax excelsa	Larger smilax	Shrub
Taxaceae	Taxus baccata	English yew	Tree- Small Tree
Tiliaceae	Tilia cordata	Small-leaved linden	Tree
	Tilia argentea	Silver linden	Tree
Ulmaceae	Ulmus glabra	Wych elm	Tree
	Celtis australis	Hackberry	Tree
	Ulmus glabra	Wych elm	Tree
	Ulmus minor	Field elm	Tree
	Ulmus laevis	Fluttering elm	Tree
Vitaceae	Vitis sylvestris	Wild grape	Trailing-Shrub

Note: Those coloured in green are xeriscaping plants that can be used in İstanbul's conditions.

Appendix-2 was created through a compilation of the references listed below.

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