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Raising Ecological Awareness Through Participation of Children

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Civil Society Support Programme III

ENVIRONMENTAL PROBLEMS AND CLIMATE CHANGE STATE OF AFFAIRS

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REVIEW ON ENVIRONMENTAL PROBLEMS AND CLIMATE CHANGE IN ADANA

INTRODUCTION

Climate change due to global warming is one of the most important environmental problems that affect, change and transform the life of every living thing we face on a global scale. The continuous increase in the use of fossil fuels due to industrialization and urbanization, from the beginning of the industrial revolution to the present, increases the temperature of the world and this situation causes climate change. Increasing greenhouse gas accumulation in the atmosphere due to the use of fossil fuels is shown as the main cause of climate change. According to the United Nations Framework Convention on Climate Change, climate change is defined as *“changes in climate that occur as a result of direct or indirect deterioration of the composition of the global atmosphere as a result of human activities, as well as natural climate change observed within comparable time periods”* (United Nations, 1992). What is important at this point is that, as stated in the IPCC (Intergovernmental Panel on Climate Change) Reports, the increase in temperatures causing global climate change is human-induced, and therefore can still be prevented and slowed down.

According to the IPCC 5th Assessment Report (IPCC, 2013), most of the observed changes in climate since the 1950s are unprecedented in the last millennium. Global average surface temperature data showed an increase of about 1°C over the period 1901-2010. During this period, almost the entire earth's surface warmed up. In the Northern Hemisphere, the 1983-2012 period was probably the warmest 30 years of the last 800 years. During this period, the atmosphere and oceans warmed, the amount of snow and ice decreased, the average sea level rose, and the accumulation of greenhouse gases in the atmosphere increased. The accumulation of carbon dioxide, methane and nitrogen dioxide gases in the atmosphere has reached a higher level than ever before in the last 800,000 years. It has been stated with the accumulation of carbon dioxide gas, which is the main responsible for the greenhouse gases accumulating in the atmosphere, has increased by 40% compared to pre-industrial times, and this is due to fossil fuel use, deforestation and net land use changes. The increase in sea and ocean levels with the increase in temperature, the melting of glaciers, the increase in the frequency of extreme weather events such as drought, flood, and hurricane lead to devastating consequences for all living things and people. In addition, climate change causes malnutrition, hunger, diseases and deaths, and reproduces and increases socio-economic inequalities.

In order to avoid all these negative effects of climate change, it is vital to limit the temperature increase to 1.5°C. According to the IPCC 1.5°C Global Warming Special Report

(IPCC, 2018); It is stated that if greenhouse gas emissions are not limited, global warming will exceed the 1.5°C limit between 2030 and 2052. In order not to exceed this limit, it is necessary to reduce emissions by 45 percent in 2030 compared to 2010 and to reach net zero emissions by 2050. Since more than half of the world's population lives in urban areas and activities that cause global warming are mostly carried out in cities, cities come to the fore in the measures to be taken to reduce greenhouse gas emissions. For this reason, as stated in the report, comprehensive transformations are required in the agriculture, energy, industry, construction, transportation sectors and in connection with these, in cities.

In line with the relationship between cities and climate change, this research aims to analyze / determine the current situation on environmental problems and climate change in Adana. The research focuses on the existing problems, measures, policies implemented and the attitudes of the local people towards these issues. In this context meetings were held with the Adana Provincial Director of National Education, Adana Metropolitan Municipality Environmental Protection and Control Department Head and environmental engineers working within the department, Seyhan Municipality Deputy Mayor and Environmental Protection Control Manager, Chamber of Agricultural Engineers Adana Branch Representative, TEMA Foundation Adana Representative and President of the Recyclers Chamber of Commerce. In this context Up-to-date data on subjects such as environmental problems, air, water, soil, noise, pollution, temperatures and precipitation, waste management, agricultural methods related to urbanization in Adana have been compiled. Environment and climate change education status in primary and secondary education institutions was examined. In the research, the relevant academic literature and media news were scanned. In the study, statistical data, national and regional reports of relevant ministries, strategy documents and performance programs of municipalities, activities and reports of relevant non-governmental organizations were used.

CITIES AND CLIMATE CHANGE

Today, cities play an important role in environmental problems and related climate change. While the global urban population was 746 million in 1950, it reached 3.96 billion in 2015. As of 2018, the urban population constitutes 54% of the world population. According to calculations, this rate is expected to increase to 68% in 2050 (United Nations, 2018). There is a reciprocal relationship between cities and climate change. On the one hand, most of the economic activities that cause climate change and therefore carbon emissions originate from urban areas where more than half of the world's population lives. On the other hand; Cities are the areas that are directly and most affected by negative consequences such as floods due to sea level rise, water pollution, food insecurity, extreme weather events, increasing air

temperatures and related livelihood problems, illness, death, and forced migration. Therefore, it is possible to say that cities are both perpetrators and victims of climate change (Uncu, 2019). In addition, the problems caused by climate change in cities increase social and economic inequalities by reproducing them. It causes problems in the access of disadvantaged groups such as the poor, women and children to basic rights such as access to food, education, health, security and shelter. The measures to be taken and the policies to be implemented in the cities are very important in the fight against climate change. In addition to the policies implemented by governments at the national level, there is a need for mechanisms that will pave the way for local people to be aware of the problems they live in and to involve them in the decision-making processes. Local governments, as the closest administrative unit to the public, "establish partnerships, determine principles and make action plans in order to reduce the effects of climate change and end it in the long term" (Yereliz, 2020). One of the activities held for this purpose is the Cities for Climate Workshop and Climate Action Plan Training held in 2019. 26 municipalities participating in the training issued a joint declaration at the end of the workshop. With this declaration;

- They will prepare a Climate Change Action Plan to reduce carbon emissions and implement adaptation policies against the crisis,
- They will give priority to sustainable transportation, renewable energy and ecological agriculture practices in cities,
- They will support local, national and international institutions, entrepreneurs, cooperatives and non-governmental organizations fighting against climate change and be involved in cooperation,
- They will prioritize the prevention of the climate crisis and its effects in the development planning processes,
- They have committed to fulfill their responsibilities for fair, equitable and livable cities in order to keep global warming at 1.5°C until 2030.

Adana Metropolitan Municipality, along with Ankara, İzmir, Aydın, Bursa, Erzurum and İzmir, it is one of the five metropolitan municipalities that signed this declaration. Adana Metropolitan Mayor Zeydan Karalar, who read the joint declaration, stated in his various speeches that they stand behind these commitments and will do their part. However, the Local Climate Change Action Plan has not been prepared by Adana Metropolitan Municipality yet. In the meeting held with Adana Metropolitan Municipality Environmental Protection and Control Department Head, it was stated that the preparations for the climate action plan continue and will be completed in June 2022. However, Adana is one of the cities that do not have a greenhouse gas inventory. Climate change, action plan and greenhouse gas reduction targets

are not included in the 2020-2024 Strategic Plan of the Metropolitan Municipality, either (<https://yesilekonomi.com/yerel-iklim-degisikligi-eylem-plani-hazirlayan-buyuksehir-belediyesi-sayisi-9a-ultim/>). There is a petition demanding that the climate topic be included in the strategic plan and performance program of Adana Metropolitan Municipality, organized by 350 Turkey initiative, and that the municipality should prepare the Local Climate Action Plan through the principle of participation (<https://act.350.org/signup/iik-adana/>).

“Supporting Joint Efforts in the Field of Climate Change Project” was carried out by the Ministry of Environment and Urbanization between 2017-2020. With this project, it is aimed to gradually adapt to the EU climate policy and legislation by increasing public awareness and stakeholder capacity to strengthen joint efforts to reduce the effects of climate change in Turkey. One of the Climate Change Trainings held in 20 provinces within the scope of the project was held in Adana. Another pillar of the project other than education is the grant program. One of the projects supported within the scope of “Capacity Building in the Field of Climate Change in Turkey Grant Programme” belongs to the Municipality of Yüreğir. Strengthening the capacity of Yüreğir Municipality and its stakeholders against climate change with the project named "Yüreğir Is Getting Ready for Climate Change", preparing the climate change action plan of Yüreğir district, establishing solar energy demonstration at Yüreğir Municipality Disabled Coordination Center, increasing awareness of the public about the environment and the effects of climate change thanks to the demonstration center. It is aimed to inform local governments and experts in Adana with the training of trainers (<http://www.iklimin.org/wp-content/uploads/2018/01/%C4%B0klim-Eylem-Plan%C4%B1.pdf>). Thus, Yüreğir Municipality has become the first and only municipality in Adana with a climate change action plan.

It is very important that other district municipalities and Adana Metropolitan Municipality to prepare a climate action plan with Yüreğir Municipality, to develop policies in these areas by putting environmental problems and combating climate change on their agenda, and to implement the necessary adaptation and prevention mechanisms. Because Adana is one of the cities that are predicted to be most affected by climate change due to both environmental problems being intensely felt and being in the Mediterranean Region, where the Seyhan Basin is located. Adana is ranked 61st in the overall ranking of the Life Index of Provinces, which includes 41 indicators in 11 areas consisting of housing, working life, income and wealth, health, education, environment, security, civic participation, access to infrastructure services, social life and life satisfaction of Turkstat. takes. According to the indicators in the environment title, the average of PM10 station values is 44.8 percent, the forest area per square kilometer is 42.1 percent, the rate of the population that receives waste service is 97.9 percent, the rate

of those experiencing noise problems from the streets is 25.5 percent, and the cleaning services of municipalities. satisfaction rate was calculated as 59.6 percent. The city is ranked 39th in the ranking made in this area (TÜİK, 2015).

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In studies on environmental problems of Adana, unplanned urbanization due to rapid population growth, air, noise, soil, water pollution and waste problems come to the fore (Doygun, 2007). It is seen that there are similar titles in the reports coming out of the events where Adana's urban problems are discussed, organized by the TMMOB Adana Provincial Coordination Board. In the reports prepared in 2009, 2015 and 2019, Adana's recurring environmental problems and suggestions for them are listed as follows:

- Adana is going through an unplanned, unlicensed, uncontrolled, distorted urbanization process. The problems caused by unplanned and unhealthy urbanization have not been solved for years.
- Due to population growth and unplanned urbanization due to immigration, illegal construction continues. In this case, parameters related to landslide areas, stream beds, groundwater feeding areas, underground richness and soil properties cannot be determined before settlement.

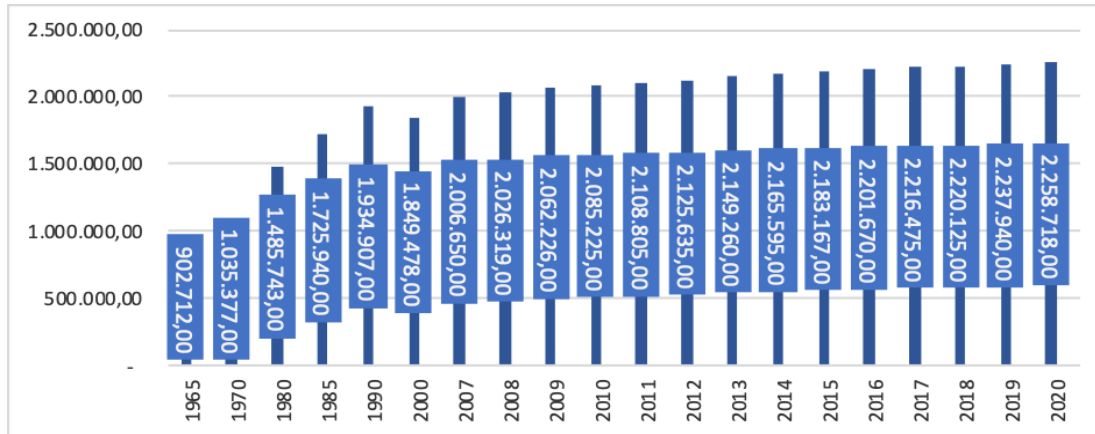
- The old stream beds, landslide areas and the right and left banks of the Seyhan River should be protected from construction.
- The unhealthy construction is made worse instead of improving it with new projects. Urban transformation projects that are not in the public interest are implemented.
- There is a lack of modern infrastructure.
- Poor quality and high-emission fuels used for stubble burning in summer and for heating in winter cause intense air pollution.
- Green areas, which have the features of providing clean air circulation and preventing air pollution in cities, are decreasing because of continuous intervention.
- Adana take placed near top in Turkey in terms of noise pollution. Noise reduction and preventive measures should be taken.
- The protection areas that need to be created in the Çatalan Basin, which provides drinking water to Adana, should be implemented immediately.
- In the medium term and in the future, scientific projects should be prepared by considering the effects of climate change, and the effects of the irrigation dams within the provincial borders of Kayseri and Adana.
- In all rivers connected to Seyhan, measures should be taken to prevent waste and leakages in irrigation and drinking water use.
- It is necessary to develop policies to prevent the destruction caused by thermal power plants, hydroelectric power plants and Akkuyu Nuclear Power Plant built in its vicinity and drinking water basins.
- Agricultural policies based on chemicals should be abandoned. Organic farming should be encouraged and regulated.
- There is a risk of pollution originating from the mines. Businesses in this area need to be subject to strict control.
- Agricultural lands are used out of purpose.
- There are problems regarding the amount of waste and disposal methods.

Population and Urbanization

In various studies, it is often stated that one of the most important environmental problems of Adana is unhealthy, unplanned urbanization due to rapid population growth. The population of Adana has increased rapidly since the 1950s with the effect of intense migration from rural to urban areas. The urban population has increased due to the development of irrigation techniques, the use of modern techniques in agriculture, and the effects of mechanization and industrialization due to agricultural activities. According to the Address Based Population Registration System for 2020, the population of Adana is 2,258,718. It is the 6th city with the most populous population after Istanbul, Ankara, Izmir, Bursa and Antalya. It houses 3% of

Turkey's population. As of 2020, the population density is 162 per km², which is above Turkey's average of 109. In the calculations made in other years, the population density in Adana is always above the Turkey average. It is seen that the economic activities of the population are concentrated in Seyhan, Yüreğir, Sarıçam and Çukurova, which are the central districts where economic relations are observed.

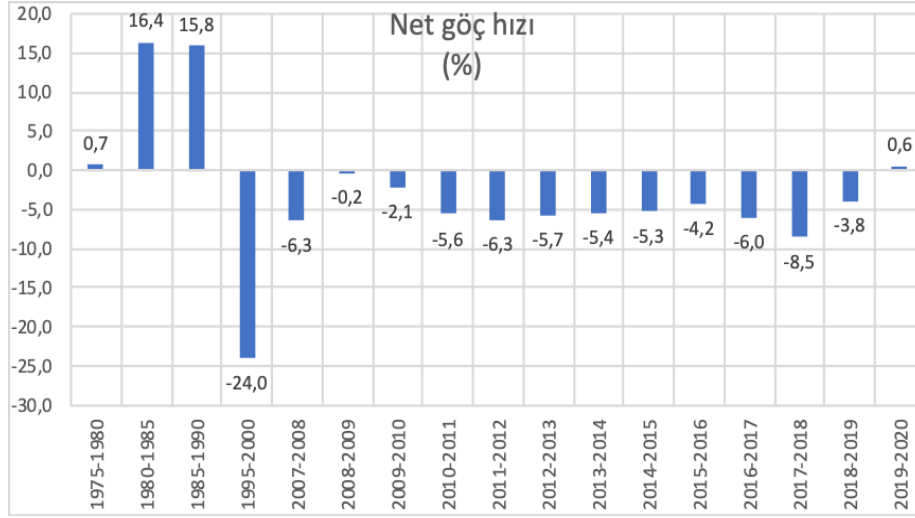
Table 1- Adana Population by Years



Source: TUIK General Population Census Results; Address Based Population Registration System (ADNKS) Results

According to 2020 data, the population growth rate in the region was calculated as 5.5 per thousand in Turkey and 9.2 per thousand in Adana. With this population growth rate, Adana has exceeded the national average for the first time since 2007. In general, the decrease in the population growth rate is directly related to the increasing amount of immigration given by the region. Çukurova Region is a region that has received intense immigration since the 1950s, with the development of sectors related to industrialization and agricultural production. This wave of migration continued with forced migrations from Eastern Anatolia and Southeastern Anatolia Regions in the 1990s. In 2000 and after, the rural population started to decline to a large extent. After 2008, Çukurova Region has become an emigrant region.

Table 2- Net Migration Rate in Adana Between 1980-2020



Source: TUIK, Migration Statistics

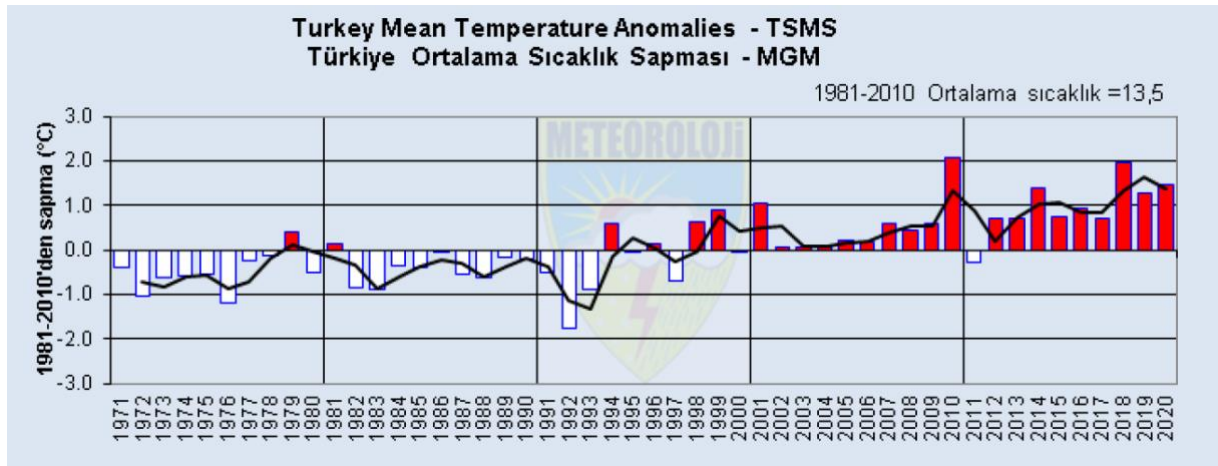
After 2008, the net immigration speed has continued to increase in minus direction, it has no longer meet the amount of migration that the region has received. Since 2007, the migration of the city to the first time was calculated as more than the migration given by 0.6. The intense migration of the region in the years has brought the intensification of the population in urban centers, with sufficient infrastructure lack of unhealthy, irregular urbanization, social and spatial integration problems due to the lack of adequate infrastructure. One of the most characteristic features of the region is intensive migration. Finally, Syrian asylum seekers were added to our country by escaping the civil war in Syria. Adana ranks 5th among the 10 provinces with the highest Syrian population. As of 2021, the official number of Syrian refugees in Adana is 254.026.

In addition to unhealthy and irregular urbanization, another result of intense population movements has been significant changes in the use of land in Adana. The reduction of forest and efficiency agricultural areas in Adana, with fast migration, agricultural activities and industrialization, has led to the destruction of the natural environment, environmental pollution and infrastructure problems (Sönmez, 2012). Changes to the use of fertile agricultural areas to settlement purposes and the use of forests due to the use of agricultural purposes are one of the most important environmental problems of Adana.

Air and Climate

According to the World Meteorological Organization's climate report of 2020, 2020 will be one of the three hottest years on record. According to the report, 2020 is expected to be 1.2°C warmer than the pre-industrial average (1850-1900) (World Meteorological Organization, 2020). It is predicted that the Mediterranean Basin, which includes Turkey, will be highly affected by climate change. According to the IPCC 4th Evaluation Report, it is stated that the general temperature increase in the Mediterranean Basin will increase by 1-2°C and this temperature increase will trigger extreme weather events, heat waves, forest fires, drought and related biodiversity loss. The Climate Change National Action Plan, published in 2011, also predicts that the annual average temperature in Turkey will increase by 2.5-4°C and that the country will have a hotter, drier and more uncertain climate in terms of precipitation in the near future. Turkey's average temperature in 2020 was 14.9°C. This value is 1.4°C above the average of 13.5°C between 1981-2010. With this result, 2020 has been the third warmest year since 1971.

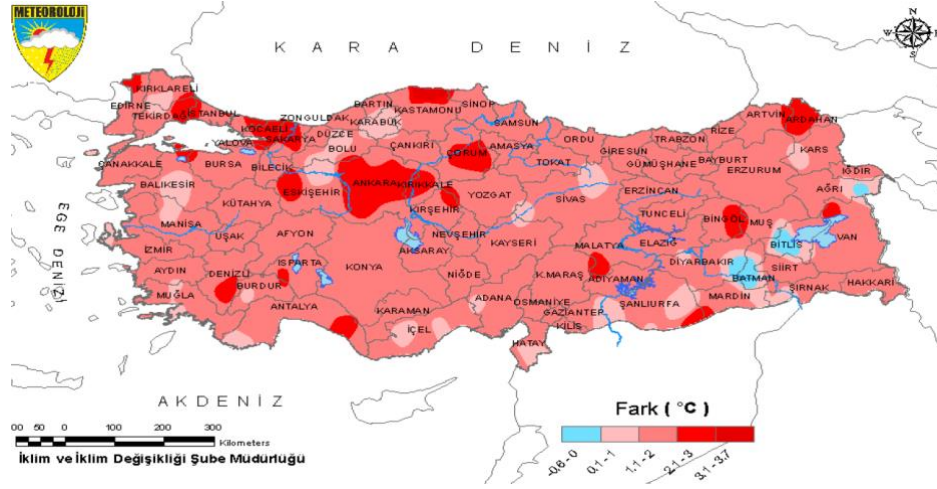
Table 3- Average Temperature Deviation in Turkey by Years



Source: General Directorate of Meteorology, 2020

According to the data of the General Directorate of Meteorology, positive anomalies, that is, an increase in average temperatures, have been experienced in the average temperatures of Turkey since 1998, except for 2011.

Map 1- Spatial Distribution of Temperature Differences in Turkey in 2020



Source: General Directorate of Meteorology, 2021

Adana's climate is generally typical of the Mediterranean climate. Winters are rainy and summers are dry. Continental climate is dominant in high and mountainous areas. According to the statistical data of the General Directorate of Meteorology for the provinces, between 1929 and 2020, the annual average temperature in Adana was 19.2 °C, the average highest temperature 25.4 °C and the average lowest temperature 13.9 °C. In 2020, temperatures in all provinces except Batman, Bitlis and Doğubayazıt are above the average. Due to climate change, it has been observed that the average temperatures have increased by 1-2°C in Adana, similar to the country in general. In 2020, Adana and its districts broke their own records by reaching the highest temperature values in the specified month.

Table 4- Maximum Temperatures Realized in Adana in 2020

DAY	MONTH	STATION	2020 MAX	LONG YEARS MAX
18	May	Kozan	42.0	41.5
18	May	Ceyhan	41.3	40.8
3	September	Adana	45.1	43.2
3	September	Kozan	47.1	43.4
3	September	Karaisali	44.4	41.8
3	September	Ceyhan	45.4	42.4
3	September	Yumurtalık	45.4	39.4
3	September	Karataş	42.4	39.5

Source: General Directorate of Meteorology, 2021

The annual average (1981-2010) areal precipitation in Turkey is 574 mm. In 2020, it received 500.1 mm of precipitation. In this direction, annual precipitation decreased by 12.9% compared to normal and 14.5% compared to last year's precipitation (585.2 mm).

Map 2- Comparison of 2020 Precipitation in Turkey



Source: General Directorate of Meteorology, Annual Precipitation Assessment, 2021.

According to the measurement period of 1929-2020, the average number of rainy days in Adana is 85.8, and the average monthly total precipitation is 668.1 mm. However, in 2020, it is seen that Adana receives precipitation below the normal, like the country in general. However, there was a decrease in the number of rainy days. The number of rainy days in Adana decreased below 75 days. Considering the amount of precipitation by regions, there was a decrease of 11% compared to normal and 31% compared to 2019 in the Mediterranean Region. According to the seasonal precipitation evaluations of 2020; throughout the country, the winter and spring precipitations were above the normal, and the winter and autumn precipitations were far below the normal ones. In Adana and Mersin, an increase of 100% was observed compared to the seasonal precipitation normal. In winter, Adana was the province with the highest rainfall with 641.5 mm.

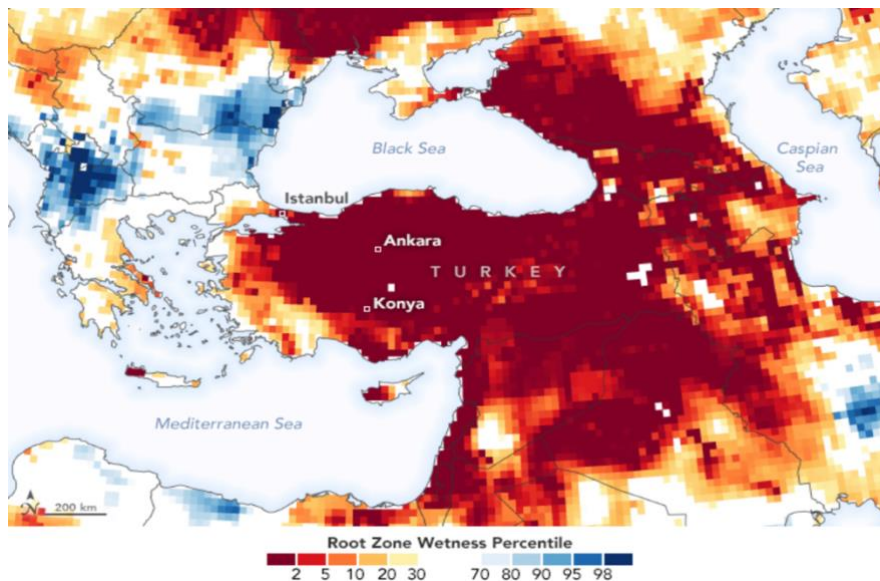
Map 3- Comparison of Watershed Areal Precipitation in Turkey in 2020



Source: MGM, Basin Precipitation Assessment, 2021.

In 2020, a decrease was observed in the amount of precipitation received by the basins throughout the country. While the amount of precipitation was normal in the Eastern Black Sea and Antalya Basins, it was observed that the precipitation decreased considerably, especially in the Western Black Sea, Kızılırmak, Yeşilirmak, Asi, Western Mediterranean, Büyük Menderes, Northern Aegean and Susurluk Basins. Seyhan and Ceyhan Basins also received less precipitation in 2020 compared to the normal ones.

Map 4- Turkey 2021 Drought Map

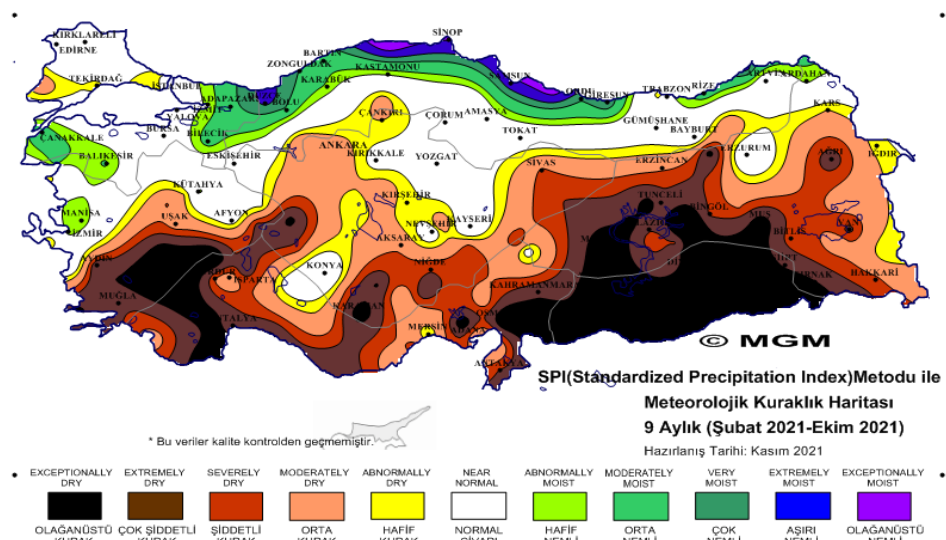


Source: Earth Observatory, NASA, 2021.

The danger of drought in Turkey is clearly seen on the map published by NASA at the beginning of 2021. According to the map, almost all of Turkey is in danger of drought. Factors such as decreased precipitation, high temperatures, and decrease in groundwater cause meteorological drought. The continuation of meteorological drought leads to a decrease in moisture in the soil and the inability of plants to find enough moisture to grow, thus leading to agricultural drought, and if this process lasts for a long time, it leads to hydrological drought. It is emphasized that this stage is the most dangerous type of drought, and that some products can no longer be produced, leading to a food crisis. Considering the scarcity of precipitation and groundwater, experts state that Turkey is in danger of hydrological drought (<https://tr.euronews.com/2021/01/19/nasa-dan-turkiye-ye-uyar-kuraklik-devam-ederse-mahsul-uretimi-tehlikeye-girebilir>).

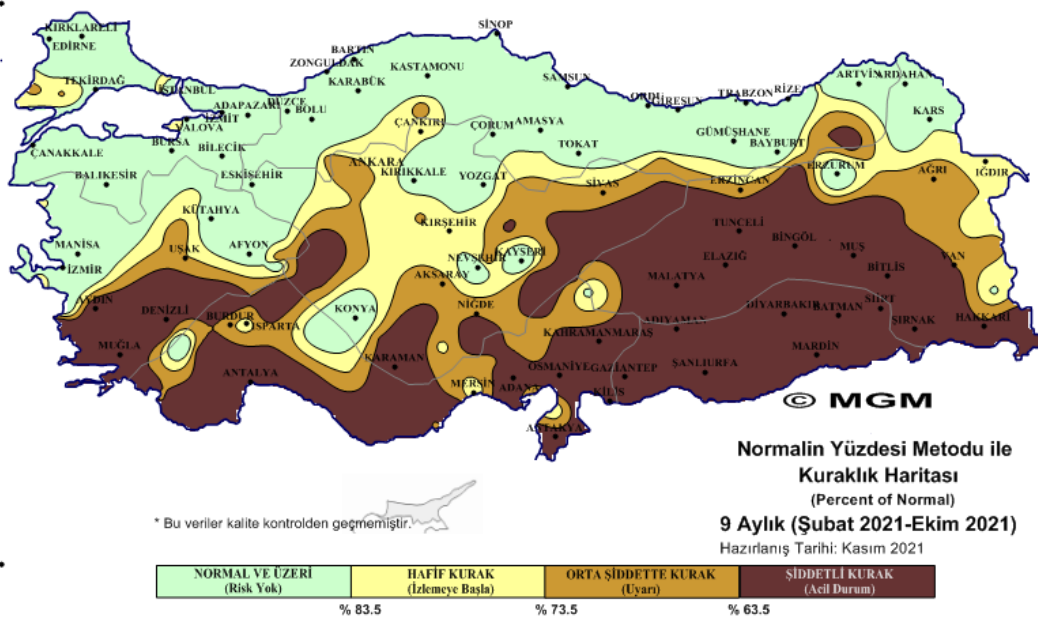
The maps published by the General Directorate of Meteorology also draw attention to the risk of drought and desertification due to the increasing temperatures and decreasing precipitation throughout Turkey. According to the 9-month drought analysis covering February 2021-October 2021 prepared by the General Directorate of Meteorology according to the standard precipitation index (SPI) method; It has been determined that most of the Southern Aegean, Eastern Anatolia and Southeastern Anatolia Regions are extraordinarily dry. In this evaluation, the situation of Adana was determined as extraordinarily dry. In the drought analysis made according to the percentage of normal method, it was seen that more than half of the country was severely dry. Except for Mersin, the Mediterranean Region has faced severe drought completely.

Map 5- 3-month Drought Map with Standard Precipitation Index (SPI) Method



Source: General Directorate of Meteorology, 2021.

Map 6- 3-Month Drought Map with Percent of Normal (PNI) Method

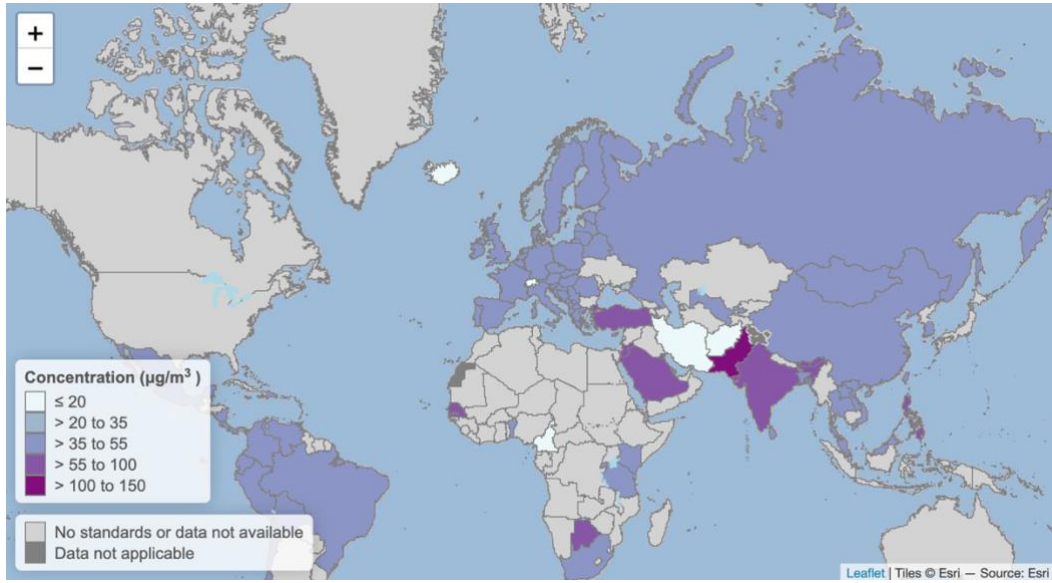


Source: General Directorate of Meteorology, 2021.

Air pollution

According to the World Health Organization, air pollution is defined as the presence of foreign substances such as dust, smoke, gas, and water vapor in the atmosphere in excess of the normal amount and density and to harm the health of living things. Particulate matter (PM), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), such as invisible substances and gases pollute the air. Exposure to air pollution causes illness and even death in children and adults. According to WHO, 4.2 million people die every year due to air pollution. Air pollution causes diseases related to heart diseases, circulatory and reproductive system, especially respiratory system diseases. Air pollution can also occur naturally as a result of volcanic activities, earthquakes, gases released from natural vegetation. Today, however, air pollution that causes diseases, deaths and climate change is caused by human activities (Right to Clean Air Platform, 2020). The main human activities that cause air pollution are fossil fuels used for energy production in industry and power plants, fossil fuels used for transportation, mining facilities and industrial facilities, burning coal and wood for heating purposes in homes, dust from construction activities and roads, burning of waste and stubble in agriculture, various industrial agricultural activities (Right to Clean Air Platform, 2020). Air pollution caused by human activities directly affects air quality and plays an important role in climate change. Therefore, global, national, and local policy documents are prepared on the measurement, monitoring and prevention of the effects of air pollution.

Map 7- National Air Quality PM₁₀



Source: World Health Organization, 2021.

In Turkey, the management of parameters related to the monitoring and evaluation of air quality is carried out within the framework of the Air Quality Assessment and Management Regulation. The National Air Quality Index, prepared in line with the national legislation, is calculated on the main pollutants that cause air pollution such as particulate matter (PM₁₀), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃). Particulate matter is defined as air pollutants consisting of a mixture of solid and liquid particles suspended in the air. It is stated that the most harmful components that cause air pollution among these substances are particulate matter with a diameter of 10 µm (micrometer) and a smaller diameter of 2.5 µm. It is stated that small-diameter particles PM_{2.5} are much more dangerous because they are about 1/30th of a hair, and thus can pass through the lungs and mix directly into the blood (Clean Air Right Platform, 2020). According to the map showing the air quality of countries over PM₁₀ values on a world scale prepared by WHO; Turkey is one of the countries where this value is the highest. Since there is no limit value determined for the PM_{2.5} parameter in Turkey, this value is not measured in most provinces. Adana is one of the provinces where this value is not measured.

According to the Clean Air Action Plan (2020-2024) prepared by Adana Provincial Directorate of Environment and Urbanization; According to the sulfur dioxide (SO₂) data of 213 stations in 81 provinces that measure hourly and daily air pollution, and the annual nitrogen oxide (NO_x) data of 173 stations in 49 provinces, Adana ranks first among the provinces that experience air pollution from SO₂ and NO_x. In addition, air pollution caused by particulate

matter (PM₁₀) is at the upper limit in Adana. There are 4 air quality measurement stations established for monitoring and evaluation of air quality in Adana. One of them is in the garden of the Regional Directorate of Meteorology in Yüreğir, one is in the garden of the Governor's Office in the city center, one is in the garden of the Metropolitan Municipality Wastewater Treatment Plant in Çatalan, and the other is in the garden of TAGEM in Doğankent, 10 kilometers south of the city in Yüreğir district. (Ministry of Environment and Urbanization Provincial Directorate, 2019). At these stations, air quality measurements are made over particulate matter (PM₁₀), carbon monoxide (CO), sulfur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃) parameters.

Table 2- World Health Organization, European Union and National Limit Values for PM₁₀

	Average duration	WHO Limit Values	EU Limit Values	National Limit Values
PM ₁₀	24 hours	50 µg/m ³	50 µg/m ³	50 µg/m ³
	Annual	20 µg/m ³	40 µg/m ³	40 µg/m ³

Source: Clean Air Platform, 2020.

In Turkey, the national limit values, which were 90 µg/m³ in 2015, 80 µg/m³ in 2016, 70 µg/m³ in 2017, and 60 µg/m³ in 2018. But in 2019 it is determined that 50 µg/m³ daily, 40 µg/m³ per year, in accordance with the European Union harmonization laws. Also, it has been decided not to exceed the daily limit value more than 35 times in a year (Ministry of Environment and Urbanization Provincial Directorate, 2019).

Table 3- Comparison of Daily Values and Annual Averages of the Stations Making PM₁₀ Measurement

Stations	No of Days Exceeding the WHO, EU and National Limit Values	No of Days without measurement	Data ingestion (%)	WHO Limit Exceeding Values (µg/m ³)	EU and National Limits Exceeding (µg/m ³)
Çatalan	5	38	89,59	19,89	19,89
Doğankent	4	12	96,71	13,95	13,95
Meteoroloji	236	37	89,86	82,59	82,59
Valilik	160	55	84,93	51,83	51,83

Source: Chamber of Environmental Engineers, 2019.

According to the measurements made in 2019, Adana was one of the provinces where the World Health Organization, European Union and national limit values were exceeded the most. The limit values were exceeded 236 times in Meteorology and 160 times in the Governor's Office, both of which are in the city centre. The use of natural gas is low, but the use of fossil fuels and heavy traffic has increased the number of overruns in the city centre. However, it is stated that one of the reasons for the high PM10 values is the stubble fires that occur in the city between June and September. Stubble fires both reduce the fertility of the soil and increase air pollution with the gases released. As a result of these, polluted air was inhaled 65 percent of the year in Adana in 2019. To determine the air quality status of Adana within the scope of the Clean Air Action Plan, emission inventories were created based on the measurement data of the air quality measurement station, domestic heating, traffic, and industry categories. To create an emission inventory in the field of industry, data from Adana Hacı Sabancı Organized Industrial Zone Directorate and industrial enterprises in the province were used. However, it was stated that the thermal power plant in Yumurtalık and Tufanbeyli were not included in the calculations due to their distance from the city.

Table 4- Industrial Emissions

NO _x emission (ton/year)	SO ₂ emission (ton/year)	PM ₁₀ emission (ton/year)	RESULTS
776,06	6,41	6,41	Results from sources using natural gas
1.141,50	12.086,44	772,67	Results of sources using local coal + imported coal
1.22,29	4.081,06	759,08	Results of sources using petroleum coke
145,63	37,07	145,63	Results of sources using wood / biomass
3.185,48	16.210,98	1.683,79	TOTAL

Source: Adana Ministry of Environment and Urbanization Provincial Directorate, 2019.

In the assessment made on industrial emissions; It is stated that until the 1970s, industrial facilities grew out of the residential areas in the east-west direction on the D-400 highway, but with the increase in population, the city grew by being surrounded by airport, bus station and industrial facilities. Therefore, emissions from industrial facilities and domestic heating in residential areas have caused air pollution to be felt more. However, it has been determined that the inability of industrial facilities to adapt themselves to new technologies, the use of high sulfur fuels in energy-generating combustion units, and the continued use of domestic coal together with natural gas due to the increase in prices increase air pollution (Adana Ministry of Environment and Urbanization Provincial Directorate, 2019).

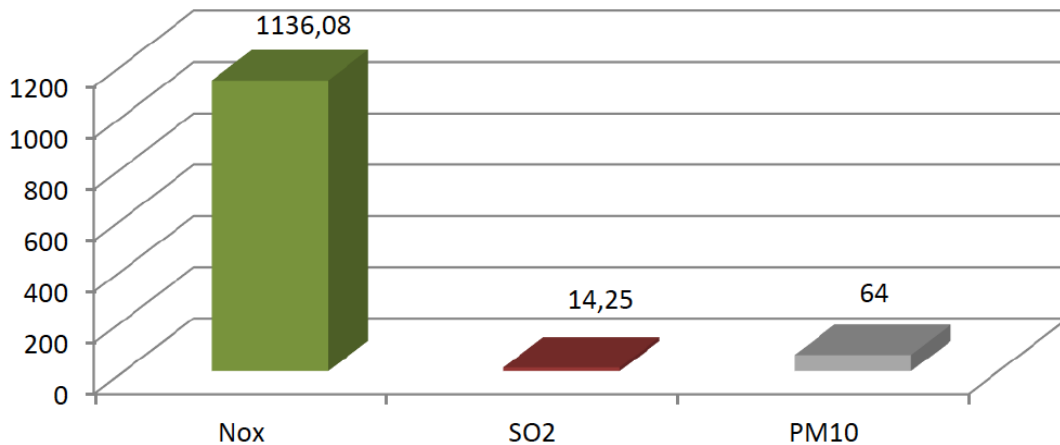
In addition to the imported coal-fired thermal power plants in Yumurtalık and Tufanbeyli, there is another thermal power plant under construction in Yumurtalık. Eastern Mediterranean Environment Associations Platform, Adana Chamber of Medicine, Adana Chamber of Agricultural Engineers, 350.org, European Climate Action Network, Ecosphere, Health and Environment Union, TEMA Foundation, WWF Turkey and Yuva Association are working to stop the construction of the thermal power plant (<https://www.wwf.org.tr/?10004/Adanaya-yapilan-komurlu-termik-santrale-istiraz-buyuygu>). In the report prepared by the Health and Environment Union for the Hunutlu Thermal Power Plant, which is still under construction, it was emphasized that the air quality in Adana is extremely unhealthy, the PM10 measurements exceeded the legal limits, and the most harmful pollutant, PM2.5, was not measured. It is emphasized that the pollution is not measured in the thermal power plants in Tufanbeyli and Yumurtalık and in the Bay of Iskenderun, and the emission amounts are not shared with the public. However, the report states that if air pollution emissions in Adana could be kept below the World Health Organization limit values, 1 out of every 5 deaths could be prevented (HEAL, 2020). Non-governmental organizations and professional chambers also carry out a signature campaign; (1) The thermal power plant project is in violation of the Iskenderun Bay Integrated Coastal Areas Plan and Mersin-Adana Environmental Plans, (2) the air quality data measured while preparing the EIA report is above the limits stipulated by the current legislation and therefore the EIA report has lost its validity, (3) It demands that the construction of the power plant be stopped as soon as possible, on the grounds that the cumulative pollution assessment in Iskenderun Bay was made superficial and incomplete, (4) the construction of the thermal power plant was started without knowing its effect on public health (https://www.change.org/p/deniz-kaplumba%C4%9Falar%C4%B1-yuvalama-kumsal%C4%B1nda-termik-santral-in%C5%9Faat%C4%B1na-yer-yok-kaplumba%C4%9Fak%C3%B6m%C3%BCrsevmez-emineerdogan-murat-kurum-csbgovtr-tcenerji-fatih-onmez?utm_source=share_petition&utm_medium=custom_url&recruited_by_id=ea9919e0-a3e2-11ea-88fd-df49a397c1ee).

Within the scope of the Clean Air Action Plan, data on solid fuels and natural gas use were evaluated to create an emission inventory for domestic heating. In addition to the local coal distributed by the social assistance foundation of the district governorship, various wastes such as plastic, rubber, wood, sawdust are used for heating in the neighborhoods of Seyhan and Yüreğir, where the population is dense and heavily migrated in Adana; It is stated that natural gas, air conditioning and electric stoves are used in neighbourhoods with new settlements and apartments. Imported coal is used in buildings with central heating, and both domestic and imported coal is used in buildings with individual heating. In 2019, domestic coal

use was 24,086 tons/year, and imported coal use was 76,360 tons/year. It is observed that coal consumption in domestic heating takes place primarily in Seyhan and Yüreğir, and then in Çukurova and Sarıçam. The use of natural gas is also concentrated in Çukurova. In 2019, 200,000 ster/year wood was used for heating purposes. The distribution by districts is as follows: Seyhan 100.000, Yüreğir 60.000, Sarıçam 30.000 and Çukurova 10.000 ster/year.

Fossil fuels, which are still used extensively throughout the province, increase the emission rates and cause pollution in the settlements. The most natural gas infrastructure in the province is in Çukurova. However, due to the use of solid waste such as coal and wood in Seyhan and Yüreğir, it has been determined that the emission rates due to heating are high in these districts. However, it has been stated that emissions from domestic heating in the winter months are higher than the number of emissions originating from industry in areas where settlements are concentrated. Actively used in traffic to create a traffic-related emission inventory; Parameters such as the age of the vehicles, operating speed of the engine, operating temperature, ambient temperature, fuel type and quality were evaluated. The continuous increase in the number of vehicles in Adana, the prevalence of individual vehicle use, but the insufficient use of public transportation vehicles, the inadequacy of the light rail system, the density of the service vehicles, the location of the airport and bus terminal in the city centre increase traffic-related emissions and pollute the air.

Graph 5- Emissions from Traffic



Source: Adana Ministry of Environment and Urbanization Provincial Directorate, 2019.

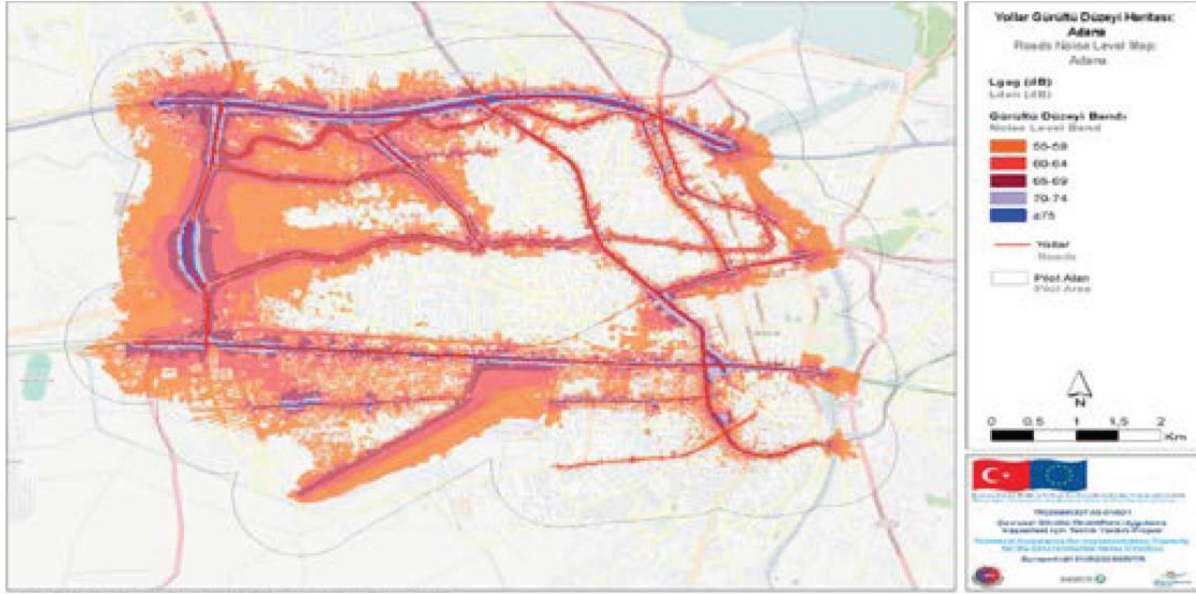
The reason for the high NOx emissions from traffic in the measurements made is explained by the high nitrogen content and usage amount in diesel fuel. According to the Action Plan, in order to reduce traffic-related air pollution, first of all, the transportation master plan

should be completed as soon as possible, and the traffic flow should be reorganized. In addition to this, it has been stated that the expansion of public transportation and the necessity of green public transportation investments are required.

Noise pollution

Legal and technical regulations on noise in Turkey are carried out by the Ministry of Environment and Urbanization. The first legal regulation regarding noise control was made with the Environmental Law dated 1983 and the first technical regulation was made with the Noise Control Regulation dated 1986. This regulation was harmonized with the EU and was named Environmental Noise Evaluation and Management Regulation in 2010. By regulation; It is aimed to take measures to reduce the effects of exposure to environmental noise and to prevent environmental vibrations that will occur in sensitive structures. This regulation includes the preparation of noise maps and action plans and the municipalities in the provinces; It has made it obligatory to prepare separate noise for the areas where noise sources such as highway, tram, subway, port, workshop, entertainment venues are located in the settlement areas where noise will be prepared within the municipality borders and the adjacent area. In this direction, noise maps should be prepared for residential areas with a population of over 100,000 and a population density of over 1000 per square kilometer throughout Turkey. Adana has become one of the 46 provinces whose noise map has been completed as of 2018 (Ministry of Environment and Urbanization, 2020). In the 2020-2024 Strategic Plan of Adana Metropolitan Municipality; It has been stated that the noise maps have been completed and cover an area of 204 km² in line with the aim of disseminating environmental and protection practices.

Map 8- Strategic Noise Map of Settlement Areas



Source: Adana Metropolitan Municipality, 2020.

In the report prepared by the Chamber of Environmental Engineers, noise pollution; It is stated that it is caused by the entertainment and workplaces within the settlements, the population growth and urbanization, and the highways and ring roads within the city center. According to the report, Adana is one of the provinces where noise pollution is the priority, along with Istanbul, Antalya and Eskişehir (2018). In the 2019 World Environment Day Turkey Report prepared by the Chamber of Environmental Engineers, it has been determined that noise pollution is the priority in Adana and there has been no change in this regard. In the assessment made by the Chairman of the Board of Adana Chamber of Environmental Engineers, noise pollution; It has been stated that the noise of the engines and horns of the vehicles, industrial facilities and construction activities increase the pollution, especially from the D-400 and Adana-Mersin highways in the city and in the city center during peak hours of vehicle traffic. It was emphasized that in order to prevent noise pollution, regular inspection and control of vehicles, ensuring traffic control and speed control, planting noise-reducing plants on the roadsides, increasing green areas, giving importance to sound insulation in buildings, and observing meteorological conditions in the construction of surrounding and secondary roads (<https://www.5ocakgazetesi.com/kenan-dogan-hava-kirliligi-adana-nin-en-onemli-cevre-sorunudur-17627>).

Water Resources, Water and Soil Pollution

According to the data of the General Directorate for State Hydraulic Works, the amount of water per capita in Turkey is 1652 m³ in 2000, 1544 m³ in 2009, and 1350 m³ in 2020, and it is among the countries experiencing water pressure. For this reason, it is aimed to use water economically and optimally, to take measures to prevent water losses, to carry out renovation projects to eliminate drainage problems affecting the quality of the soil, and to popularize modern closed system irrigation systems (<https://www.dsi.gov.tr/Sayfa/Detay/754>).

In the report prepared by the Chamber of Environmental Engineers; It has been emphasized that the loss of drinking and utility water throughout the country due to leakage in the transmission line leads to more water withdrawal, increasing costs, and this situation creates environmental and economic problems. For 2019, the amount of water lost in the transmission line is targeted to be 30%. However, the rate of water lost in drinking water networks in Adana remained above this target with 33% (Chamber of Environmental Engineers, 2019). According to TUIK Environmental Statistics, as of 2018, the rate of population with drinking water network in Adana is 100%, the rate of population provided with drinking water treatment service is 82%, the rate of population provided with waste water treatment service is 91.2%, and the rate of population provided with sewage service is calculated as 95%.

Table 5- Adana Province Streams

Name of the stream	Total length (km)	Length within provincial borders (km)	Flow rate (m ³ /sc)	Tributary stream	Aim of use
Seyhan	560	300	190	Seyhan	Energy production, drinking water, irrigation, flood prevention, aquaculture
Ceyhan	500	115	195	Ceyhan	Energy production, drinking water, irrigation, flood prevention, aquaculture
Çakır	162	112	12,8	Seyhan	Energy production, drinking water, irrigation
Eğlence	87	87	8,8	Seyhan	Energy production, drinking water, irrigation, aquaculture
Körkün	157	80	13,4	Seyhan	Energy production, irrigation, aquaculture
Üçürge	60	60	0,7	Seyhan	Irrigation, aquaculture

Source: General Directorate of State Hydraulic Works, 2020.

There are 6 rivers in Adana that are used for different purposes. Most of the drinking water needs in Adana are supplied from the Çatalan Dam located on the Seyhan River. In most of the Seyhan basin, drinking water is supplied from spring waters. Seyhan, Çukurova, Sarıçam, Yüreğir, Karaisalı and Karataş Municipalities provide drinking water service with the water coming from Çatalan Drinking Water Treatment Plant. As of 2021, Adana Metropolitan Municipality's project to bring water from Yedigöze Dam has been approved. With the project; It is planned to supply water to Kozan, İmamoğlu, Ceyhan, Yumurtalık districts and 163 villages (<https://www.politikyol.com/adananin-su-sorunu-tarihe-karisiyor/>). According to the statement made by Adana Water and Sewerage Administration; As of 2020, it is predicted that the occupancy rate of the Seyhan, Yedigöze and Çatalan dams will be around 80%, and the Çatalan basin will not have any problems in terms of feeding, so there will be enough water for the next 100 years (<https://www.dha.com.tr/yurt/adananin-100-year-water-problem-no/news-1751600>). Before the wastewater treatment plants were built in Adana, the wastewater of the Seyhan district was poured directly into the Mediterranean, and the wastewater of the Yüreğir district first spilled into the Seyhan river and then into the Mediterranean, causing pollution. It is stated that this pollution has been prevented to a great extent with the completion of the Waste Water Treatment (WWTP) Plant in Yuregir (<https://www.adana-aski.gov.tr/web/atiksu.aspx>). The West WWTP gives the water to the TD8 drainage channel and the East WWTP to the Seyhan River. However, DSI expressed an opinion that it would be appropriate for both facilities to give their water to the Seyhan River. There are 6 wastewater treatment plants within the provincial borders. These are: Seyhan (treating the wastewater of Seyhan and Çukurova districts), Yüreğir (treating the wastewater of Yüreğir and Sarıçam districts), Karaisalı, Ceyhan, Kozan and Yumurtalık. There are 2 OIZs in Adana, Adana Hacı Sabancı Organized Industrial Zone (OIZ) and Adana Kozan Organized Industrial Zone (OIZ). Among them, Adana Hacı Sabancı OIZ is located in the Seyhan Basin, but it draws water from the Ceyhan River and discharges its wastewater into the Ceyhan River (AÇŞİM, 2019). Kozan OIZ does not have a wastewater treatment plant and the wastewater from the enterprises is collected in septic tanks (CHKEP, 2016).

In the Seyhan Basin Pollution Prevention Action Plan, the main causes of pollution in the basin are; (1) Urban wastewater discharged to rivers after treatment and/or without treatment, (2) industrial wastewater, (3) leachate from sanitary landfills. As non-point sources of pollution; (1) organic matter, nitrogen and phosphorus discharges from septic tanks, (2) nitrogen, phosphorus, pesticide and sediment losses from agricultural and livestock activities, (3) nitrogen and phosphorus losses from forests by runoff and erosion, (4) irregular solids Leachate from landfills, (5) accumulation of nitrogenous and sulfuric compounds due to atmospheric transport, (6) emissions from industry, (7) road-borne pollutants (2016).

The intensive use of pesticides and chemical fertilizers, especially around the Çatalan Dam Lake and in the protection areas, reaches the surface and underground waters and pollutes the resources. For this reason, it is necessary to control the use of pesticides and fertilizers, to raise awareness of farmers on this issue, and to encourage organic agriculture in the protection areas of Çatalan and Yedigöze Dam. Since the wastes generated as a result of livestock activities cannot be disposed of in a systematic way, they lead to the pollution of surface waters and soil. Pollution is observed in underground and surface waters caused by mining activities in the region. Wild storage of solid wastes in settlements other than Seyhan and Yüreğir districts, and rural settlement solid wastes thrown into the irrigation and drainage network of the Lower Seyhan Plain create pollution throughout the basin. It is necessary to prevent the use of agricultural drainage channels as a sewer network where waste water is discharged by using it for other than its purpose. As a result of the Seyhan Basin water quality monitoring studies; According to the physical and inorganic chemical parameters, the water quality was mostly determined as Class III or Class IV. It has been determined that there are mostly materials such as aluminum, mercury, iron and nickel at the points where the pollution is intense (Ministry of Environment and Urbanization, 2016).

Unplanned urbanization with intensive population movements, wastes from industrial activities and mining activities, domestic and hazardous wastes stored in the wild, excessive use of pesticides and chemical fertilizers in agriculture, use of untreated polluted water in agricultural lands, misuse of agricultural lands by settlement, gases released into the air. Many factors cause soil pollution throughout the country. It is seen that primarily industrial waste discharge causes soil pollution in Adana. (Chamber of Environmental Engineers, 2019).

Map 9- Causes of Soil Pollution by Province



Source: Chamber of Environmental Engineers, 2019.

In the meeting with the representative of Adana Chamber of Agricultural Engineers, the factors causing soil pollution in the region; (1) Misuse of agricultural lands and construction, (2) excessive use of chemical fertilizers and pesticides, (3) increase in nitrate pollution in the soil, (4) leaving greenhouse materials such as plastic cover and disposable pipes in the field, (5) pesticide and fertilizer plastic wastes are left around the field and discharged into drainage and irrigation channels, (6) irrigation problems such as uncontrolled irrigation, salinity and pH balance, (7) erosion, (8) stubble burning.

Waste Pollution

Metropolitan municipality and district municipalities in accordance with Environment Law No. 2872, Waste Regulation, Metropolitan Municipality Law No. 5216 and Municipality Law No. 5393

They are obliged to dispose of domestic and domestic industrial solid wastes without harming the environment, to reduce environmental pollution, to categorize and collect reusable solid wastes and to take measures related to them. Solid waste facilities are established by municipalities in order to fulfill these obligations. It is stated that in this way, the wastes can be directly discharged to the landfills, that is, the wastes that can be recycled instead of the wild

storage method, and the wastes that cannot be recycled and/or used in a way can be disposed of by regular storage. For this purpose, Adana Integrated Solid Waste Disposal Facility started its activities in 2011 in the area known as Sofulu dumpsite. In the facility, domestic wastes of 15 districts, commercial and institutional domestic solid wastes are sorted as organic waste and packaging waste, turned into compost, regular storage and medical wastes are disposed of. Since 2020, 713,815,160 kg of waste has been disposed of at the facility (Adana Metropolitan Municipality, 2020). After the wastes coming to the facility are separated as organic and non-organic packaging waste, they are sent to licensed recycling centers. Electricity is produced from the methane gas obtained during the disposal of organic wastes. With this electricity, the needs of 50,000 households are met (Provincial Directorate of Environment and Urbanization, 2019). In addition, the fact that the waste facility is located between residential areas is highly controversial today. When the EIA report of the project was taken in 2007, it was criticized that Adana Metropolitan Municipality did not fulfill its commitments that no residential area would be built within 1200 meters of the facility and that facilities that would intensify human activities would not be built (<https://www.birgun.net/haber/akp-mhp-isbirligiyle-cevre-talani-238959>). Today, the surrounding area is rapidly being built and the population density is increasing. In addition to this, there is the university campus across the facility and the newly completed stadium nearby. The smell coming from the facility, which varies according to the direction of the wind, the temperature of the air, and the time of the day, poses an important problem for the environment.

In addition to the establishment of solid waste facilities for the management of solid waste in cities, another activity is the Zero Waste Project, which started in 2017. With the Zero Waste Project, it is aimed to use resources more efficiently, to prevent and minimize waste generation, to collect and recycle wastes at the source, thus reducing the damage to the environment and increasing environmental protection awareness (<https://sifiratik.gov.tr/sifir-atik/sifir-atik-nedir>). In this context, the Zero Waste Regulation entered into force in 2019. With the regulation, it is foreseen that the transition of local administrations to zero waste management system will be completed in 2020. For the implementation of this regulation, Adana Province Zero Waste Management System Plan was prepared in 2020. According to the plan; (1) the establishment, implementation and cooperation of the zero waste management system will be done by the municipalities, (2) the zero waste management system to be implemented by the buildings and campuses will be integrated with the system established by the municipalities, (3) the establishment of the Local Waste Management Systems to be implemented in the province, (4) It is aimed to ensure and develop the sustainability of the zero waste management system. The most important factor within the

scope of the plan is education and awareness activities. With these activities, which started in 2018, zero waste training was provided to many public institutions and organizations, state and private school students affiliated to the Ministry of National Education, non-governmental organizations and educational institutions. During the meeting with Adana Provincial Deputy Director of National Education, it was stated that the issue of climate change is not included in the primary and secondary education curriculum. Although environmental problems are addressed in science lessons in the curriculum, the issue of climate change is not addressed. Issues related to environmental problems in schools are handled within the scope of the Zero Waste Project.

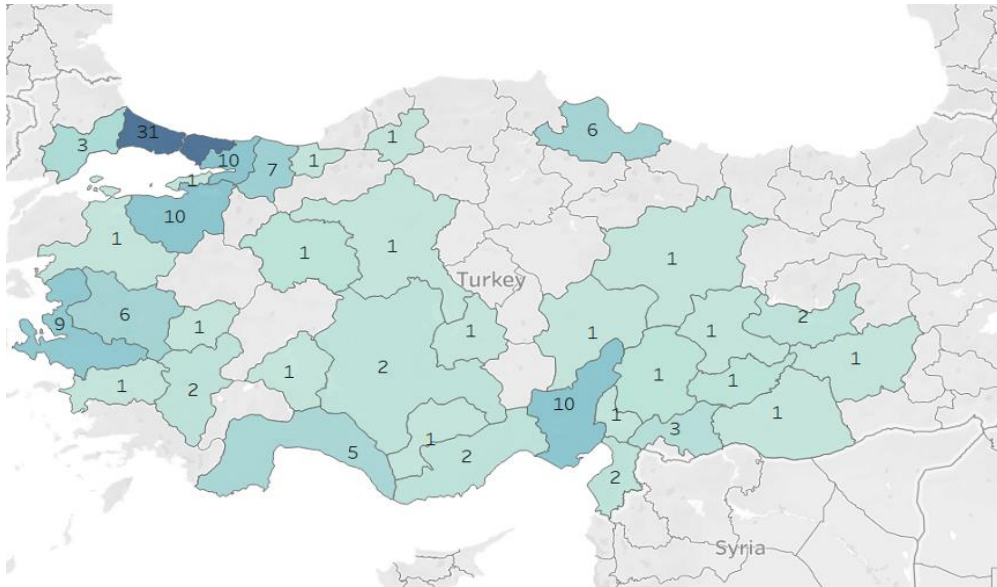
The most important problem related to waste management and pollution is the increasing plastic garbage and waste imports in recent years. After China banned the import of plastic garbage in 2018, Turkey has become one of the centers of this trade in parallel with the Zero Waste Project's activation. While Turkey's plastic import was 4000 tons at the beginning of 2016, it reached 33,000 tons at the beginning of 2018. Towards the end of 2018, it started to import 10,000 tons of plastic per month, and this amount increased to an average of 48,000 tons per month in 2019. With this amount, Turkey became the first country to import plastic waste/waste from Europe, especially from England, in 2019 (<https://www.greenpeace.org/turkey/blog/dunyanin-bunalimi-plastik-atik-ithalati/>) This issue entered the agenda of Turkey with the video published by the BBC in June 2020. In the video, there are images where plastic waste/garbage imported from England for recycling is thrown on the roadsides in Adana, dumped on empty lands, some of them are burned and mixed with water (<https://www.bbc.com/news/av/uk-53181948>). In field studies conducted by Greenpeace in 2020 and 2021, it was observed that the situation did not change, and it was documented that plastics imported from Germany were illegally destroyed in Adana. There is also a signature campaign titled "No Plastic Trash in Turkey" initiated by Greenpeace to ban plastic imports

(https://act.greenpeace.org/page/61130/petition/1?utm_source=direct&utm_medium=link&utm_campaign=copluk-olmasin). This issue was discussed in different channels, and complaints about the dump sites were conveyed to the Ministry of Environment and Urbanization. As a result of these developments, the Ministry of Environment and Urbanization reduced the plastic waste/garbage import quota from 80 percent to 50 percent in August 2020. During the inspections carried out in 133 facilities operating in the recycling field in Adana, the activities of 26 enterprises operating without a Temporary Activity Certificate or Environmental Permit and License Certificate were suspended and administrative fines were imposed. Mixed plastic waste/garbage imports were banned at the beginning of 2021, and the import of ethylene polymer type plastics was banned in May (<https://www.aa.com.tr/tr/turkiye/adanada-cevreyi->

[kirleten-geri-donusum-tesissinde-rekor-ceza/2227274](https://www.kirleten-geri-donusum-tesissinde-rekor-ceza/2227274)). The ban on ethylene polymer type plastic waste was lifted soon after it went into effect in July, with intense backlash from the recycling industry.

The recycling industry justifies the import of waste for reasons such as meeting the raw material need, earning foreign currency for the country, contributing to the economy. In the meeting with the President of Adana Chamber of Recyclers, similar reasons for plastic waste/garbage imports were presented and it was stated that the garbage incineration incidents in Adana were individual incidents that occurred when a few companies imported more than their capacity. But research shows there is much more to it than that. According to the research of the Microplastics Research Group, it was determined that there were fires in more than 65 recycling facilities across the country in 2020 (<https://yesilgazete.org/2020nin-ardindan-plastik-batakliginda-bir-yil/>).

Map 10 - Fires in Recycling Facilities in 2020



Source: Green Newspaper, 2020

In another study; Illegal garbage dumping and burning areas in Adana have been mapped. 19 illegal garbage dumping sites and 12 illegal dumping and incineration sites were identified (<https://mikroplastik.org/yasadisi-cop-dokum-alarlari/>) How the changes made in the national legislation and the strict measures envisaged will affect the current situation will be revealed over time. However, the dumping and burning of garbage on agricultural fields, empty lands and roadsides is one of the most important environmental problems of Adana. Scattering, burning and burial of garbage causes soil pollution; air pollution by causing the

release of toxic gases; It is a multidimensional environmental problem that triggers water pollution by being carried away by rain and mixed with water resources, and endangers the lives of all living things.

CONCLUSION

Today, human-induced global climate change is one of the most important issues affecting the life and future of every living thing. Cities where the majority of the world's population live are directly related to climate change, as they are the areas where the activities that cause climate change are carried out the most, on the other hand, they are the areas most affected by this situation. Cities also play an important role in combating climate change. Based on this, in this study, climate change was evaluated and the current situation analysis of the related problems was made.

Environmental problems in Adana are diversified around unhealthy and unplanned urbanization due to rapid population growth. Inadequate infrastructure, illegal construction, misuse of agricultural lands and related problems are the results of unhealthy urbanization. Temperature increases due to global climate change and precipitation above or below seasonal normals have also been observed in Adana. Due to the decrease in precipitation and groundwater, Adana is in danger of severe drought, similar to the country in general. This situation necessitated the abandonment of the wild irrigation method and the use of environmentally friendly techniques such as drip irrigation. However, some products can no longer be produced, so it has come to the fore to change the product variety. The air quality in Adana is quite unhealthy due to many factors such as the scarcity of green areas, the high number of vehicles in traffic, industrial activities, thermal power plants, and fossil fuel dependence. Misuse of agricultural lands and construction, excessive use of chemical fertilizers and pesticides in agriculture, leaving greenhouse materials, pesticides and fertilizer plastic wastes around the fields or throwing them into irrigation channels, wastes from livestock, industry and mining activities, water leaking from landfills causes water pollution.

One of the most important environmental problems in Adana in recent years is imported plastic waste/garbage. It has been determined that plastic waste imported from Europe, especially from England, to be recycled, is illegally dumped and incinerated on agricultural lands, roadsides and empty lands in Adana. The scattering, burning and burial of garbage cause the emergence of toxic gases, resulting in air and soil pollution; It is a multidimensional environmental problem that triggers water pollution by being carried away by rain and mixed with water resources, and endangers the lives of all living things.

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ENVIRONMENT AND CLIMATE CHANGE POLICIES AND PRACTICES IN THE EUROPEAN UNION

Introduction

This EU review is a part of *Do not dispose of my future. Raising ecological awareness through participation of children* project financed by the EU. It analyses the EU environmental policy and studies the situation in three chosen Member States – France, Germany, and Poland.

The second part of the review deals with different methods of raising awareness about climate change and sustainable development, among children and adults. It analyses good practices in ecological education in the EU and gives concrete examples of practices in ecological education: awareness campaigns, scientific labs, field trips, conferences, workshops and trainings. It also describes the involvement of the CSOs in chosen Member States, focusing mainly on Polish civil society organizations. Poland represents a particularly interesting study case, for its active civil society organizations and ambitious challenges in terms of implementing the EU's environmental policy.

In this review you will find links to free online materials produced under different EU educational projects –mainly the DEAR program. The materials include printable leaflets, scenarios for activities and games.

Environmental Policies in the EU

The aim of the European Environmental Policy is to ensure that by 2050 all Europeans can live healthily and within the limits of the planet. The EU is striving to transition to a low-carbon and highly efficient economy, tackle air and water pollution, improve waste management, protect nature, safeguard biodiversity and control the use of chemicals. Lowering greenhouse gas emissions, establishing a wide network of Natura 2000 protected areas, fighting wildlife crime, expanding household waste recycling and improving the quality of air and water are some of the most tangible results of the EU's Environmental Policy¹.

Moreover, the EU continues to implement ambitious policies in order to achieve these goals. New greenhouse gas emission targets have been set, as well as limits on key air pollutants. The EU is also striving to limit the use of plastics, decarbonize its transport sector, improve the rules on biodiversity protection and address marine litter. In the upcoming years, the new legislations will focus on fighting climate change, tackling pesticides, improving air quality and facilitating transition to circular economy.

The cornerstone of the EU's Environmental Policy is the European Green Deal.² The EU Member States agreed to reduce emissions by 55% by 2030. The reduction of emissions will contribute to creating new jobs and opportunities, reducing external energy dependency, and improving the health and the wellbeing of the EU citizens. The transport sector accounts for 21% of total emissions, and road transport is responsible for 15% of total CO₂ emissions³. Therefore, the EU promotes the transition to greener mobility. To achieve this goal, the Commission propose to expand carbon pricing to aviation and maritime sectors, and to cover road transport by emissions trading.

By 2030, the EU will increase the share of renewable energy sources to 40%. This shift must be supported by fiscal incentives and improving energy efficiency. Renewable fuels should be widely used in industry. By 2030, it is proposed to gradually increase the share of renewable energy in heating and cooling by 1.1 percentage points per year.

¹ <https://what-europe-does-for-me.eu/en/portal/3/focus07>

² https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en

³ <https://ourworldindata.org/co2-emissions-from-transport#:~:text=Since%20the%20entire%20transport%20sector,of%20total%20CO2%20emissions.>

Preserving nature is vital for fighting climate change. Restoring Europe's soils, wetlands forests and peatlands will allow to absorb more CO₂, maintain a healthy environment, provide sustainable energy resources and shift from fossil-fuels based economy to a greener, decarbonized model.

In order to build awareness about the climate urgency, it is vital to integrate the education for the environment and sustainable development in European school programs, non-formal education, and the labor sector. This review looks on how the Environmental Policies are implemented in different member states across Europe, as well as examines some of the most interesting education programs for environmental awareness in the EU, and the involvement of the civil society organizations in action against climate change.

France's Climate Plan

The Government's Climate Plan was presented in 2017, by the French Minister for the Ecological and Inclusive Transition. The aim of the Plan was to speed up the energy and climate transition, as well as to accelerate the implementation of the Paris Agreement.

The Plan envisages a carbon-neutral approach, which should be achieved through ambitious policies, such as developing marine and geothermal energy sources, generating carbon-free electricity, turning away from fossil fuels, raising the price of carbon and stopping sales of petrol and diesel cars by 2040. In order to adapt to climate change and mitigate its impact, the country adapted a National Adaptation Plan for Climate Change (PNACC-2). Its aim is to prepare the key sectors of the economy (agriculture, industry, tourism) and territories to climate change.

The country also decided to stop, by 2030, importing products that contribute to deforestation of world's major tropical rainforests (Amazonia, South-East Asia and Congo Basin). The country also committed to curtailing the emissions in agriculture and improving storage of carbon in the ground.⁴

Implementing EU Environmental Policy in Poland

In the EU's 2017 EIR the biggest challenges for Poland were air pollution, implementing the Water Framework Directive, as well as the Urban Wastewater Treatment Directive. However, in July 2017 Poland adopted a new Water Act to tackle water pollution by nitrates. Poland failed to meet the deadline for the implementation of the Urban Wastewater Treatment

⁴ <https://www.gouvernement.fr/en/climate-plan>

Directive. Air quality represents another challenge. Individual houses are heated using poor-quality coal in boilers. This is aggravated by a high presence of cars, especially old cars contributing to air pollution. Poland should speed up its transition from coal to cleaner energies. Fiscal incentives and technical improvements to vehicles should be put in place.

Poland has improved its waste management system. National regulations on household waste management and separate collection of waste represented a major breakthrough in Poland's waste management.

Despite tangible improvements in nature conservation, the rapid development of roads, the regulation of rivers and intensive agriculture are some of the biggest threats to safeguarding biodiversity in Poland.

In terms of implementing EU Environmental Policies, Poland is one of the most interesting study-cases. It is one of the EU's major economic actors, one of the fastest growing economies in the European Union. It is also largely dependent on coal. In 2020, however, for the first time in history, coal accounted for less than 70% in Poland's electricity production⁵.

⁵ <https://www.forum-energii.eu/en/analizy/transformacja-2021>

Germany – the EU’s leader in implementing environmental policies

Germany is the EU’s leader in international climate policy, in transition to renewable energies, and in energy and resource efficiency. The German government is actively promoting strategies fostering environment- and climate-friendly growth.

The country performs well in wastewater management, water resources and biodiversity protection. However, intensive agriculture continues to have a negative impact on the environment. In 2014, the country adopted the Renewable Energy Act, which resulted in making solar and wind power the most important electricity sources⁶. In 2021, the Act was renewed. It was decided that by 2050, the country will become greenhouse gas neutral.

Education Programs for Environmental Awareness

Changing people’s ecological, social and economic perception is key to achieve sustainable development. Therefore, the countries need to integrate the concept of sustainable development in their school curricula. Environmental problems such as climate change jeopardize our prosperity and our economic development. We all contribute to environmental problems and, as a result, we can only solve them on the basis of cooperative action. Environmental education, like education for sustainable development, is based on building awareness and identification with personal living environments. It is therefore not merely the conveyance of knowledge, but a process of learning about the concept of political action.

EduLab4Future

EduLab4Future is a cross-border, multilateral project financed by the Erasmus+ Program. One of its main objectives is promoting Education&Innovation toward Sustainable Development through Education Laboratory for Accelerating Civic Skills and Sustainable Business – the EduLab4Future.

The project analyses worldwide knowledge on economic, social, and environmental challenges and aims to develop innovative pedagogical curricula to promote learning and teaching for Sustainable Development Goals. It involves HE students, academics, and practitioners and supports intercultural learning for SDGs education. It develops educational material in line with SDGs education, and as a result will strengthen citizenship and sustainability of eco-systems. Through collaborative learning practices and cross-border exchange it will contribute to strengthening active citizenship, social, and digital skills. The

⁶ <https://www.cleanenergywire.org/factsheets/whats-new-germanys-renewable-energy-act-2021>

project will also promote cooperation in education and the transfer of knowledge about Sustainable Development Goals on the European level.

The project will result in editing a report on innovation and sustainable development goals, preparing learning curricula for SDGs education, elaborating learning materials for SDGs education, as well as creating a collaborative e-learning platform containing e-learning cross disciplinary modules, video lessons on economic, environmental and social performance on sustainable businesses. What's more, an inventory of good practices in SDG's education will be edited. Two short-term staff trainings will take place, one in Bucharest, Romania, the other one in San Secondo di Pinerolo in Italy, as well as two intensive summer schools, in Brno and in Bucharest (will take place in June 2022). Moreover, throughout the project numerous multiplier events took place, and will take place in Romania, Bulgaria, Poland, Italy, and Czech Republic.

SOURCE : <https://edulab4future.eu/wp-content/uploads/2020/11/EduLab-Brochure.pdf>

The DEAR programme

The European Union's Development Education and Awareness Raising Program, DEAR, supports projects that engage Europeans in worldwide issues of social, economic and environmental development. The DEAR Program works with civil society organizations and local authorities to promote global justice, human rights, sustainable development and democratic participation.

The Programme is managed by the European Commission's International Partnerships Directorate, with the assistance of the DEAR Support Team.

Some of the projects implemented under DEAR are:

Global Issues – Global Subjects - Poland

This project was led by Centrum Edukacji Obywatelskiej – Center for Citizenship Education, the largest Polish non-governmental organization in the education sector, and more accurately by its Global and Environmental Education Department. The project involved partners from Austria, Czech Republic, England, France, Hungary, Italy, Poland, Scotland, Slovakia and Slovenia.

About the project:

Global citizenship education, or global learning, is gradually finding its way into schools with the main objective to bring about long-term change in pupils' attitude to global issues. Through the 'Global Issues - Global Subjects' project, we are trying to encourage teachers to embed global learning topics such as sensitive global issues and Sustainable Development Goals (SGIs and SDGs) into their subject lessons. Such an approach will ensure systematic appearance of global learning in the classroom in line with the curricula.

As a support, teachers gathered in the project working groups have developed and beta-tested sets of subject lesson plans related to SGIs and SDGs. These ready-to-use free toolkits in 9 languages will help global education beginners start their teaching and will inspire veterans to go deeper. Along with the Global Learning Framework and a set of exercises for assessing impact, project materials provide users with a holistic insight into their GL teaching process.

SOURCE : https://globalna.padlet.org/1/GIGS_partners

Change the Power – (Em)Power to Change – Germany

The project, led by Climate Alliance (LA) Germany, aims to strengthen the role of local authorities in implementing international climate agreements. Moreover, the project will enhance the critical approach among local authorities and citizens through development education and awareness campaigns. Some of the main themes covered by the project are: urban environment, climate, consumerism, ecology, biodiversity, natural environment, sustainable development and global citizenship. The project's target groups are teachers, primary and secondary school students, university students, young people (16-35), local authorities, non-formal education institutions, schools, universities, CSOs and local communities. Training sessions, debates, exhibitions, lobbying actions, fairs, workshops, social media interventions and public meeting will represent some of the activities organized throughout the project.

On the project's website : <http://overdeveloped.eu/en/education.html> free educational tools, leaflets, game scenarios and other activities' ideas on topics such as natural resources, rainforests, mobility and sustainable lifestyle.

End Climate Change, Start Climate of Change - Italy

End Climate Change, Start Climate of Change - #ClimateOfChange is a project funded by the European Commission under the DEAR Program (Development Education and Awareness Raising) with the goal of engaging young Europeans to understand the complex relationships between climate change and migration, to foster the creation of a movement of informed people, ready to change their lifestyle and demand new development policies.

Since the beginning of 2020, 16 European partners - including civil society organizations, universities and NGOs - led by WeWorld, join forces to plan researches, surveys, debates in schools and universities as well as a panEuropean communication and awareness campaign, online and offline, targeting youth between 16 and 35 years of age, together with advocacy initiatives at local, national and European level.

During the 40 months of intervention - through scientific research, activities in schools and universities, advocacy actions from the local to the European Parliament, and especially the involvement of young people in the dissemination of a pan-European communication and awareness campaign - the goal of the project is to engage young Europeans to understand the complex relationship between climate change and the migration of people in or out of their country. And that's not all. The ambition is to create a movement of informed people ready not only to change their habits in favor of a sustainable and responsible lifestyle, but also willing to take action to call for development policies to tackle global warming, recognizing the latter, in its complexity, as one of the main drivers of migration and forced displacement of populations.

The first part of the project is dedicated to research in order to support an evidence-based narrative on the nexus between migration and climate change. The participants will produce 4 case studies in Cambodia, Guatemala, Senegal and Ethiopia to give voice to local communities most affected by climate change and run a comparative survey in 23 EU countries on the opinions and knowledge of the nexus between migration, climate change and the current economic model among EU citizens aged 16-35. A human economy report that will analyze how our current economic system is an important root cause of climate emergency and climate-induced migration will be published, and proposals for a systemic change towards just and sustainable economies will be provided.

Debate contests at local, national and European level involving young people from high schools, universities and youth centers of all types and addresses will be organized. The debate contest will not be about competition but an extended educational activity that will familiarize students with climate change and migration related issues.

Youth and all partners will be involved in advocacy activities at local, national and European level in order to make their voice heard and participate in the global debate on the effects of climate change. They will also have the opportunity to participate in some relevant meetings and summits. Thanks to three tours around Europe, young people will also meet spokespersons from the four case study countries, who will give their testimonies to strengthen and support the advocacy actions foreseen.

SOURCE: <https://climateofchange.info/about-the-project/>

1 Planet 4 All – Razem dla klimatu – Poland

1Planet4All is another project co-financed by the DEAR program. It combines climate education with media education, in order to counter disinformation and help participant gain thorough knowledge about climate change. As part of the project, teachers and students and teachers created School Climate Magazines and worked on press articles on topics related to climate change. Through numerous projects, young people got the chance to learn about causes and consequences of climate change and conducted research on local phenomena brought about by climate change.

Participants receive free teaching guides, lesson scenarios, and textbooks for students on climate change and creating school magazines. They could take part in webinars, workshops and a mentoring program. At the end, all participants receive certificates and congratulation letters from school headmasters.

The program is targeted at primary school pupils (aged 10-14) and high school students (15-18), teachers, youth workers and librarians. School libraries are a key part of the projects, as they can help children develop their journalistic skills.

Environmental Education & Sustainability through Education Centres for Environment in Abruzzo Region, Italy

The Environmental Education Centres (CEA) constitute a single point of reference in the field of environmental education and sustainable development for citizens, schools, educational agencies, local authorities and companies that want to compare their expertise with sustainability issues.

The CEAs are structures which, in compliance with the inspiring principles of sustainable development, carry out environmental education projects with particular reference to the territorial contexts in which they are inserted.

The CEAs, distributed throughout the territory, are recognized as being of regional interest. Each has its own methodology in teaching sustainability. Together, they build the network of Environmental Education Centers of the Abruzzo Region.

The centres carry out educational courses, didactic stays, training initiatives, provide didactic and informative materials and manage documentation, research, communication and dissemination.

Their activities are aimed at the entire local community. Their fundamental objective is to promote and manage participative spaces, an essential condition for a complex and systemic learning process in exchange with the surrounding environment.

The centres are situated in hilly, mountainous, coastal and urban areas. This heterogeneity means that diversity must be promoted and encouraged, as a source of enrichment. The Centres operate directly on the territory and are the leaders in promoting a systemic action education, that takes into account the transition from the local to the global. They work with schools, with private individuals and with local authorities, becoming a point of reference for the entire community. Their activity is monitored by the bodies of the Regional System for a continuous quality action.

Participation, i.e. the active involvement of the subjects who take part in a process, is the best energy that moves learning situations. In participatory processes, knowledge and actions are shared and individual and collective identities are defined in order to create learning opportunities and, therefore, educational contexts. In the participatory process everyone is an actor, everyone possesses skills, which are shared by those who play the role of facilitators in the process.

The Environmental Education Centres support, stimulate and facilitate the transition to participatory educational processes. The CEAs make the skills of their operators available to help them learn about the issues that drive sustainable development, aiming to create a relationship of sharing knowledge and actions in the field.

SOURCE: <https://www.interregeurope.eu/policylearning/good-practices/item/1985/environmental-education-sustainability-through-education-centres-for-environment/>

Written on Water – Italy, Croatia, Poland

Written on Water's objective is to encourage the development of environmental awareness and green skills among young people, in order to promote their interest in scientific careers. This will be achieved by work-based learning paths for students, in teaching water analysis will represent the main goal. In addition, the project aims to support professional development of teachers and trainers by improving their relevant didactic and methodological skills, and to promote collaboration between schools and companies/organizations across Europe.

The project consists in students' first-hand experience of water sampling and analysis, which will be delivered in three different partner countries: Italy, Poland and Croatia. The partnership is composed by 3 schools and 4 organizations with a long-standing experience in the scientific field and environmental conservation.

National laws are increasingly promoting WBL as an effective method to help students acquiring skills and competences relevant for the labour market, benefiting both learners and employers. At the same time, future employment opportunities are expected to be high for professionals with science-related skills, which highlights the necessity to make science education and careers attractive for young people. Within this context, the main objective of the Written on Water (WoW) project is to develop an innovative model of transnational work-based learning for the promotion of European scientific careers.

Activities:

Visiting the purification plant in Verzano

Since the project is focused on the environment, before starting to work on the Oglio river, students in Italy went to visit the Verzano depuration system. This plant is responsible for the water purification in the city of Brescia, as well as for collecting discharges of a great number of zones in the area. In wastewater treatment tanks, the bacteria transform the biodegradable pollutants into non-polluting substances. The innovative systems make the water leaving the plant usable in agriculture. The purifier also contains an innovative element, an ultrafiltration system, called MBR (Membrane BioReactor), which in Brescia had the first large-scale world application for civil wastewater.

Field activities. Koszarawa river

The aim of the classes was to discover biodiversity on each noticeable level – from fungi and mosses, through animals and plants, up to all ecosystems. Students had the opportunity to experience organisms occurring in the Carpathian river valley, gain knowledge about their adaptation to this environment. They were introduced into basic field methods used in ecological, vegetation and zoological studies. The most important element of the course was to explain where biodiversity comes from, how to maintain it and what are the greatest threats to it. Mountain rivers in the upper parts are characterized by a predominance of erosion over accumulation. This is conditioned by the occurrence of strong disturbances, related both to the regular erosive activity of the river and irregular floods, often significantly changing the habitat conditions. Therefore, it is possible to study gravel mountain streams occupied by various types of vegetation – from the almost plant-free initial stage, through reed communities, to riverside forests. Different types of vegetation associated with alluvial forests represent successive stages of gravel succession exposed as the result of the river's erosive activity. Usually, succession is studied on permanent plots for many years, and on rivers such as Koszarawa different succession stages can be observed at the same time.

During the course participants identified successive stages of gravel bars. At individual gravel bars, research areas were determined, and floristic lists were carried out. As a result, participants could follow which species are the first to inhabit the initial riverside habitats and how the species composition changes over the succession, and which plant characteristics are particularly important during the settlement of the ecosystems in question.

SOURCE: <https://www.writtenonwater.eu/>

Grow at School – Ireland

GIY is piloting a school food growing and research program in 32 primary schools across Ireland for 3 years (2019-2021), thanks to funding from The Community Foundation Ireland. GROW at School will examine the impact of food growing on primary schools and their students over the course of 3 years.

GIY has been running food growing programs in schools for a number of years. It allowed the participants to witness first-hand how food growing instils an appreciation and understanding of food in children and can help them to live healthier and more sustainable lives. GROW at School will help to establish an evidence base for the impact these programs can have. Primarily it will help us answer the questions:

- What impact does food growing at school have on participating children? (Does it develop a knowledge and understanding of food? Does it result in behavioral change or healthier outcomes?)
- How dependent is the success of a school food growing program on the knowledge of the lead teacher?
- How important is the garden kit, resources and curriculum plans provided?
- How valuable is a school garden as a teaching resource?
- What impact does it have on the whole school community?

Participating schools have received identical vegetable garden kits, a school garden plan and associated curriculum resources. They have also committed to completing surveys of participating students, parents and teachers at the start and end of each year. The program is specifically designed for primary schools and for the academic year with curriculum plans and teachers resource guides for the full school year.

SOURCE: <https://giy.ie/veg-directory/>

Climate Civil Society Organizations in the EU

Klub Gaja - Poland

Klub Gaja was established by Jacek Bożek in October 1988. Since its creation, it has been organizing activities and campaigns focused on animal rights' violations and the need for nature conservation. Throughout the years, the organization developed partnerships with numerous prominent international CSOs, as well as a strong network of volunteers. Among its main achievements are passing legislation on animal rights' protection in 1997, establishing the biggest ornithology conservation area in Poland in 2010, carrying out long-term projects involving more than 800 thousand participants, planting almost 840 thousand trees in Poland and saving 60 mistreated, sick or sentenced to death horses. The Club organized each year the Animal Rights' Day, which is a great opportunity for volunteers to organize events and actions on a local level.

Institute for Sustainable Development Foundation - Poland

The Institute for Sustainable Development (ISD) is a non-governmental think-tank type organization which was founded in 1990 on the initiative of few members of the Polish Ecological Club. ISD works for the promotion and implementation of the principles and solutions which contribute to Poland's sustainable development.

The mission of the Institute is to:

- build positive relations between socio-economic development and environmental protection;
- act in the interest of the present and future generations.

The Institute is a member of the European Environmental Bureau (EEB), CAN-Europe, Regional Center for Excellence in Sustainability Education Warsaw Metropolitan (UN certified) and takes part in the national NGO coalitions, e.g. the Climate, for EU Funds and Forum for the Animation of Rural Areas.

The activities of the foundation focus on 10 themes:

- Energy – demand side management, increase of energy efficiency and support for renewable.
- Transport – sustainable mobility, treating equally the road, rail, public and nonmotorized modes of transport
- Rural areas – promotion of sustainable development of rural areas with landscape and nature protection as well as non-farming forms of employment on rural areas (particularly through the development of tourism).
- Urban areas – improving the living conditions of the inhabitants, control of urban sprawl and sustainable use of urban resources
- Jobs – fostering environmentally friendly entrepreneurship and raising environmental awareness in business
- Climate protection – supporting integration between climate policy and economic development; working on changes of public behavior towards more sustainable consumption; adapting to climate change
- Natura 2000 – promotion of development which protects and strengthens the natural capital, looking for patterns allowing to use naturally valuable areas for environmentally friendly local development – particularly through tourism
- Competitiveness – creation of an economy which takes into account the external costs (environmental and social) and intends to phase out environmentally harmful subsidies
- EU structural funds and Cohesion Fund – indicating the possibilities for the effective use of these Funds, strengthening sustainable development and preventing excessive consumption of natural resources.
- Strategic assessments – expanding the scope of strategic environmental assessments as an instrument to integrate environmental policy into other policies.

SOURCE: <https://www.pine.org.pl/english/>

Centre for Citizenship Education – Poland

The Centre for Citizenship Education (CCE) is the largest educational non-governmental organization in Poland. CCE supports teachers in bringing to school methods and topics that help students engage in their education and better cope with the challenges of the modern world. The Centre runs programs that develop faith in our own capabilities, foster openness and critical thinking, teach teamwork and responsibility, encourage engagement in public life and social activities. The solutions proposed by CCE are based on over 25 years of experience, expertise, and cooperation with practitioners. About 20 thousand teachers and several thousand school's directors from all over Poland benefit from the CCE's support.

The CCE's work is divided into six departments that are responsible for different activities:

⇒ Learning school – the program was implemented in co-operation and with Polish-American Freedom Foundation. It assists teachers in improving their teaching skills and supports headmasters in developing their leadership skills. It promotes project-based learning, formative assessment, peer-learning in schools, as well as school evaluation techniques.

⇒ Culture and Heritage – the department is focused on cultural and artistic education, education for heritage and media education. These programs help teachers find attractive and engaging methods of promoting local and national heritage and encouraging critical reflection about Polish history. The team also runs a program on media literacy and a program supporting the use of film in education.

⇒ Civic and Entrepreneurship Education – is a set of programs designed for the teachers interested in developing students' entrepreneurship. The program includes European education and critical reflection about Polish contemporary history. Project-based learning is proposed as a method together with a whole-school approach.

⇒ Global and Environmental Education – the department supports teachers in their attempts to explain to young people how the globalized world functions. It offers teaching materials on how to discuss issues such as migration, climate change, consumption patterns, gender equality and other topics related to Sustainable Development Goals, as well as training programs (blended learning) on how to use them.

⇒ Youth Programs – it supports school initiatives and local projects developed and implemented by young people assisted by their teachers. The department serves as a support

centre for student councils and youth leaders and as a resource centre for teachers who foster youth activism. It also runs a nationwide campaign Young People Vote.

⇒ Education Leadership Academy of the Learning School – the program offers post-graduate program for head-teachers delivered in cooperation with two Warsaw-based universities – Collegium Civitas and Academy of Special Education. The program focuses on student-centered leadership and the role of head-teachers in improving teaching practices in schools.

SOURCE: <https://ceo.org.pl/english>

Fundacja Kupuj Odpowiedzialnie – Buy Responsibly Foundation – Poland

The Buy Responsibly Foundation is an organization active on a national level, acting for sustainable development and environmental protection, responsible consumption and production, as well as supporting human rights and environment protection in business.

The main goal of the Foundation is to raise awareness among Polish consumers about responsible choices. It also aims to empower consumers to make pressure on companies and global corporations in order to promote human rights and protect the environment.

The Foundation popularizes knowledge on the conditions in which products that we buy every day are made. It also proposes ethical and ecological alternatives to these products. It runs awareness campaigns, works with teachers, NGOs, entrepreneurs, and government officials. The foundation investigated into the practices of fashion, toys and wood industry. In the upcoming months, it will also examine the food and the electronics industries. It organizes debates, conferences, film screenings, exhibitions, festivals, and workshops.

La Fresque du Climat – Climate Fresk – France

The association La Fresque du Climat was created in 2018 by Cédric Ringenbach, with the goal to spread the Climate Fresk workshop, train facilitators and upskill them. The association has a decentralised and participative governance, inspired by the Swedish Pirate Party, whose principles are “do-docracy”, the right to make mistakes, the rule of three, duplication and transparency.

The founding principles of the association are the climate emergency, humanism, respect for science and the acceptance of money and working with the corporate world.

Its aim is to :

- Publicize and disseminate the “Climate Fresk” tool, which aims to raise climate science awareness among a maximum number of people around the world.
- Train participants in workshops allowing them to use this tool, thanks to facilitators present at numerous events (festivals, conferences, back-to-school events, fairs, etc.).
- Design additional educational material and provide it to facilitators to help them achieve autonomy and make the use of the “Climate Fresk” tool easier.
- Build, grow and manage the association’s member community

Climate change is threatening humanity and we need to react very quickly. The Climate Fresk is an effective tool for educating and raising awareness among citizens, and for this reason its author felt the responsibility to spread it as widely and as quickly as possible. He entrusted this mission to the association he created for this purpose.

SOURCE: <https://climatefresk.org/association/>

Les Amis de la Terre - France

The Federation *Les Amis de la Terre* (Friends of Earth) was created in 1970. Back then, only few people were conscious about the negative impacts of mass consumption and wanted to act to change the system. The Federation’s campaigns highlight the economic and political mechanisms responsible for climate deregulation, plundering natural resources and inequalities. It challenges the modern system, the power of big corporations and makes pressure on the State to defend public interests. And, above all, it proves that alternatives exist. Friends of Earth are present in more than 70 countries across the world. They fight for the right of all humans and future generations to live on an unpolluted Planet, live and work in a healthy environment where everyone has equal access to natural resources.

Friends of Earth are whistle-blowers who examine the measures taken by the elected politicians and the companies in order to denounce practices

SOURCE: <https://www.amisdelaterre.org/nous-connaître/>

Germanwatch – Germany

Germanwatch is a non-profit, non-governmental organization created in 1991. Its main mission is to fight for global equity and for the preservation of livelihoods. The political and globalised market structures of the North, as well as their resource-intensive mode of production, which is now being increasingly imitated, are influencing human lives worldwide. The organization advocates for a political, economic and social framework which can ensure a future for the

people of the South, who through unbridled globalization are being pushed to the margins of society and whose very existence is threatened by the loss of the ecological and economic foundations of their livelihoods. The organization focuses on topics such as Climate Change, World Food, Land Use and Trade, Corporate Accountability, and Education for Sustainable Development. It organizes online training courses on climate action, as well as the Empowerment for Climate Leadership Program.

The organization also contributes to a constructive, transregional exchange between stakeholders of the Mercosur region, China, and the EU on effective approaches and frameworks for making supply chains deforestation free. It contacts and connects actors from civil society, academia, business and politics transnationally to jointly develop approaches to ensure deforestation-free agricultural supply chains.

SOURCE : <https://germanwatch.org/en>

NOTES FROM THE STUDY VISIT TO POLAND

The study visit was organized in Warsaw and Lublin regions of Poland between September 28, 2021 and October 04, 2021 in the scope of the Do Not Dispose My Future! Project. During the study visit, representatives of the project coordinator Flying Balloon Children and Youth Association, the project management team, participants from civil society organizations and business circles operating in Adana organized field trips to workplaces operating in the field of ecological agriculture and environmentally friendly practices, met with local producers and producer communities, and observed how climate change and ecological awareness shape agriculture and local production in Poland. Together with the Development Policy Foundation (DPF), the Polish partner of the project, businesses and institutions that focus on sustainable development were visited and efficient examples in Poland were examined.

The first stop of the study visit was Vertigo Farms. The founder Dawid Drzewiecki gave a presentation to the project team to provide information about this company. In the training, he explained how they practice vertical farming and how they produce efficient seed production. Drzewiecki told the group of local entrepreneurs, aspiring entrepreneurs and the project team about possible new green technologies and showed the vertical farming rooms and infrastructure where the plants grow. Then, a visit to the Institute of Soil Science and Plant Breeding followed. They were shown how hydroponics, indoor plant growing, which has the potential to shape the agriculture of the future, works and how green technologies are used to increase yields in agricultural production. In the meeting held at this institute, training was given on methods to increase the efficiency of agricultural production on Polish soil, how new generation technologies such as drones are used to increase yields and record them. These methods were examined in practice. Entrepreneurial companies in this institute can find support from the institute and the European Union for their new technologies and indoor crops. Therefore, advanced technology and creative ideas are needed to produce marketable and ecologically sustainable products. This institute provides financing for creative ideas and, in the start-up phase, incubation centers to bring these creative ideas to life. If the mass production and sale of these products can be realized, the initiative in question can grow and open its own production facilities. Similar practices can be carried out through Technology Development Zones in Turkey, but considering the economic conditions and difficulties of the Çukurova Region, it may be recommended to focus support on the agricultural sector and the development and application of green technology in agriculture-based production.

The visit to La'Lawenda, which operates as an eco-tourism destination established by starting to grow lavender on land previously used as an orchard, was particularly noteworthy in showing how climate change can be an opportunity to increase plant diversity in Poland. One such change is the placement of beehives on the borders of lavender fields, creating ecological awareness and diversity in the surrounding landscape. With lavender, which is not currently grown around Poland, producers in other fields are also installing beehives, creating biodiversity and cooperation between producers.

As part of the study visit, the Power of Plants workshop was organized. The workshop was organized by Łukasz Falba, owner of Lessowa Pięciolinia Turystyczna. Mr. Falba emphasized that it is insufficient to use plants only at certain times for their healing power, and that plants should be a regular part of daily life. In this context, the trainer talked about the growing conditions of the plants in the region and the characteristics of the soil that make it possible to grow them. In the last part of the training, he talked about the benefits of the continuous use of plants in daily life.

As an example of sustainable production, we visited the pressing plant of a brand called Szczepanówka, which is located next to an apple orchard. The organic apples produced in the orchard are pressed in the adjacent pressing factories to produce 100% natural apple juice and the pulp at the end of this process is reused as compost. The proximity of the orchard and the factory to each other was an important aspect of this facility, which is a good example of local ecological production chain. After the apples are picked, they are not transported elsewhere, so there are no transportation costs and the carbon footprint is kept to a minimum. Moreover, in this pressing plant, 100% recycled cardboard boxes are used for filling, thus preventing waste in the packaging process. Considering the highly diverse and productive fruit growing sector in our country and region, this kind of production model is much easier to work with than in Poland.

The visit to Warsztatoterapii Zajęciowej in Lublin with the topic "How to include people with disabilities in the working society?" provided information about the work of a local civil society organization. Within the scope of this visit, discussions were held on how people with disabilities can participate in the local working life and how inclusion policies can be addressed as part of local economic development. The workshops of the facility were also visited. In the visited region, information was received about the support programs and policies of the government and local organizations for social inclusion.

Afterwards, a walk was organized to the Spa Park in Nałęczów. During this walk, project partners from DPF provided information on how green spaces can be actively used in everyday

life for rehabilitation purposes other than agricultural production. This center is one of the good examples for this purpose. Also in Nałęczów, we visited Pijalnia Wód Leczniczych, where natural mineral water is produced and sold.

We visited the Library Garden and Green Roof of the University of Warsaw, which is a good example of monitoring and preserving ecological biodiversity in the city. This area is an important architectural work in terms of landscape architecture. It is an exemplary practice both as a green space with natural biodiversity and as a public structure implemented on the roof level. There was also a walk along the banks of the Vistula River with representatives of NGOs working on biodiversity conservation and information on action plans for the protection of ecological life in connection with urban life.



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www.ucanbalon.org.tr
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