REPUBLIC OF TURKEY
MINISTRY OF ENVIRONMENT
AND URBANISATION

ENVIRONMENTAL INDICATORS

GENERAL DIRECTORATE OF ENVIRONMENTAL IMPACT ASSESSMENT, PERMIT AND INSPECTION

ANKARA 2021

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ENVIRONMENTAL INDICATORS

GENERAL DIRECTORATE OF ENVIRONMENTAL IMPACT ASSESSMENT, PERMIT AND INSPECTION
Environmental Inventory and Information Management Department

ANKARA 2021

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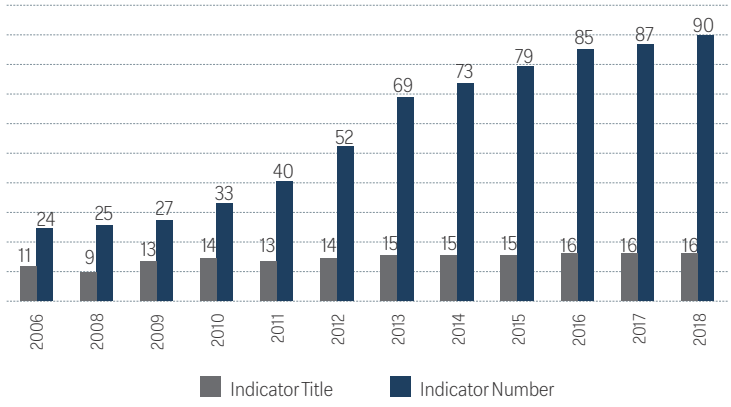
CLASSIFICATION OF INDICATORS

ENVIRONMENTAL INDICATORS

Indicators are tools used to describe complex processes or events in a simple and easily understandable way, such as "a sign or a signal". Environmental Indicators ensure that the interactions between the environment and human activities are monitored numerically. And indicators aim to reflect the relationship between the environment and sectors, to observe some activities with environmental impacts in the time series, to enable the monitoring of the outcomes of the implemented environmental policies, to assist in the determination of the future plans, programs and policies to be made, in the preparation of legislation, as well as providing information.

Environmental Indicators Booklets are published every year with updated environmental indicators. While the first publication "Environmental Indicators 2006" consists of 11 titles and 24 indicators, today it is prepared to include 16 titles and 90 indicators.

Data quality is of great importance in environmental information management. In general, the data and evaluations regarding the indicators in this booklet have been obtained from the relevant authorized institutions that produce these data. Therefore, it should be pointed out that the accuracy and reliability of these data are under the responsibility of the data providing institutions.



CLASSIFICATION OF INDICATORS

In the world, various approaches are applied related to developments of environmental indicators; indicator sets are created within different conceptual frameworks or models. One of them is, "Pressure- State-Response" (PSR) framework. The OECD (Organization for Economic Cooperation and Development) developed and established a comprehensive indicator system to serve as a basis for environmental policies and reporting studies in 1994. Another model, DPSIR framework was created by the EEA (European Environment Agency) in 2004, developing the PSR framework to define the relationship between society and the environment. This model includes five elements as Driving force, Pressure, State, Impact, Response. With this approach, it is possible to measure the effectiveness of the measures implemented, in other words, to explain the entity relationship between driving forces and impacts.

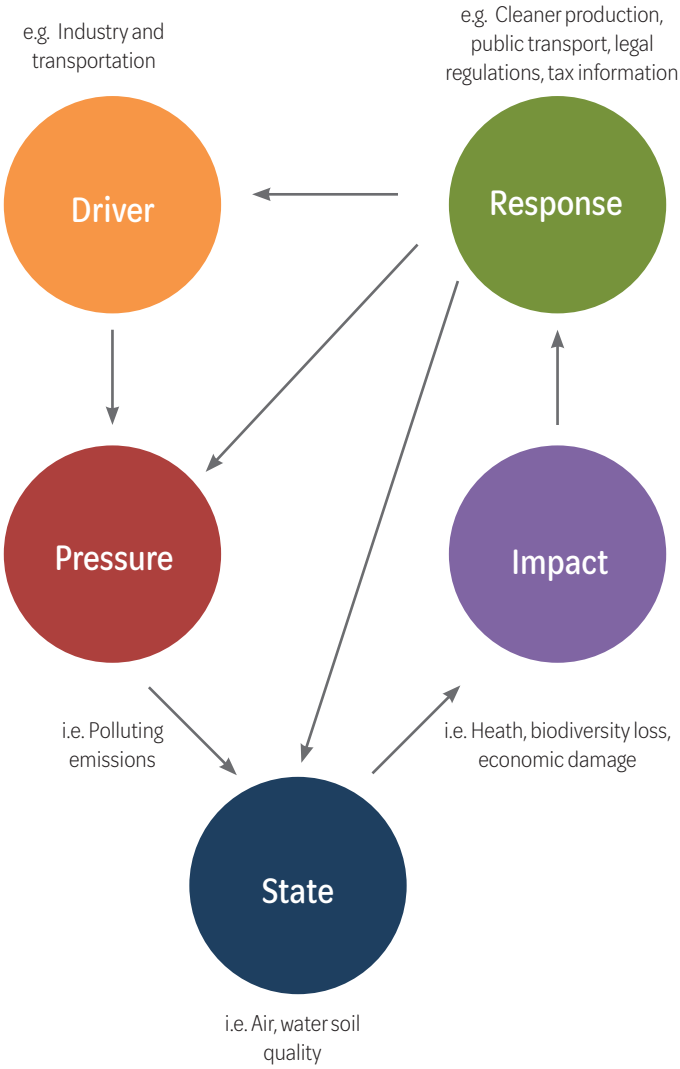
D Driving force indicators: These indicators are the factors behind various variables. Generally speaking, all economic activities are classified in this group.

P Pressure indicators: They define the variables that cause or can cause environmental problems. These indicators are those that focus directly on the sources of problems. Generally speaking, all emissions are classified in this group.

S State indicators: They are indicators to reveal the current state of the environment. Generally, all concentration measurements are classified in this group.

I Impact indicators: These are the most extreme effects caused by environmental changes. In general, indicators related to health problems resulted from environmental changes are classified in this group.

R Response indicators: Response indicators include the reactions of society and individuals against changes in the state of the environment and official attempts to prevent, compensate, improve or adapt to these changes. In other words, indicators related to solutions against environmental pollution are classified in this group.


e.g. Industry and transportation
e.g. Cleaner production, public transport, legal regulations, tax information
Driver
Response
Pressure
Impact
i.e. Polluting emissions
i.e. Heath, biodiversity loss, economic damage
State
i.e. Air, water soil quality

We can classify the indicators in the booklet accordingly as follows;

Driving Force Indicators	Pressure Indicators	State Indicators
• Population Growth • Urban- Rural Population Ratio • Migrant Population • Resource Efficiency • Domestic Material Consumption per Capita • Consumption of Ozone-Depleting Substances (ODS) • Amount of Passengers and Freight by Transport Types • Final Energy Consumption by Mode of Transport • Fuel Consumption by Mode of Transport • Average Age of Vehicles Registered to the Traffic • Real Change in Transport Prices by Mode • Taxes / Expenditures and Subsidies in Railway Transport • Total Energy Consumption by Sectors • Primary Energy Consumption by Fuel Type • Final Energy Consumption by Sectors • Primary Energy Consumption per Capita • Primary Energy Production • Final Energy Intensity	• Greenhouse Gas Emissions • Total Greenhouse Gas Emissions by Sectors • Air Pollutants Emissions • Large Combustion Plants • Use of Freshwater Resources • Abstraction for Municipal Water Supply Networks • Waste Production Quantities • Misuse of Agricultural Lands • Invasive Alien Species • Highway - Railway Network Intensity • Greenhouse Gases Emissions by Transport Types • Emissions of Air Pollutants by Transport • Number of Motor Vehicles • Number of Mining Facilities According to Their Groups • Chemical Fertilizer Consumption • Use of Pesticides • Aquaculture Production • Fishing Fleet Capacity • Number of Tourists • Tourist Overnights and Beds per 1000 Inhabitants • Technological Accidents	• Life Expectancy at Birth • Access to Reliable Drinking Water • Sectoral Distribution of Employment • Sectoral Distribution of Gross Domestic Product • Temperature • Average Concentrations of PM10 and SO2 in Ambient Air • Number of Exceedances of Air Quality Limit Values • Oxygen Consuming Substances in Rivers • Nutrients in Freshwater Resources • Chlorophyll-a Concentration in Coastal and Marine Waters • Nutrients in Coastal and Marine Waters • Bathing Water Quality • General Distribution of Land Cover • Zones at Risk of Erosion • Distribution of the Forest Areas • Distribution of Forests by Tree Species • Agricultural Land per Capita • Blue Flag Applications

Impact Indicators	Response Indicators
• Waterborne Diseases • Precipitation • Sea Water Temperature • Heating and Cooling Day-Degrees • Storm Disaster Numbers • Number of Endangered Species (Biodiversity) • Natural Disasters • Forest Fires	• Environmental Protection Expenditures • Carbon Sinks and Capture • Number of Air Quality Monitoring Stations • Municipalities Served by Wastewater Treatment Unit • Repayment of Energy Incentives for Wastewater Treatment Plant • Municipalities Served by Sewerage Systems • Municipal Waste Disposal • Disposal and Recycling of Various Wastes • Protected Areas for Biodiversity • Wildlife Conservation Activities • Regulation and Control of the Trade of Wild Animals According to the International Conventions • Forest Establishment Activities • Share of Renewable Energy Sources in Consumption • Ratio of Electricity Generated from Renewable Sources • Primary Energy Intensity • Energy Efficiency in Buildings • The share of the Total Domestic and International Sales Values of the Products of the Enterprises Operating in the Organized Industrial Zones in All Industrial Enterprises • Number and Area of Mines Closed After Being Operate • Number of Laboratories Operating under Environmental Legislation • Environmental Impact Assessment Decisions • Organic Farming Areas and Production Amounts • Good Agricultural Practices • Number of Environment-Friendly Accommodation Facilities • Risk Assessment and Emergency Response • Liability Insurance

INDICATORS SUMMARY TABLE

TREND OVER THE PREVIOUS YEAR IN TERMS OF ENVIRONMENTAL IMPROVEMENTS

Key

↑	Negative Developments Increasing Trend
↓	Negative Developments Decreasing Trend

↑	Positive Developments Increasing Trend
↓	Positive Developments Decreasing Trend

→	Neutral Developments
x	Comparative Data Not Available

POPULATION	
Population	↑
Population Growth Rate	↓
Urban- Rural Population Ratio	↑
Migrant Population	↑

ECONOMY	
Resource Efficiency	↑
Domestic Material Consumption per Capita	↑
Environmental Protection Expenditures	↑
Share of Total Environmental Protection Expenditures in GDP	↓

HEALTH	
Life Expectancy at Birth	↑
Safe Drinking Water Access Rate	↑

CLIMATE CHANGE	
Greenhouse Gas Emissions	↓
Carbon Sinks and Capture	↑
Consumption of Ozone-Depleting Substances (ODS)	↓

Precipitation	↑
Temperature	↑
Mediterranean Sea Surface Temperatures	↑
Aegean Sea Surface Temperatures	↑
Black Sea Surface Temperatures	↑
Marmara Sea Surface Temperatures	↑
Heating and Cooling Day-Degrees	↑
Storm Disaster Numbers	↑

AIR POLLUTION	
SO_2, NH_3 and NO_x Emissions	↑
PM_{10}, CO and NMVOC Emissions	↓
Number of Large Combustion Plants and Total Thermal Power	↑
Number of Exceedance of Air Quality Limit Value for PM_{10} Parameters	↓
Number of Exceedance of Air Quality Limit Value for SO_2 Parameters	↓
The Number of Air Quality Monitoring Stations	↑
Oxygen Consuming Substances in the River Waters of Buyuk Menderes, Konya and East Eastern Black Sea Basins	↑

WATER – WASTEWATER	
Total Use of Freshwater Resources	↑
Oxygen Consuming Substances in the River Waters of Antalya, East Mediterranean and Coruh Basins	↓
Nitrate Nitrogen in the Eastern Black Sea Basin	→
Nitrate Nitrogen in Büyük Menderes Basin	↓
Rate of Class A Quality Bathing Waters	↓
Amount of Water Abstracted for Municipal Water Supply Network	↑
Rate of Number of Municipalities Served by Wastewater Treatment Plants to the Total Number of Municipalities	↑
Rate of Population Served by Wastewater Treatment Plants to the Total Municipal Population	↑
Energy Incentive Payments for Wastewater Treatment Plants	↑
Rate of Number of Municipalities Served by Sewerage System to Total Number of Municipalities	↑
Rate of Population Served by Sewerage Systems in Total Municipal Population	↑
Average Amount of Daily Wastewater Discharged by Municipalities via Sewerage Network Per Capita	↑

WASTE	
Number of Landfills	↑
Rate of the population served by landfills to the total municipal population	↑
Recovery Rate of the Hazardous Waste	↑
Number of End of Life Vehicles	↑
Amount of Mining Waste	↑
Amount of Packaging Waste Recovered	↑
Amount of Municipal Waste Per Capita	↓

LAND	
Artificial Areas	↑
Agricultural Areas	↓
Forest and Semi-Natural Areas	↓
Wetlands	→
Zones at Risk of Erosion	X

BIODIVERSITY	
Total Number of Species, Endangered Species, Endemism Rate	X
Number of Invasive Alien Species	→
Protected Area Size	→
Protected Coastal Length	→
Wildlife Conservation Activities	↑
Forest Areas	↑
Forest Establishment Activities	↑

INFRASTRUCTURE AND TRANSPORTATION	
Highway Network	↑
Railway Network	↑
Road Passenger Transportation Rate (passenger-km)	→
Road Freight Transportation Rate (ton-km)	→
Rail Passenger Transportation Rate (passenger-km))	↑
Rail Freight Transportation Rate (ton-km)	↑
Capacity Use Ratio in Railway Freight Transportation	↓
Greenhouse Gases Emissions from Transport	↑

Emissions of Air Pollutants from Transport	↓
Final Energy Consumption by Mode of Transport	↑
Number of Motor Vehicles	↑
Average Age of Vehicles Registered to the Traffic	↑
Taxes / Expenditures and Subsidies in Railway Transport	↑

ENERGY	
Total Energy Consumption	↓
Share of Coal and Derivatives in Primary Energy Consumption	↑
Total Final Energy Consumption	↓
Energy Consumption per Capita	↓
Primary Energy Production	↑
Share of Renewable Energy Sources in Consumption	↑
Rate of Electricity Generated from Renewable Sources	↑
Primary Energy Intensity	→
Final Energy Intensity	→

INDUSTRY AND MINING	
The share of the Total Domestic and International Sales Values of the products of the Enterprises Operating in the Organized Industrial Zones in All Industrial Enterprises	↑
Yearly Number of Issued Mining Licenses	↓
Number of Mining Sites/Facilities Rehabilitated After Being Operated	↓
Area of Mining Sites/Facilities Rehabilitated After Being Operated	↓
Number of Laboratories Operating under Environmental Legislation	↑

AGRICULTURE	
Agricultural Land Per Capita	↓
Chemical Fertilizer Consumption	↓
Use of Pesticides	↑
Share of the Organic Farming Lands to the Total Agricultural Lands	↑
Good Agricultural Practices Cultivated Areas	↓

FISHERIES	
Aquaculture Fishing	↓
Aquaculture Production	↑
Number of Fishing Vessel	↓
Total Engine Power of the Fishing Fleet	↑

TOURISM	
Number of Tourists	↑
Environment-Friendly Accommodation Facilities	↑
Number of Nights Spent Per 1000 Inhabitants	↑
Number of Tourist Beds Per 1000 Inhabitants	↑
Number of Blue Flag Beaches	↑
Number of Blue Flag Marinas	→

DISASTERS	
Number of Forest Fires	↓
Number of Burnt Forest Areas	↓
Number of Approved Coastal Facility Risk Assessment and Emergency Response Plans	↑
Number of Liability Insurance Policies	↑

EXECUTIVE SUMMARY

According to the content of the Environmental Indicators booklet;

Population

According to TURKSTAT data for 2018, the total population of Turkey is 82,003,882 people. The population growth rate, which was 1.24% in 2017, increased to 1.47% in 2018. If current trends in demographic indicators continue, the population of Turkey is expected to reach 86,907,367 in 2023 and 100,331,233 in 2040. The population will increase until the year 2069, and reach its highest value with 107,664,079 people. It is foreseen that the population of the country will decrease after the year 2069 and it will be 107,100,904 people in 2080.

Provinces with the highest net migration (the difference between in-migration and emigration) in the 2017-2018 period were Çankırı, Ordu, and Sivas while those with the lowest net migration were Istanbul, Ankara and Adana[1].

Economy

While the gross domestic product (GDP) was 1.4 Euro for each kilogram of material consumed in Turkey in 2017, this figure was 2.2 Euro in the EU-28 countries[2].

Turkey's domestic material consumption per capita was 13.4 tons in 2017, below the EU-28 average of 14.2 tons, but above the world average of 12.1 tons[3].

While the ratio of environmental protection expenditures in the gross domestic product was 1.18% in 2013, it decreased to 1% in 2018.

Health

Although life expectancy in Turkey has increased, it is still below that of the European Union average. It is expected that the life expectancy at birth will increase and the population will continue to age in Turkey. According to TURKSTAT data, 95.3% of the population was benefiting from the piped water system in Turkey in 2006, while this rate was 99.2% in 2018.

Climate Change

In Turkey, total greenhouse gas emissions (CO_2-equivalent,) increased in 2018 by 137.5% compared to 1990 and by 10.2% compared to 2015 and reached 520.9 million tons.

Although the equivalent (per capita) greenhouse gas emissions, calculated as 6.4 ton CO_2/capita in 2018, increased in parallel with energy consumption in Turkey, it is below the average of EU countries. The energy sector has the highest share in greenhouse gas emissions with 71.6%

Energy

The utilization of renewable energy resources is important in combating climate change. Although the amount of energy supplied from renewable sources increased by 79% in Turkey, the contribution of renewable in primary energy consumption increased from 18.4% in 1990 to 13.8% in 2018. The ratio of electricity generated from renewable sources in gross electricity consumption increased to 32.5%.

Primary energy intensity, which is an indicator of energy efficiency, was 0.12 kTOE / 2010$ in 2018. Although this rate was lower than the world average of 0.18 kTOE/ 2010$, it was above those of OECD and EU-28 countries.

Industry

A total of 5,288 "EIA Positive" decisions were taken from 1993, when the first EIA Regulation was published in our country, until the end of 2018. When the distribution of these Positive decisions is analyzed by sectors, it is seen that petroleum and mining investments take the lead with 27%, followed by energy investments with 24%, waste-chemistry sector, and agriculture-food sector investments with 13%.

Air Quality

Despite the decrease in air pollutant emissions in recent years, it is observed that air pollution continues to be a problem. The total number of the limit value exceedances of pollutants was 14648 for the PM_{10} parameter and 244 for the SO_2 parameter in 2018. The national limit value was exceeded by 11% and the European Union limit value by 18% in 2018. The stations with the highest annual averages in the last five years have been Bursa, Iğdır, Manisa, and Afyon for PM_{10}, and Edirne, Manisa, Hakkari, and Yozgat

for SO_2. The effect of heating-related pollutants on air pollution continues to be a problem, especially in winters. It is considered that additional measures are required as well as the continuation of existing ones to improve the air quality.

Water- Wastewater

The water exploitation index of Turkey was 21.3% in 2010, while it increased continuously and reached up to 26.3% in 2018. For this indicator, a water exploitation index value above 20% indicates water scarcity, and a value above 40% indicates severe scarcity [35]. Accordingly, effective measures should be taken urgently on water exploitation.

A high level of pollution and eutrophication is observed in our river basins located especially in the western regions and our seas. This is thought to be caused by urban, industrial, and agricultural wastewater. Phosphorous compounds have been measured at the Gulf of Bandırma indicated the highest level in all seasons, which reveals the permanent existence of industrial and domestic pressures.

Although the rate of the population served with wastewater treatment has increased as a result of the investments made in wastewater treatment in our country, the population rate connected at least to the secondary (biological) wastewater treatment plant (43.1% according to 2014 data) is below the EU average.

While 75% of the swimming areas monitored in our swimming waters in 2016 were Class A (very good), this rate decreased to 73% in 2017.

Waste

The amount of waste increases in parallel with the constantly increasing population and consumption. The rate of the population served with landfill and the rate of waste recovery has increased owing to the studies and environment investments, especially the zero waste movement, conducted in line with the general principles of waste management. Nevertheless, the total recovery rate is still below the EU average.

Land Use

Land use is considered important in terms of protecting the environment and natural resources, as well as ensuring climate change and avoding sustainable development, and it is aimed to protect natural areas and limit the rate of built-up areas. There

has been a decrease in the rate of natural areas and an increase in the rate of built-up areas in our country, as it has been all over the world. The permissions for making non-agricultural use of agricultural lands continue in 2018. However, the amount of agricultural land allowed for non-agricultural use was lower than in previous years.

Biodiversity

Turkey is the gene center of several plant species. Although the country has a special position in the world in terms of biodiversity, some of our plant and animal species are endangered and some of our species that existed before have already been extinct.

For example, the rate of endemism in the flowering plant group among seed plants is nearly 34%. Although Turkey is very rich in endemic plants, some of these species face serious threats.

The ratio of the total protected areas to the country area is 8.9% as of 2018 and it is quite below the European Union and world averages.

Infrastructure and Transportation

The transport sector continues to be one of the leading sectors in terms of its environmental impacts. In addition to the increasing population, the number of motor vehicles is also increasing in Turkey, however, the number of motor vehicles relative to the population is far below the European Union average.

16.1% of the total greenhouse gas emissions were caused by transportation, and 93% of this was caused by road transportation in 2018.

While most of the 28,146 thousand TOE energy consumed in the transportation sector, excluding pipelines, in Turkey was provided by fossil fuels, only about 1% was provided by renewable sources in 2018. Accordingly, the transportation sector is one of the sectors that is still in need of great development regarding the prevention of environmental pollution, sustainability, and combating climate change.

Agriculture

Agricultural activities are among the important sources of environmental pollution. Irrigation, use of fertilizer and chemicals, and land-use changes are the primary environmental pressures. The number of chemical fertilizers as pure plant nutrients

(N, P_2O_5, K_2O) used in Turkey was 2,164,158 tons as of the end of 2018 with an 18.15% decrease compared to 2017. The amount of chemical fertilizer used as pure plant nutrient per hectare of agricultural land in Turkey was around 93.34 kg as of the end of 2018[4].

The total consumption of pesticides in Turkey increased by 10.9% compared to 2017 and reached 62,020 tons in 2018.

Fisheries

The production of fishery products obtained by hunting in our country is above the sustainable stock capacity as it is in the world. For this reason, the basic approach accepted by scientists in hunting is to maintain the sustainability of the stocks to meet the needs of production. According to TURKSTAT data, the fisheries production was 628,631 tons in 2018 and so decreased by 0.3% compared to 2017.

The aquaculture fishing in marine and inland waters decreased by 11.4% in 2018, while aquaculture production increased by 13.8% compared to the previous year. The further growth of the fleet has been limited by denying licenses for new vessels since 2002 to protect the aquaculture resources and to ensure the sustainability of our fisheries. Furthermore, support payments have been made to the fishermen who want to exclude their vessels from fishing, according to the size of the vessels, since 2012 in return for the cancellation of their licenses. The total number of vessels is reduced with the effect of this policy. Nevertheless, the commercial fishing pressure on fish stocks cannot be reduced since the total fishing effort, that is the total engine power of the fishing fleet, is increasing.

Tourism

Turkey ranks high in the world in terms of tourist arrivals and tourism revenues. The number of tourists in 2018 increased by 21.71% compared to 2017. The high number of visitors coming to the country in a certain period puts pressure on the environment due to land use, water consumption, wastewater, waste generation, noise, etc. As a result of the studies carried out as a precaution to this, the number of accommodation facilities with Tourism Management Certificate was 3,925 as of the end of 2018. 475 of these facilities (12.10%) have been certified with an Environment-Friendly Accommodation Facility Certificate (Green Star). Also, Turkey ranks third after Spain and Greece with 459 blue-flagged beaches, and eighth in the world with 22 marinas according to 2018 data. This situation necessitates more measures for environmental issues in touristic areas.

Conclusions

When the environmental indicators under 16 headings are examined, improvements are observed in some areas. It is believed that some of these improvements are the developments achieved as a result of the measures taken and the policies developed, and some of them are due to the decline in economic activities.

Progress has been made especially on the issues of access to drinking water, wastewater sewage, and treatment services, reducing the consumption of substances that deplete the ozone layer, the amount of packaging offered to the market, and waste recovery. Moreover, it is understood that air and water pollution problems continue and the control of pollution sources needs to be improved. For example, developing effective policies to prevent air pollution caused by heating and transportation is recommended.

High pollution observed in basins irrigating important agricultural production areas of our country threatens both our maritime and coastal areas and food security. Innovative methods should be developed and expanded to prevent the caused pollution by monitoring agricultural resources. The water exploitation index (WEI) rises rapidly and makes Turkey a country with severe water scarcity. The available water resource decreases due to the increasing water need with the effect of increasing population and urbanization. This shows that effective solutions should be developed in water management with the effect of climate change, of which consequences have become more frequent in recent years.

Greenhouse gas emissions decreased compared to the previous year, but have continued to increase in general over the years. There has been an increase in energy consumption and greenhouse gas emissions due to its industrial and economic development in Turkey which is a developing country.

While ensuring development, environmental impacts should be reduced relatively to ensure sustainability. Within the concepts of today's green growth and circular economy, models that can be achieved by reducing the environmental effects

of economic development in absolute terms are developed and the transition is provided. It is expected that our country will not fall behind these developments.

Apart from the implementation of environmental policies enacted under laws; less environmentally damaging methods need to be focused regarding the environmental problems, particularly in the energy, transport, and agriculture sectors that cause the most environmental pressure, in addition to technological approaches in production and changing habits in consumption. For this purpose, it is considered information management and the use and development of environmental indicators should be emphasized more in setting goals, policy-making, and monitoring policies.

1

POPULATION

1.1. Population Growth Rate

D P S I R

Population growth is important as it is a major driving force for human activities that creates pressure on the environment.

Although the population growth rate has decreased from time to time, the population of Turkey has increased continuously. The population growth rate in Turkey was 1.24% in 2017 and increased to 1.47% in 2018. According to the data of 2018, the total population in Turkey was 82,003,882 people, and the population density (population per km^2) increased by 2 people compared to 2017 and reached 107 people. The median age in our country was 31.7 in 2017 and increased to 32 in 2018 compared to the previous year[5].

The world population has exceeded 7.7 billion people according to the population projections calculated the United Nations for 2019. Turkey, which constitutes approximately 1.1% of the world population as of 2019, is the 18th largest country in the world in terms of population.

GRAPH 1- POPULATION AND POPULATION GROWTH RATE CHANGES OVER THE YEARS

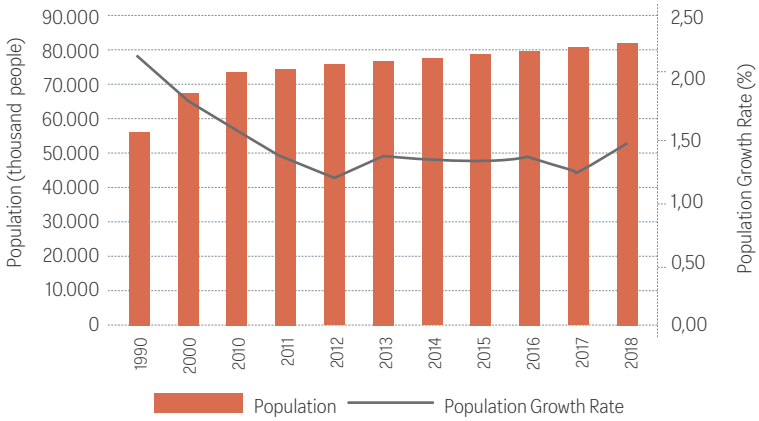


TABLE 1- POPULATION AND POPULATION GROWTH RATE CHANGES OVER THE YEARS

YEARS	1990	2000	2010	2015	2016	2017	2018
Population (thousand people)	56,473	67,804	73,723	78,741	79,815	80,811	82,004
Population Growth Rate (%)	2.17	1.83	1.59	1.34	1.35	1.24	1.47
Population density (capita/km^2)	73	88	96	102	104	105	107

Source: TURKSTAT. General Population Census Results between 1990-2000 and Address Based Population Registration System results between 2010-2018 were used.

Note: Last year's administrative division structure was taken into account when calculating annual population growth rates..

Population projections are of great importance in terms of future policy-making. Determination of the current population trends and predicting future population structure in case of continuation of these trends provide healthier policies.

The population of Turkey is expected to reach 86,907,367 in 2023 and 100,331,233 in 2040. It is predicted that the population will increase until 2069 and reach its highest value with 107,664,079 people. The population of Turkey, which is predicted to decrease from this year, is expected to be 107,100,904 people in 2080.

Life expectancy at birth is expected to continue to increasing and the population will continue to age in Turkey. The median age, which is a major indicator of the age pattern of the population, is expected to be 33.5 in 2023, 38.5 in 2040, 42.3 in 2060 and 45 in 2080[6].

Assuming that fertility and mortality rates remain at current levels, the world population is expected to rise to 10.2 billion by 2050 and 19.3 billion by 2100[7].

GRAPH 2- POPULATION PROJECTIONS BY YEARS, 2019-2080

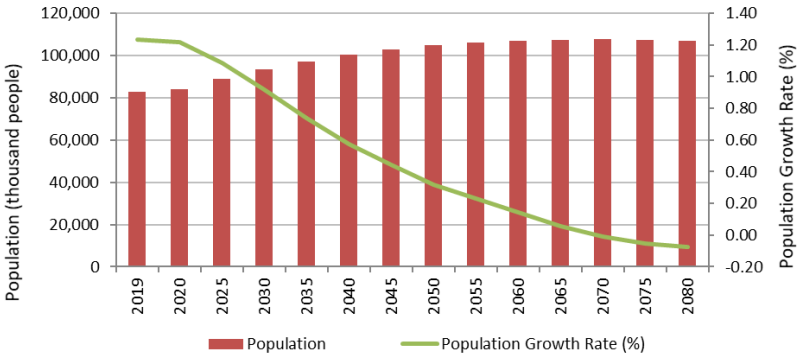


TABLE 2- POPULATION PROJECTIONS BY YEARS, 2018-2080

YEARS	2019	2020	2025	2030	2035	2040	2045	2050
Population (thousand people)	82,886	83,900	88,845	93,329	97,177	100,331	102,844	104,749
Population Growth Rate (%)	1.24	1.22	1.09	0.92	0.74	0.58	0.44	0.32
Population density (capita/km^2)	108	109	115	121	126	130	134	136

YEARS	2055	2060	2065	2070	2075	2080
Population (thousand people)	106.150	107.096	107.577	107.653	107.453	107.101
Population Growth Rate (%)	0,23	0,14	0,06	-0,01	-0,05	-0,07
Population density (capita/km^2)	138	139	140	140	140	139

Source: TURKSTAT, Population Projections, 2018-2080

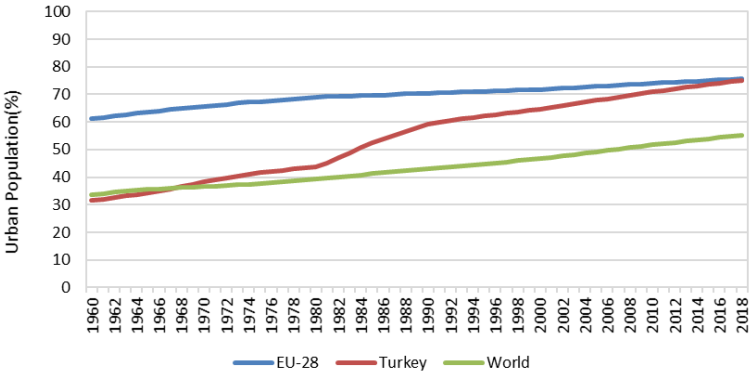
1.2- Urban-Rural Population Ratio

D P S I R

Urban population emerges as a driving force leading to pressure on environmental assets. While the rapid growth of the urban population correspondingly brings about an increase in urban expansion, infrastructure, transportation, housing, industrial area, and energy needs, it also brings environmental problems such as wastewater, noise, air pollution. Urbanization is one of the important processes experienced in parallel with industrialization and economic development.

According to the first census conducted in 1927, while 75.8% of the population lived in towns and villages, and 24.2% lived in provincial and district centers in Turkey, whose population was 13,648,270, however, the population started to accumulate in urban areas after 1950. According to World Bank data, the rate of population living in urban areas in Turkey was 75.1% in 2018.

Today, about half of the world's population lives in urban areas and this rate is predicted to rise to two-thirds by 2050. Approximately 73% of the population in Europe lives in cities [8].



GRAPH 3- URBAN POPULATION RATIO IN TURKEY AND THE WORLD BY YEARS (%)

Source: The World Bank (World Development Indicators) https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?contextual=default

1.3- Migrant Population

D P S I R

Internal migration is defined as changes in permanent residence addresses in certain areas within the borders of the country within a year. There are conditions required by economic development behind demographic movements such as rapid population growth and rural-urban migration.

While the population migrated between provinces in our country was 2,273,492 people in the 2007-2008 period, it was 3,057,606 in the 2017-2018 period according to the results of the Address Based Population Registration System. The foreign national population in our country is not included in these figures.

Provinces with the highest net migration (difference between immigration and emigration) in the 2017-2018 period were Çankırı (28, 027 people), Ordu (24,661 people) and Sivas (19,590 people), the lowest provinces were İstanbul (-210,301 people), Ankara (-37,365 people) and Adana (-18, 978 people)[9].

GRAPH 4- MIGRANT POPULATION, 2008-2018

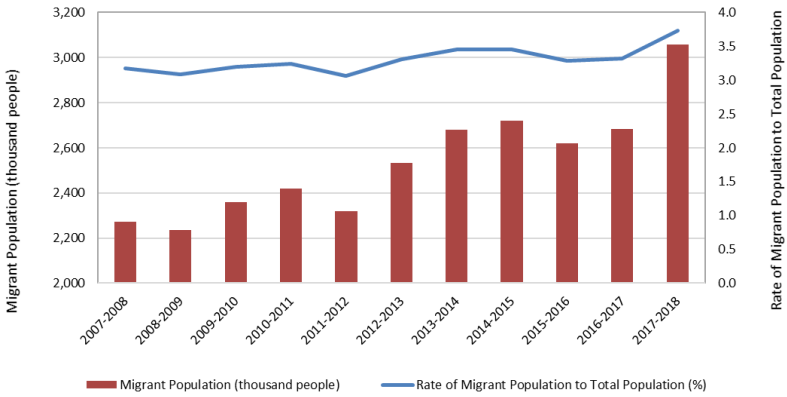


TABLE 3- MIGRANT POPULATION, 2008-2017

Period	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
Total Population (thousand people)	71,517	72,561	73,723	74,724	75,627	76,668
Migrant Population (thousand people)	2,273	2,237	2,360	2,420	2,318	2,534
Rate of Migrant Population to Total Population (%)	3.2	3.1	3.2	3.2	3.1	3.3

Period	2013-2014	2014-2015	2015-2016	2016-2017	2017-2018
Total Population (thousand people)	77,696	78,741	79,815	80,811	82,004
Migrant Population (thousand people)	2,681	2,720	2,619	2,685	3,058
Rate of Migrant Population to Total Population (%)	3.5	3.5	3.3	3.3	3.7

Source: TURKSTAT, Address Based Population Registration System results, 2007-2018
Note: The foreign national population in our country are not included.

2

ECONOMY

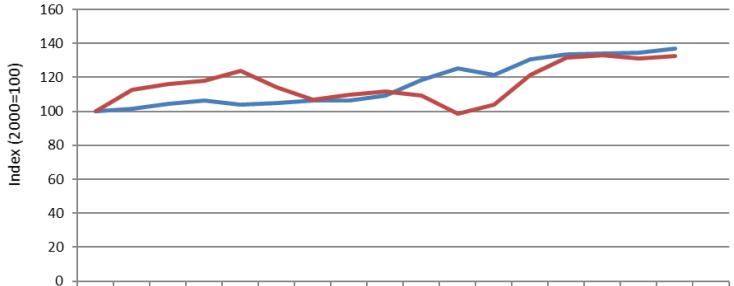
2.1- Resource Efficiency

D P S I R

Economic activities put pressure on the environment, so resource efficiency has been defined to reveal the environmental efficiency of the economy. Resource efficiency is the ratio of gross domestic product to domestic material consumption. The amount of domestic material consumption is calculated by adding the annual amount of domestic raw material consumed and the physical import amount and subtracting the physical export amount.

Compared to 2000, resource efficiency increased by 33% in the EU-28 economy and 36% in Turkey between 2000 and 2017 and reached the values of 2.2 €/ton and 1.4 €/ton, respectively[10].

GRAPH 5- RESOURCE EFFICIENCY BY YEARS



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EU	100	102	105	106	104	105	107	107	109	119	125	121	131	134	134	135	137	133
Turkey	100	113	116	118	124	114	107	110	112	109	99	104	122	132	133	131	133	136

Resources : EUROSTAT, Resource productivity statistics.

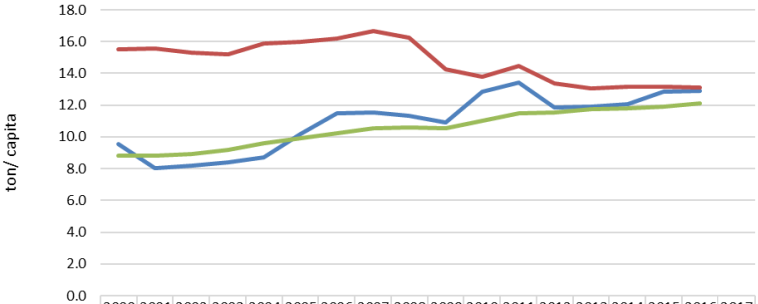
In cross-country comparison of the resource efficiency indicator, GDP (code: RP_PPS) should be used in purchasing power standards.

Domestic material consumption per capita represents the level of efficient use of production and inputs used for the national economy. Domestic material consumption (DMC) per capita in Turkey increased from 9.5 tons in 2000 to 13.4 tons in 2017. The average per capita domestic material consumption in EU-28 countries was 15.5 tons in 2000 and decreased to 14.2 tons in 2019. However, the level of domestic material consumption varies from around 9 tons per capita (Italy, UK, Spain, Netherlands and Croatia) to about 30 tons per capita (Finland, Norway and Estonia) in European countries.

Worldwide material consumption is equivalent to the world domestic material consumption when the global trade balance is zero. It was 12.1 tons per capita in 2018 and steadily increased from 8.8 tons per capita in 2000[11].

Per capita domestic material consumption in Turkey was below the average of the EU-28 countries, but above the world average as of 2017.

GRAPH 6- DOMESTIC MATERIAL CONSUMPTION PER CAPITA BY YEARS

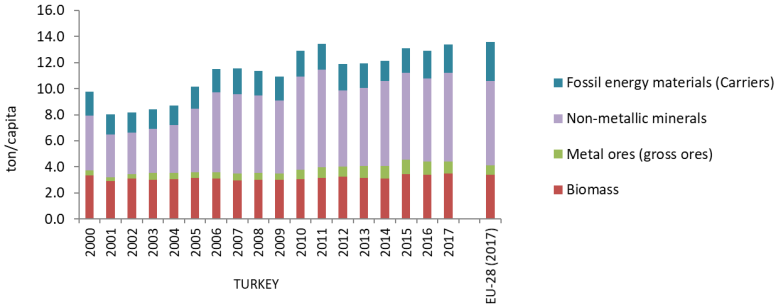


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Turkey	9.5	8.0	8.2	8.4	8.7	10.2	11.5	11.6	11.3	10.9	12.9	13.4	11.8	11.9	12.1	12.9	12.9	13.4
EU-28	15.5	15.6	15.3	15.2	15.9	16.0	16.2	16.6	16.3	14.3	13.8	14.5	13.4	13.0	13.2	13.2	13.1	14.0
World	8.8	8.8	8.9	9.2	9.6	9.9	10.2	10.6	10.6	10.5	11.0	11.5	11.5	11.8	11.8	11.9	12.1	12.3

Resource :https://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_and_resource_pro- ductivity#Material_consumption_by_EU_Member_State

When the distribution of domestic material consumption by material category is examined, it is observed non- metallic minerals consumption both in Turkey and in the EU-28 countries constituted nearly half of the total material consumed. Consumption of non-metallic minerals is affected by country's construction investments, infrastructure investments (such as road networks) and population densities[12].

GRAPH 7- CONSUMPTION ACCORDING TO MATERIAL CATEGORY (Tons per capita)



Resources:

1) Sustainable Development Indicators of TURKSTAT

2) Eurostat (online data code: env_ac_mfa; demo_gind)

2.2- Sectoral Distribution of Employment

D P **S** I R

This indicator is a state indicator. It is important in that the distribution of the working population between sectors affects the quality and size of the pressure of the population on the environment.

Over the years, while there has been a decrease in especially the agricultural sector employment in Turkey, there has been an increase in the employment in the service sector. The service sector in Turkey had a share of 54.9% in employment and an average share of 72.1% in the EU-28 countries according to the data of 2018.

Considered the sectoral distribution of employment in EU-28 countries in 2018; agriculture was 4.0%, construction was 6.8%, industry was 15.4%, and services was 72.1%. These rates in OECD countries (Organization for Economic Cooperation and Development) were 4.5% in agriculture, 7.2% in construction, 13.7% in industry, and 73.4% in services [13].

GRAPH 8- SECTORAL DISTRIBUTION OF EMPLOYMENT

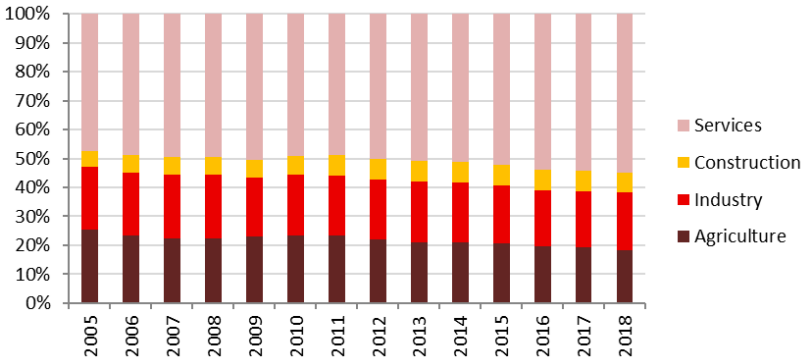


TABLE 4- SECTORAL DISTRIBUTION OF EMPLOYMENT

(+15 Age)

Years	2005		2010		2015		2017		2018	
	Thousand people	%	Thousand people	%	Thousand people	%	Thousand people	%	Thousand people	%
Total	19,633	100.0	21,858	100.0	26,621	100.0	28,189	100.0	28,738	100.0
Agriculture	5,015	25.5	5,084	23.3	5,483	20.6	5,464	19.4	5,297	18.4
Industry	4,241	21.6	4,615	21.1	5,332	20.0	5,383	19.1	5,674	19.7
Construction	1,097	5.6	1,434	6.6	1,914	7.2	2,095	7.4	1,992	6.9
Service	9,281	47.3	10,725	49.1	13,891	52.2	15,246	54.1	15,774	54.9

Note: NACE Rev. 2 used for classification of Economic Activities.

Source: TURKSTAT, Labor Force Statistics, http://www.tuik.gov.tr/UstMenu.do?metod=temelist
Note: 2005-2013 results are estimated by econometric model.

2.3- Sectoral Distribution of Gross Domestic Product

D P S I R

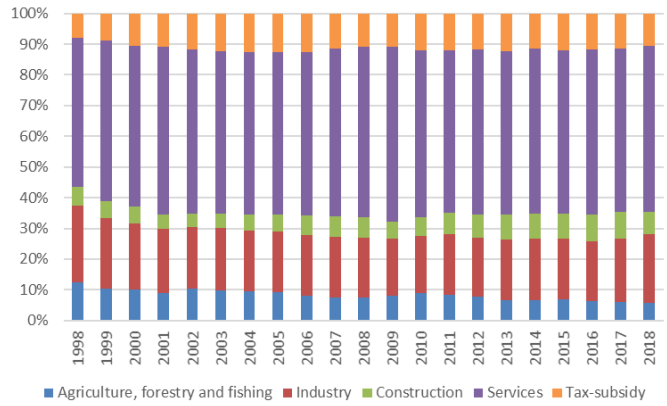
This indicator is a state indicator and shows the contribution made to GDP by the agriculture, industry, construction and services sectors. The indicator shows the percentage share of the economic activity branches in the gross domestic product (consumer prices) in current prices.

GDP at current prices according to the production method increased by 19.7% compared to the previous year and reached 3,724,387,936 TL in 2018 according to TURKSTAT data.

The sector activities that make up the GDP at current prices were 3,335,213,229 TL excluding taxes and subsidies in 2018. When they are analyzed, the share of agriculture, forestry and fisheries sector was 6.5%, the share of the industrial sector was 24.9%, the share of the construction sector was 8.0% and the share of the services sector was 60.6%.

Considering the distribution of gross value added by economic activity in the EU-28 countries in 2018, the share of agriculture, forestry and fisheries sectors was 1.6%, the share of the industrial sector was 19.5%, the share of the construction sector was 5.6% and the share of the services sector was 73.3%[14].

GRAPH 9-GROSS DOMESTIC PRODUCT AT CURRENT PRICES BY ECONOMIC ACTIVITIES (A21) (%)



Source: TURKSTAT

Notes:

1) Numbers may not add up due to rounding.

2) NACE Rev. 2 used for classification of Economic Activities.

2.4- Environmental Protection Expenditure

D P S I R

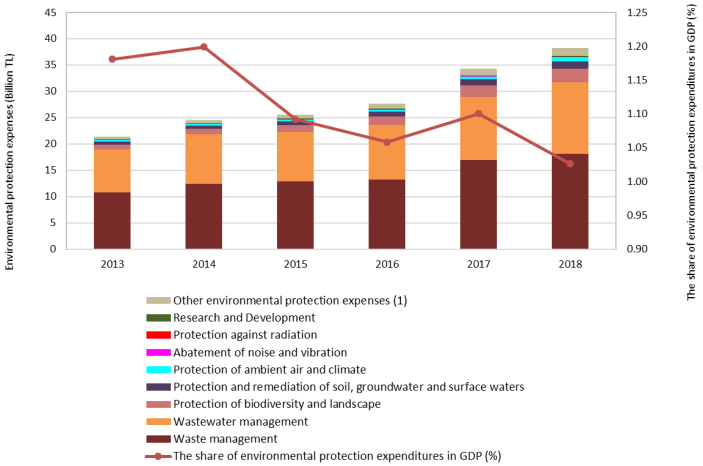
Total environmental expenditures are directly related to the environmental performance of and economic welfare of the countries. Environmental expenditures appear as a response indicator for the protection of environmental values.

Total environmental protection expenditures were 38.2 billion TL in 2018. 56.6% of environmental protection expenditures were realized by financial and non-financial companies, 36.3% by general government and non-profit institutions serving households, and 7.1% by households. While the ratio of environmental protection expenditures in gross domestic product was 1.18% in 2013, it decreased to 1% in 2018.

In total environmental protection expenditure, waste management services accounted for 47.5%, wastewater management services accounted for 35.6%, protection of biodiversity and landscapes accounted for 6.8%, protection and remediation of soil, groundwater and surface water accounted for 3.6% and other environmental protection domains accounted for 6.5%[15].

In the EU-28 countries, the ratio of private and public expenditures on environmental protection in the gross domestic product was 1.9% in 2018[16].

GRAPH 10- ENVIRONMENTAL PROTECTION EXPENDITURE BY DOMAINS, (2013-2018)



Source: TURKSTAT,

(1) General environmental administration and management, training on environmental protection, activities leading to indivisible expenditure, and activities not elsewhere classified are included.

3

HEALTH

3.1- Life Expectancy at Birth

D P S I R

Life expectancy at birth is an indicator of the socio-economic status and the life quality of the countries. It is used to compare the mortality levels of countries and to measure their development levels. This indicator varies according to the efficiency of health services as well as socio-economic conditions and living conditions. Life expectancy is generally higher in more developed countries. Women's life expectancy is generally higher than men's.

Life expectancy at birth in Turkey increased from 71 in 2000 to 78 years in 2015 according to TURKSTAT data. Life expectancy at birth in the world population was 68.7 years according to 2015 estimates[17]. Monaco (90 years), Japan (85 years), Singapore (85 years), Iceland, Hong Kong, Switzerland (83 years) are among the countries with the highest life expectancy at birth. Turkey was 62nd with life expectancy at birth 77 years in 2018 according to TURKSTAT population projections[18].

Total life expectancy at birth was 78.3 years for Turkey (75.3 years for men and 80.7 years for women) in the period of 2016-2018 according to TURKSTAT data. In general, women live longer than men, and the difference in life expectancy at birth is 5.4 years[19].

The average life expectancy at birth in EU-28 countries was 81.0 in total (78.3 for males and 83.6 years for females) according to 2018 European Union Statistics Office (EUROSTAT) data[20].

TABLE 5- LIFE EXPECTANCY BY SEX AND AGE (YEAR)

Period	Total	Man	Women
2013	78.0	75.3	80.7
2013-2014	78.0	75.3	80.7
2013-2015	78.0	75.3	80.7
2014-2016	78.0	75.3	80.7
2015-2017	78.0	75.3	80.8
2016-2018	78.3	75.6	81.0

Source: TURKSTAT

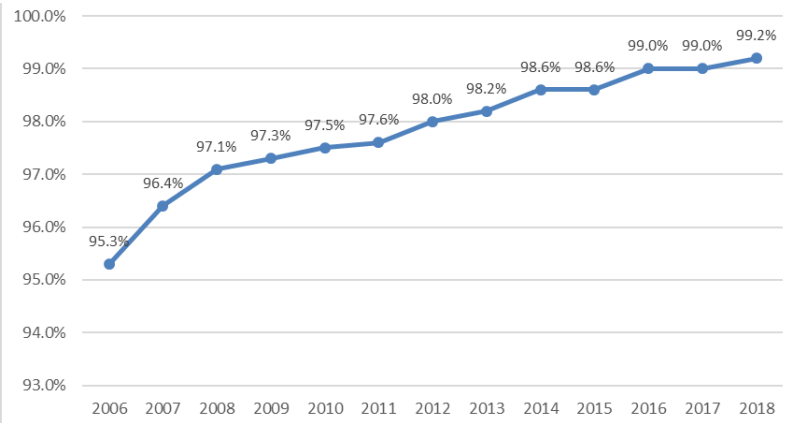
3.2- Safe Drinking Water Access Rate

D P S I R

Lack of access to safe drinking water is a major cause of illness and death caused by infectious substances, chemical pollutants, and poor hygiene. Bringing water up to the interior of the house through pipes is considered a piped water system in the urban water supply.

95.3% of the non-institutional population in Turkey benefited from the piped water system in 2006, while this rate was 99.2% in 2018 according to the data of TURKSTAT. By non-institutional population is meant all individuals living in households within the borders of the Republic of Turkey. It does not cover those living in schools, dormitories, hotels, kindergartens, nursing homes, hospitals, and prisons and those living in barracks and army houses. The share of the world's population with access to a developed water resource increased from 86% in 2005 to 91% in 2015[21].

GRAPH 11– NON-CORPORATE POPULATION RATE ACCORDING TO BEING OWNERSHIP OF THE PIPED WATER SYSTEM (2006-2018)



Source: TURKSTAT

4

CLIMATE CHANGE

4.1- Greenhouse Gas Emissions

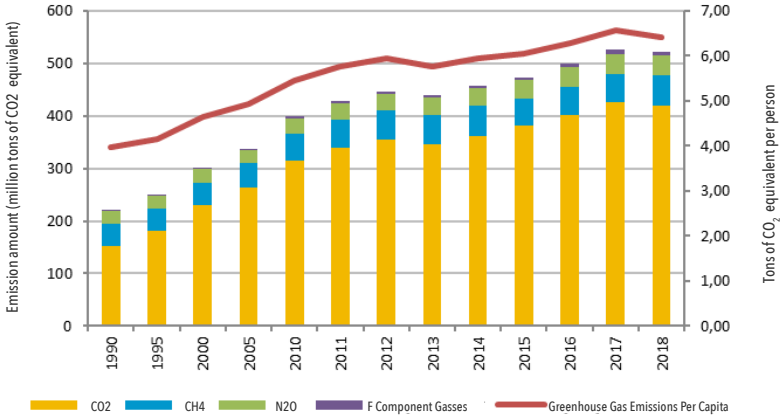
D P S I R

Greenhouse gas emissions are indicators of pressure. They are important concerning Turkey's contribution to climate change and the distribution of this contribution by sources, and also monitoring and controlling of emissions.

Total greenhouse gas emissions (CO_2-equivalent) in 2018 increased by 137.5% compared to 1990, and 10.2% compared to 2015[22]. In 2018, greenhouse gas emissions in the EU-28 decreased by 21% compared to 1990 levels[23].

While per capita CO_2 equivalent emissions were 4 tons/person in Turkey, this value was calculated as 6.4 tons/person in 2018[24]. CO_2 equivalent EU-28 emissions per capita were calculated as 8.6 tons in 2018[25].

GRAPH 12- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS



Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990-2018

TABLE 6- GREENHOUSE GAS EMISSIONS OVER THE YEARS (million tons of CO_2 equivalent)

	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
CO_2	151.5	180.9	229.8	264.2	314.4	339.5	353.7	345.2	361.7	381.3	401.2	425.3	419.2
CH_4	42.4	42.5	43.6	45.2	51.3	53.7	57.1	55.5	57.3	51.3	53.9	54.2	57.6
N_2O	24.7	23.6	24.8	26.1	29.4	30.5	31.6	33.5	33.9	34.7	37.1	38.5	38.9
F Component Gases	0.6	0.6	0.7	1.7	3.5	3.9	4.6	4.8	5.1	4.8	6.3	8.2	5.2
Total	219.2	247.6	298.9	337.2	398.7	427.6	446.9	439.0	458.0	472.2	498.5	526.3	520.9

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990- 2018

Notes:

(1) Data 1990-2017 has been revised in the table.

(2) Emissions and sinks from forestry and other land use are not included.

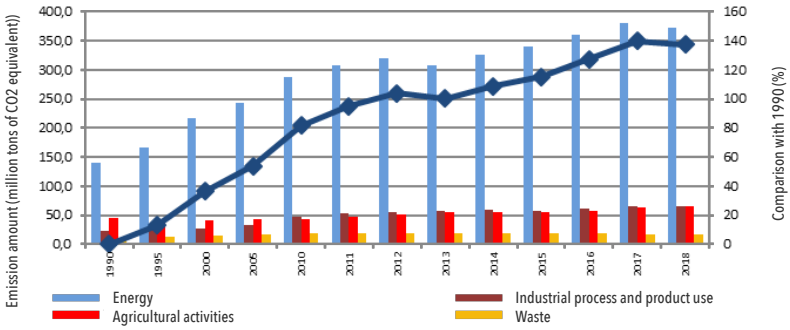
4.2- Total Greenhouse Gas Emissions by Sectors

D P S I R

Considering the sectoral distribution of greenhouse gas emissions in Turkey over the years, the increase in total emissions is largely observed in energy production and consumption. While energy-related greenhouse gas emissions were 139.6 million tons of CO_2 equivalent in 1990, they increased to 373.1 million tons of CO_2 in 2018. When 2018 greenhouse gas emissions are considered as CO_2 equivalent, energy-related emissions have the largest share with 71.6%, respectively, industrial processes and product use with 12.5%, agricultural activities with 12.5% and followed by waste sector with 3.4% [26].

'Fuel combustion and fugitive emissions from fuels (excluding transport)' were responsible for 53% of EU-28 greenhouse gas emissions in 2018. Transport (including international aviation) was the second most important resource sector with 25% in 2018. Greenhouse gas emissions from agriculture contribute 10%, industrial production and product use contribute 9% and, waste management contributes 3% to the EU-28 total greenhouse gas emissions[27].

GRAPH 13- TOTAL GREENHOUSE GAS EMISSION DISTRIBUTION BY SECTORS OVER THE YEARS



Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990-2018

TABLE 7- TOTAL GREENHOUSE GAS EMISSION DISTRIBUTION BY SECTORS OVER THE YEARS

(million tons of CO_2 equivalent)

Years	1990	1995	2000	2005	2010	2014	2015	2016	2017	2018
Energy	139.6	166.3	216.1	244.0	287.0	325.8	340.9	359.7	379.9	373.1
Industrial process and product use	22.8	25.2	26.2	33.6	48.1	58.6	57.1	61.1	63.6	65.2
Agricultural activities	45.7	43.7	42.3	42.3	44.0	55.9	55.8	58.5	62.8	64.9
Waste	11.1	12.4	14.3	17.3	19.5	18.2	18.8	18.4	17.4	17.8
Comparison with 1990 (%)	-	12.95	36.35	53.84	81.87	108.9	115.5	126.9	138.8	137.5

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990- 2018

Notes: (1) Data 1990-2017 has been revised in the table.

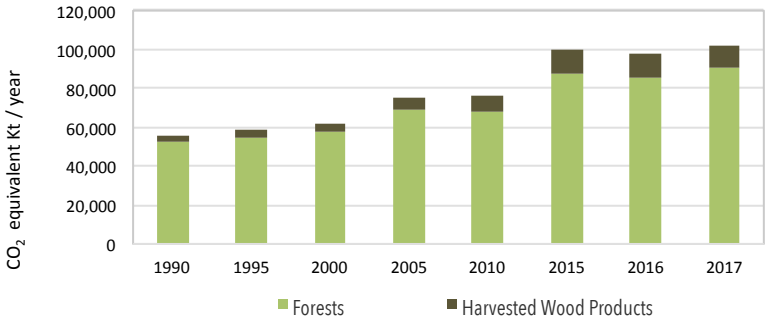
(2) Emissions and sinks from forestry and other land use are not included.

4.3- Carbon Sinks and Capture

D P S I R

CO_2 in the atmosphere can accumulate as carbon in vegetation and soil by photosynthesis in terrestrial ecosystems. Under the United Nations Framework Convention on Climate Change, any process, activity, or mechanism that removes greenhouse gas from the atmosphere is called a sink. Sustainable forest management, afforestation, expansion of forest areas, transformation of the degraded forests into fertile forests (rehabilitation), forest maintenance (silviculture), effective forest protection, and forest fire management activities of the General Directorate of Forestry are activities that increase the sink potential of forests and create a greenhouse gas reduction effect. The results of these activities are reflected in the annual amount of CO_2 removed by the forestry sector of the Land Use, Land-Use Changes and Forestry (LULUCF) section of the National Greenhouse Gas Inventory Report reported to the United Nations Framework Convention on Climate Change Secretariat. Furthermore, the removed CO_2 in the processed forest products category under the LULUCF section of the National Greenhouse Gas Inventory Report is also a sink mechanism related to forestry. All activity data in LULUCF Sector changed in 2018 [28].

GRAPH 14- CARBON SINK AREAS AND CARBON CAPTURES IN TURKEY(1990-2017)
(CO_2 equivalent Kt / year)



Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, National Inventory Report (NIR) 2018

Notes: All series were recalculated and updated in the Greenhouse Gas Inventory reports of 2018.

TABLE 8- CARBON SINK AREAS AND CARBON CAPTURES IN TURKEY(CO_2 equivalent Kt / year)

Years	1990	1995	2000	2005	2010	2015	2016	2017
Forests	52830	54962.955	57890.32	69355.58	67613.57	87668.69	85232.64501	90194.56
Harvested Wood Products	2947.738	3333.1455	4304.738	6379.15	8334.141	12200.4	13000.00258	12115.04
TOTAL	55777.74	58296.101	62195.06	75734.73	75947.71	99869.09	98232.64759	102309.6

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, National Inventory Report (NIR) 2018

4.4- Consumption of Ozone-Depleting Substances (ODS)

D P S I R

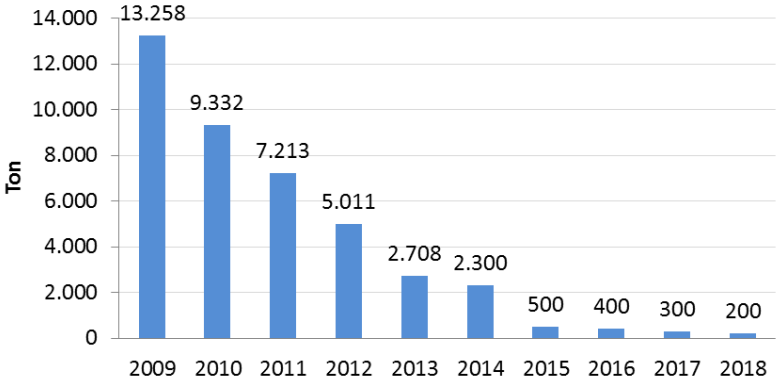
The indicator is a driving force indicator. The ozone layer absorbs almost all of the sun's harmful ultraviolet (UV) rays, reaching the earth, within the stratosphere layer and protects the living creatures and the environment from harmful ultraviolet (UV) rays [24]. However, the release of ozone-depleting substances (ODS) into the atmosphere causes the ozone layer to thin out.

Chlorofluorocarbon (CFC,) Hydrochlorofluorocarbon (HCFC), Halon, Carbon Tetrachloride, Methyl Chloroform group gases are ozone-depleting substances and used in areas occupying an important place in our daily life, such as refrigerators, air conditioners, and fire extinguishers.

Turkey became a party to the Montreal Protocol on Substances that Deplete the Ozone Layer (ODS) in 1991 and adopted all its amendments. It is among the developing countries of the protocol (named as A5 group countries in the Protocol). The import and consumption of ODSs that haven't been produced in our country are gradually terminated under the Protocol obligations. Projects and public/sector awareness-raising activities are carried out on transition to ODS alternative substances. Turkey carries out successful activities by implementing a faster ODS phase-out calendar than other developing countries. The use of substances that deplete the ozone layer has decreased by 98% in Turkey between 2009-2018[29].

Globally, the worldwide consumption of ozone-depleting substances under the Montreal Protocol decreased by 98.5% between 1986 and 2018[30].

GRAPH 15- OZONE-DEPLETING SUBSTANCES (ODS) CONSUMPTION IN TURKEY



Source: Ministry of Environment and Urbanization General Directorate for Environmental Management, Climate Change Management Department

4.5- Precipitation

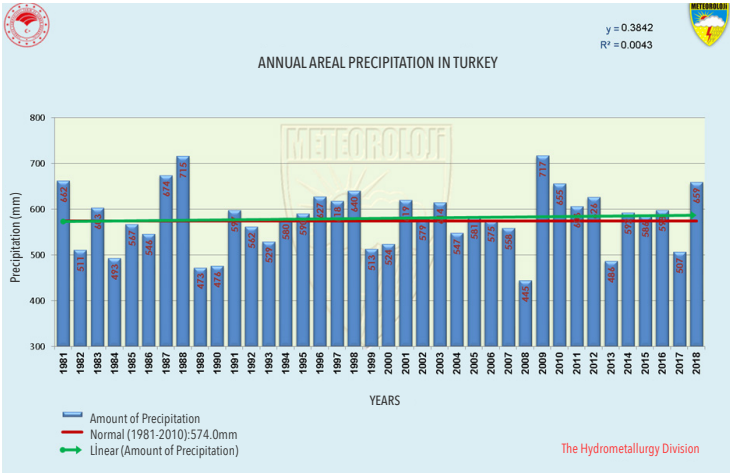
D P S I R

The indicator is an impact indicator and expresses the average amount of precipitation per unit area in time series.

Annual areal precipitation is around 574 mm in our country. An average of 659 mm of precipitation was recorded in 2018 (01 January - 31 December). It is observed that the last 10 years of precipitation have been rainier than the previous years. Only 2013 and 2017 received precipitation below normal, other years received above normal. The precipitation in 2018 has been the second-highest rainfall in the last 30 years.

The areal precipitation in 2018 increased by 18% compared to the normal and 17% compared to the precipitation in 2017. While precipitation increased compared to normal in all regions, the highest increase occurred in Southeast Anatolia Region in 2018[31].

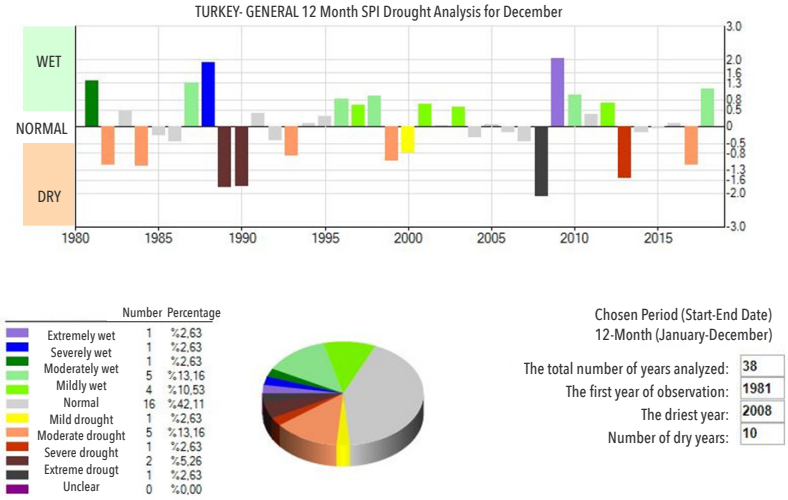
GRAPH 16- ANNUAL AREAL PRECIPITATION IN TURKEY (mm)



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

According to the drought analysis made with the SPI method for Turkey in general between 1981 and 2018, the number of dry years among 38 years is 10. 2008 has been the driest year and this year has been extraordinarily dry. 16 years were normal and 12 years were humid. 2009 has been the dampest year, with extraordinary humidity[32].

GRAPH 17- GENERAL DROUGHT ANALYSIS IN TURKEY BETWEEN 1981-2018



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

4.6- Temperature

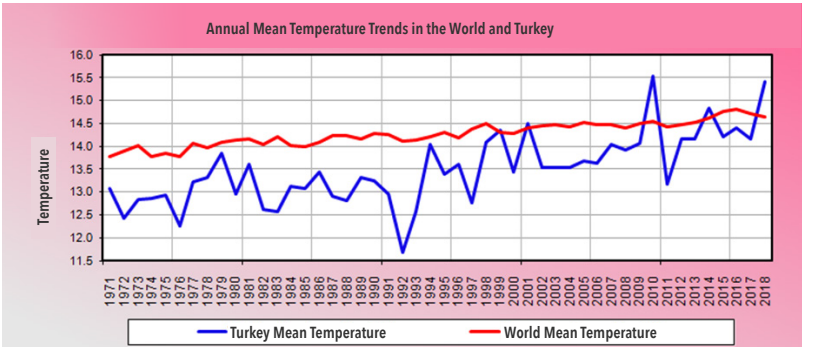
D P **S** I R

The indicator is a status indicator and shows the annual mean temperature change in Turkey and the world.

In 2018, the global mean temperature of oceans and lands was 14.65 °C, which was 0.36 °C above the 1981-2010 average (14.29°C). Annual mean temperatures for Turkey were 15.4 ° C in 2018, which was 1.9 °C above the 1981-2010 average (13.5°C). The lowest temperature in 2018 was recorded in Ardahan with -23.2 °C in December, and the highest temperature was in Cizre with 47.4 °C in July.

Considering the period of 1971-2018, the highest annual mean temperature in Turkey was 15.5 °C in 2010, and the lowest annual mean temperature was 11.7 ° C in 1992. There have been positive temperature anomalies in Turkey since 1994 (excluding 1997 and 2011) [33].

GRAPH 18- ANNUAL MEAN TEMPERATURE TRENDS IN THE WORLD AND TURKEY



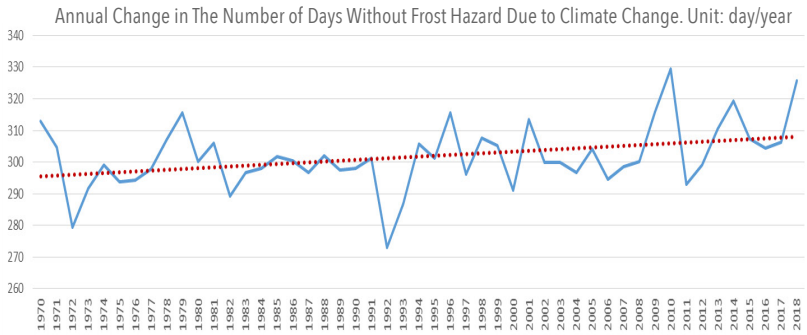
Sources:

For World data; National Oceanic and Atmospheric Administration/ U.S. Department of Commerce (NOAA).

For Turkey data; Ministry of Agriculture And Forestry, Turkish State Meteorological Service

When the issue is considered in terms of agriculture; frost events occurring from time to time during the development period of cultivated plants are of great importance among the damages caused by the effect of meteorological factors. There has been an increase in the safe period for plants daily in Turkey since 1970[34].

GRAPH 19- ANNUAL CHANGE IN THE NUMBER OF DAYS WITHOUT FROST HAZARD DUE TO CLIMATE CHANGE



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

4.7- Sea Surface Temperature

D P S I R

The indicator is an impact indicator and expresses the annual change of sea surface temperature

The main source of atmospheric weather events and air masses are oceans and seas. The most accurate indicator of climate change is the warming and cooling trends of the sea surface. The warming or cooling of the sea surface affects many living creatures by changing the ecological structure of the seas, and it is closely related to an important group that benefits from the seas economically.

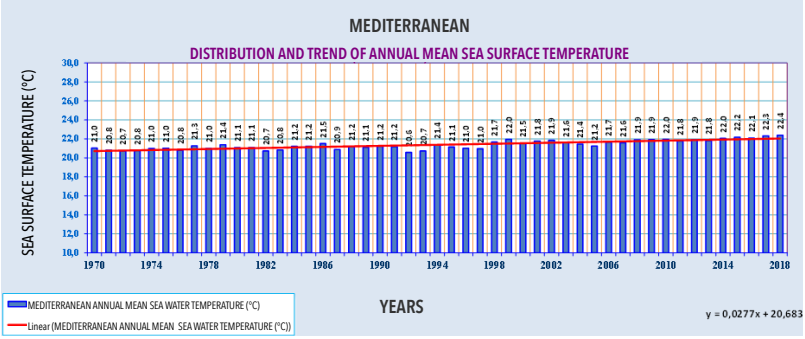
Sea surface temperature is a meteorological parameter that is not immediately affected by atmospheric warming and cooling as it is in the air temperature. Moreover, it warms up and cools down slower than lands, so its temperature does not change very suddenly during the day. The major factors affecting sea surface temperature are latitude, salinity, cold water currents, and the direction of the wind blowing during the day.

According to the data of the Turkish State Meteorological Service, although there has been a slight increase in the mean sea surface temperatures for many years in Turkey, we cannot mention global warming at this point. The Turkish State Meteorological Service continues its sea surface temperature measurement studies covering all of our

coasts and seas to monitor this process. Thus, a higher resolution data source will be available about our seas.

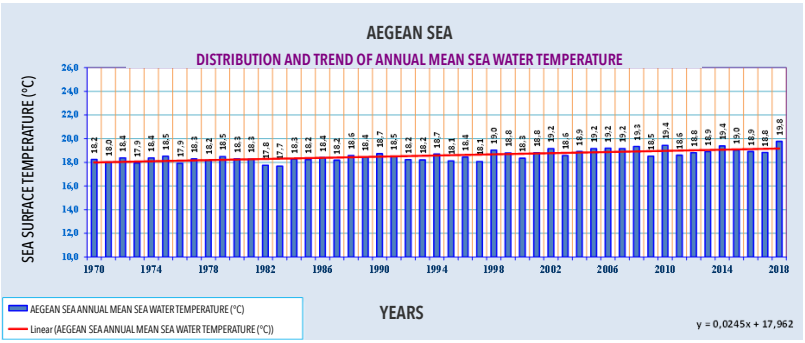
Mean sea surface temperatures in 2018 were 22.4°C in the Mediterranean, 19.8 °C in the Aegean Sea, 17.4 ° C in the Marmara Sea, and 16.5 ° C in the Black Sea. The annual mean sea surface temperatures (°C) measured in seas between 1970 and 2018 are given in the graphs below[35].

GRAPH 20- ANNUAL MEAN SEA SURFACE TEMPERATURES MEASURED IN THE MEDITERRANEAN (°C)

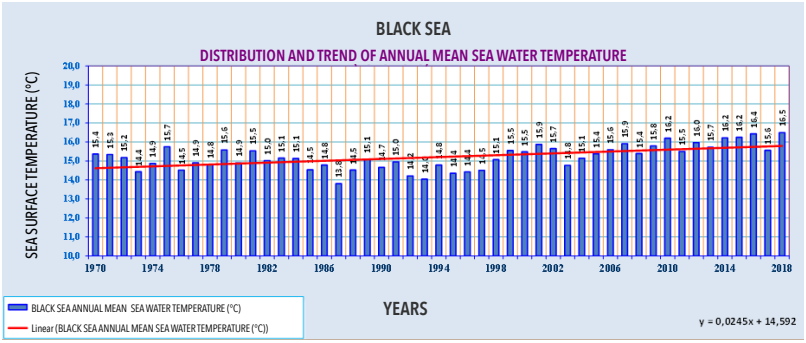


Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

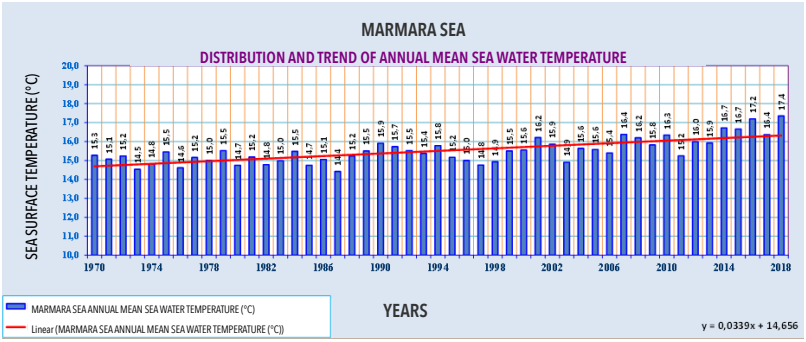
GRAPH 21- ANNUAL MEAN SEA SURFACE TEMPERATURES IN THE AEGEAN SEA (°C)



GRAPH 22- ANNUAL MEAN SEA SURFACE TEMPERATURES IN THE BLACK SEA (°C)



GRAPH 23- ANNUAL MEAN SEA SURFACE TEMPERATURES IN THE SEA OF MARMARA (°C)



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

4.8-Heating and Cooling Day-Degrees

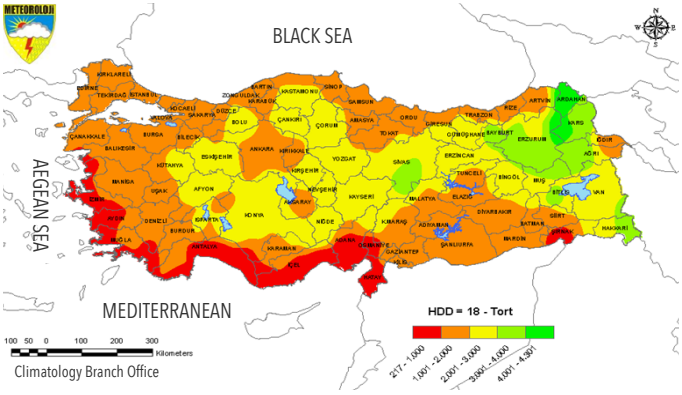
D P S I R

The amount of heating and cooling degree days is an impact indicator and it is important to know the total amount for understanding the energy required for the heating or cooling of buildings. If the outside air temperature is above 15 ° C, heating is unnecessary. The heating cost is directly proportional to the annual Heating Degree Days (HDD). HDD is also used to compare winter hardiness relative to previous and long years[36].

When the heating and cooling day-degrees in Turkey are considered for 129 stations in Turkey; while the average Heating Day-Degrees was 2058 Day-Degrees between 2007-2018, those were 1725 Days-Degrees in 2018.

MAP 1- AVERAGE HEATING DAY-DEGREES FOR 2007-2018 IN TURKEY

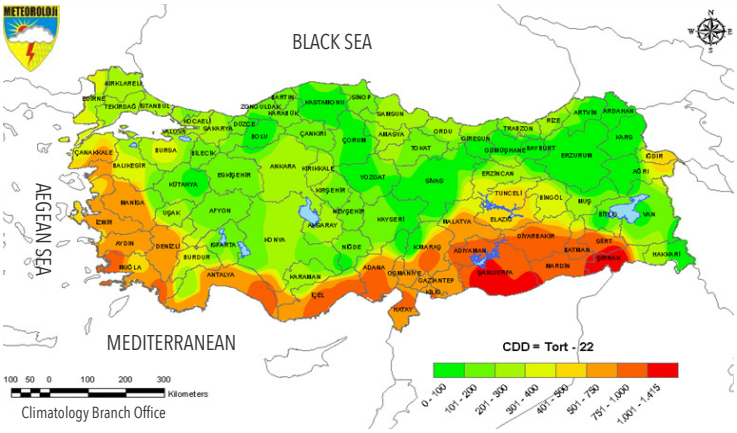
MAP 2- HEATING DAY-DEGREES FOR 2018 IN TURKEY



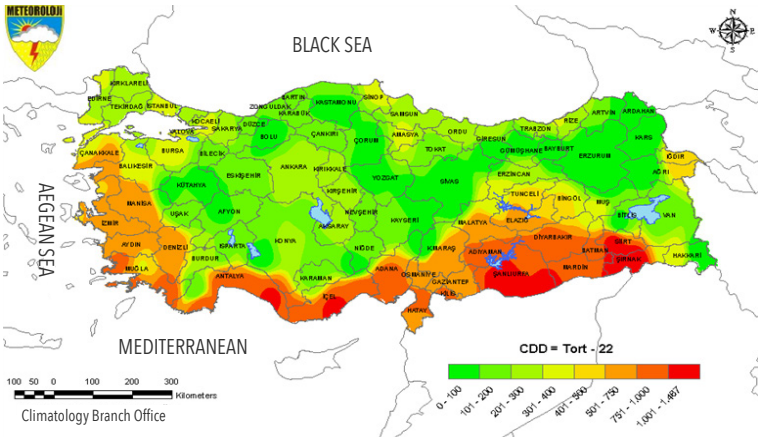
Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

For 129 stations in Turkey; while the average Cooling Day-Degrees was 358 Day-Degrees between 2007-2018, those were 381 Days-Degrees in 2018 [37].

MAP 3- AVERAGE COOLING DAY-DEGREES FOR 2007-2018 IN TURKEY



MAP 4- COOLING DAY-DEGREES FOR 2018 IN TURKEY



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

If we analyze the situation in Europe (EU-28 except for Cyprus, Liechtenstein, Norway, and Switzerland), it is observed that the annual population-weighted warming day degrees (HDD) decreased by 6% between 1950-1980 and 1981-2017 periods. Annual population-weighted cooling day temperatures (CDD) increased by 33% between the periods 1950–1980 and 1981–2017[38].

4.9- Number of Storm Disasters

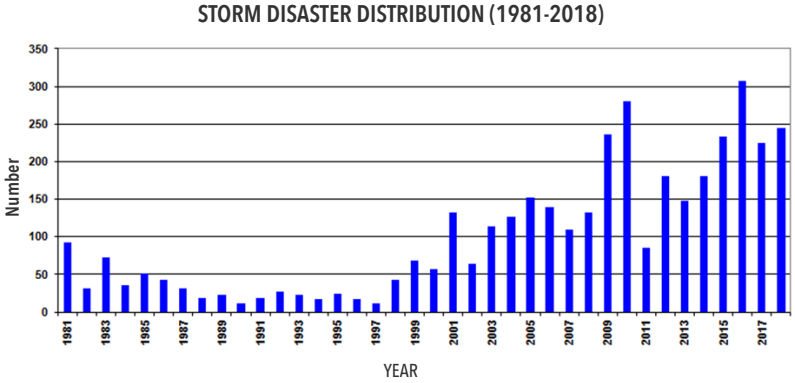
D P S I R

This indicator is an impact indicator and shows the change in the number of storm disasters that occurred in Turkey between 1981 and 2018 according to the records of the Turkish State Meteorological Service[39].

Storms can cause structural damage and flooding, especially when accompanied by heavy rains. These events can have major impacts on vulnerable systems such as human health and forests, and transport and energy infrastructures[40].

Storm disaster is a type of disaster that can be experienced almost all over Turkey. It is observed that there has been an increasing trend in the number of storm disasters in Turkey, especially since the 2000s. The highest number of storm disasters was recorded in 2017. 2018 has been recorded as the third year in which the most storm disasters occurred in the last 10 years[41].

GRAPH 24- YEARS DISTRIBUTION OF TOTAL STORM DISASTER OCCURRED ACROSS TURKEY BETWEEN 1981-2018



Source: Ministry of Agriculture and Forestry, Turkish State Meteorological Service

5

AIR POLLUTION

5.1- Air Pollutant Emissions

D P S I R

Air pollutant emissions are important indicators of pressure affecting air pollution. It includes the national emission amounts of major air pollutants by years and source sectors.

The Ministry of Environment and Urbanization prepares an annual national emission inventory for nitrogen oxides (NO_X), sulfur dioxide (SO_2), non-methane volatile organic compounds (NMVOC), ammonia (NH_3), carbon monoxide (CO), and particulate matter (PM_{10}) within the scope of the Protocol of the United Nations Economic Commission for Europe (UNECE) Convention on Long-Range Transboundary Air Pollution (CLRTAP) and EMEP Long-term Financing of the Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP). The Ministry of Environment and Urbanization, together with the UN-EEC Secretariat, has been regularly reporting the inventory data of the second previous year since 2011, through the European Environment Agency.

When the state of 1990-2018 emissions, covered by the reporting for 2020 in Graph 23, is examined, it is observed that a serious decrease has been recorded in recent years, especially in combustion-related pollutants. This may be due to the reduction in fuel consumption in power plants and the updated emission factors due to changing technologies. This situation was caused by the reduction in fuel consumption in power plants and the updated emission factors due to changing technologies. Compared to 1990, it is observed that NO_X emissions have increased the most (200%), followed by SO_2 (46%), NH_3 (23%) NMVOC (21%) emissions and PM_{10} and CO emissions have decreased by 16% and 22%, respectively[42].

When the emissions are examined compared to 2017, it is observed that NH3 emissions increased by 9%, SO_2 emissions increased by 4%, and CO, PM_{10}, NMVOC, and NO_X emissions decreased by 22%, 16%, 2%, and 1%, respectively. The emission changes are given in Table 9 depending on the time series and compared to the previous year.

Among the national emissions of 2018; SO_2 emissions were caused by power generation plants with 70.4% and domestic heating with 9%. NO_X emissions were caused by power generation plants with 45.7%. NMVOC emissions were caused by the livestock sector with 21.7%. The main source of NH_3 emissions is fertilizer management.

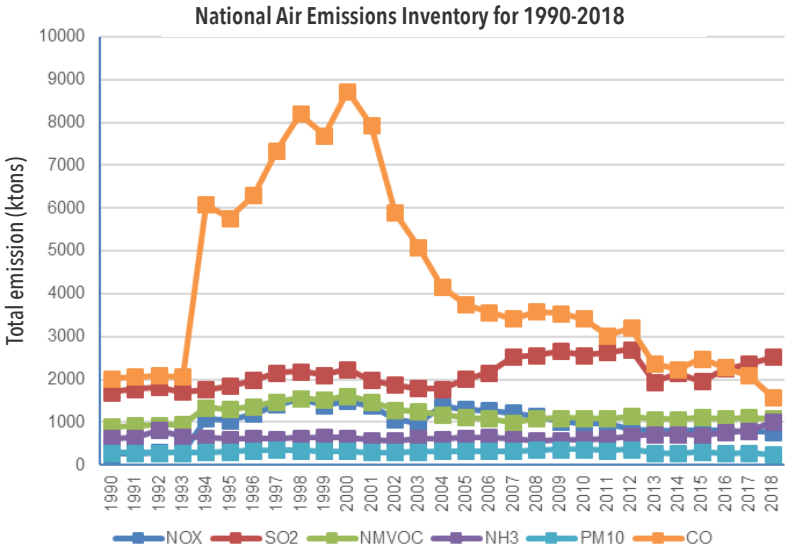
TABLE 9- EMISSION-CHANGE TRENDS FOR SO_2, NO_X, NMVOC, NH_3, CO AND PM_{10}

Change by Years (%)	SO_2	NO_X	NMVOC	NH_3	CO	PM_{10}
Trend (1990-2018)	46	202	21	23	-22	-16
Trend (2017-2018)	4	-1	-2	9	-25	-16

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

Ammonia emissions have decreased by 23% in total in the EU-28 since 1990, but it has been continuously increasing since 2014. Nitrous oxide emissions have decreased by 57% and non-methane volatile organic compounds emissions have decreased by 54%. Fine particulate matter emissions have decreased by 28% (almost one-third) in the EU-28 since 2000.

GRAPH 25- EMISSION TOTALS FOR SO_2, NO_X, NMVOC, NH_3, CO, and PM_{10} (1990-2018)



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

5.2- Large Combustion Plants

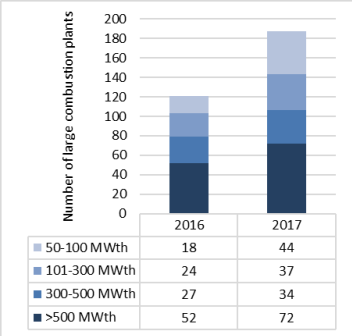
D P S I R

This indicator is an important pressure indicator that affects air pollution. Large combustion plants use large amounts of fuels, mostly fossil fuels to produce useful forms of energy as they are the plants with a rated thermal power of 50MW and above. Emissions from large combustion plants constitute a large part of total human-induced pollutant and greenhouse gas emissions. The aim of the legislation on this issue is to reduce emissions of acidifying pollutants, particulate matter, and ozone precursors. More effective pollution reduction requires a systematic transition to low-carbon and cleaner alternatives in energy generation[43].

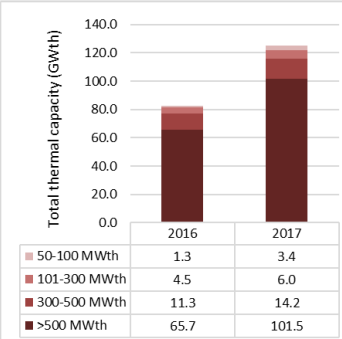
The total thermal capacity of the Large Combustion Plants in Turkey was 82 GWth in 2016 and it increased by 42% to 125 GWth in 2017[44].

The total installed capacity in EU-28 countries was 1287 GWth in 2017. There has been a decrease in the total fuel consumption in combustion plants as a result of the policies of the European Union on air quality, public health, and climate change. It is expected, within the framework of the New Green Consensus, that more effective measures will be taken to achieve zero pollution and decarbonization targets, and fossil fuels will be replaced by renewable resources[45].

GRAPH 26- NUMBER OF LARGE COMBUSTION PLANTS



GRAPH 27- LARGE COMBUSTION PLANTS TOTAL THERMAL POWER



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

5.3- Average Concentrations of PM_{10} and SO_2 in Ambient Air

D P S I R

Pollutant concentration in ambient air is a major state indicator regarding air pollution. Hence, the data obtained from the air quality monitoring stations established in 81 provinces within the scope of the "National Air Quality Monitoring Network" are collected, and they are also available to the public online at www.havaizleme.gov.tr.

Annual average PM_{10} and SO_2 data measured and verified at 10 stations with the highest pollution in 2017 are presented in Table 10 according to the information obtained from the National Air Quality Monitoring Network. Edirne (Keşan) has the highest annual SO_2 average for the last 4 years. Iğdır station is considered to be the highest station of 2018 in terms of its annual average PM_{10} value.

When the last five-year period between 2014 and 2018 is analyzed, it is seen that Manisa and Iğdır stations entered the top 10 of the stations with the highest annual PM_{10} averages 5 times, and Muş and Düzce stations entered that 4 times. In the last five years, it is seen that Edirne and Manisa entered the top 10 of the stations with the highest annual SO_2 averages 5 times, and Yozgat station entered that 4 times.

TABLE 10– AIR QUALITY MONITORING STATIONS WITH THE HIGHEST PM_{10} and SO_2 AVERAGES FOR 2018

Station Name	PM_{10} ($\mu g/m^3$)*	Station Name	SO_2 ($\mu g/m^3$)*
IĞDIR	114	EDİRNE KEŞAN	238
İSTANBUL SULTANGAZİ MCAC	104	MANİSA SOMA	85
MUŞ	99	AMASYA SULUOVA	67
BURSA	98	ÇANAKKALE ÇAN MCAC	63
KAHRAMANMARAŞ ELBİSTAN	93	ŞIRNAK	60
AĞRI DOĞUBEYAZIT	88	HAKKARİ	43
MANİSA	88	ÇORUM MİMARSİNAN	41
DÜZCE	86	SAMSUN CANİK	36
KAYSERİ HÜRRİYET	86	TEKİRDAĞ MCAC	34
SİİRT	85	AMASYA MERZİFON	32

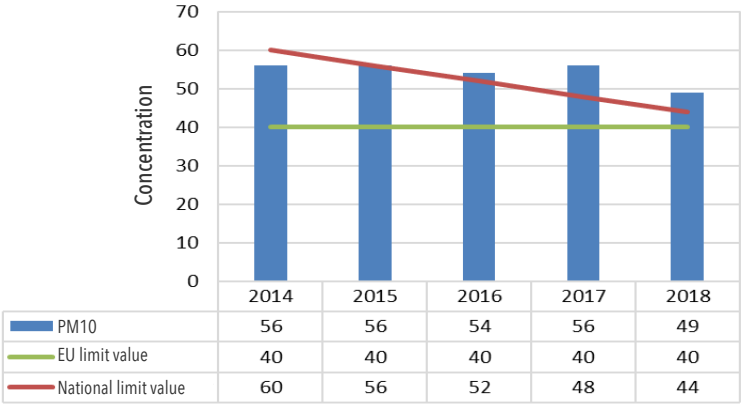
* Evaluated on the basis of validated hourly average values taken from the stations, where data availability is 90% and above.

MCAC: Marmara Clean Air Center

Source: Ministry of Environment and Urbanization, General Directorate of EIA, Permitting and Inspection, Department of Laboratory, Measurement and Monitoring

Graph 28 shows the average concentrations of PM_{10} for the last five years. Accordingly, in 2018, the national limit value was exceeded by 11% and the European Union limit by 18%.

GRAPH 28- AVERAGE PM_{10} CONCENTRATIONS OF THE LAST FIVE YEARS (2014-2018)



	2014	2015	2016	2017	2018
PM10	56	56	54	56	49
EU limit value	40	40	40	40	40
National limit value	60	56	52	48	44

Source: Ministry of Environment and Urbanisation General Directorate for EIA, Permitting and Inspection, Department of Laboratory, Measurement and Monitoring.

Necessary studies, to increase the efficiency of measures for controlling the type of fuel used for heating, improving combustion systems, jacketing in buildings, training of firemen, and reducing pollution loads caused by motor vehicles, are carried out and continue to be carried out within the scope of "Clean Air Action Plans" to improve air quality. Both local administrations and the Ministry of Environment and Urbanization and Provincial Directorates continue their studies for the control of air pollution.

5.4- Number of Exceedances of Air Quality Limit Values

D P **S** I R

It is a status indicator showing how often air pollution exceeds the (daily) limit values. Increasing the number of exceedance indicates worsening air quality.

A stricter limit value has been applied in the By-law on Air Quality Assessment and Management (BAQAM) every year with a gradual reduction for air quality parameters since 2009. Reducing the limit values specified in the BAQAM a little more each year and the continuous increase in the number of measuring stations act in the increase of the total number of exceedances.

The daily limit value was determined as 60 µg/m3 for the PM_{10} parameter and 150 µg/m3 for the SO_2 parameter in 2018. The total number of exceedances was 14648 for the PM_{10} parameter and 244 for the SO_2 parameter in 2018. Although there was a 14.5% decrease in both limit values in 2018 compared to 2017, 1.5% in the number of excess for the PM_{10} parameter and 3% decrease in the number of exceedances for the SO_2 parameter according to the number of exceedances calculated based on all stations in the period between 2015-2017[46].

5.5- Number of Air Quality Monitoring Stations

D P S I **R**

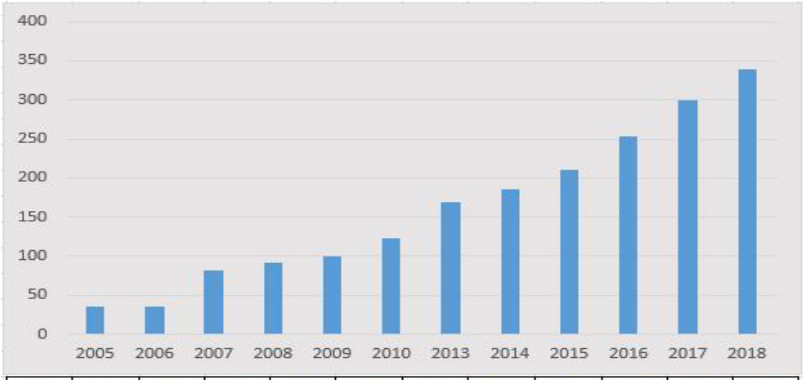
The indicator is a response indicator and monitors the number and qualifications of the monitoring stations to ensure more reliable air quality data.

339 stations established in our country have been established by being classified based on both source and area following European Union norms. The air quality preliminary assessment studies conducted by our Ministry were utilized during the establishment of the stations.

Among the existing stations, PM_{10} parameters are measured in 319, $PM_{2.5}$ in 151, SO_2 in 288, NO_X in 279, O_3 in 190, and CO in 173 stations[47].

Considering the population data, which is effective in determining the number of stations to be established according to European Union norms, the number of existing stations should be at least 350. In this regard, our Ministry continues to establish new stations.

GRAPH 29- NUMBER OF AIR QUALITY MONITORING STATIONS THROUGH THE YEARS



2005	2006	2007	2008	2009	2010	2013	2014	2015	2016	2017	2018
36	36	81	92	100	123	169	186	210	253	300	339

Source: Ministry of Environment and the Urbanisation, General Directorate of EIA, Permit and Inspection, Department of Laboratory, Monitoring, and Measuring

6

WATER-WASTEWATER

6.1- Use of Freshwater Resources

D P S I R

The indicator is a pressure indicator. It shows the use of freshwater resources (surface and groundwater) to meet the requirements such as drinking water and water demand of industry and agriculture. Water consumption is the indicator of the pressure on freshwater bodies.

Based on DSI[48] (General Directorate of State Hydraulic Works) data for irrigation and TURKSTAT[49] data for other types of water consumption, 71.5% of the water exploited in Turkey was used in agricultural irrigation, 17.8% in industry, and 10.7% as drinking and potable water as of 2018.

69% of water resources were consumed in irrigation, 19% in industry, and 12% in urban consumption according to the 2010 data of United Nations Food and Agriculture Organization (FAO) published in 2016[50].

58.3% of the water resources were consumed in agriculture, forestry, and fishing, 18.2% in electricity, gas, steam, and air conditioning, 10.6% in mining and quarrying, manufacturing 9.6% in households, and 3.3% in the service sector in the European countries other than Southern Cyprus and Germany, which are members of the agency as of 2017 according to the data of the European Environment Agency[51].

TABLE 11- AMOUNT OF WATER ABSTRACTED FROM WATER RESOURCES ACCORDING TO ITS USAGE (billion m^3/year)

Years	2008	2010	2012	2014	2016	2018
Municipalities	4.55	4.78	4.94	5.23	5.83	6.19
Villages	1.22	1,01	1.04	0.43	0.38	0.39
Manufacturing Industry Workplaces	1.31	1.56	1.79	2.20	2.12	2.68
Thermal Power Plants	4.54	4.27	6.40	6.53	8.61	7.87
Organized Industrial Zones	0.11	0.11	0.14	0.14	0.15	0.16
Mining Facilities	... (*)	0.05	0.11	0.21	0.23	0.24
Irrigation	33.77	38.15	41.55	35.85	43.06	43.95
Total		49.95	55.96	50.59	60.38	61.48

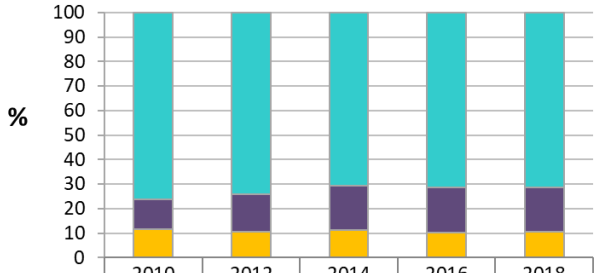
(*) No available information.

Note: TURKSTAT data includes seawater consumption.

Sources: For "irrigation" values, the source is the amount of surface and groundwater taken from the Ministry of Agriculture and Forestry General Directorate of State Hydraulic Works (DSI), http:// www.dsi.gov.tr/dsi-resmi-istatistikler.

For other data; TURKSTAT "Sectoral Water and Wastewater Statistics, 2018" Newsletter, https://tuikweb.tuik.gov.tr/PreHaberBultenleri.do?id=30673

GRAPH 30- WATER CONSUMPTION BY SECTORS, (2010-2018)



	2010	2012	2014	2016	2018
Irrigation	76.4	74.2	70.9	71.3	71.5
Industry	12.0	15.1	18.0	18.4	17.8
Drinking-Potable	11.6	10.7	11.2	10.3	10.7

The water exploitation index (WEI) is obtained by dividing the average annual total amount of water abstracted from freshwater by the average annual total renewable freshwater resources in a country. It is expressed as a percentage.

The annual mean precipitation in Turkey is 643 mm, which corresponds to 501 billion m^3 of annual water volume in the country.

274 billion m^3 of this water returns to the atmosphere through evaporation from soil and water surfaces and plants, 69 billion m^3 feed groundwater, and 158 billion m^3 flows into the seas and lakes in closed basins through rivers of various sizes. 28 billion m^3 of 69 billion m^3 of water that feed groundwater is re-added to surface water through springs. Moreover, there is an average of 7 billion m^3 of water per year coming to our country from neighboring countries. Thus, the gross surface water potential of our country is 193 billion m^3. Considering the 41 billion m^3 that feed the groundwater, the total renewable water potential of our country is calculated as gross 234 billion m^3[52].

Accordingly, Turkey's water exploitation index is 21.3% for 2010, 23.9% for 2012, 21.6% for 2014, 25.8% for 2016 and 26.3% for 2018, respectively. For this indicator, a water exploitation index value above 20% indicates water scarcity, a value above 40% indicates severe scarcity, and that water management is not sustainable[53]. Data on this indicator shows that our country should take measures regarding sustainable water resources management.

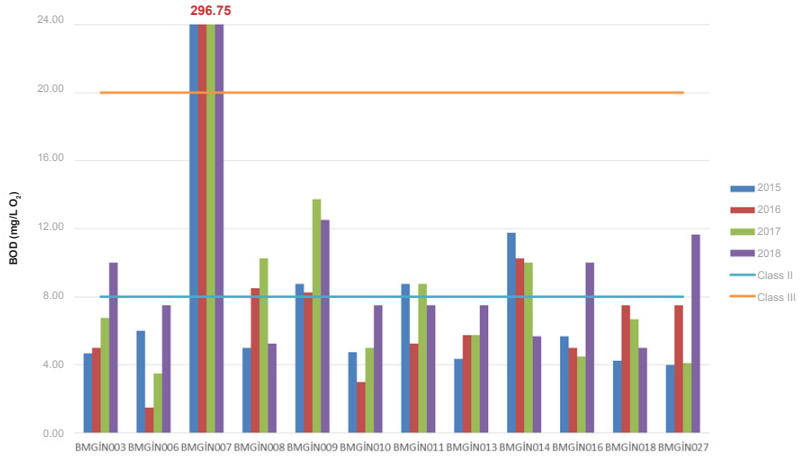
6.2- Oxygen Consuming Substances in Rivers

D P S I R

The primary indicator of the oxygenation state in water bodies is the biochemical oxygen demand (BOD) parameter which expresses the demand of aquatic organisms consuming oxidizable organic materials in a body of water. Furthermore, ammonium is a parameter that causes oxygen consumption in water bodies, as well. The "Oxygen Consuming Substances in Rivers" indicator is a state indicator showing the current status and trends regarding ammonium (NH_4) and BOD in rivers.

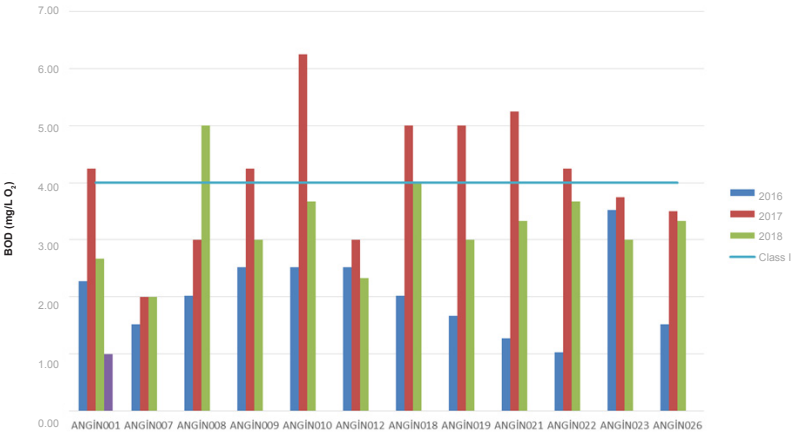
The results of the monitoring programs carried out by the Ministry of Agriculture and Forestry in various basins are evaluated according to the criteria given in the "By-Law on Surface Water Quality Management" Annex-5 Table 2 and the current status in terms of BOD and NH_4 parameters has been revealed. The water quality is generally found out to be at Class II quality in terms of the BOD parameter in the basins where the measurement is made. On the other hand, it is seen that the water quality is at a better level in the Çoruh and Eastern Black Sea Basins in the Black Sea Region. However, the water quality is at a very low level in the Büyük Menderes Basin, which is one of the basins under heavy urban, agricultural and industrial pressure in the western parts of our country[54].

GRAPH 31- BÜYÜK MENDERES BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



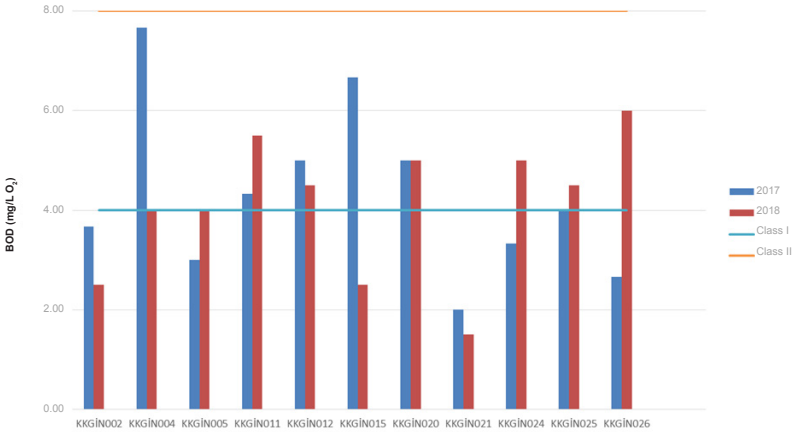
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 32- ANTALYA BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



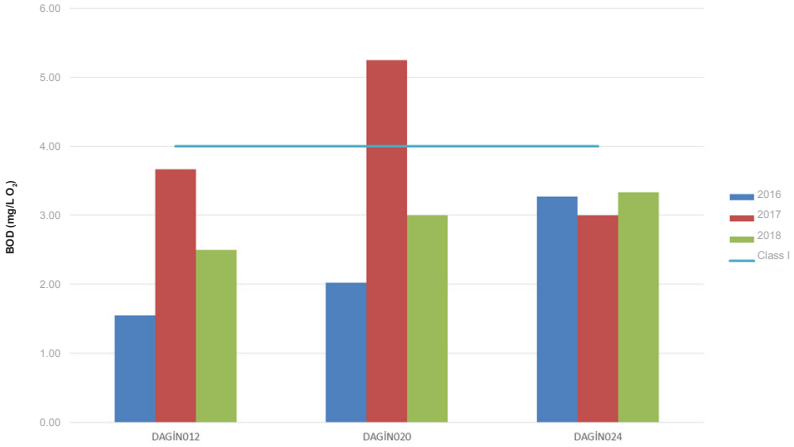
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 33- KONYA CLOSED BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



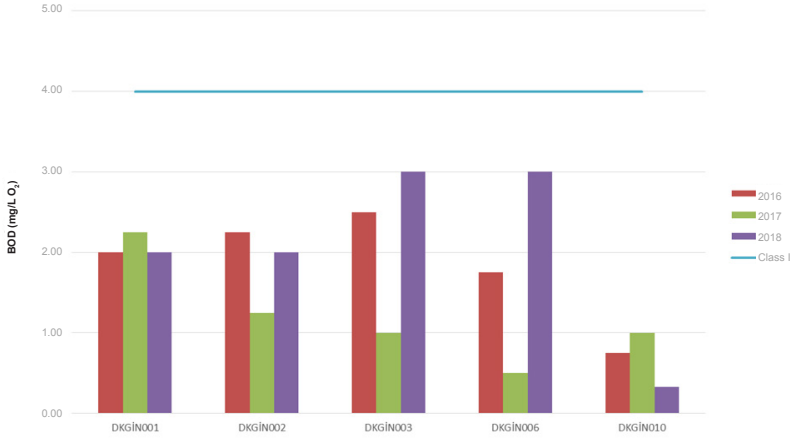
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 34- EAST MEDITERRANEAN BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



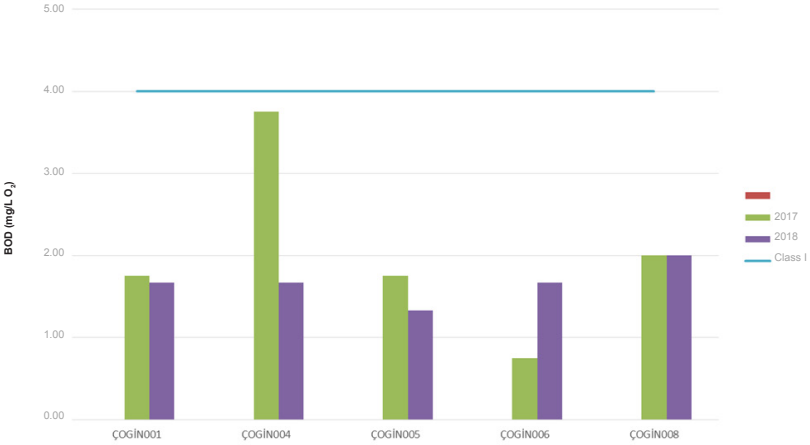
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 35- EAST BLACK SEA BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

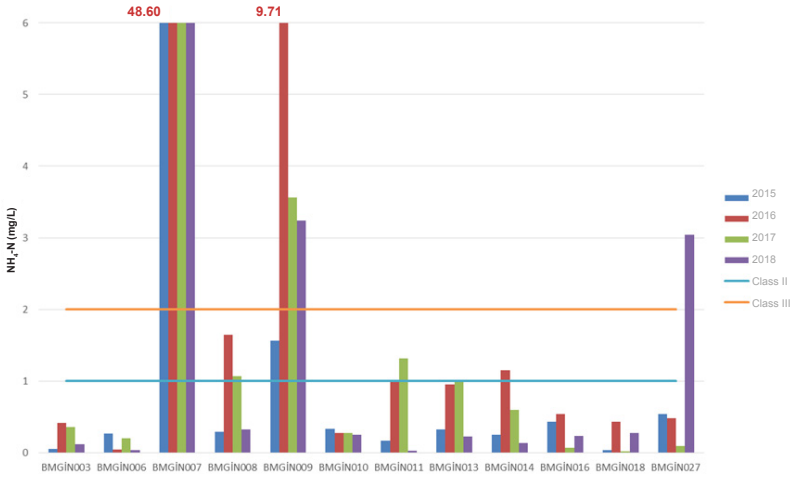
GRAPH 36- ÇORUH BASIN BIOCHEMICAL OXYGEN DEMAND (mg/L O_2)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

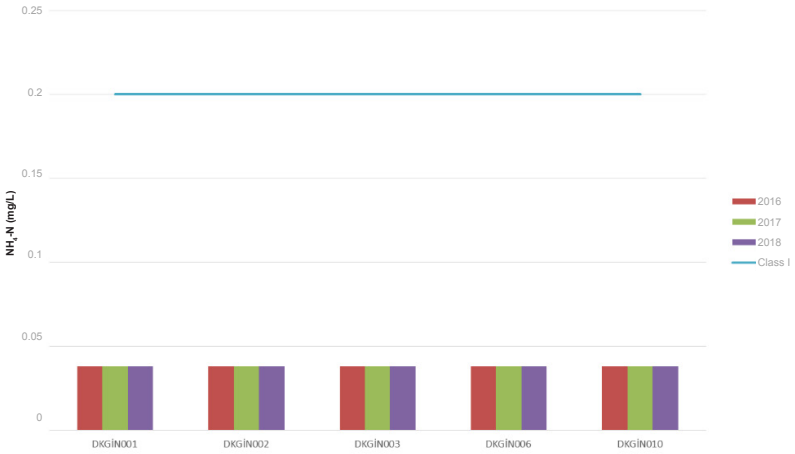
Water quality is generally found to be at Class II in terms of NH_4 parameter. On the other hand, it is seen that the water quality in the Eastern Black Sea Basin located in the Black Sea region is at Class I.

GRAPH 37- BÜYÜKMENDERESBASIN NH_4-N(mg/L)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

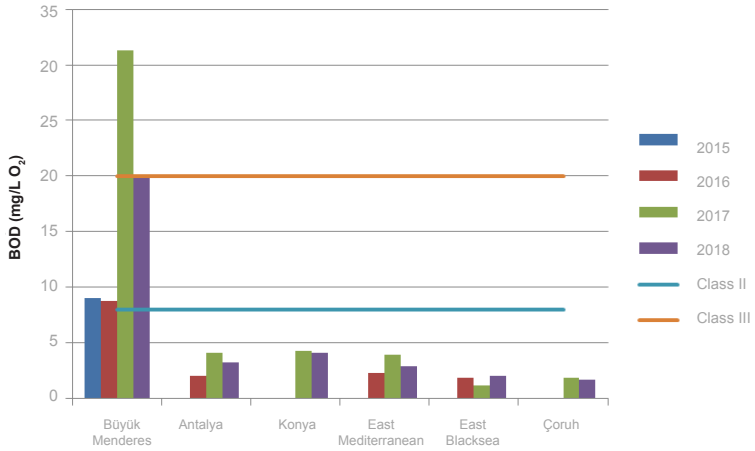
GRAPH 38- EAST BLACK SEA BASIN NH_4-N (mg/L)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

When the change in basins by years is examined in terms of the BOD parameter, mostly a decrease tendency is observed in 2018.

GRAPH 39 – BOD CONCENTRATION CHANGE OVER THE YEARS



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

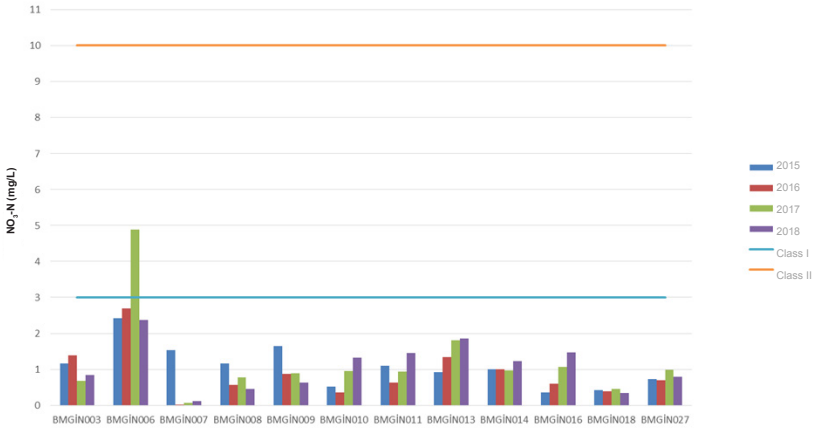
6.3- Nutrients in Freshwater Resources

D P **S** I R

High amounts of nitrogen and phosphorus entering from urban areas, industrial and agricultural areas to the water bodies can cause eutrophication. The indicator is a state indicator and is used to show current nutrient levels and their temporal and spatial variation. The changes of the parameters of total nitrogen (TN), nitrate-nitrogen (NO_3-N), and orthophosphate phosphorus (o-PO_4-P) in water bodies by the time were examined within the scope of this indicator.

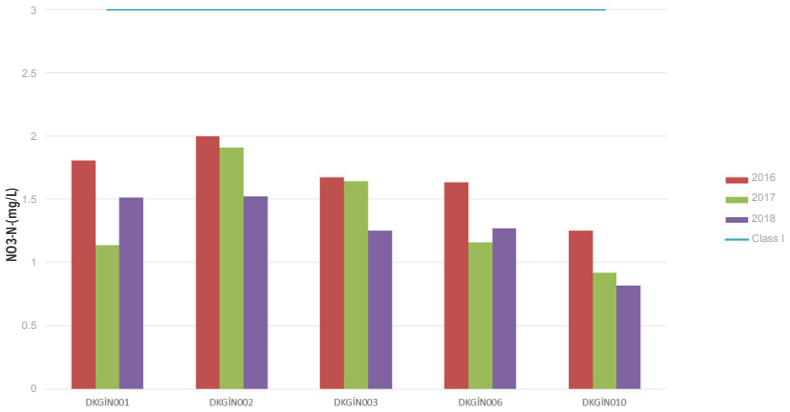
The results of the monitoring programs carried out by the Ministry of Agriculture and Forestry in various basins are evaluated according to the criteria given in the "By-Law on Surface Water Quality Management" Annex-5 Table 2 and the current status in terms of TN, NO_3-N, and orthophosphate phosphorus o-PO_4-P parameters has been revealed. The water quality is generally found out to be at the Class I quality in terms of the NO_3-N parameter in the basins where the measurement is made. On the other hand, the water quality in Büyük Menderes and Eastern Black Sea Basins is at the Class II quality on the average in terms of TN parameter. Water quality can generally be said to be at the Class II quality in terms of O-PO_4 parameter[55].

GRAPH 40-BÜYÜK MENDERES BASIN NO_3-N (mg/L)



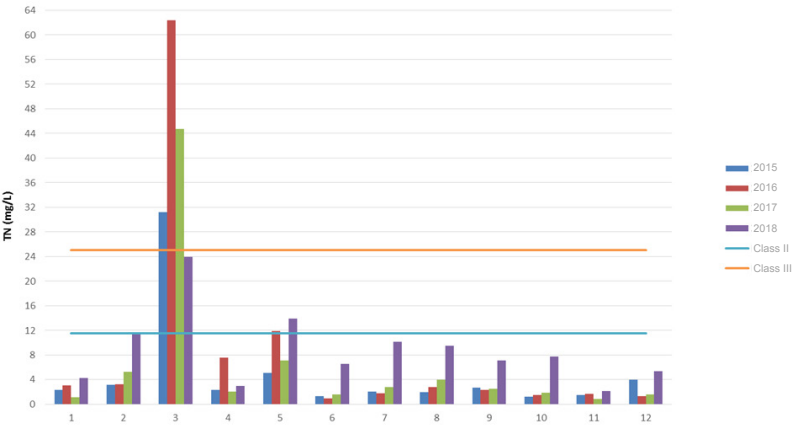
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 41– EAST BLACKSEA BASIN NO_3-N (mg/L)



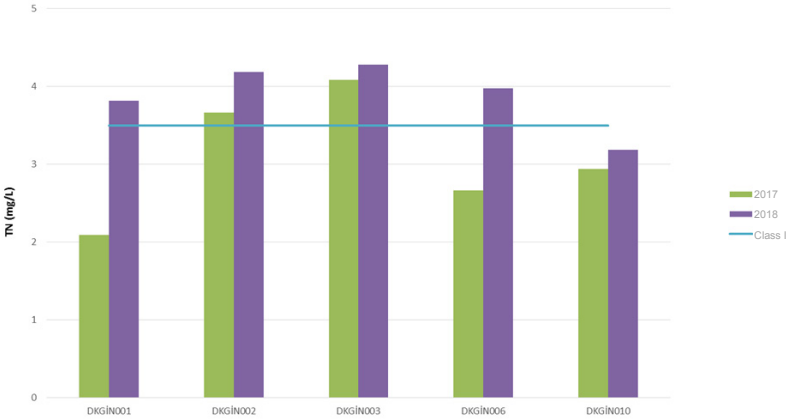
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 42– BÜYÜK MENDERES BASIN TN (mg/L)



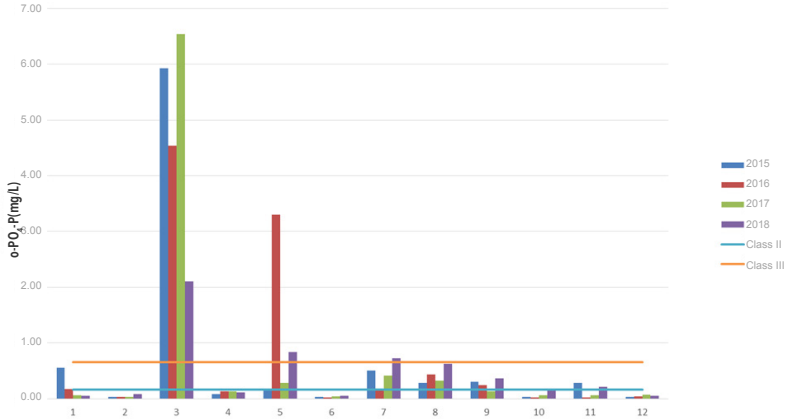
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 43– EAST BLACK SEA BASIN TN (mg/L)



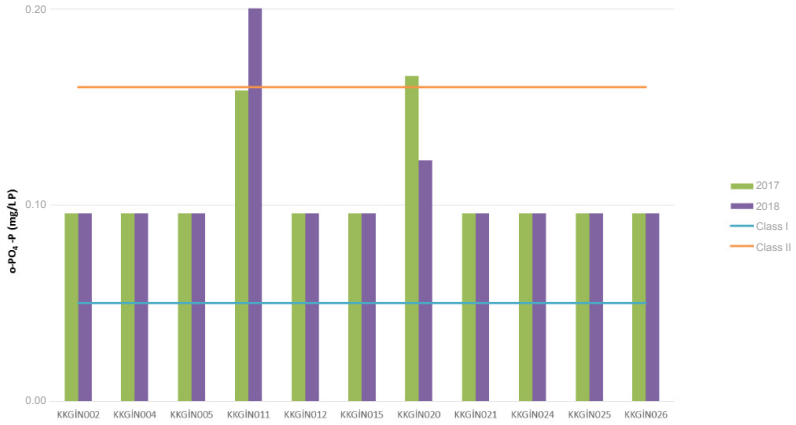
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 44 – BÜYÜK MENDERES BASIN o-PO_4-P (mg/L)



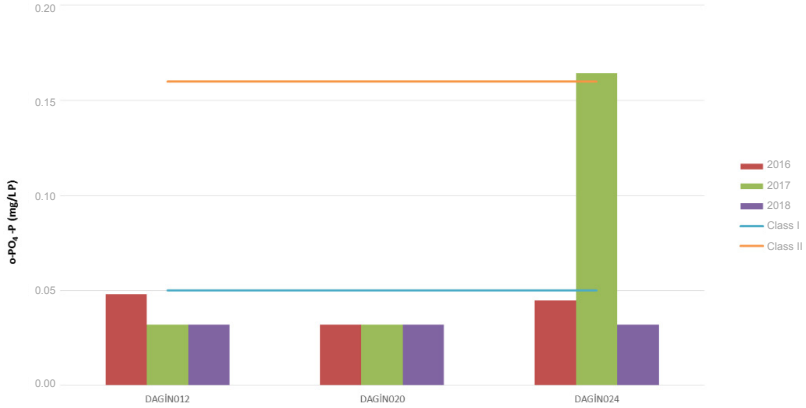
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 45– KONYA CLOSED BASIN o-PO_4-P (mg/L)



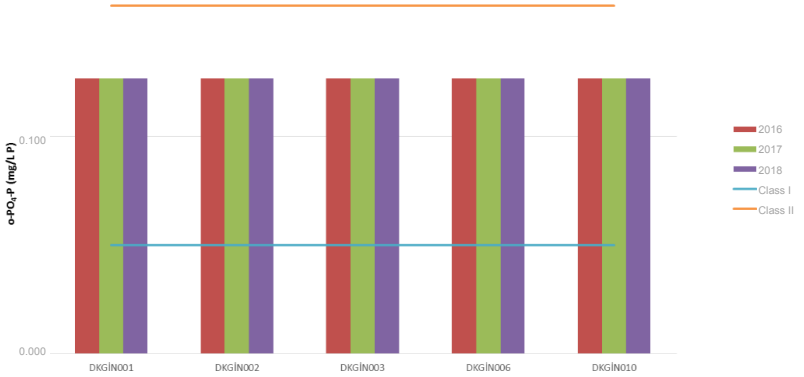
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 46– EAST MEDITERRANEAN BASIN o-PO_4-P (mg/L)



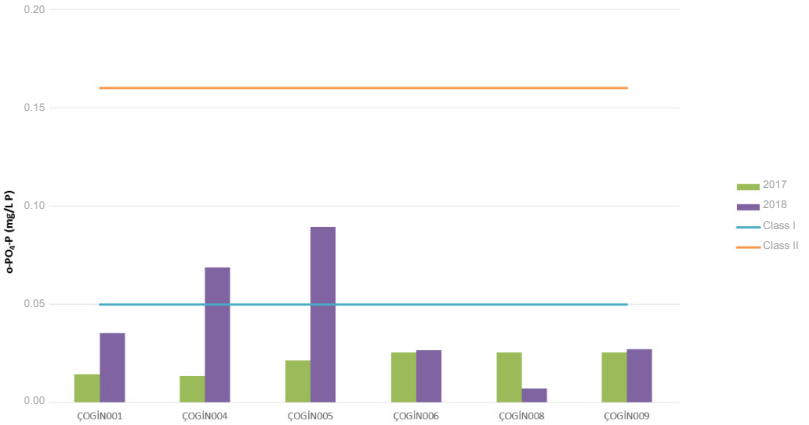
Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

GRAPH 47– EAST BLACK SEA BASIN o-PO_4-P (mg/L)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

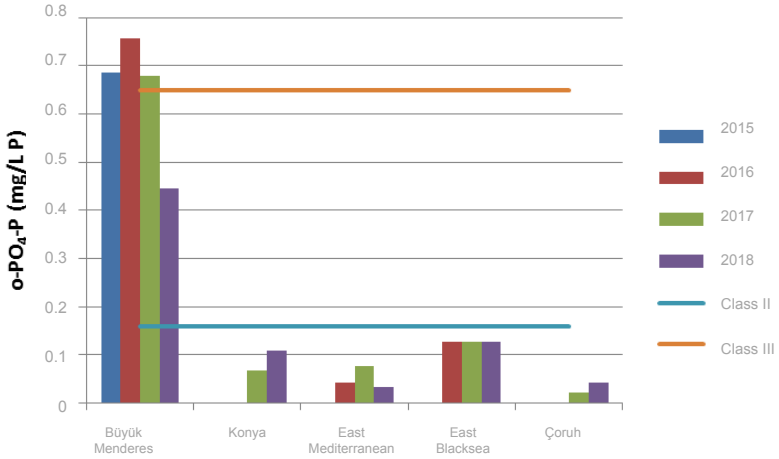
GRAPH 48 – ÇORUH BASIN o-PO_4-P (mg/L)



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

Considering the variation of the o-PO_4-P parameter by years based on basins, although it is not possible to talk about a general trend, it is observed that the water is at Class I quality level in terms of this parameter. However, this parameter was observed as at Class IV quality before 2018 in the Büyük Menderes Basin, which was under the influence of intense urban, agricultural and industrial pressures. On the other hand, an improvement was observed in water quality in 2018 and Class III quality was achieved in terms of the o-PO_4-P parameter[56].

GRAPH 49 – CHANGE OF o-PO_4-P CONCENTRATION IN THE BASINS OVER THE YEARS



Source: Ministry of Agriculture and Forestry, General Directorate of Water Management

6.4- Chlorophyll-a Concentration in Coastal and Marine Waters

D P S I R

Chlorophyll-a is an indicator of phytoplankton biomass and performs photosynthesis. This mechanism ensures the production of primary organic matter in the nutrient cycle. The organic load and organic wastes generated in the euphotic zone and produced in the connected productions settle deeper in the water column. Meanwhile, they cause the use of oxygen dissolved in water and decrease the oxygen required for life through bacterial breakdown.

Laboratory, Measurement and Monitoring Department of the Ministry of Environment and Urbanization carried out the "Integrated Marine Pollution Monitoring Program"

under the coordination of TUBITAK-Marmara Research Center. In the program, the quality and pollution status of our seas are revealed with various indicators under monitoring studies in the Mediterranean, Aegean Sea, Marmara Sea, and the Black Sea.

The chlorophyll-a (Chl-a) values were examined for the classification of water quality within the water management unit determined in all our seas between 2014 and 2018. Accordingly, it was observed that in general, sunlight was sufficient in all seas every year and it reached its highest values with the increase of primary production in the winter period when the inputs of terrestrial nutrients increased, and there was no certain difference between years.

Pollution and quality assessments in seas are conducted based on the water management unit (WMU). Water Management Units, or Coastal Water Bodies, defines a surface water segment that is separated by important characteristics of surface waters such as physical, hydromorphological, ecological, and stress analysis. They are the smallest management units covered by the Water Framework Directive.

The highest chlorophyll-a values were observed in shallow and less salty coastal areas fed by rivers and other terrestrial inputs such as domestic/urban wastewater (AKD-1 (Asi River), AKD-4 (Ceyhan River), AKD-5 (Seyhan River)) in the Mediterranean. Chlorophyll-a levels were low and at their natural level in open sea surface waters where the effects of terrestrial inputs were weakened and in the clean coastal zone (the region between Anamur and Marmaris). The effect of terrestrial inputs in the water column was up to 5-10 m depth. The change of 2018 summer period values with depth was examined. Accordingly, the biomass indicator Chl-a values were measured at high levels in the coastal area of Mersin and İskenderun gulfs, which were fed by rivers and where low saline and low Secchi Disc Depth values were observed. On the other hand, Chl-a values were at ground values in the coastal area and reference zone surface waters where terrestrial inputs were weakened (Graph 50).

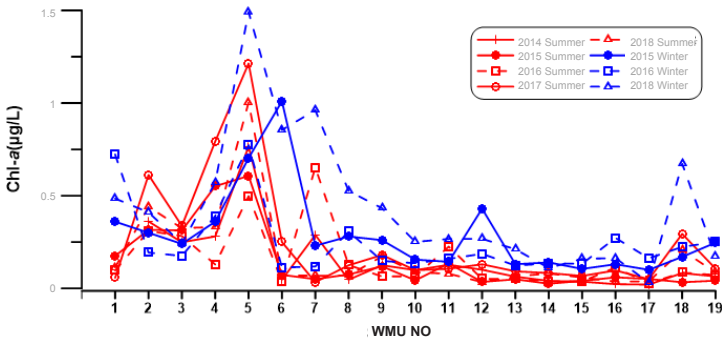
When the surface layer chlorophyll-a concentration is evaluated in the Aegean Sea 2014-2018 WMUs, although no significant variation between the summer and winter samplings was observed, relatively high values were observed in the Inner and Central Gulf of İzmir and in the Gulf of Güllük. Relatively high values in the North Aegean during the winter months are thought to be originated from the Marmara Sea (Graph 51).

When the 2018 winter and summer surface distributions of chlorophyll-a are analyzed, it is seen that concentrations across the Black Sea are <1 µg / L. Relatively higher values (> 1-1.5 µg / L) were generally observed at the coastal stations under the influence of the Sakarya River and the near-coastal stations of the river/stream in the eastern Black Sea. Most of the stations in the open sea remained below <1 µg / L. When the 2014-2018

surface layer chlorophyll-a concentrations are compared, it is seen that winter levels are generally higher than summer levels. 2018 winter and summer concentrations are consistent with the previous periods (Graph 52).

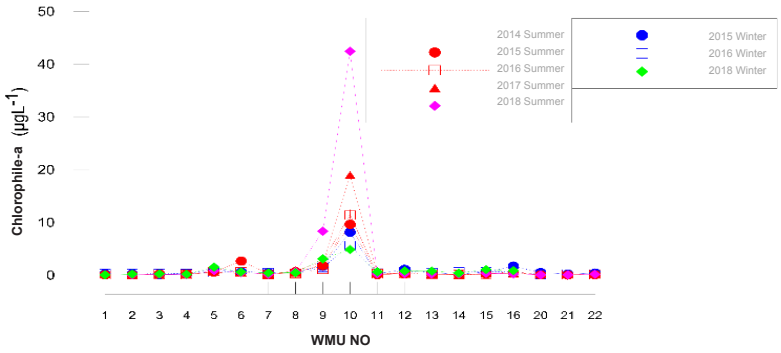
These two periods (especially the spring period) showed high values in almost all WMUs in the winter and spring periods of 2018 in the Marmara Sea. 2018 summer concentrations are consistent with the previous summer concentrations (Graph 53).

GRAPH 50- 2014-2018 COMPARISON OF THE MEDITERRANEAN SURFACE WATER CHLOROPHILE-A CONCENTRATIONS



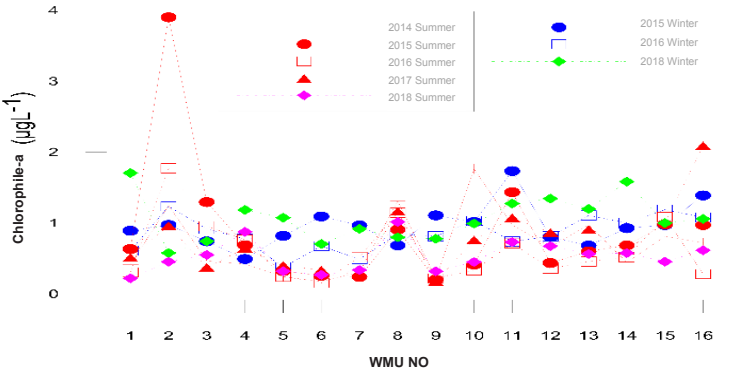
Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2111 (The Mediterranean Final Report, 2018), February 2018, Gebze-Kocaeli.

GRAPH 51- 2014-2018 COMPARISON OF THE EAGEAN SURFACE WATER CHLOROPHILE-A CONCENTRATIONS



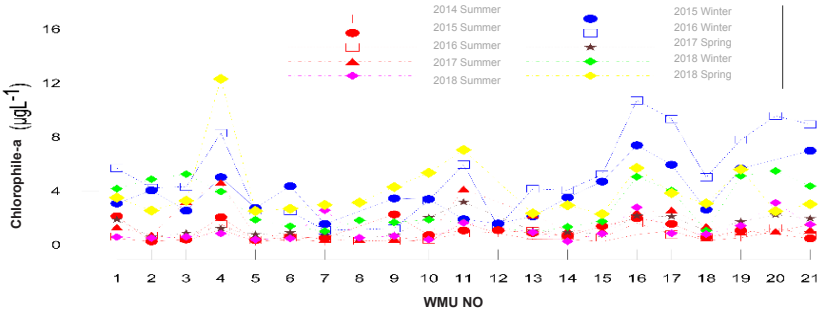
Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2113 (The Aegean Sea Final Report, 2018), February 2018, Gebze-Kocaeli.

GRAPH 52- 2014-2018 COMPARISON OF THE BLACK SEA SURFACE WATER CHLOROPHILE-A CONCENTRATIONS



Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2115 (The Black Sea Final Report, 2018), February 2018, Gebze-Kocaeli.

GRAPH 53- 2014-2018 COMPARISON OF THE MARMARA SEA SURFACE WATER CHLOROPHILE-A CONCENTRATIONS



Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2116 (The Marmara Sea Final Report, 2018), February 2018, Gebze-Kocaeli

6.5- Nutrients in Coastal and Marine Waters

D P S I R

The nutrients indicator is a state indicator and is used to show geographic changes in current nutrient concentrations and temporal trends. Widespread ingress of nitrogen and phosphorus from urban areas, industrial and agricultural areas carried/discharged into the sea can cause eutrophication.

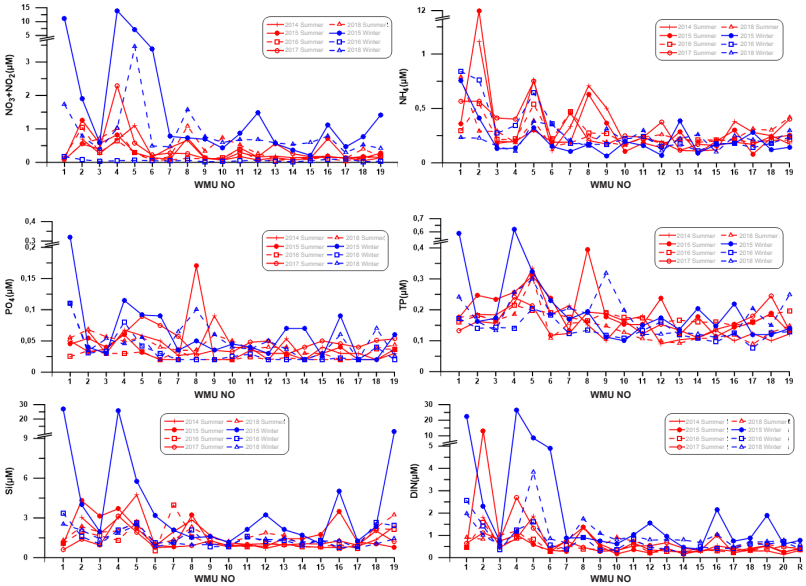
Laboratory, Measurement and Monitoring Department of the Ministry of Environment and Urbanization carried out the "Integrated Marine Pollution Monitoring Program" under the coordination of TUBITAK-Marmara Research Center. In the program, the quality and pollution status of our seas are revealed with various indicators under monitoring studies in the Mediterranean, Aegean Sea, Marmara Sea, and the Black Sea.

Pollution and quality assessments in seas are conducted based on the water management unit (WMU). Water Management Units, or Coastal Water Bodies, defines a surface water segment that is separated by important characteristics of surface waters such as physical, hydromorphological, ecological, and stress analysis. They are the smallest management units covered by the Water Framework Directive.

Surface dissolved inorganic nitrogen (CHIN), silicate (Si), nitrite-nitrate nitrogen (Nox), and total phosphorus (TP) concentrations were evaluated in nutrient surface distributions[57].

PO_4 and TP values in Mediterranean coastal waters were relatively high in İskenderun and Mersin Bays where terrestrial pressures were evident. The highest values were measured in WMU surface waters fed by the river inputs (Asi, Ceyhan, Seyhan, Göksu river waters) in winter. The surface water phosphate and TP averages of the WMUs decreased with the seasonal decrease in stream flows in the late summer (August) period and similar average values were obtained in marine areas where terrestrial pressure was weak. Dissolved inorganic nitrogen total (DIN) areal distribution and WMU averages showed a decreasing trend from İskenderun Bay region to Marmaris Bay (east-west direction) in the Mediterranean Region, depending on the stream input. DIN concentration values in coastal and open seawaters of Antalya Bay and Finike Region were close to the general characteristics of the eastern Mediterranean in summer and winter periods. Nox concentration increased significantly in the winter period in coastal marine areas affected by inputs due to the seasonally increasing flows of rivers and rainfalls in winter. This seasonal change is consistent with the high PO_4, TP and low SDD values measured in the same periods in the eastern region WMUs where terrestrial pressures are evident (Graph 54).

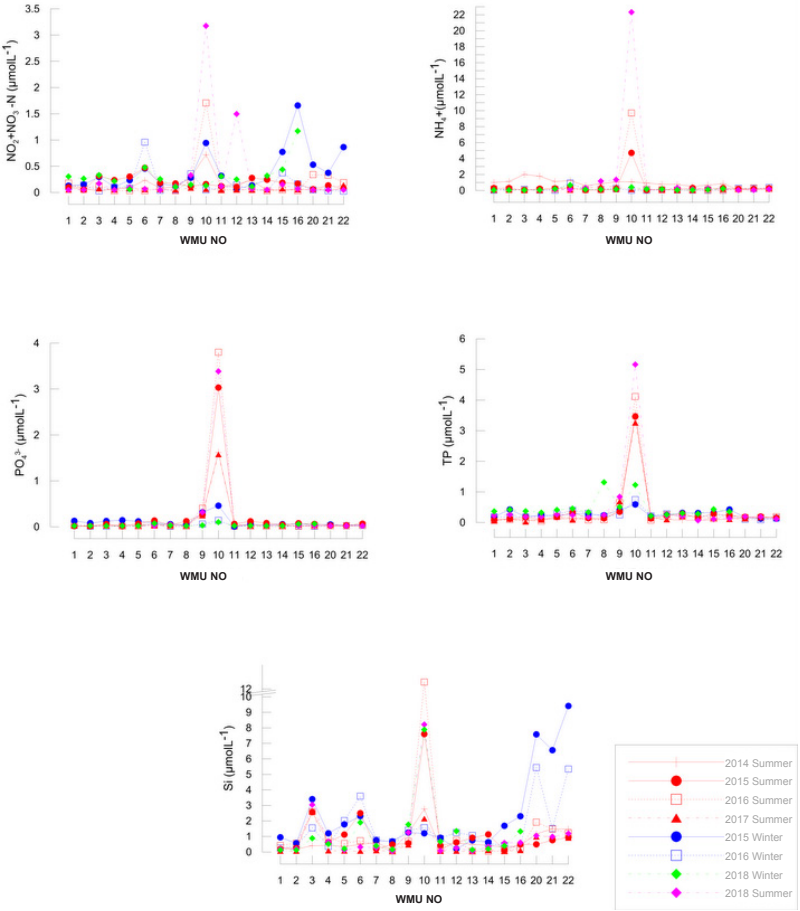
GRAPH 54- 2014-2018 COMPARISON OF MEDITERRANEAN SURFACE WATER NUTRIENT PARAMETERS



Source: MOEU-DG for EIA, Permitting and Inspection and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2111 (Mediterranean Final Report, 2018), February 2018, Gebze-Kocaeli.

When the nutrient salt concentrations in the Aegean Sea were assessed seasonally, no significant difference between summer and winter values was observed. However, 2018 measurements were observed as low in all WMUs. Nox values were observed to be generally below 0.5 µM in both seasons, but concentrations were found to be 2-4 times higher (0.5-2 µM) especially in EGE06 (Büyük Menderes River Mouth) and EGE10 (Inner Gulf of İzmir). This situation can be explained by the fact that both WMUs are under the influence of the river input. Besides, the Inner Gulf of İzmir is thought to be under the influence of urban discharges. The influence of high river input was observed in the mouth of the Meriç River (EGE16) during the sampling period. Meanwhile, the surface waters rich in nutrients from the Marmara Sea were thought to affect the Dardanelles Strait. All the samplings, including 2018, revealed that nutrients had significantly higher concentrations in EGE10 than other WMUs.

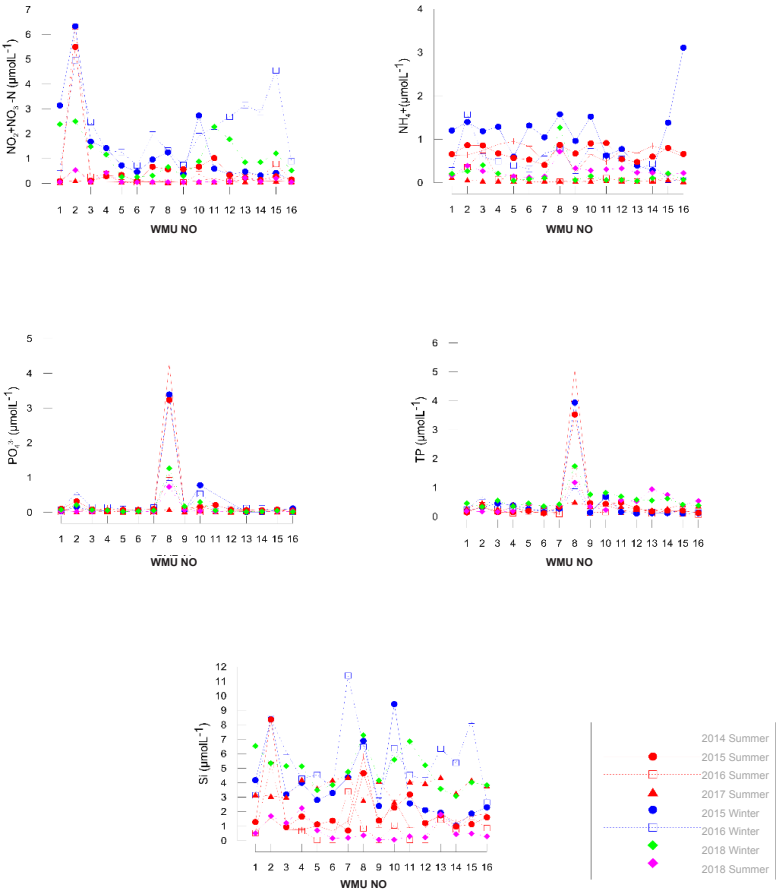
GRAPH 55- 2014-2018 COMPARISON OF AEGEAN SURFACE WATER NUTRIENT PARAMETERS



Source: MOEU-DG for EIA, Permitting and Inspection and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2113 (Aegean Sea Final Report, 2018), February 2018, Gebze-Kocaeli

Although higher levels are generally observed in the Black Sea during the winter periods, the most prominent feature is the high nitrogen and silicate values in the WMUs (2,7,10) under the influence of the rivers Sakarya, Kızılırmak and Yeşilırmak (Graph 56). Besides, high phosphorus values are apparent in KAR08, which is under the influence of Samsun city.

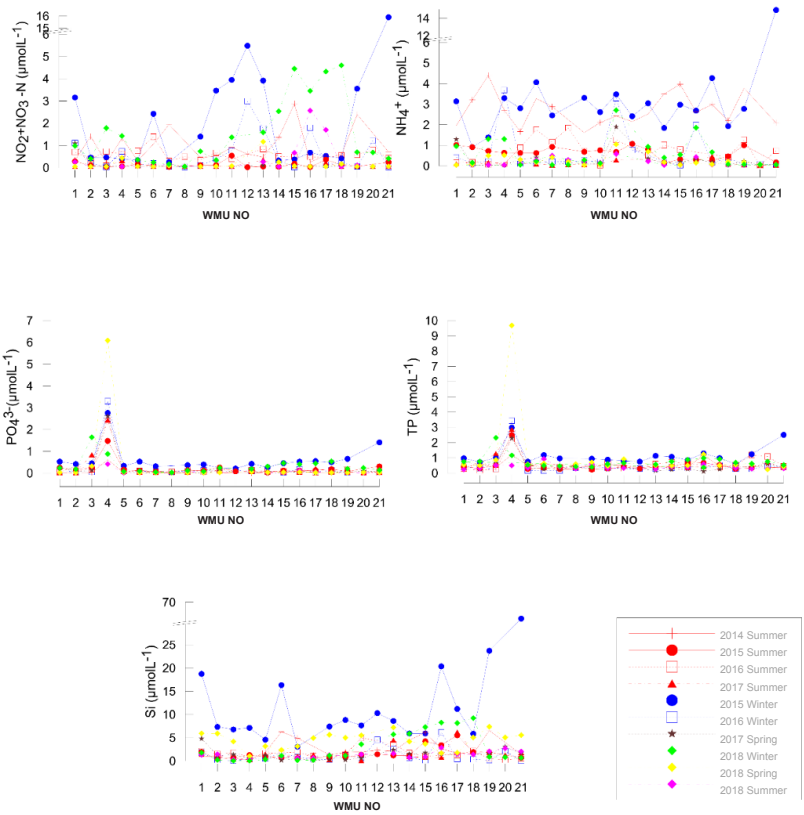
GRAPH 56- 2014-2018 COMPARISON OF BLACK SEA SURFACE WATER NUTRIENT PARAMETERS



Source: MOEU-DG for EIA, Permitting and Inspection and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2115 (Black Sea Final Report, 2018), February 2018, Gebze-Kocaeli.

It is possible to assert that the nutrients in the Marmara Sea are measured higher in the winter periods than in the spring and summer periods, but there are also differences between years (Graph 50). All of the nutrients are at the lowest level in the spring period and this indicates that the primary producers consume them. Phosphorous compounds have been measured at the highest level of MAR04 (Gulf of Bandırma) in all seasons, indicating the permanent existence of industrial and domestic pressures. Besides, relatively high nitrogen compounds and silicates have been detected in WMUs (1-2-20-21) under the influence of the Susurluk River.

GRAPH 57- 2014-2018 COMPARISON OF MARMARA SEA SURFACE WATER NUTRIENT PARAMETERS



Source: MOEU-DG for EIA, Permitting and Inspection and TÜBİTAK-MAM (2017). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2116 (Marmara Sea Final Report, 2018), February 2018, Gebze-Kocaeli.

6.6- Bathing Water Quality

D P **S** I R

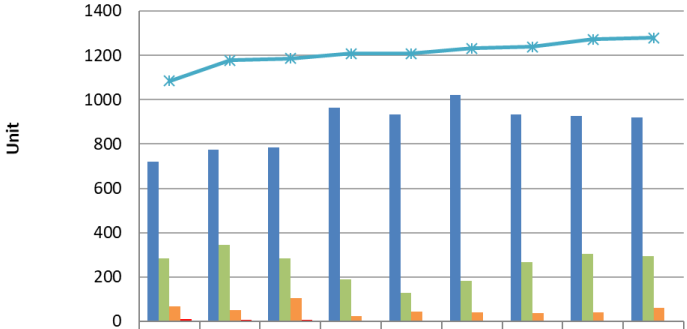
The indicator is a state indicator and is related to the impacts of urban wastewater on marine and coastal water quality.

The Ministry of Health General Directorate of Public Health carries out bacteriological monitoring activities in 34 provinces with coasts to the sea and lakes every year during the bathing season to protect individual and public health.

The number of bathing areas monitored was 1.085 in 2010, while it was 1.279 in 2018.

921 bathing areas were classified as Class A (72%), 296 bathing areas as Class B (23%), and 62 bathing areas as Class C (5%) according to the results of monitoring conducted in 2018. No bathing areas were classified as Class D[58].

GRAPH 58- CHANGE OF BATHING AREA QUALITY CLASSES (2010-2018)



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Class A	721	776	786	963	932	1021	932	926	921
Class B	285	345	284	189	130	183	267	306	296
Class C	68	50	105	24	44	40	38	41	62
Class D	11	7	8	0	2	5	2	0	0
Monitored bathing areas	1085	1178	1186	1208	1208	1232	1239	1273	1279

Source: Ministry of Health, General Directorate of Public Health.

6.7- Drinking and Utility Water Supplies of Municipalities

D P S I R

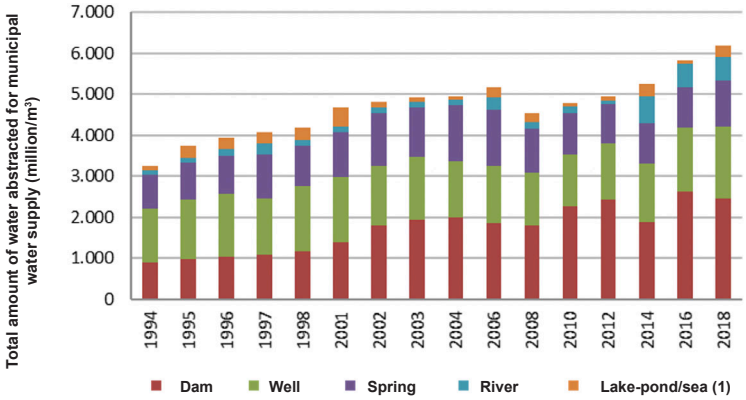
The indicator represents the pressure on water supplies. Dams are the most important and most used water supply of the municipalities. The rate of water abstracted from dams used for water supply by municipalities may decrease, and the rate of water abstracted from rivers, lakes, and ponds may increase in years of low precipitation. 39.9% of the water exploited for water supply in Turkey was from dams, 26.1% from wells, 18.4% from springs, 9% from rivers, and 4.6% from lakes-ponds/seas in 2018.

The rate of the municipal population served by water supply networks to the total municipal population was 98.6%, and the rate of the municipal population served by water treatment facilities to the total municipal population was 60.1% in 2018.

While 3.24 billion m^3 of water was abstracted in 1994 to be distributed by the municipalities through the water supply network, this figure increased to 6.2 billion m^3 in 2018.

3.6 billion m^3 of the total 6.2 billion m^3 of water abstracted for water supply networks were treated in drinking and utility water treatment plants. 92.1% of this amount was treated by conventional methods, 7.8% was treated by advanced methods, and 0.1% was treated by physical methods[59].

GRAPH 59- DISTRIBUTION OF WATER ABSTRACTED FOR MUNICIPAL WATER SUPPLY NETWORK BY SOURCES



The amount of water been abstracted from the sea since 2010 is included..

Source: TURKSTAT

6.8- Municipalities Served by Wastewater Treatment Unit

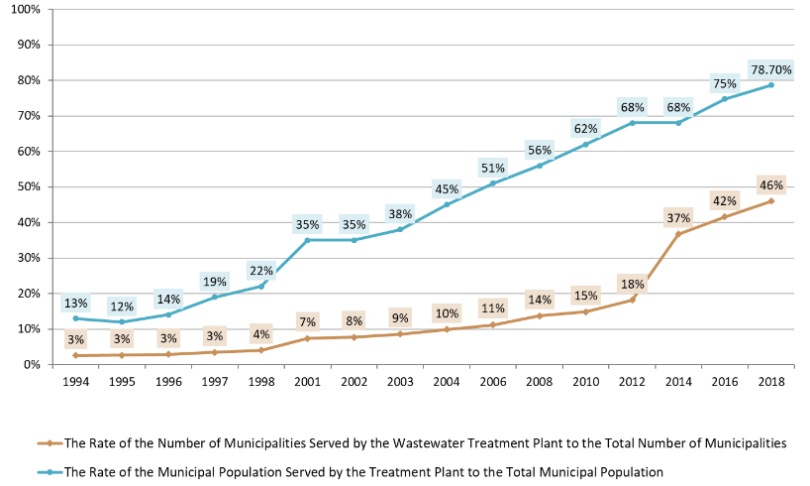
D P S I R

The indicator is a response indicator and is important in monitoring the success of policies implemented for the control of pollution from domestic wastewater.

It is an important practice to treat wastewater for using water more efficiently and protecting available water resources. As a result of significant investments made by Turkey in this field, while the rate of the number of municipalities served by wastewater treatment plants in total municipal number was 3% in 1994, this figure reached 46% in 2018. The rate of the municipal population served with wastewater treatment facilities to the total municipal population reached 78.7%[60].

Regarding the rate of population based on urbanization; the highest connectivity rates in the EU-28 were recorded in the United Kingdom (100%), the Netherlands (99.4%), Malta (98.6%), Luxembourg (98.5%), Spain (94.6%) and Germany (95.4%) (2015 data)[61].

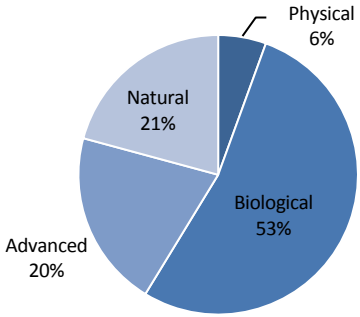
GRAPH 60- NUMBER OF MUNICIPALITIES AND RATE OF POPULATION SERVED BY WASTEWATER TREATMENT PLANTS (%)



Source: Turkish Statistical Institute, "Municipal Wastewater Statistics, 2018"

The total number of wastewater treatment plants, which was 145 in 2002, reached 991 at the end of 2018. Considering the distribution of these plants, 20% of the wastewater treatment plants in our country are advanced treatment plants, 53% of them are biological treatment plants, 6% of them are physical treatment plants, and 21% of them are natural treatment plants.

GRAPH 61- DISTRIBUTION OF WASTEWATER TREATMENT PLANTS BY TYPE -2018



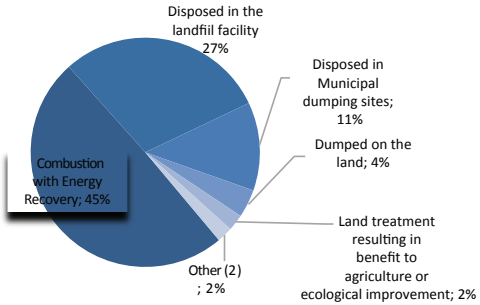
Source: Turkish Statistical Institute, "Municipal Wastewater Statistics, 2018"

47.9% of the wastewater in Turkey was treated with advanced, 27.6% of that was treated with biological, 24.2% of that was treated with physical and 0.3% of that was treated with natural treatment in 2018 according to TURKSTAT data[62] [40].

The proportion of the population connected to at least secondary wastewater treatment plants is above 80% in EU-15 countries (according to different reference years). The share of the population connected at least to the secondary wastewater treatment plant has exceeded 95% in Latvia, Estonia, England, Netherlands, Luxembourg, Germany, Sweden, Switzerland, and Austria according to 2016 data. This rate was 56.3% in Turkey according to 2016[63].

It was determined that 319 thousand tons (on a dry matter basis) sewage sludge was formed as a result of wastewater treatment processes in Turkey in 2018 according to TURKSTAT data.

GRAPH 62 – DISTRIBUTION SEWAGE SLUDGE BY DISPOSAL AND RECOVERY METHODS, 2018 (%) (1)



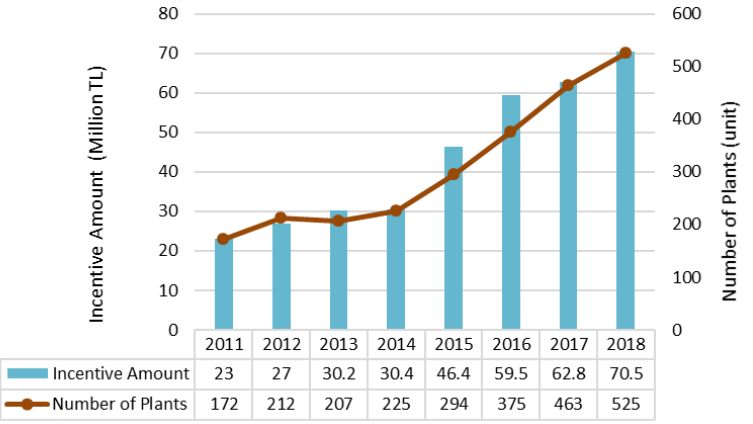
Source: TURKSTAT

(1)Sludge amount data are on a dry matter basis.

(2) Includes temporarily stored, buried, etc. sludge amounts.

Generally, the excessive energy needs of wastewater treatment plants increase operational costs and negatively affect the operation of the plant. In this context, the Ministry of Environment and Urbanization submits Energy Incentive Repayment Certificate to the plants whose application is approved under the "By-Law for Subsidizing Energy Costs of Wastewater Treatment Plants" to meet 50% of the energy costs of wastewater treatment plants. In this context, the Ministry of Environment and Urbanization made a support payment of 70.5 million TL to 525 plants in 2018 to ensure the effective operation of wastewater treatment plants and to improve the receiving water body quality.

GRAPH 63- ENERGY INCENTIVES FOR WASTEWATER TREATMENT PLANTS



	2011	2012	2013	2014	2015	2016	2017	2018
Incentive Amount	23	27	30.2	30.4	46.4	59.5	62.8	70.5
Number of Plants	172	212	207	225	294	375	463	525

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

6.9- Municipalities Served by Sewerage Systems

D P S I R

The indicator is a response indicator that represents the rate of municipality population served by sewerage systems in the total municipal population.

The share of the municipal population served by the sewerage systems in the total municipal population was determined to be 90.7% as of 2018.

The total number of municipalities was 1399 and the number of the municipalities served by the sewerage system was 1357(97% of the municipalities) as of 2018.

The average daily per capita amount of wastewater discharged by municipalities through the sewerage increased from 126 liters in 1994 to 188 liters in 2016[64].

GRAPH 64- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

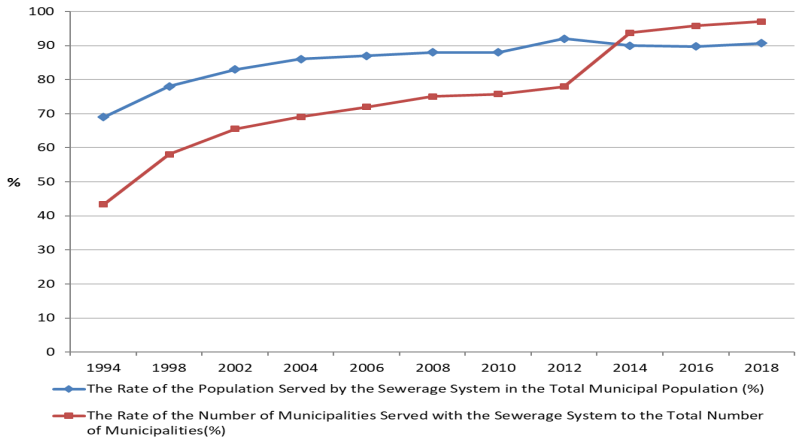


TABLE 12- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

YEARS	1994	1998	2002	2004	2006	2008	2010	2012	2014	2016	2018
Rate of Population Served by Sewerage Systems in Total Municipal Population (%)	69	78	83	86	87	88	88	92	90	90	90,7
Rate of Number of Municipalities Served by Sewerage System in Total Number of Municipalities (%)	43	58	66	69	72	75	76	78	94	96	97
Average Daily Amount of Wastewater Discharged per Person (liter/capita-day	126	154	154	174	181	173	182	190	181	183	188

Source: TURKSTAT

7

WASTE

7.1- Municipal Waste and Disposal Amounts

D P S I R

Primary prevention of waste generation, reduction of waste at source, waste recycling, energy recovery and finally directing waste to disposal methods are general principles of waste management. Waste production quantities are pressure, their collection, disposal and recovery quantities are response indicators.

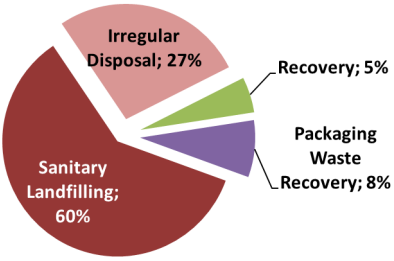
Our Ministry prepared the National Waste Management and Action Plan (NWMAP) (2016-2023) under the responsibility of determining a policy and strategy for minimizing waste at source and its classification, collection, transportation, temporary storage, recycling, disposal, reuse, processing, conversion to energy and final disposal processes. The plan was prepared under the principle of sustainability, taking into account international standards and national priorities to create a healthy or sustainable environment for present and future generations through the protection and development of our natural resources and ecosystems. The prepared "National Waste Management and Action Plan" includes the current situation of waste management in our country, the points that need to be improved or developed in the management system, the population and waste projections, the contributions of the stakeholders involved in waste management, the periodic waste management activities planned until 2023, the investments in waste management and the financing needs.

The Zero Waste Project, the vision project of our Ministry, was initiated to control our waste within the principles of sustainable development and leave a clean and developed Turkey and a livable world for future generations. The aim is to gradually implement the zero waste project in public facilities/organizations, airports, ports, marinas, bus stations, train stations, educational institutions, shopping malls, hospitals, recreational facilities and large workplaces starting from 2018 in Ankara and to spread it throughout the country by 2023.

The average amount of municipal waste generated per capita in the EU-28 countries was 488 kg, while in our country it was 424 kg, according to EUROSTAT data of 2018[65].

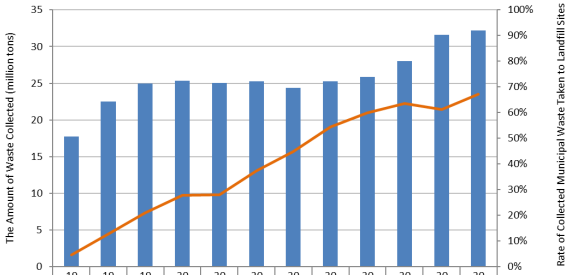
The recycling rate in municipal waste was 46% as the average of EU-28 countries as of 2017[66]. This rate was 13% in Turkey as of 2016 according to the National Waste Management and Action Plan[67].

GRAPH 65- DISTRIBUTION OF MUNICIPAL WASTES IN 2016 BY DISPOSAL/ RECOVERY METHODS ACCORDING TO THE NATIONAL WASTE MANAGEMENT AND ACTION PLAN (%)



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

GRAPH 66- AMOUNT OF MUNICIPAL WASTE COLLECTED AND RATE OF SANITARY LANDFILLING BY YEARS



	1994	1996	1998	2002	2004	2006	2008	2010	2012	2014	2016	2018
Municipal Waste Collected	17.76	22.48	24.95	25.37	25.01	25.28	24.36	25.28	25.85	28.01	31.58	32.21
Rate of Collected Municipal Waste Taken to Landfill Sites	4.6%	12.7%	21.1%	27.8%	28.0%	37.3%	45.0%	54.4%	59.9%	63.6%	61.2%	67.10%

Source: TURKSTAT

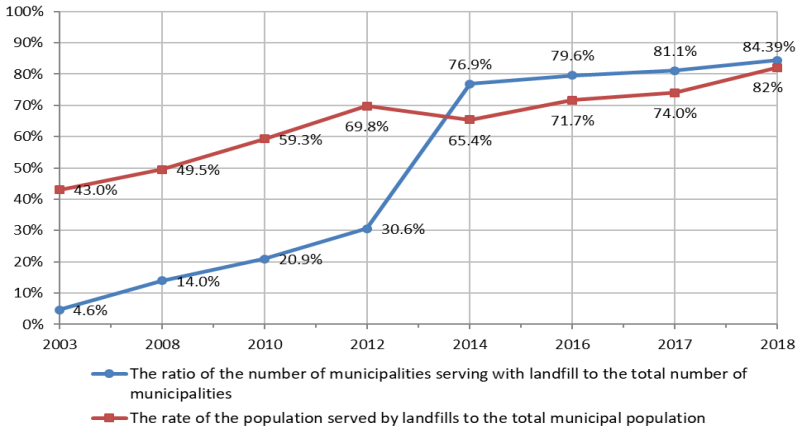
7.2- Number of Landfills - Number of Municipalities - Population Served with Landfills

D P S I R

The number of waste landfills, which was 15 until 2003, increased to 38 in 2008, 46 in 2010, 79 in 2014, 81 in 2015, 84 in 2016 and 87 in 2017, and 88 in 2018 as a result of the studies for the establishment of solid waste disposal facilities in Turkey. 89 facilities served 64.8 million people in 1179 municipalities as of 2019.

The proportion of the population served by landfills to the total population of municipalities was 82% in 2019, according to the Ministry of Environment and Urbanization. The goal is to improve all existing infrastructure facilities and increase the percentage of the population served by waste disposal facilities to 100% by the end of 2023.

GRAPH 67-NUMBER OF MUNICIPALITIES AND RATE OF POPULATION SERVED WITH LANDFILLS (%) BY YEARS



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

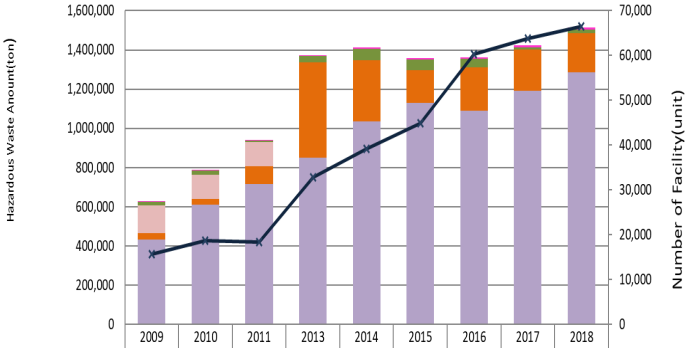
7.3- Hazardous Waste

D P S I R

Hazardous waste, especially from industrial plants, is an indicator of an important pressure factor in terms of environmental values.

The amount of waste throughout Turkey is determined by the waste declaration system used by industrial facilities whose operational processes generate hazardous waste. At the end of 2018, 66,478 companies used the Waste Declaration System(WDS) and the amount of hazardous waste generated throughout Turkey was declared by these companies as 1,513,624 tons for 2018. The amount of waste generated from mining activities is not included in this amount.84.99% of 1,513,624 tons of waste was directed to recycling. 13.26% was disposed of, 1.15% was stocked, 0.6% was exported [68].

GRAPH 68- DATA OF WASTE DECLARATION SYSTEM (2009-2018)



	2009	2010	2011	2013	2014	2015	2016	2017	2018
Amount of Exported Waste	2,773	631	139	4,548	6,571	7,779	10,222	10,678	9,060
Amount of Stocked Waste	21,288	22,971	9,943	32,733	58,225	53,251	40,933	13,673	17,434
Waste Processed within the Facility(***)	139,228	121,730	122,915						
Amount of Disposed Waste	35,013	30,315	91,035	487,802	314,826	167,222	222,263	209,930	200,767
Amount of Recovered Waste	430,727	610,770	714,466	848,285	1,033,598	1,129,088	1,089,809	1,190,764	1,286,363
Number of Declarant Facilities	15,664	18,685	18,428	32,803	39,134	44,922	60,233	63,741	66,478

TABLE 13- DATA OF WASTE DECLARATION SYSTEM (2009-2018) (**)

YEARS	2009	2010	2011	2013	2014	2015	2016	2017	2018
Number of Declarant Facilities	15,664	18,685	18,428	32,803(*)	39,134	44,922	60,233	63,741	66,478
Total amount of hazardous waste (tons)	629,933	786,418	938,498	1,373,368	1.413.220	1,357,340	1,363,227	1,425,045	1,513,624

Source: Ministry of Environment and Urbanization, General Directorate of the EIA, Permit and Inspection

Notes:

Wastes generated during exploration, extraction, operation, physical and chemical treatment of the minerals in the waste list (code 01) have been excluded from these amounts.

(*) Missing data have been revised and these data have been recalculated following the publication of the 2013 Environmental Indicators Booklet.

(**) Data for 2012 are not included here because the 2012 Hazardous Waste Statistics Bulletin was not published.

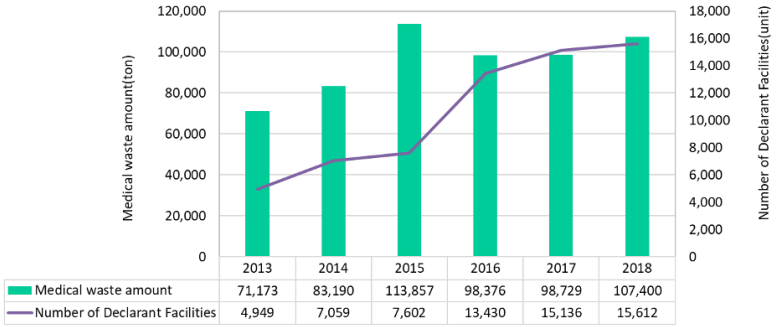
(***) The amount of waste processed at the facility was evaluated under the amount of waste recycled and disposed of according to the 2013 Statistics Bulletin.

7.4- Medical Waste

D P S I R

15,612 facilities declared on Waste Declaration System(WDS) in 2018 and the total amount of medical waste declared was 107,400 tons. This represented 7.1% of the total amount of hazardous waste (excluding mining waste). Medical waste has been successfully rendered harmless by the sterilization plants and incinerators established in Turkey since 2008[69].

GRAPH 69 – MEDICAL WASTE ACCORDING TO THE WASTE DECLARATION SYSTEM DATA (2013-2018)



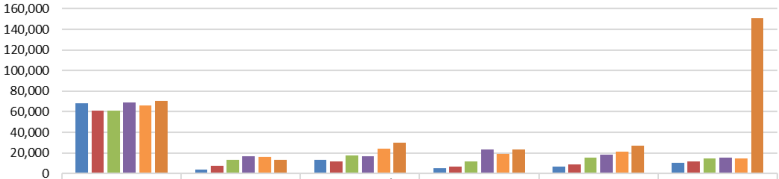
Source: Data from the Ministry of Environment and Urbanization, General Directorate of the EIA, Permit and Inspection, Waste Declaration System(WDS).

7.5- Waste Mineral Oils, Vegetable Waste Oils, Waste Batteries, Waste Accumulator, Waste Electrical and Electronic Equipment, End-of-Life Tires, and End-of-Life Vehicles

D P S I R

2013-2018 amount of the collected waste mineral oils, vegetable waste oils, waste batteries, waste accumulators, waste electrical and electronic equipment, end-of-life tires, and end-of-life vehicles is shown in Graph 70.

GRAPH 70 – THE QUANTITY OF COLLECTED WASTE MINERAL OIL, VEGETABLE WASTE OIL AND NUMBER OF WASTE BATTERIES AND ACCUMULATORS, WASTE ELECTRICAL AND ELECTRONIC GOODS, END-OF-LIFE TIRES, AND END-OF-LIFE VEHICLES (2013-2018)



	Waste Mineral Oils (tons)	Vegetable Waste Oils (tons)	Waste Batteries (tons) and Waste Accumulators (tons)	Waste Electrical and Electronic Equipment (ton)	End-of-Life Tires (ton)	End-of-Life Vehicles (number)
2013	68,236	4,022	13,488	4,911	6,277	10,619
2014	61,335	7,234	11,982	6,817	8,917	11,962
2015	60,906	12,958	17,282	11,596	15,307	14,736
2016	68,895	17,070	16,908	23,027	18,406	15,541
2017	66,442	16,043	23,684	19,224	21,450	14,606
2018	70,130	13,170	29,598	23,365	27,269	150,625

Sources:

1) For the number of end-of-life vehicles; the General Directorate of Environmental Management

2) For the other data;

Ministry of Environment and Urbanization, General Directorate of the EIA, Permit and Inspection, Waste Declaration System(WDS)

7.6- Mining Waste

D P S I R

According to TURKSTAT data, 812 million tons of waste was determined to be generated in mining enterprises in 2018. Mineral waste accounted for 99.9% of the total mining waste. It was found that 97.9% of mineral wastes were pickling material/tailing.

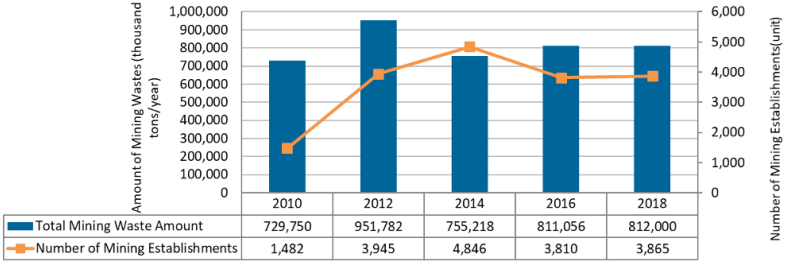
Considering the distribution of total mine wastes according to recovery and disposal methods in 2018; 71.2% was disposed of in waste areas, tailing dams, or landfills, 26.2% was backfilled into the quarry, and 2.6% was recovered or disposed of by other methods[70].

TABLE 14- NUMBER OF MINING WASTE LANDFILLS

YEARS	2011	2012	2013	2014	2015	2016	2017	2018
Mining Waste Landfills	6	17	25	32	34	36	39	51

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

GRAPH 71- MINING WASTE BY YEARS



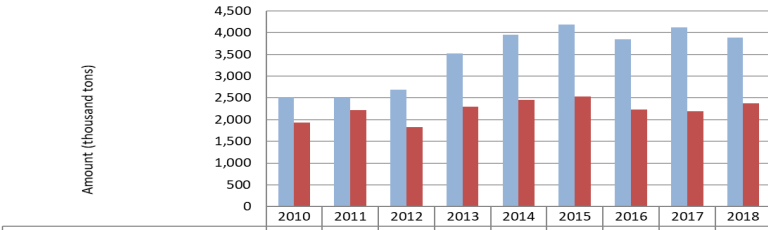
Source: TURKSTAT, Mining Establishments Water, Wastewater and Waste Statistics
http:// http://www.tuik.gov.tr/PreTablo.do?alt_id=1019

7.7- Packaging Waste

D P S I R

In general, packaging waste accounts for 30% of the weight and 50% of the volume of waste. The enterprises that put their products on the market packaged are responsible for covering the collection costs of packaging waste according to the polluter pays principle in the By-Law on the Control of Packaging Waste (CPW) and it is of great importance to register these enterprises.

GRAPH 72- AMOUNT OF PACKAGING RELEASED TO THE MARKET BY YEARS AND AMOUNT OF RECOVERED PACKAGING WASTE ACCORDING TO THE PACKAGING WASTE DECLARATION SYSTEM



	2010	2011	2012	2013	2014	2015	2016	2017	2018
Amount of packaging released to the market	2,516	2,511	2,684	3,529	3,948	4,183	3,851	4,128	3,893
Recycled packaging waste amount	1,938	2,225	1,834	2,300	2,453	2,531	2,226	2,199	2,375

TABLE 15- RESULTS OF PACKAGING AND PACKAGING WASTE PRODUCED AND RELEASED TO THE MARKET IN 2018

Waste Code	Waste Type	Produced Packaging Amount (ton)	Under B-1 (1)			Under B-2 (2) Released to the market (ton)	Under C (3) Supplied (ton)
			Released to the market (ton)	Recovered (ton)	Achieved Recovery Rate (%)		
15.01.02	PLASTIC	4,099,951	943,567	590,923	63	98,240	20,317
15.01.04	METAL	179,438	130,981	89,488	68	82,284	6,307
15.01.05	COMPOSITE	102,636	96,773	62,110	64	21,629	0
15.01.01	PAPER/ CARDBOARD	2,529,403	1,314,154	1,227,249	93	17,164	11,805
15.01.07	GLASS	955,721	860,239	234,699	27	40,021	120,063
15.01.03	WOOD	1,070,084	547,681	171,048	31	4,952	85,935
	TOTAL	8,937,232	3,893,396	2,375,518	61	264,289	244,427

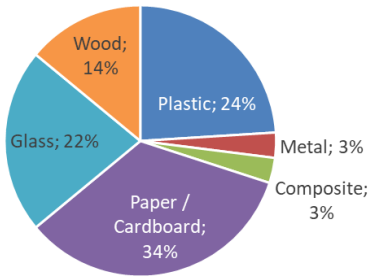
(1) B-1: Packages disposed of under By-Law on CPW

(2) B-2: Packages disposed of under the legislation other than By-Law on CPW

(3) C: Packages released to the market with a deposit under By-Law on CPW

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

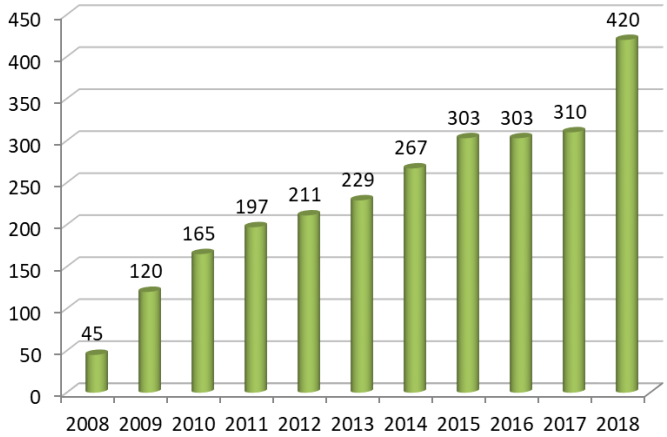
GRAPH 73- THE RATES OF PACKAGES IN THE MARKET UNDER B-1 IN 2018 ACCORDING TO THEIR TYPES



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

Municipalities are obliged to collect or arrange for the collection of packaging waste in accordance with By-Law. They shall prepare packaging waste management plans showing by whom, how and when packaging waste will be collected and transported separately from other waste at source and submitted to the Ministry. These studies began in 2008 and are ongoing.

GRAPH 74- NUMBER OF MUNICIPALITIES WITH APPROPRIATE PACKAGING WASTE MANAGEMENT PLAN



Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

Note: Municipalities were reorganized under Law No. 6360.

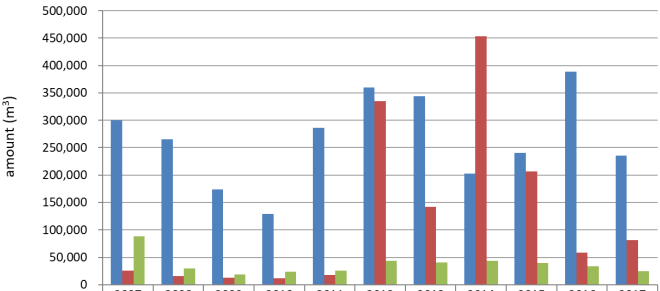
7.8- Ship-Sourced Waste

D P S I R

In order to prevent waste and cargo residues produced by ships under maritime jurisdiction from entering the sea for the protection of the marine environment, waste management facilities are established and operated in accordance with the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), to which Turkey is a party, and national legislation. The number of coastal facilities providing waste reception service to ships in Turkey was 301 in 2018.

The waste collected at the port waste reception facilities is sent for recovery/disposal in accordance with the maritime legislation as per Environmental Law. This will reduce the marine pollution caused by ships due to increasing maritime traffic.

GRAPH 75- DISTRIBUTION OF SHIP-SOURCED WASTES BY YEARS (m^3)



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Oil and Oil Derived Wastes	299,960	264,954	173,571	129,483	286,712	359,505	343,585	203,041	240,046	388,311	236,004
Sewage	25,481	15,934	12,777	11,947	17,583	335,530	141,695	453,718	206,429	58,950	81,585
Garbage	88,038	29,950	18,653	23,977	25,255	43,177	41,039	44,007	40,067	33,872	24,514

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management 2019

8

LAND

8.1- General Distribution of Land Cover

D P **S** I R

The indicator is a state indicator and it is important to know accurately the general distribution of land cover in order to balance land use planning with the monitoring of current and potential developments in this area and to limit the pressure of activities such as urbanization and industrialization on natural areas.

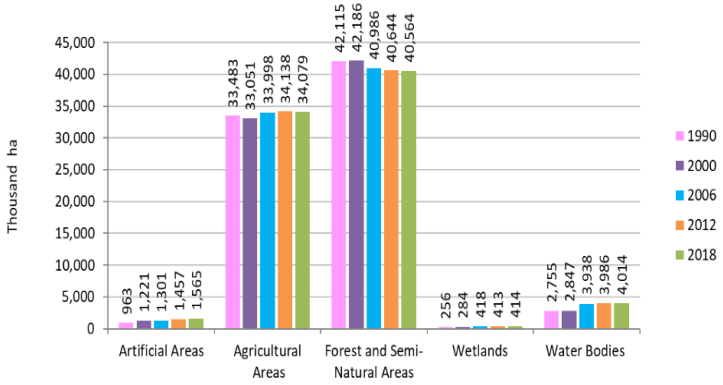
Under the CORINE (Coordination of Information on the Environment - Environmental Information Order) program on land cover, which is one of the land management projects of European Union, CORINE projects were conducted in Turkey in 1990, 2000, 2006, 2012 and 2018.

According to the 2018 CORINE data, the percentage of artificial land in Turkey is 1.94%, while agricultural land is 42.26%, forest and semi-natural land is 50.31%, wetlands are 0.51%, and water bodies are 4.98% of the land.

While forests and semi-natural lands in Turkey have decreased by 1,550,586 ha in Turkey between 1990 and 2018, all other lands have increased, such as artificial lands by 602,640 ha, agricultural lands by 596,041 ha, water bodies by 1,258,936 ha and wetlands by 157,479 ha. Growing population, urbanization and industrialization are factors that put pressure on agricultural land and natural areas.

Looking at the situation in the EU-28 countries, forests and other wooded areas accounted for more than one third (37.8%) of the total area of the EU-28 in 2015, while more than one fifth of the total area was covered by cultivated land (22.2%) and pasture (20.7%). Shrubs covered 7.1% of the total area. While artificial land accounts for 4.2 % of the total area of the EU-28, bare land has a share of 3.3 %, water areas 3.0 % and wetlands 1.7 % [71] .

GRAPH 76- LAND USE BY YEARS (1990-2018)



Source: http://corinecbs.tarimorman.gov.tr/corine

8.2- Misuse of Agricultural Areas

D P S I R

The indicator is a pressure indicator. Increasing population, urbanization and industrialization poses pressure on agricultural lands and impact agricultural lands.

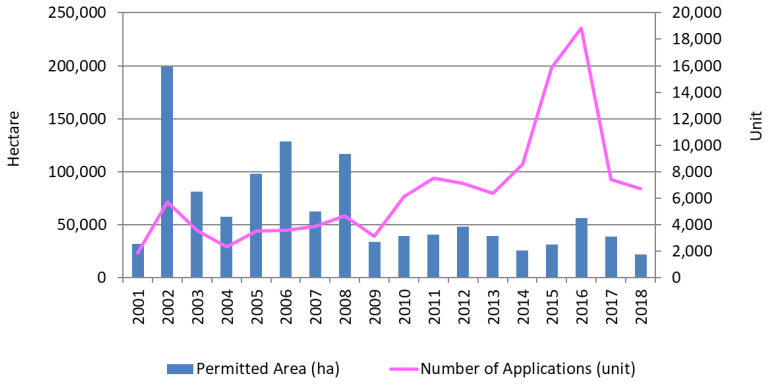
Non-agricultural use of a total of 2,604,517 hectares of agricultural land was allowed in Turkey between 1989 and 2018.

Looking at the class distribution of 722,488 hectares of non-agricultural land permitted for non-agricultural use between 2005 and 2018, 63.9% was marginal agricultural land and 23.7% was absolute agricultural land.

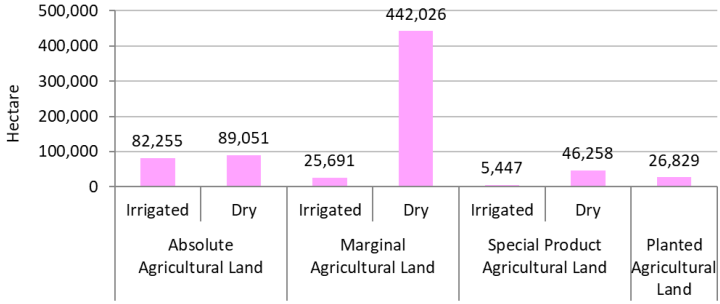
A total of 6,695 permit applications for non-agricultural uses were submitted, and 21,513 hectares of land were granted a permit for non-agricultural use in 2018[72].

Law No. 5403 on Soil Conservation and Land Use contains provisions to protect irrigated and fertile agricultural land and to prevent the opening of agricultural land except for marginal agricultural land for construction, unless there is an obligation to do so.

GRAPH 77- MISUSE OF AGRICULTURAL LAND UNDER THE LAW NO. 5403 ON SOIL CONSERVATION AND LAND USE (2001-2018)



GRAPH 78- DISTRIBUTION OF LANDS PERMITTED FOR MISUSE ACCORDING TO THEIR CLASSES BETWEEN 2005-2018



Source: Ministry of Agriculture and Forestry, General Directorate of Agricultural Reform, 2019

8.3- Zones at Risk of Erosion

D P S I R

The indicator is a state indicator that expresses the erosion-prone zones and the degree of erosion. Turkey is highly vulnerable to erosion due to its geographical location, climate, topography, geological structure and soil characteristics. However, man's improper interference with nature and excessive use of natural resources further exacerbate erosion.

Studies on monitoring and evaluation of water and wind erosion occurring on the soils of Turkey were initiated by the Ministry of Agriculture and Forestry, General Directorate of Combating Desertification and Erosion and advised by Ankara University, Faculty of Agriculture. In this context, two predictive models named "Dynamic Erosion Model and Monitoring System" (DEMİS) and "National Dynamic Wind Erosion Model and Monitoring System" (UDREMİS) were established.

According to the data obtained as a result of the Dynamic Erosion Model and Monitoring System, a maximum of 642 million tons of soil are displaced by water erosion every year. On average, 8.24 tons of soil per hectare are displaced by water erosion every year. If we classify this amount according to the area of our country, it shows a distribution like 60.28% is very slight, 19.13% is slight, 7.93% is moderate, 5.97% is severe and 6.7% is very severe.

When the equality parameters are studied, 14.26% precipitation, 3.36% soil, 47.55% topography and 34.82% vegetation are effective in the spatial and quantitative changes of soil loss in our country.

If we evaluate it in terms of land use, 38.71% of the displaced land in our country is in agricultural areas, 4.17% is in forest areas and 53.66% is in pasture areas.

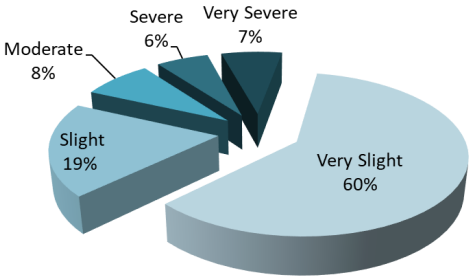
The amount of suspended soil in our rivers is measured by stations of the Ministry of Agriculture and Forestry, General Directorate of State Hydraulic Works. According to the measurement results, 154 million tons of soil are transported through our rivers. This means that about 2 tons of soil per hectare per year are carried by the rivers[73].

TABLE 16- AREAS EXPOSED TO WATER AND WIND EROSION AND SEVERITY CLASSES OF THE EROSION

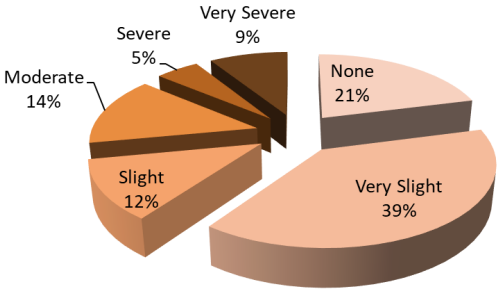
	ERZ – EROSION CLASSESS	AREA (milyon ha)
WATER EROSION	Very Slight	387
	Slight	123
	Moderate	51
	Severe	38
	Very Severe	43
WIND EROSION	None	3,56
	Very Slight	6,78
	Slight	1,99
	Moderate	2,36
	Severe	0,95
	Very Severe	1,49

Source: Ministry of Agriculture and Forestry, General Directorate of Combating Desertification and Erosion 2019

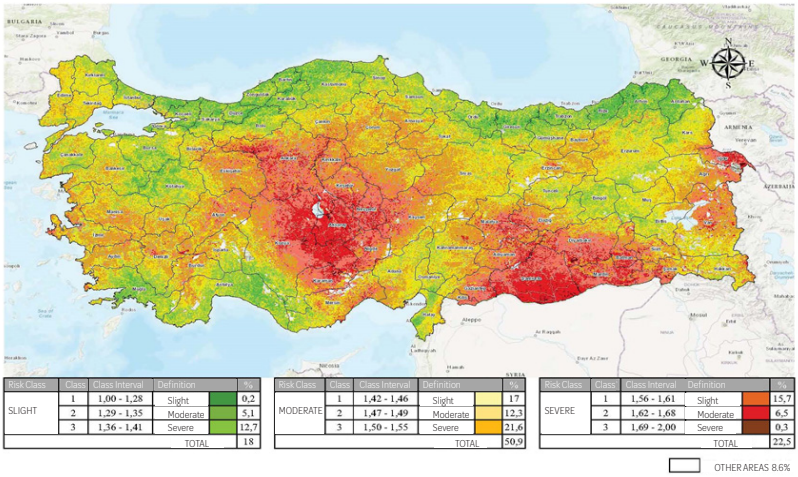
GRAPH 79- DISTRIBUTION OF WATER EROSION CLASSES



GRAPH 80- DISTRIBUTION OF WIND EROSION CLASSES



MAP 5- TURKEY DESERTIFICATION RISK MAP



Risk Class	Class	Class Interval	Definition	%
SLIGHT	1	1,00 - 1,28	Slight	0,2
	2	1,29 - 1,35	Moderate	5,1
	3	1,36 - 1,41	Severe	12,7
			TOTAL	18

Risk Class	Class	Class Interval	Definition	%
MODERATE	1	1,42 - 1,46	Slight	17
	2	1,47 - 1,49	Moderate	12,3
	3	1,50 - 1,55	Severe	21,6
			TOTAL	50,9

Risk Class	Class	Class Interval	Definition	%
SEVERE	1	1,56 - 1,61	Slight	15,7
	2	1,62 - 1,68	Moderate	6,5
	3	1,69 - 2,00	Severe	0,3
			TOTAL	22,5

OTHER AREAS 8.6%

Source: Ministry of Agriculture and Forestry, General Directorate of Combating Desertification and Erosion, 2019

9

BIODIVERSITY

9.1- Total Number of Species, Endangered Species, Rate Of Endemism

D P S I R

The indicator is an impact indicator. The impact of human activities is closely linked to biodiversity.

The Mediterranean and Near East Centers, which are the centers of plant diversity and origin, overlap with Turkey and are home to many genetic diversity centers of several cultivated plants.

Our country has a position that can be considered quite rich in plant species, especially considering its climate zone. The rate of endemism is very high in the group of flowering plants (Angiospermae) among seed plants. 3925 of the 11,000 species of flowering plants among the species and subspecies are endemic and the endemism rate is about 34%.

Among the seedless plants, the best known plant group is that of ferns (Pteridophtyes). The number of fern species and subspecies recorded in Turkey is 101, of which only 3 are endemic[74].

Although Turkey is a very rich country in terms of endemic plants, some of these rich species are seriously threatened. According to the IUCN 2001 criteria, about 600 of our endemic species are in the Very Endangered category CR" and about 700 are in the Endangered category EN".

TABLE 17- NUMBER FROM TAXONS INCLUDE TO VARIOUS TYPES FROM SPECIES AND SUBSPECIES, STATE FROM ENDEMISM, RARE AND ENDANGERED SPECIES AND EXTINCT SPECIES

Plant Groups	Identified Species/ Subspecies	Endemic Species	Rare and Endangered Species	Extinct Species
Algae	2,150	-	unknown	unknown
Lichens	1,000	-	unknown	unknown
Bryophytes	910	2	2	unknown
Sword ferns	101	3	1	unknown
Gymnosperms	35	5	1	unknown
Monocotyledons	1,765	420	180	-
Dicotyledons	9,100	3.500	1.100	11

Source: National Biological Diversity Strategy and Action Plan 2007

Turkey has a rich and special status in terms of fauna, due to its zone. It has been found that 460 species of birds, 161 species of mammals, 141 species of reptiles and amphibians, 480 species of marine fishes and 236 species of freshwater fishes live in our country.

Of the 141 reptile and amphibian species in Turkey, 16 are endemic and 10 are threatened. There are no endemic bird species in Turkey. However, 5 species and 32 subspecies of mammals, 16 species and/or subspecies of reptiles and 70 species/ subspecies of freshwater fishes are endemic.

Although the invertebrate fauna is not as well-known as the vertebrate fauna, it is known that 30,000 species have been identified, while the total number of species is estimated to be about 60,000-80,000.

10 marine mammal species have been identified in the maritime zones of Turkey. Despite the 21 marine mammal species that regularly or occasionally enter the Mediterranean in the Mediterranean basin, only 3 species live in Black Sea. It is stated that the Mediterranean monk seal (Monachus monachus) has not been seen in the Black Sea since 1994.

TABLE 18- NUMBER FROM TAXONS INCLUDE TO VARIOUS TYPES FROM SPECIES AND SUBSPECIES, STATE FROM ENDEMISM, RARE AND ENDANGERED SPECIES AND EXTINCT SPECIES

Animal Groups	Defined Species	Endemic Species/ Subspecies Variety	Rare/ Endangered Species	Extinct Species
VERTEBRATES				
Reptiles/Amphibian	141	16	10	-
Birds	460		17	-
Mammals	161	37	23	4
Freshwater Fishes	236	70	-	4
Marine Fishes	480	-	-	-
INVERTEBRATES				
Molluscs	522	203	unknown	unknown
Butterflies	6.500	89	89	unknown
Locusts	600	270	-	-
Damselflies	114	-	-	-
Coleoptera	~10.000	~3.000	-	-
Hemiptera	~1.400	~200	-	-
Homoptera	~1.500	~200	-	-

Source: National biodiversity strategy and action plan 2007

Below is the number of cases detected in the fight against bio-smuggling between 2007 and 2017.

TABLE 19- NUMBER OF BIO-SMUGGLING CASES DETECTED BY YEARS (2007-2018)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of Detected Bio-Smuggling Cases	2	2	2	9	21	11	2	5	8	3	3	1

Source: Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks, (http://www.milliparklar.gov.tr/resmiistatistikleryeni)

9.2- Invasive Alien Species

D P S I R

This indicator is a pressure indicator because invasive alien species pose a threat to indigenous species and habitats.

While the number of alien species in our seas was 263 in 2005, this number increased to 422 in 2011 and reached 500 in 2018, of which 10% are invasive[75].

Although the vast majority of invasive alien species in the Mediterranean Sea come through the Suez Canal, a significant number of invasive alien species in the Black Sea are transferred through the ballast water of vessels.

25 alien species were identified in our inland waters in 2017[76].

9.3- Protected Areas

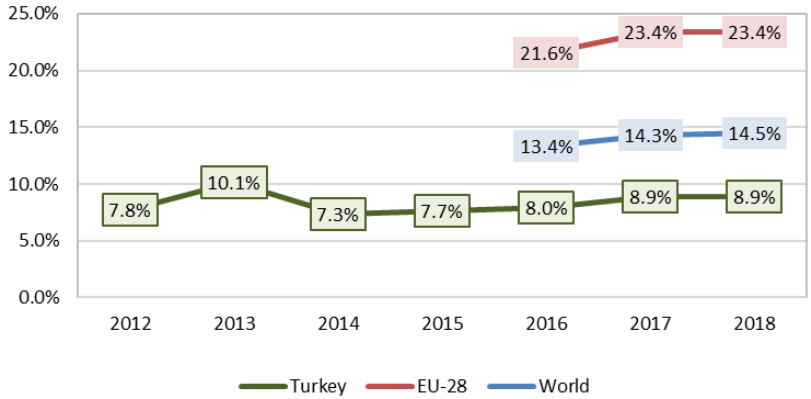
D P S I R

The indicator is a response indicator. The conservation of biodiversity and natural resources is sought through protected areas.

In 2018, the ratio of total protected areas (terrestrial and marine) under the responsibility of the Ministry of Agriculture and Forestry and the Ministry of Environment and Urbanization of the General Directorate for Protection of Natural Assets to the national area is 8.9%. Pastures, drinking water basins and forest areas allocated as nature conservation function outside the protected area (total forest, forest land, pasture, stony) are not included in the protected area calculations.While the percentage of protected areas was 7.8% in 2012, it was 7.3% in 2014 and 8.9% in

2017[77]. The main reason for the decrease in 2014 is that the 2014 amendment in the "By-Law on Wetlands" introduced the registration procedure for wetlands. Looking at the situation in the world, the ratio of global terrestrial and marine protected areas to terrestrial area is 14.5% according to the World Bank data for 2018[78].

GRAPH 81- THE PERCENTAGE OF TERRESTRIAL AND MARINE PROTECTED AREAS IN TOTAL TERRESTRIAL AREA OF TURKEY (%)



Sources: Ministry of Agriculture and Forestry; General Directorate of Nature Conservation and National Parks, Nature Conservation Status Reports,

For World and EU 28 data: https://data.worldbank.org/indicator/ER.PTD.TOTL.ZS

Notes:

(1) The registration process was introduced for wetlands with the amendment in By-Law on Wetlands in 2014.

(2) The size of protected areas refers to the number of terrestrial and marine areas.

(3) For the total calculations, the percentages were calculated from the ratio of the area from terrestrial and marine protected areas to the Turkish land area. The ratio is based on a uniform area of 77,998,600 hectares in Turkey.

TABLE 20- STATUS AND AREAL DISTRIBUTION OF PROTECTED AREAS IN TURKEY

YEARS	2013		2018	
The Ministry of Agriculture and Forestry, Protected Areas	Number (unit)	Area (ha)	Number (unit)	Area (ha)
National Park	40	848,203	44	866,684
Nature Park	192	90,218	243	106,453
Nature Conservation Area	31	64,243	30	46,794
Nature Monument	112	6,684	112	7,488
Wildlife Conservation Area	80	1,191,340	81	1,172,421
Wetland (of International Importance)	135	3,215,500		
Wetland of Local Importance (1)			9	10,289
Ramsar Areas (1)			14	184,487
Wetlands of National Importance (1)			48	714,133
Protection Forests	55	320,451	55	251,519
Honey Forests	200	24,861		
City Forests	128	11,722	137	10,363
Gene Conservation Forests (in-situ)	257	47,978	312	42,329
Seed Stands (in-situ)	351	47,063	317	41,992
Seed Stands (ex-situ)	179	1,414	197	1,457
TOTAL OVERLAPPING	**1,760**	**5,373,162**	**1,599**	**3,384,717**
Ministry of Environment and Urbanization, Protected Areas	Number (unit)	Area (ha)	Number (unit)	Area (ha)
Specially Protected Environment Areas (SPA)	16	2,459,116	16	2,458,749
Natural Sites	1,273	1,322,749	2,450	2,017,549
GENERAL TOTAL OVERLAPPING	3,049	7,883,511	4,065	6,961,046
Ratio of protected areas in the Country's total surface area (%) (3)		**%10.1**		**%8.9**

Resources: Ministry of Agriculture and Forestry; General Directorate of Nature Conservation and National Parks, Nature Conservation Status Reports, http://www.milliparklar.gov.tr/docs/default-source/default-document-library/tkdr_tr_2018_30-05-2019. pdf?sfvrsn=0

Notes:

(1) The registration process was introduced for wetlands with the amendment in By-Law on Wetlands in 2014.

(2) The size of protected areas refers to the number of terrestrial and marine areas.

(3) For the total calculations, the percentages were calculated from the ratio of the area from terrestrial and marine protected areas to the Turkish land area. The ratio is based on a uniform area of 77,998,600 hectares in Turkey.

9.4- Protected Coastal Length

D P S I **R**

The indicator is a response indicator. Coastal areas are under greater pressure from human pressures and climate change. The aim is to mitigate these impacts and protect biodiversity. The total coastal length of Turkey, excluding islands, is 8592 km. The protected coastal length is 1957 km, which is 23%, as of 2018[79].

TABLE 21- TURKEY'S PROTECTED COASTAL LENGTH

YEARS	2002	2012	2013	2014	2015	2016	2017	2018
Turkey's Protected Coastal Length (km)	1775	1853	1855,3	1855,3	1860	1865	1957	1957
Ratio of Protected Coastal Length to Total Coastal Length (%)	20	22	22	22	22	22	23	23

Source: Status Report on Nature Conservation, Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks

9.5- Wildlife Conservation Activities

D P S I **R**

The indicator is a response indicator for biodiversity conservation. 481 bird, 150 mammal and 130 reptile species have been placed under protection by the Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks. 19 Species Action Plans were completed in 2018, and action plans have been prepared for 79 species to date.

81 Wildlife Development Areas have been declared by the Council of Ministers Decision to protect endangered wildlife in our country. A regular inventory of species in these areas is conducted every year.In these areas, rupicapra rupicapra ornate, the Anatolian wild sheep, wild goat, gazelle, red deer, fallow deer, roe deer, great bustard, grouse, black vulture and bold Ibis, hyena and waterfowl species are protected. Stations where these animals are bred are established and adult animals are released back to nature in suitable habitats to breed endangered wildlife species.

Investigations are carried out within the framework of the CITES Convention to prevent the illegal trade in endangered wildlife[80].

TABLE 22- WILDLIFE CONSERVATION ACTIVITIES

YEARS	2012	2013	2014	2015	2016	2017	2018
Number of mammals wild animals that are reproduced and placed in the nature	62	84	148	114	36	21	27
Winged Wild Animal Placement Numbers (Partridge – Pheasant	64,895	79,200	91,050	97,200	103,100	92,000	97,500
Number of Trout Stocked in In-Forest Waters	2,042,000	3,172,000	1,291,000	1,510,000	3,016,000	4,274,000	3,900,000
Total Number of Wildlife Production Facilities (Partridge, Pheasant, Mammals, Bald Ibis, Trout, Mountain Gazelle)	20	21	21	23	24	24	24
The Number of Wild Animals Rehabilitated and Released back to Nature	921	1,643	2,109	2,561	2,465	4,881	5,733

Source: Status Reports on Nature Conservation, Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks,2019

9.6- Regulation and Supervision of Wild Animal Trade in Accordance with International Conventions

D P S I **R**

The indicator is a response indicator related to biodiversity conservation.

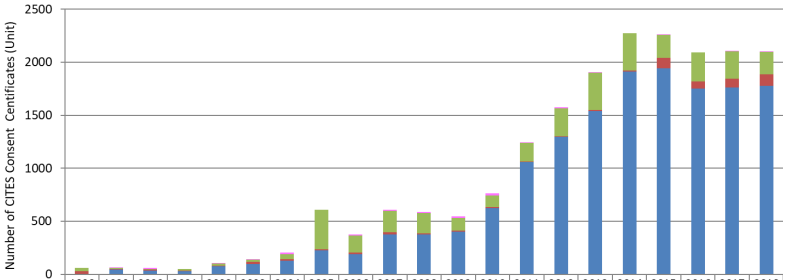
CITES Convention is the "Convention on International Trade in Endangered Species of Wild Fauna and Flora".

Turkey has been a party to CITES Convention since 1996 and By-Law on National Implementation of CITES was published in 2001.

The Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks is authorized to issue CITES certificates and take necessary measures for birds, reptiles, mammals (except marine mammals), reptiles, arthropods and other species that are not included in the tasks of Management Authorities listed in subparagraphs (a), (b) and (c). The Ministry also performs tasks such as coordination, reporting and training. Turkey is placed in Category A due to its successful efforts.

Certificates of Conformity for Import and Export are issued for species not included in the lists in the CITES Annex. In 2018, a total of 2,098 documents were issued.

GRAPH 82- NUMBER OF CITES CONSENT CERTIFICATES BY THE DOCUMENT TYPE (1998-2018)



	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Other		6	11	0	3	5	14		9	8	9	17	22	2	8	2	0	4	0	2	2
Reexport	29	11	7	16	24	22	47	375	159	202	190	116	110	173	263	353	353	217	269	260	210
Export	27	5	9	4	4	18	15	7	16	19	12	11	9	9	6	10	8	98	71	83	108
Import	5	44	36	32	76	98	130	228	192	378	377	403	624	1057	1298	1539	1914	1943	1750	1762	1778

Source: Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks

9.7- Distribution of Forest Areas

D P **S** I R

The indicator is a state indicator and represents the total size of forest areas. The total forest area of Turkey was 22,621,935 ha in 2018. This forest area accounts for 29% of the total area of the country.

However, 57% of this area is normal closed areas, 43% is degraded closed areas (sparsely vegetated or unvegetated) [81].

The forest area of Turkey in 2018 was 1,658,120 thousand m^3. Of this, 95.8% belongs to normal closed forests and 4.2% to degraded closed forests.

The country's forest area increased by 722,607 thousand m^3 between 1973 and 2018[82].

While the proportion of forest cover in Turkey was 26.7% of the country's land area in 1999, this proportion increased to 29% in 2018. According to World Bank data, the ratio of global forest cover to land area was 31.2% in 2000 and 30.7% in 2016[83].

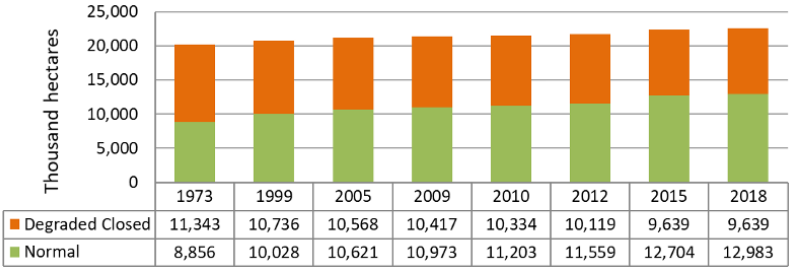
TABLE 23- FOREST AREA BY YEARS

YEARS	1973	1999	2005	2010	2012	2015	2018
Forest Area (hectare)	20,199,296	20,763,248	21,188,747	21,537,091	21,678,134	22,342,935	22,621,935

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, https://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatis- tikler.aspx

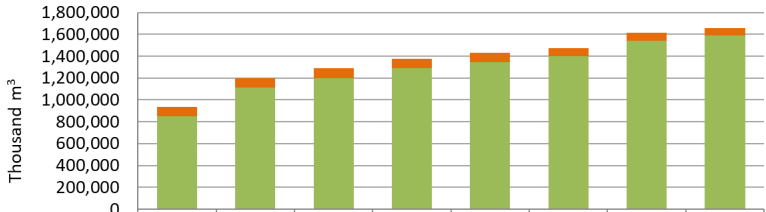
Note: These figures do not include wooded areas other than forest areas (private poplar, orchard, hazelnut groves, etc.) but cover all natural, cultivated or planted areas as forestland.

GRAPH 83- DISTRIBUTION OF THE FOREST LAND BY FOREST FORM



	1973	1999	2005	2009	2010	2012	2015	2018
Degraded Closed	11,343	10,736	10,568	10,417	10,334	10,119	9,639	9,639
Normal	8,856	10,028	10,621	10,973	11,203	11,559	12,704	12,983

GRAPH 84- DISTRIBUTION OF GROWING STOCK BY FOREST FORM



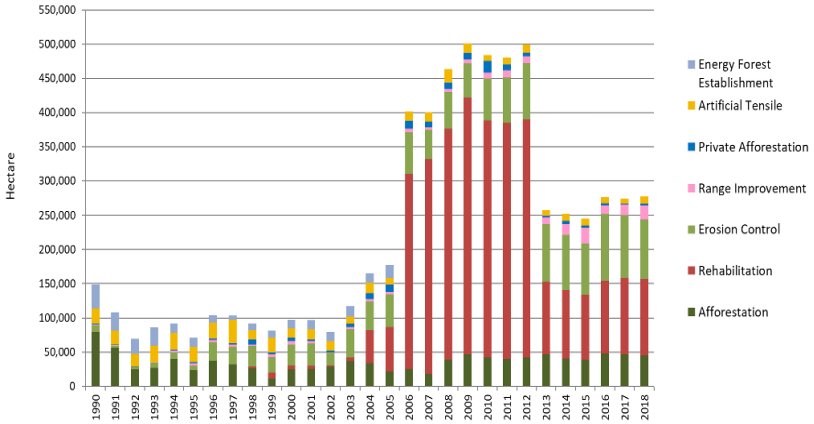
	1973	1999	2005	2009	2010	2012	2015	2018
Degraded Closed	88,479	87,179	89,091	83,791	81,051	71,088	71,951	69,873
Normal	847,033	1,113,612	1,199,034	1,290,450	1,347,454	1,400,050	1,539,824	1,588,247

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, http://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatistikler.aspx

43% of forests in Turkey are degraded closed forest areas and they are inefficient. It is important to rehabilitate inefficient forest areas and convert them into productive areas. Rehabilitation studies were carried out more intensively especially between 2006-2012. In 2018, forest rehabilitation activities were carried out on a total of 277,134 ha, including afforestation on 45,015 ha area, rehabilitation on 112,273 ha area,

erosion control on 86,758 ha area, pasture improvement on 20,518 ha area, private afforestation on 2,468 ha area and artificial tensile work on 10,102 ha area[84].

GRAPH 85- (1990-2018) FOREST ESTABLISHMENT ACTIVITIES (ha)



Note: Forest establishment activities are the total of the work performed by the Ministry of Agriculture and Forestry and other institutions,

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, http://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatistikler.aspx

9.8- Distribution of Forest Areas According to Tree Species

D P S I R

The diversity of tree species is a positive indicator of the state of biodiversity. In 2018, the total forest area of Turkey was composed of 26.3% oaks, 25.1% Turkish pines and 19% black pines[85].

TABLE 24- DISTRIBUTION OF FOREST AREAS ACCORDING TO MAIN TREE SPECIES

Tree species groups	Forrest Form (ha)			% Rate
	Normal	Degraded Closed	Total	
Turkish Pine (pinus brutia)	3,527,063	2,158,946	5,686,009	25.1
Oak (Quercus sp)	2,435,265	3,503,262	5,938,527	26.3
Black Pine	2,787,424	1,517,397	4,304,821	19.0
Beech (fagus orientalis)	1,665,997	269,733	1,935,730	8.6
Scots pine (pinus sylvestris)	901,606	636,698	1,538,04	6.8
Juniper (Juniperus)	223,097	740,120	963,217	4.3

Tree species groups	Forrest Form (ha)			% Rate
	Normal	Degraded Closed	Total	
Fir	391,842	201,359	593,201	2.6
Cedar	252,590	235,229	487,819	2.2
Spruce Tree	234,224	93,666	327,890	1.4
Stone Pine	131,548	33,250	164,798	0.7
Alder	115,646	33,569	149,215	0.7
Chestnut	69,727	20,214	89,941	0.4
Hornbeam	28,872	6,737	35,609	0.2
Poplar	6,587	9,843	16,430	0.1
Lime tree	10,637	2,166	12,803	0.1
Ash tree	6,854	505	7,359	0.0
Eucalyptus	1,383	51	1,434	0.0
Other species	192,784	176,042	368,826	1.6
TOTAL	12,983,148	9,638,787	22,621,935	

(*) The title "Other species" includes cypress, Aleppo pine, maritime pine, radiata pine, black locust, sycamore, walnut, Turkish/oriental sweetgum and numerous other tree species not listed here

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, https://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatis- tikler.aspx

9.9- Distribution of Forests by Their Main Functions

Today, forests are planned using an ecosystem functional planning approach based on multidirectional use. According to these planning data, 50% of forests have economic functions, 42% ecological functions and 8% socio-cultural functions[86].

TABLE 25- DISTRIBUTION OF FORESTS BY THEIR MAIN FUNCTIONS

MAIN FUNCTIONS	GENERAL FOREST LANS (hectare)			% Rate
	Normal Closed	Degraded Closed	TOTAL	
1– Economic Function	7,411,790	3,831,304	11,243,094	50
2– Ecologic Function	4,192,532	5,095,315	9,287,847	42
3– Sociocultural Functions	1,099,826	712,168	1,811,994	8
TOTAL	12,704,148	9,638,787	22,342,935	100

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, Turkey Forest Assets-2015.

10

INFRASTRUCTURE AND TRANSPORT

10.1- Highway - Railway Network Intensity

D P S I R

The density of the road network provides information on the fragmentation of wildlife habitats and natural landscapes due to active transport. Environmental risks such as traffic-related pollution and noise are also important factors. In this respect, the indicator is a pressure indicator.

In 2018, the number of active airports open to civil air traffic was 56 and the total length of the airlines' flight route in our country was 74,640 km. Turkey has a total of 403 coastal facilities and the number of internationally operating ports is 181. At the end of 2018, the length of the highway network (state roads and highways) was 68,034 km and the length of the railway network (conventional and high-speed lines) was 12,740 km[87].

TABLE 26- HIGHWAY AND RAILWAY NETWORKS BY YEARS (km)

YEARS	2002	2005	2010	2015	2016	2017	2018
Highway Network Length (km)	63,082	63,606	64,865	66,437	67,161	67,620	68,034
Railway Network Length (km)	10,948	10,973	11,940	12,532	12,532	12,608	12,740

Source: General Directorate of Highways, General Directorate of Turkish State Railways, 2019

Compared to highways, railways emit fewer greenhouse gases into the atmosphere thanks to more efficient energy consumption. It also plays an important role in the conservation of the natural environment as less land is required for railway construction. On the other hand, railways also help in reducing respiratory disorders and other diseases caused by air pollution.

According to 2017 data, the length of highways per 100,000 inhabitants in Turkey was 80 km and the length of the main railway line length was 13 km. In the EU-28 countries, these figures averaged 400 km and 43 km, respectively. In terms of total area, there were 85 km highways and 13 km of railways per 1000 km^2 in Turkey. In the EU-28 countries, these figures were 461 km and 49 km respectively.

It is expected that by 2023, Turkey's motorway network will have reached a length of 70,000 km and the railway network will have reached a length of 25,000 km. Therefore, it is expected that the highway will be 86 km and the railway 32 km per 1000 km^2.

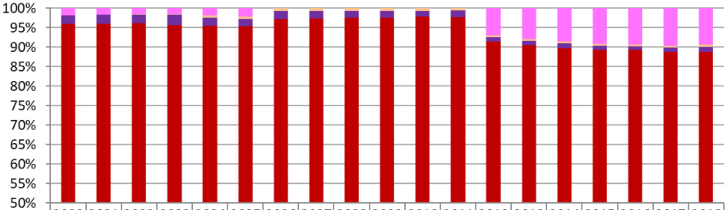
10.2- Passengers and Freight Transported by Mode of Transport

D P S I R

This indicator is a driving force indicator and plays a role in transport-related environmental impacts. In terms of domestic passenger transport, share of the air transport increased to 9.4% in 2018 from 1.8% in 2000; in the same period, share of road transport decreased from 95.9% to 88.8% and rail transport from 2.2% to 1.2%. The share of maritime passenger transport was 0.56% in 2018. The target is to reduce the share of domestic passenger transport by road (in passenger/km) to 76% by the end of 2023.

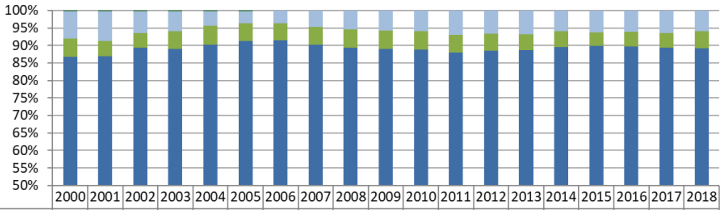
If we look at the domestic freight transport rates in 2018, we can see that highways dominate again with 89.2%. In 2018, it can be observed that the shares of railways and maritime transport in domestic freight transport have decreased compared to 2000.

GRAPH 86- DOMESTIC PASSENGER TRANSPORT RATIOS (% rate on passenger-km)*



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Domestic Aviation	1.8%	1.6%	1.6%	1.6%	1.8%	2.1%							7.0%	7.9%	8.5%	9.1%	9.4%	9.6%	9.4%
Maritime	0.03%	0.03%	0.02%	0.02%	0.63%	0.65%	0.72%	0.73%	0.74%	0.75%	0.68%	0.63%	0.52%	0.56%	0.59%	0.56%	0.33%	0.59%	0.56%
Railway	2.2%	2.4%	2.3%	2.7%	2.1%	1.9%	2.0%	1.9%	1.7%	1.6%	1.6%	1.6%	1.1%	1.0%	1.1%	1.1%	1.0%	1.0%	1.2%
Road	95.9%	95.9%	96.1%	95.7%	95.5%	95.3%	97.3%	97.4%	97.5%	97.6%	97.8%	97.8%	91.5%	90.5%	89.8%	89.2%	89.3%	88.8%	88.8%

GRAPH 87- DOMESTIC FREIGHT TRANSPORT RATIOS (% rate over Tonnes-km) **



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Domestic Aviation	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%													0.0%
Maritime	7.8%	8.6%	6.3%	5.8%	4.2%	3.5%	3.6%	4.8%	5.5%	5.8%	5.9%	6.9%	6.6%	6.9%	5.9%	6.3%	6.1%	6.4%	6.0%
Railway	5.3%	4.3%	4.3%	5.1%	5.4%	5.0%	5.0%	4.9%	5.3%	5.2%	5.3%	5.1%	4.8%	4.4%	4.6%	3.9%	4.1%	4.3%	4.8%
Road	86.7%	86.9%	89.3%	88.9%	90.2%	91.3%	91.4%	90.3%	89.3%	89.0%	88.8%	88.0%	88.6%	88.7%	89.5%	89.8%	89.7%	89.2%	89.2%

Sources: Ministry of Transport and Infrastructure, General Directorate of the Turkish State Railways

Notes: 1) Urban transport was not included in passenger transport.

2) Data on freight and passenger transport on the road network under the responsibility of the of Directorate General for State Highways were considered.

3) Data on freight and passenger transport belonging to the General Directorate of the Turkish State Railways were considered. Data on suburban passenger transport were not considered.

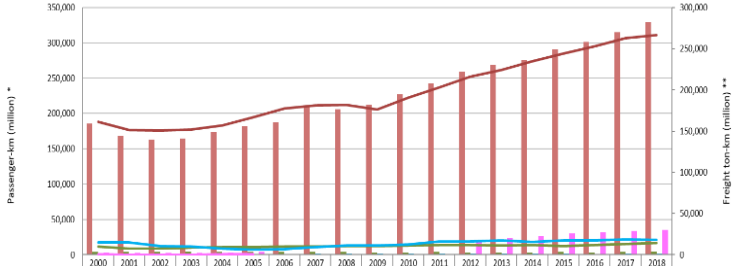
4) Data on domestic freight and domestic passenger transportation between our airports belonging to the General Directorate of the State Airports Authority were considered. There is no data for the cells left blank.

5) Data on freight and passenger transports was taken into account on the cabotage line of the General Directorate of the Maritime Trade were taken into account. The value given as Ton-Miles was converted to Ton-Km, the value given as Passenger-Miles was converted to Passenger-Km.

*Passenger/Km: Unit of measure of traffic resulting from the transportation of one passenger over one kilometer.

**Ton/Km: Unit of measure of traffic resulting from the transport of one ton of goods over a distance of one kilometer.

GRAPH 88- DOMESTIC PASSENGER AND FREIGHT TRANSPORT ACCORDING TO TRANSPORT PATHS



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Road passenger km (million)	185,681	168,211	163,327	164,311	174,312	182,152	187,593	209,115	206,098	212,464	226,913	242,265	258,874	268,178	276,073	290,734	300,852	314,734	329,363
Railway passenger-km (million)	4,240	4,213	3,939	4,583	3,835	3,661	3,878	4,080	3,650	3,572	3,606	4,002	3,006	3,020	3,458	3,708	3,323	3,683	4,374
Maritime passenger-km (million)	56	57	39	41	1,150	1,240	1,395	1,561	1,570	1,643	1,570	1,570	1,459	1,667	1,806	1,836	1,117	2,109	2,101
Airline passenger-km (million)	3,555	2,859	2,706	2,752	3,223	3,992	0	0	0	0	0	0	19,731	23,357	26,204	29,790	31,730	34,018	34,996
Road ton-km (million)	161,552	151,421	150,912	152,163	156,853	166,831	177,399	181,330	181,935	176,455	190,365	203,072	216,123	224,048	234,492	244,329	253,139	262,739	266,502
Railway ton-km (million)	9,891	7,558	7,221	8,669	9,417	9,152	9,676	9,921	10,739	10,326	11,462	11,677	11,670	11,177	11,992	10,474	11,661	12,794	14,478
Maritime ton km (million)	14,631	15,001	10,627	10,001	7,277	6,439	7,084	9,573	11,114	11,397	12,570	15,959	16,223	17,312	15,572	17,204	17,279	18,946	17,801
Airline ton-km (million)	310	285	275	276	321	392													13

Sources: Ministry of Transport and Infrastructure, General Directorate of the Turkish State Railways

Notes: 1) Urban transport was not included in passenger transport. 2) Data on freight and passenger transport on the road network under the responsibility of the of Directorate General for State Highways were considered.
3) Data on freight and passenger transport belonging to the General Directorate of the Turkish State Railways were considered. Data on suburban passenger transport were not considered.

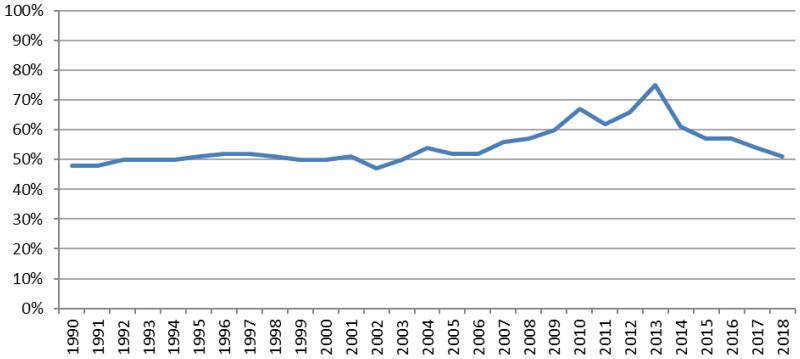
4) Data on domestic freight and domestic passenger transportation between our airports belonging to the General Directorate of the State Airports Authority were considered. There is no data for the cells left blank. 5) Data on freight and passenger transports was taken into account on the cabotage line of the General Directorate of the Maritime Trade were taken into account. The value given as Ton-Miles was converted to Ton-Km, the value given as Passenger-Miles was converted to Passenger-Km.

*Passenger/Km: Unit of measure of traffic resulting from the transportation of one passenger over one kilometer.

**Ton/Km: Unit of measure of traffic resulting from the transport of one ton of goods over a distance of one kilometer.

The use of rail should be preferred to road transport in terms of environmental impact. In addition to the expansion of the rail network, effective utilization is also an important concern. Although the utilization rate of freight transport by rail increased to 75% in 2013, it decreased to 51% in 2018.

GRAPH 89-CAPACITY USAGE RATIOS OF FREIGHT TRANSPORTATION ON RAILWAYS (%)



Source: For 1990-2016, data of Ministry of Transport and Infrastructure: 2017-2018 data of General Directorate of the Turkish State Railways Administration; Turkish State Railways Transportation Co.

NOTE: Since 2017, data on freight transport are only transport data in the area of the General Directorate of TCDD Transportation Co. Data from other railway train operations hasn't been included.

10.3- Greenhouse Gas Emissions by Mode of Transport

D P S I R

This indicator is a pressure indicator. The contribution of transportation to climate change and the distribution of this contribution by mode are important for monitoring and controlling emissions.

According to TURKSTAT's greenhouse gas emission inventory data for 2017, Turkey's total greenhouse gas emission was 526.3 million tons as CO_2 equivalent and 84,659 kilotons of CO_2 equivalent of this emission came from transport. While the share of emissions from transport in total greenhouse gas emissions was 12.8% in 1990, this figure was 16.1% in 2017.

According to TURKSTAT's greenhouse gas emission inventory data for 2017, 93% of CO_2 emissions from transport came from road transport, 4.5% from airline transport, 1.1% from maritime transport, 0.5% from railways and 0.9% from other modes of transport.

Looking at the situation in the EU-28 countries, 25% of the total greenhouse gas emissions in the EU-28 in 2018 came from transport (emissions from international aviation and marine emissions were not included)[88].

GRAPH 90- GREENHOUSE GAS EMISSIONS ACCORDING TO MODE OF TRANSPORTATION

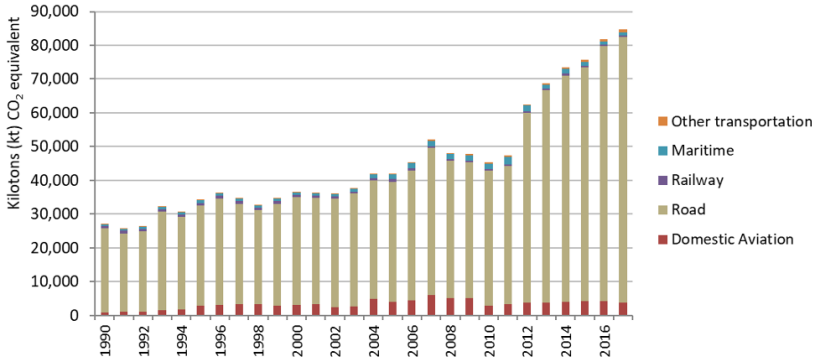


TABLE 27- GREENHOUSE GAS EMISSIONS ACCORDING TO MODE OF TRANSPORTATION (Kilotonnes CO_2 equivalent)

Years	1990	1995	2000	2005	2010	2015	2016	2017
Total	26,969	34,113	36,465	42,041	45,392	75,789	81,841	84,659
Domestic Aviations	923	2,775	3,099	4,089	2,862	4,205	4,281	3,838
Road	24,777	29,760	31,850	35,532	39,941	69,309	75,595	78,706
Rail	721	768	713	757	517	480	374	413
Maritime	509	726	623	1,299	1,682	1,147	970	944
Other Transportation	39	83	180	364	390	647	621	758

Source: TURKSTAT

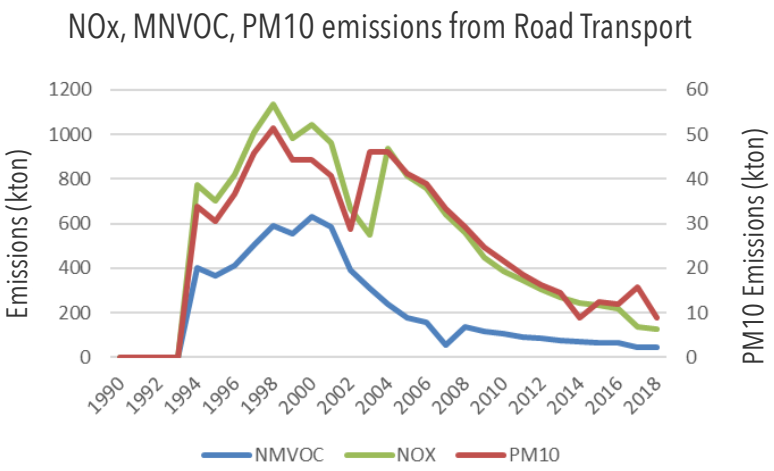
10.4- Emissions of Air Pollutants from Transport

D P S I R

Air pollutant emissions from transport are important pressure indicators that represent the impact of transport activities on air pollution.

An important sector included in the National Air Pollutants Emission Inventory is transportation. Emissions from transport are calculated separately for the road, maritime, airline and rail sectors, with the main data based on road transport evaluated as the indicator scope. The nationally calculated totals of road-based emissions are included in the graph. Looking at the emission status from 1994-2020, it can be seen that the reduction of vehicle emissions is progressing with renewed engine technologies[89].

GRAPH 91- TOTAL NO_x and PM_{10} EMISSIONS FROM ROAD TRANSPORTATION



Source: Ministry of Environment and the Urbanization, General Directorate of Environmental Management

10.5- Final Energy Consumption by Mode of Transport

D P S I R

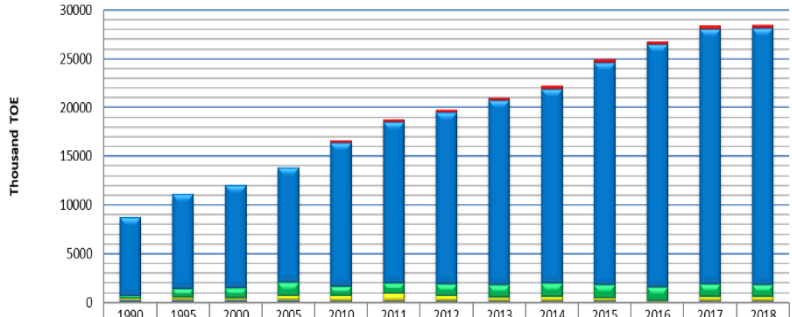
Energy consumption is an important driving force on environmental pressure factors, especially on climate change. Reducing the number of trips and time spent in traffic, using more fuel-efficient modes of transport, increasing the energy efficiency of vehicles and using technologies that use renewable or low-carbon fuels are methods of reducing fuel consumption in transport.

In 2018, the total amount of energy consumption in the transport sector increased by 226.1% compared to 1990, reaching 28,441 thousand TOE (Ton of Oil Equivalent). Excluding the 293 thousand TOE consumed by pipeline transport, 93.4% of the 28,148 thousand TOE energy was consumed in road transport, 4.4% in airline transport, 1.4% in maritime transport and 0.8% in railway transport[90].

In 2018, air transport energy consumption increased by 301% compared to 1990, followed by road transport with an increase of 228% and maritime transport with an increase of 152% compared to 1990. Railway transport energy consumption decreased by 9% compared to 1990.

In 2017, 73% of final energy consumed in transport in the EU-28 countries was used in road transport[91].

GRAPH 92- FINAL ENERGY CONSUMPTION BY MODE OF TRANSPORT (thousand TOE)



	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018
Pipelines					200	247	239	235	311	300	284	392	293
Road Transport	8015	9651	10508	11785	14740	16494	17583	18987	19928	22833	24866	26164	26286
Airline	311	924	1034	1368	956	1127	1258	1253	1367	1405	1430	1272	1247
Maritime Transport	158	226	195	411	541	718	528	370	432	189	48	393	398
Railways	238	276	270	285	169	173	160	162	180	209	128	204	216

Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

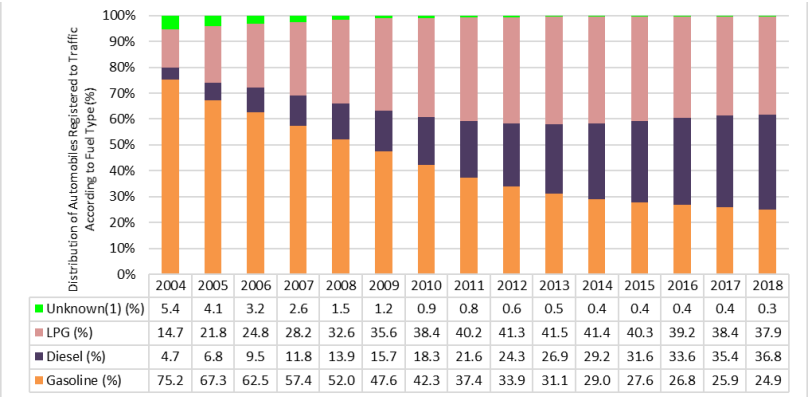
Of the 28,148 thousand TOE of energy consumed in the transportation sector in Turkey in 2018, excluding pipelines, 97.8% were petroleum products, 1.2% natural gas, 0.6% bioenergy and waste, and 0.35% electricity.

In the EU-28 countries, energy consumed in the transport sector in 2016 (taking into account road, railway, domestic airline and maritime transportations) consisted of 93.6% petroleum products, 4.4% biofuel, 1.4% electricity and 0.4% natural gas[92].

Looking at the distribution of cars registered in traffic by fuel type, there were 12,398,190 cars registered in traffic at the end of 2018. Of these, 37.9% were running on LPG, 36.8% on diesel and 24.9% on petrol. The share of cars with unknown fuel type is 0.3%[93].

In 2018, the majority of cars in EU countries had a petrol engine. In 2017, on average, 42% of the car fleet in the EU-28 countries had diesel engines. The share of diesel vehicles is particularly high in Lithuania (67%) and France (66%), followed by Luxembourg (62%)[95].

GRAPH 93- DISTRIBUTION OF AUTOMOBILES REGISTERED TO TRAFFIC ACCORDING TO FUEL TYPE (%) (2004-2018)



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Unknown(1) (%)	5.4	4.1	3.2	2.6	1.5	1.2	0.9	0.8	0.6	0.5	0.4	0.4	0.4	0.4	0.3
LPG (%)	14.7	21.8	24.8	28.2	32.6	35.6	38.4	40.2	41.3	41.5	41.4	40.3	39.2	38.4	37.9
Diesel (%)	4.7	6.8	9.5	11.8	13.9	15.7	18.3	21.6	24.3	26.9	29.2	31.6	33.6	35.4	36.8
Gasoline (%)	75.2	67.3	62.5	57.4	52.0	47.6	42.3	37.4	33.9	31.1	29.0	27.6	26.8	25.9	24.9

Source: TURKSTAT,

(7) Vehicles with unknown fuel type include vehicles where the fuel type field in the registration was filled in incorrectly or left blank, and electric cars.

10.6- Number of Motor Vehicles

D P S I R

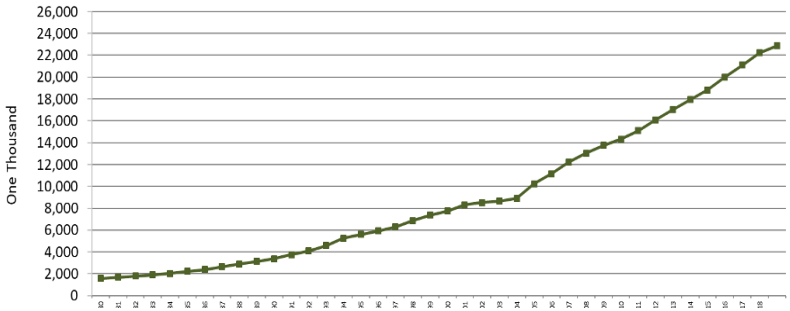
Emissions from motor vehicles are one of the main causes of air pollution, especially in large cities. The number of vehicles is a pressure indicator.

The total number of motor vehicles, which was 1,566,405 in 1979, increased and reached 22,865,921 in 2018. Comparing the share of motor vehicle types on the road between 1979 and 2018, the increase in the shares of automobiles, pickup trucks and motorcycles in 2018 is striking.

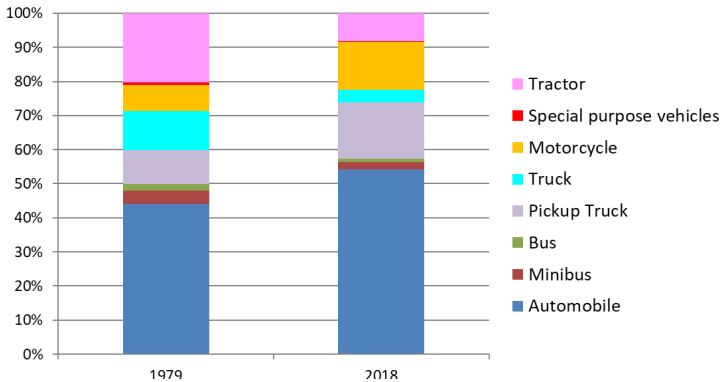
In 2018, automobiles constitute 54.2% of the total number of motor vehicles, 16.4% pickup trucks, 14% motorcycles, 8.2% tractors, 3.7% trucks, 2.1% minibuses, 1% buses and 0.3% special purpose vehicles[96].

Despite the increasing number of vehicles, the rate of vehicle ownership in Turkey is far below the European average due to high prices and taxes. According to 2018 data, the number of cars per thousand people was 767 in Luxembourg, 646 in Italy, while this figure was 151 in Turkey[97]. The EU-28 average was reported at 515,68 in 2017[98].

GRAPH 94- NUMBER OF MOTOR VEHICLES BY YEARS (1979-2018)



GRAPH 95- DISTRIBUTION OF MOTOR VEHICLE TYPES OF 1979 and 2018 (%)



Source: TURKSTAT. Note: Vehicles published under construction machinery and heavy tonnage vehicles included in special purpose vehicles have been reported under the heading "truck" since 2004.

10.7- Average Age of Vehicles Registered to the Traffic

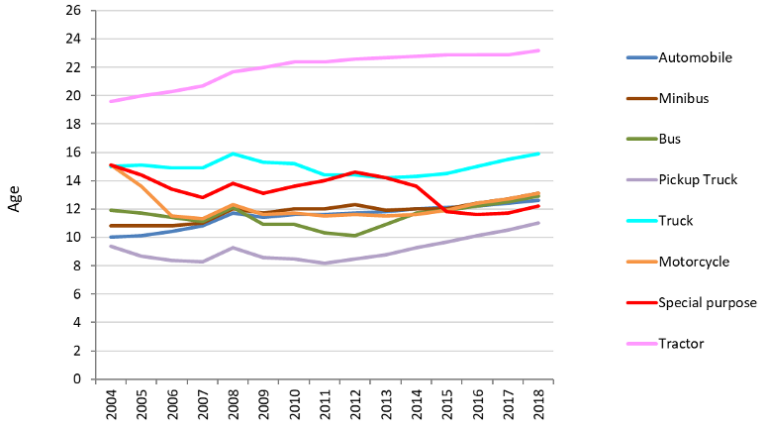
D P S I R

The indicator is a driving force indicator. The average age of the vehicle fleet is an indirect indicator of the environmental performance of road transport. It is expected that the value of this indicator and its impact on the environment will be reduced by replacing old and polluting vehicles with newer and cleaner vehicles.

However, despite this expectation, it was observed that the average age of total vehicles registered for traffic was 12 years in 2004 and 13.4 years in 2018. While the age of cars was 10 in 2004, it increased by 26% to 12.6 in 2018. The average age of other vehicle types of vehicles in 2018 was as follows: 13.1 years for minibuses, 12.9 years for buses, 11 years for pickup trucks, 15.9 years for trucks, 13.1 years for motorcycles, 12.2 years for special purpose vehicles and 23.2 years for tractors[99].

In the EU-28 countries, the average age of passenger cars was 7.4 years in 2014, increasing by 8% compared to 2000, although it was low compared to Turkey. The average age of other types of vehicles in 2014 was as follows: 8.4 years for light commercial vehicles, 8.1 years for heavy vehicles, 9.1 years for two-wheelers and 9.4 years for buses[100].

GRAPH 96- AVERAGE AGE OF VEHICLES REGISTERED IN TRAFFIC BY TYPE (2004-2018)

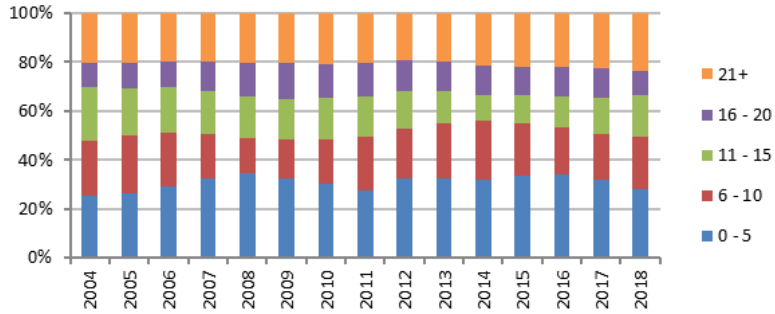


Source: TURKSTAT

The percentage of cars older than 20 years is high in Turkey with 23.4% in 2018. The proportion of passenger cars aged 20 years and older was 2.2% in England, 4.4% in Denmark and 7.3% in Germany in 2018[102].

Looking at the distribution of total vehicles registered in traffic by age group in Turkey in 2018, it can be seen that 28.1% of vehicles were in the 0-5 age group, 21.5% in the 6-10 age group, 17% in the 11-15 age group, 9.9% in the 16-20 age group and 23.4% in the 20+ age group.

GRAPH 97- ISTRIBUTION OF TOTAL VEHICLES REGISTERED IN TRAFFIC BY AGE GROUP (%), 2004-2018



Source: TURKSTAT

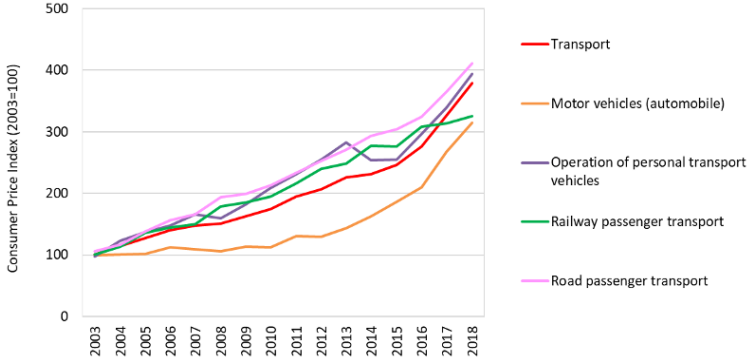
10.8- Real Change in Transport Prices by Mode

D P S I R

The indicator is a driving force indicator. Prices of transportation services influence the growth of the transportation sector and the choice of transportation mode. It is important that prices are monitored to see if users are given adequate incentives to use more environmentally-friendly modes of transport. However, there are variations over time that can affect the reliability of the comparison. For example, people tend not to buy the same cars and use the same shipping service package (price / quality) as they were ten years ago[103].

According to the 2003 Indexed Consumer Price Index (CPI), the cost of buying a car increased 214.5% from the end of 2003 to the end of 2018. During the same period, the cost of road passenger transport increased by 288.5%, the cost of railway passenger transport increased by 220.9%, the cost of sea and domestic waterway passenger transport by 260.6% and the cost of passenger transport by airline increased by 110.2% in the CPI[104].

GRAPH 98- REAL CHANGE IN TRANSPORT PRICES BY MODE



Source TURKSTAT, https://tuikweb.tuik.gov.tr/PreTablo.do?alt_id=1014 Notes:

(1) 2003 = 100 Base Annual Consumer Price Index (CPI) index

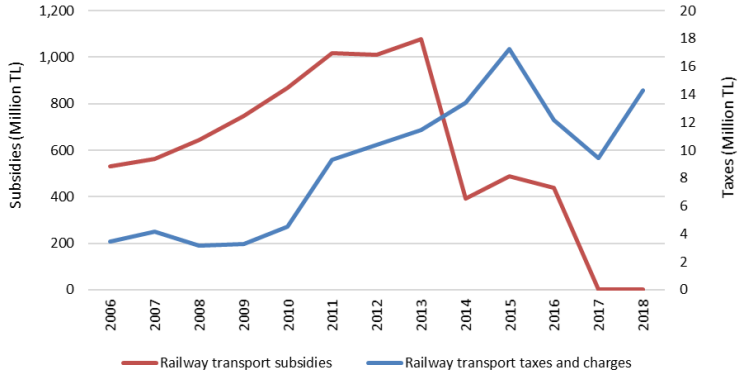
(2) Individual Consumption Classification by Purpose (COICOP) was used in the determination of weights and index calculation.

10.9- Taxes / Expenditures and Subsidies In Railway Transport

D P S I R

The indicator is a driving force indicator and is important in promoting the use of railways, which is more environmentally advantageous than road transport. According to the data of the General Directorate of State Railways, the change of railway transportation tax/expenses and subsidies by years is given below.

GRAPH 99- TAXES / EXPEDITURES AND SUBSIDIES IN RAILWAY TRANSPORT (2006-2018)



Source: General Directorate of Turkish State Railways

11

ENERGY

11.1- Total Energy Consumption by Sectors

D P S I R

The indicator is a driving force indicator that shows the level of energy consumption. The total energy consumption in Turkey in 2018 was 143,666 MToe (million tons of oil equivalent). Turkey's total energy consumption increased by 174% compared to 1990, 62% compared to 2005 and decreased by 1.1% compared to 2017[105].

According to 2018 data, total energy consumption in the EU-28 countries decreased by 0.8% compared to the previous year[106].

Looking at the distribution of total energy consumption in 2018, it can be seen that the highest consumption was in the industry sector with 25.3% and in the energy and transformation sector with 24%. This was followed by the residential and services sector with 23%, the transport sector with 19.8%, the non-energy sector with 4.4% and the agriculture and livestock sector with 3%[107].

GRAPH 100- TOTAL ENERGY CONSUMPTION BY SECTORS (Mtoe)

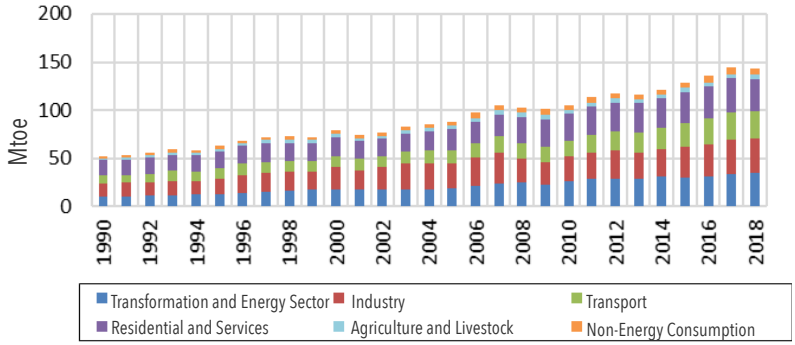


TABLE 28- TOTAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)

Years	1990	1995	2000	2005	2010	2015	2016	2017	2018
Energy Supply	52,465	62,968	79,428	88,672	105,888	129,139	136,229	145,305	143,666
Transformation and Energy Sector	10,228	12,442	17,834	18,347	26,048	29,672	31,655	33,522	34,517
Industry	13,641	15,986	22,876	26,410	26,077	32,157	33,254	35,329	36,277
Transportation	8,723	11,077	12,007	13,849	16,314	24,936	26.812	28,425	28,452
Residential and Services	15,356	17,514	19,557	22.285	27,762	32,329	33,222	36,013	33,074
Agriculture/ Foresty and Fishing	1,956	2,556	3,073	3,359	3,736	3,932	4,056	4,273	4,381
Non-Energy Consumption	2,543	3,087	3,455	4,089	5,314	5,652	6,989	7,372	6,296

Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

11.2- Primary Energy Consumption by Fuel

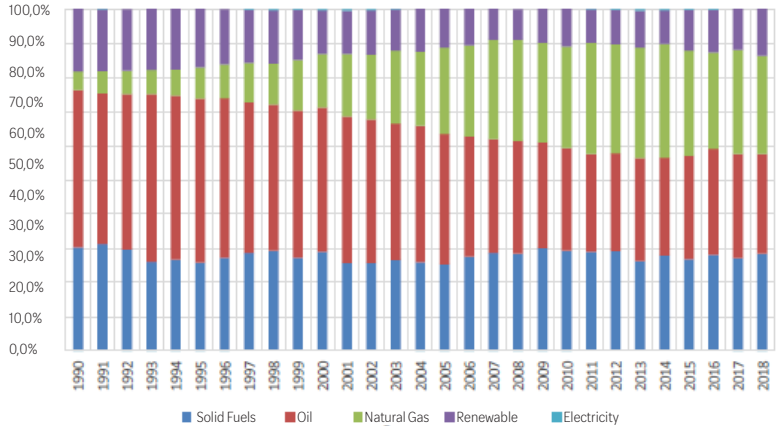
D P S I R

Total primary energy consumption by fuel type is a driving force indicator that defines the improvement of energy resources and the corresponding consumption levels. Fossil fuel consumption (crude oil, petroleum products, mineral coal, lignite, natural and derived gasses) is a proxy indicator for resource consumption, greenhouse gas emissions and air pollution (SO_2 and NO_X). The level of environmental impact depends on the relative shares of different fossil fuels and the extent of pollution reduction measures.

Turkey's primary energy consumption increased from 52,465 Mtoe in 1990 to 143,666 Mtoe in 2018. The share of solid fuels in Turkey's primary energy consumption was 30.2% in 1990. While petroleum and petroleum products accounted for 46.1%, natural gas accounted for 5.4% and renewable energy resources accounted for 18.4%. In 2018, 28.4% of Turkey's primary energy consumption was covered by solid fuels. While the share of petroleum and petroleum products decreased to 29.2%, the share of natural gas increased to 28.7%. The share covered by renewable energy sources was 13.8%.

As of 2017, 18.3% of total primary energy consumption in the EU-28 countries was covered by solid fuels, 34,8% by petroleum and petroleum products, 23.8% by natural gas, 12.6% by nuclear energy, 13.9% by renewable energy sources and 1% by other sources[108].

GRAPH 101- PRIMARY ENERGY CONSUMPTION BY FUEL TYPE (%)



Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

11.3- Final Energy Consumption by Sectors

D P S I R

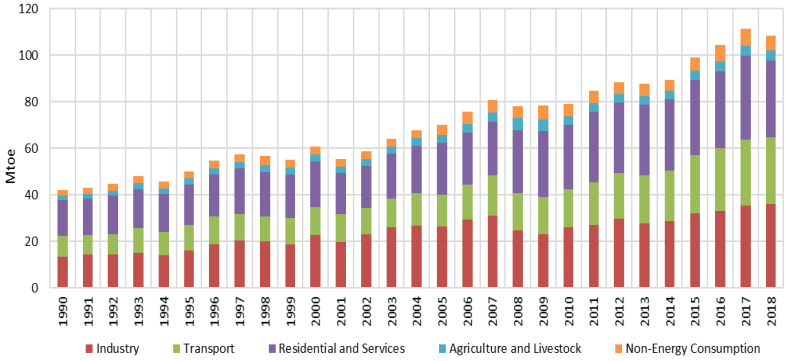
Final energy consumption by sector is a driving force indicator and provides information on the progress made in reducing energy consumption and the corresponding environmental impact of the different end-use sectors (transport, industry, services and residential).

In 2018, the total final energy consumption of sectors in Turkey was 108,481 Mtoe with a decrease of 157% compared to 1990, 55% compared to 2005 and 2.59% compared to 2017 (Table 28). The sharp increase in final energy consumption in Turkey could be associated with the growth of the economy, but to mention an improvement, energy intensity must also decrease and should be considered together with energy efficiency. For example, in the EU-28 countries, final energy consumption has decreased by 4.6% in the last 10 years as a function of productivity growth (2018 data), but the target values have not been reached yet[109].

In 2018, the industrial sector (33.4%) and the residential and services sector (30.5%) had the highest share of final energy consumption in Turkey, followed by the transport sector (26.2%) and the agriculture/livestock sector (4%). The share of non-energy consumption was 5.8%.

Compared to the European Union countries, the highest share in the EU-28 countries in 2017 was the transport sector with 32%. This was followed by residential with 27.6%, industry with 25.7% and other sectors such as trade and public services with 14.8%[110].

GRAPH 102- FINAL ENERGY CONSUMPTION BY SECTORS (Mtoe)



Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

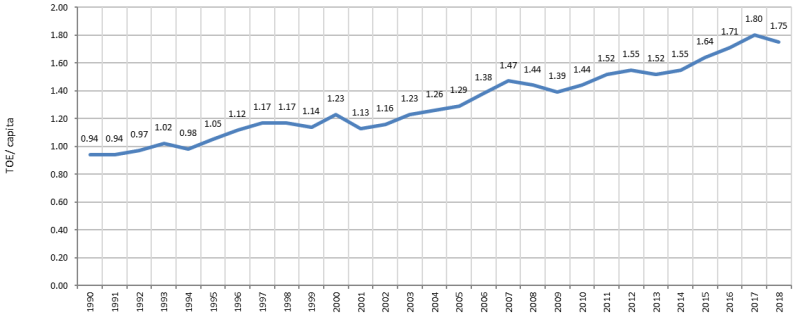
11.4- Energy Consumption per capita

D P S I R

The indicator is a driving force indicator that describes the level of consumption. It is one of the indicators used to make comparisons between countries, regions, etc.

While energy consumption per capita in Turkey was 0.94 toe in 1990, it was 1.75 toe in 2018. In European Union countries, primary energy consumption per capita was 3.51 toe in 1990 and 3.3 toe in 2017 [34]. Final energy consumption per capita in the EU-28 countries was 2.07 toe in 2018[111].

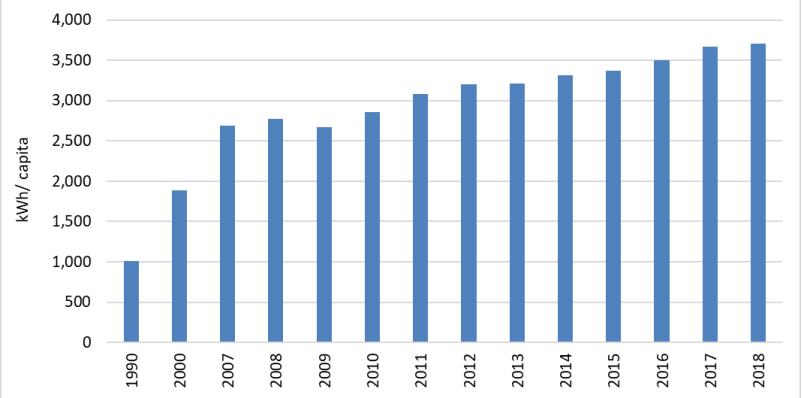
GRAPH 103- ENERGY CONSUMPTION PER CAPITA BY YEARS (toe / capita)



Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

Looking at the per capita electricity consumption figures, the electricity consumption per capita in Turkey was around 1,000 kWh in 1990, while this value was 3,709 kWh in 2018.

GRAPH 104- ELECTRIC ENERGY CONSUMPTION PER CAPITA (kWh / capita)



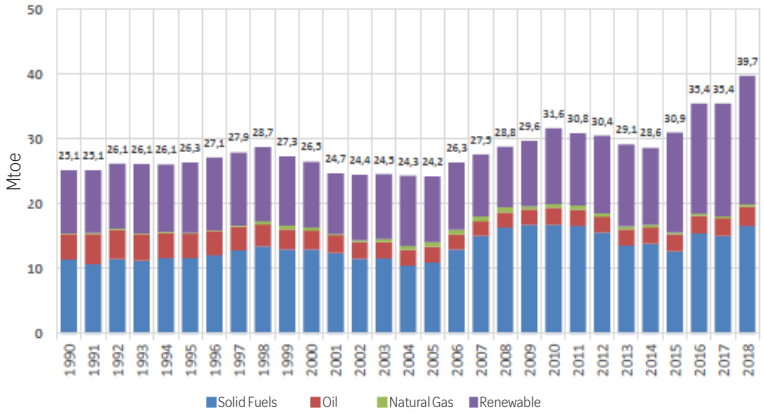
Source: Directorate General of Turkish Electricity Transmission Corporation

11.5- Energy Consumption per capita

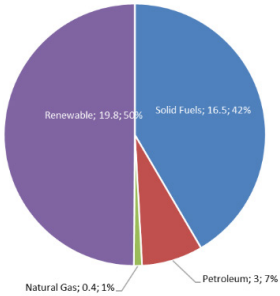
D P S I R

This indicator is a driving force indicator. While the total primary energy produced in Turkey was 25,138 Mtoe in 1990, this value increased to 39,675 Mtoe in 2018, and the increase from 1990 to 2018 was 57.8%[112].

GRAPH 105- PRIMARY ENERGY PRODUCTION BY THE YEARS (Mtoe)



GRAPH 106- DISTRIBUTION OF PRIMARY ENERGY PRODUCTION BY SOURCES IN 2018 (MTOE and %)



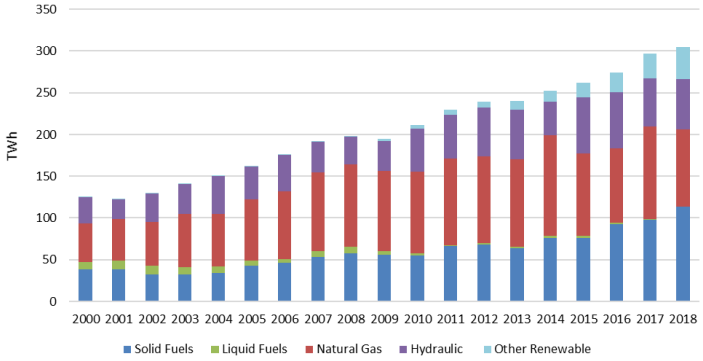
Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

When the issue is addressed in terms of gross electricity generation by source;

Electricity generation in Turkey amounted to 304.8 TWh (terawatt hours) in 2018. Total electricity generation in Turkey increased by 430% compared to 1990, 88% compared to 2005 and 2.5% compared to 2017.

If we look at the distribution of total electricity generation in Turkey in 1990, we see that the share of solid fuels was 35%, the share of natural gas was 18%, the share of liquid fuels was 7%, and the share of hydraulics was 40%. In 2018, solid fuels had a share of 37%, natural gas had a share of 30%, hydraulics had a share of 20% and other renewable sources had a share of 13%.

GRAPH 107- TOTAL ELECTRIC ENERGY GENERATION BY SOURCES (TWh)



Source: Directorate General of Turkish Electricity Transmission Corporation

11.6- Share of Renewable Energy Sources in Gross Final Energy Consumption

D P S I R

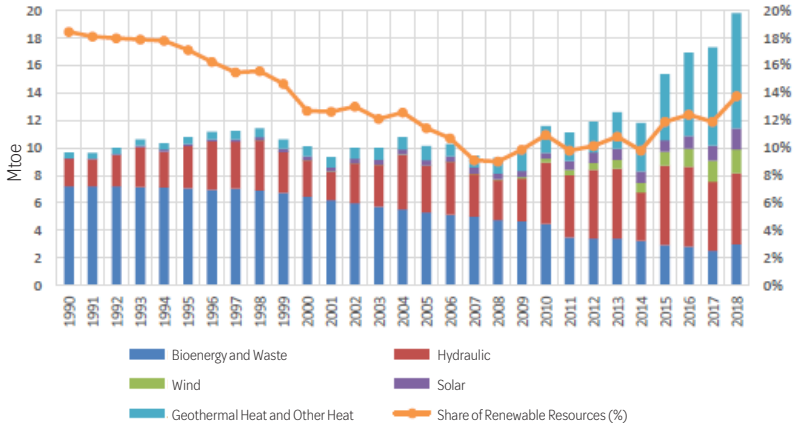
This indicator is a response indicator that measures the total share of energy generated from renewable energy sources in the country. Renewable energy sources are environmentally friendly and have much lower CO_2 emission levels per unit of energy produced.

In Turkey, renewable energy supply mainly consists of hydro, wind, solar, geothermal and biomass (wood, plant and animal residues). Primary energy supply was 143.66 Mtoe, while domestic energy production reached 39.675 Mtoe at the end of 2018. 50% of domestic energy production (the part with a total value of 19.775 Mtoe) was provided from renewable energy sources. The amount of energy provided from renewable sources increased by 105% compared to 1990.

While the share of renewable energy in the total energy consumption in Turkey was 18.4% in 1990, this share reached 13.8% in 2018, in parallel with the decreasing fuel wood consumption and the increasing total energy consumption.

In the EU-28 countries, the share of renewable energy in primary energy consumption was 4.3% in 1990 and 18.0% in 2018[113].

GRAPH 108- GROSS ENERGY PRODUCTION FROM THE RENEWABLE ENERGY SOURCES IN TURKEY and SHARE OF RENEWABLE ENERGY IN GROSS FINAL ENERGY CONSUMPTION



Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

11.7- Rate of Electricity Generated from Renewable Sources

D P S I R

This indicator is a response indicator and is calculated by dividing electricity generated from renewable sources by total gross electricity consumption (total gross electricity + electricity imports - electricity exports from all fuels).

Turkey's gross electricity consumption at the end of 2018 was 304,166.9 GWh and the amount of electricity generated from renewable sources was 98,741.3 GWh. Accordingly, the share of electricity generated from renewable sources in gross electricity consumption was 32.5%.

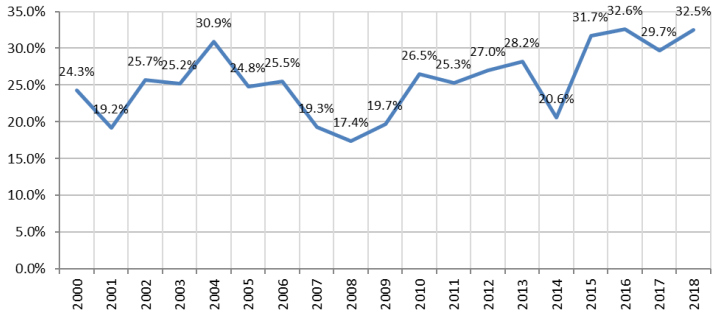
According to European Statistical Office (EUROSTAT), the share of electricity generated from renewable sources in the gross electricity consumption of the EU-28 countries was 32.1% in 2017[114].

TABLE 29- DISTRIBUTION OF ELECTRIC ENERGY GENERATION FROM RENEWABLE SOURCES IN 2018

Source	Generation (GWh)	Share (%)
Hydraulic	59,938,4	60.70
Wind	19,949,2	20.20
Geothermal	7,431,0	7.53
Biomass *	3,662,9	3.67
Solar	7,799,8	7.90
Total	98,741,3	100

* Including industrial waste.

GRAPH 109- SHARE OF ELECTRICITY GENERATED FROM RENEWABLE SOURCES IN GROSS ELECTRICITY CONSUMPTION (%)



Source: Turkish Electricity Generation-Transmission 2018 Statistics, https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-2018-yili-istatistikleri

11.8- Primary Energy and Final Energy Intensity

D P S I R/D P S I R

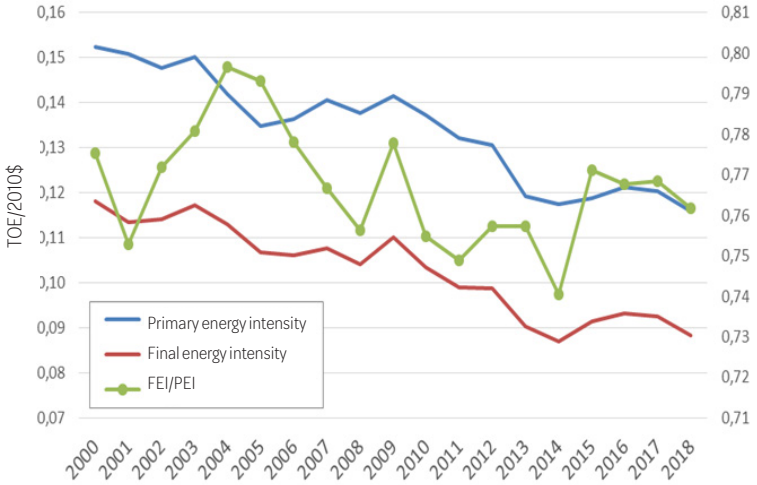
Primary energy intensity is the response, and the final energy intensity is the driving force indicator. Decrease in indicator values means improvement in energy efficiency. Primary energy intensity is an energy efficiency indicator that measures how much energy is required to produce one unit of Gross National Product (GDP) on a regional and country basis. The level of this indicator shows the economic structure of countries or regions, the structure of energy consumption, climatic conditions and technical energy efficiency. The energy intensity trend is influenced by structural changes in the economy and industry, changes in the structure of energy consumption and the equipment used by end users, as well as efficiency in the building sector.

In 2018, Turkey's primary energy intensity was 0.12 TOE /2010$, a decrease of 24% compared to 2000. According to 2017 data, the world average of primary energy intensity was 0.18 TOE /2010$. The average of OECD and EU-28 countries was 0.11 and 0.09 TOE /2010$, respectively. Turkey's primary energy intensity is quite close to the average of OECD countries, but remains high compared to the average of EU countries.

As with primary energy intensity, there is also a declining trend in final energy intensity. Final energy intensity decreased by 25.4% between 2000-2018, reaching 0.09 TOE /2010$ in 2018. Although it tends to decrease compared to 2000, it has been in the range of 0.09 TOE /2010$ since 2013, so the success between 2000-2013 has been stable since 2013.

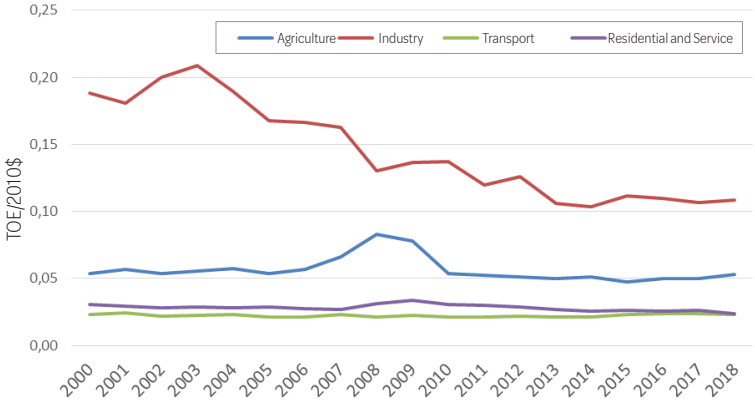
The graph shows the trend of increasing/decreasing primary and final energy intensity during 2000-2018 and it is observed that the ratio of final energy intensity to primary energy intensity (FEI /PEI) has decreased in 2018 as compared to previous year.

GRAPH 110- PRIMARY AND FINAL ENERGY INTENSITY BY YEARS (Climate Corrected)



Source: Ministry of Energy and Natural Resources, Department of Energy Efficiency and Environment

GRAPH 111- SECTORAL FINAL ENERGY INTENSITIES BY YEARS



Source: Ministry of Energy and Natural Resources, Department of Energy Efficiency and Environment

When the final energy intensities are examined on the basis of sectors, we see that industry is the sector with the highest energy intensity, followed by agriculture, residential and service, transportation sectors, respectively[115].

11.9- Energy Efficiency in Buildings

D P S I R

If we compare the energy efficiency and saving potential of the building sector with the current consumption, it reaches 50%. The " By-Law on Energy Efficiency in Buildings" dated 05.12.2008 numbered 27075 came into force and obtaining an energy identity certificate determining the energy consumption class of the building, became mandatory under the said By-Law. By the end of 2018, energy identity certificates had been issued for a total of 823,528 buildings (122,112 existing buildings and 701,416 new buildings). Renewable energy systems are used in 29,904 of these buildings for which an energy identity certificate has been issued.

Within the scope of the " By-Law on Sharing the Heating and Hot Water Expenses in Central Heating and Hot Water Systems" numbered 26847, which came into force on 14/04/2008, it was mandatory for all existing and new buildings with central heating systems to comply with cost sharing practices for central heating systems. Under these applications, the number of metering companies authorized to issue metering and cost-sharing certificates in buildings with central heating systems was 115 at the end of 2018, with the aim of reducing fuel consumption by an average of 30% without changing the comfort conditions in these buildings[116].

12

INDUSTRY AND MINING

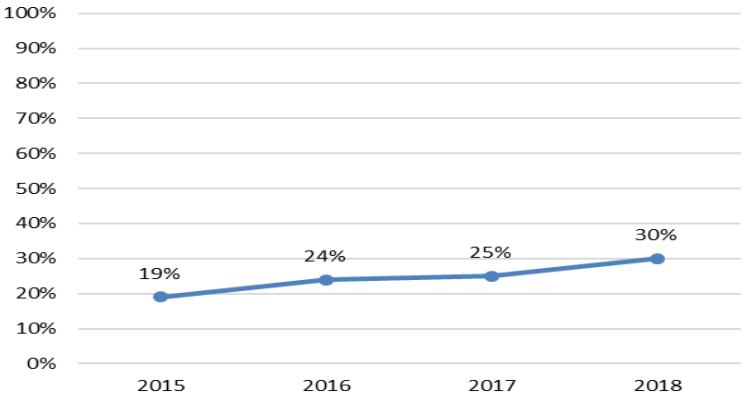
12.1- The share of the Total Domestic and International Sales Values of the products of the Enterprises Operating in the Organized Industrial Zones in all Industrial Enterprises

D P S I R

Organized Industrial Zones have been established in our country for the purpose of disciplining industry, contributing to the planned development of the city, ensuring efficiency and increase in profits in production, spreading industry to less developed regions, disciplining the use of agricultural land in industry, providing healthy, cheap, reliable infrastructure and common social facilities, preventing the environmental pollution through common treatment facilities, etc.

The Ministry of Industry and Technology maintains the register of industrial enterprises based on the Industrial Registry Law No. 6948. Industrial registries have a dynamic structure and there are both new registrations and de-registrations. In this context, the share of enterprises registered in the Industrial Register in the total domestic and international sales values of products manufactured by enterprises operating in the organized industrial zones is 19% for 2015, 24% for 2016, 25% for 2017 and 30% for 2018[117].

GRAPH 112 – THE SHARE OF THE TOTAL DOMESTIC AND INTERNATIONAL SALES VALUES OF THE PRODUCTS OF THE ORGANIZED INDUSTRIAL ZONES IN ALL INDUSTRIAL ENTERPRISES BY YEARS



Source: Ministry of Industry and Technology, General Directorate of Industry and Productivity

12.2- Number of Mining Facilities by Groups

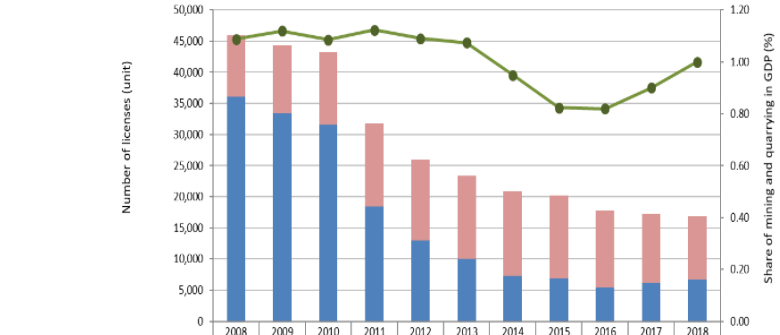
D P S I R

This indicator is a pressure indicator and shows the number of mines registered in a year by different licensing groups. Mining plays a significant role because of its direct contribution to the economy and especially because of the inputs it provides to the manufacturing sector. However, mining decisions should be made and implemented with commercial and environmental criteria in mind to ensure the general welfare of the country.

In 2018, the Ministry of Energy and Natural Resources, General Directorate of Mining Affairs issued a total of 16,801 mining licenses, of which 6,646 were exploration licenses and 10,155 were operating licenses. During 2008-2018, there was a decrease in the total number of licenses issued over the years. The share of mining and quarrying in GDP decreased from 1.1% in 2008 to 1% in 2018.

Looking at the distribution of the 8,011 licensed mines in operation in 2018 by their groups, it can be seen that 2,294 of them were in the IV Group, followed by the II Group (a) with 2,534 and the II Group (b) with 2,210[118].

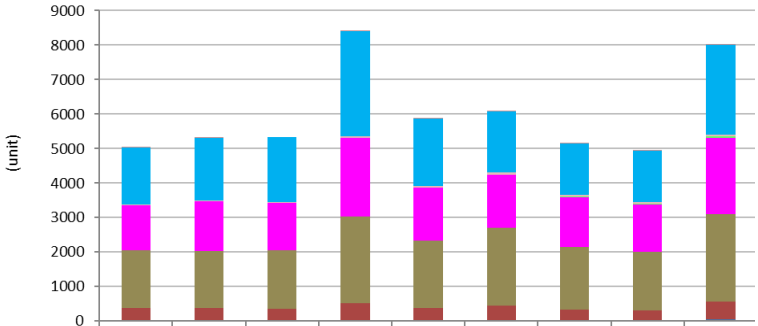
GRAPH 113-TOTAL NUMBER OF LICENSES GIVEN BY YEARS (2008-2018)



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of Operating License	9,802	10,935	11,604	13,373	13,068	13,382	13,464	13,331	12,355	11,076	10,155
Number of Exploration License	36,098	33,407	31,562	18,417	12,945	9,984	7,341	6,864	5,445	6,144	6,646
Share of mining and quarrying in GDP (%)	1.09	1.12	1.09	1.12	1.09	1.07	0.95	0.82	0.82	0.90	1.00

Source: Ministry of Energy and Natural Resources, General Directorate of Mining Affairs (MIGEM) http://www.mapeg.gov.tr/maden_istatistik.aspx

GRAPH 114- NUMBER OF LICENSES FOR MINES OPERATING BY MINING GROUPS (2010-2018)



	2010	2011	2012	2013	2014	2015	2016	2017	2018
V Group	3	2		3	1	1	2	3	7
IV Group	1,637	1,798	1,869	3,056	1,944	1,783	1,467	1,499	2,594
III Group	26	33	35	47	44	61	59	52	62
II(c) Group						11	13	22	47
II(b) Group	1,301	1,450	1,360	2,279	1,536	1,521	1,451	1,379	2,210
II(a) Group	1,686	1,642	1,707	2,507	1,957	2,264	1,809	1,694	2,534
I(b) Group	377	380	357	526	380	449	338	302	508
I(a) Group	0	0	0	0	0	0	0	0	49

Source: Ministry of Energy and Natural Resources, General Directorate of Mining Affairs (MIGEM) http://www.mapeg.gov.tr/maden_istatistik.aspx

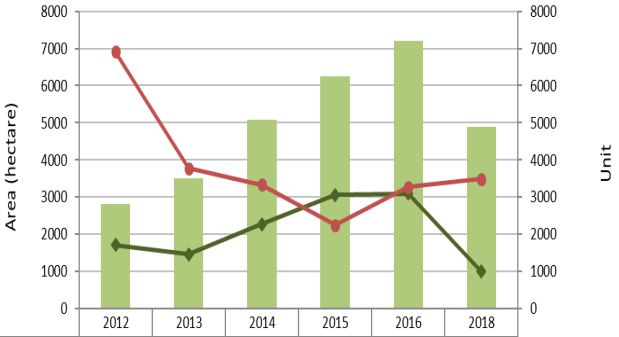
12.3- Number and Area of Mines Closed After Being Operated

D P S I R

The indicator is a response indicator. Reclamation activities should be implemented during the closure phase of an activity. The aim is to bring the areas degraded by mining activities to a state close to the old economic and ecological state through reclamation.

According to the data of the General Directorate of Forestry, in 2018 the number of mines/facilities rehabilitated after being operated was 1001 and their area was 4,888.77 hectares.

GRAPH 115- NUMBER AND AREA OF MINES/FACILITIES REHABILITATED AFTER BEING OPERATED (2010-2018)



	2012	2013	2014	2015	2016	2018
Area of Mines/Facilities Rehabilitated After Being Operated	2810	3499	5086	6243	7208	4888.77
Number of Mines/Facilities Rehabilitated After Being Operated	1711	1462	2277	3064	3101	1001
Number of Closed Mines	6,910	3,781	3,339	2,251	3,271	3,485

Resources:

(1) General Directorate of Forestry for the data of the Mines/Facilities Rehabilitated After Being Operated;

(2) Ministry of Energy and Natural Resources, General Directorate of Mining Affairs (MIGEM) Oracle Discovery Database for the data of the Number of Closed Mines.

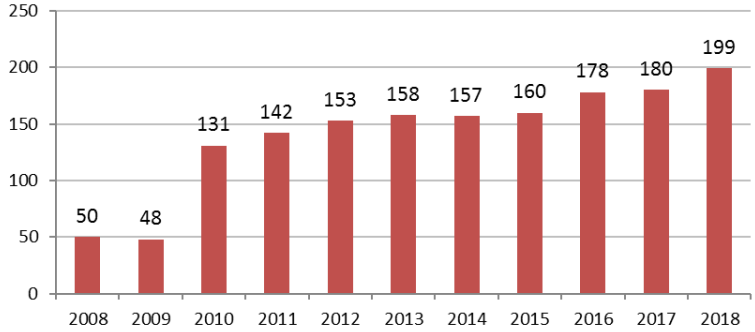
12.4- Laboratories Operating Under Environmental Legislation

D P S I R

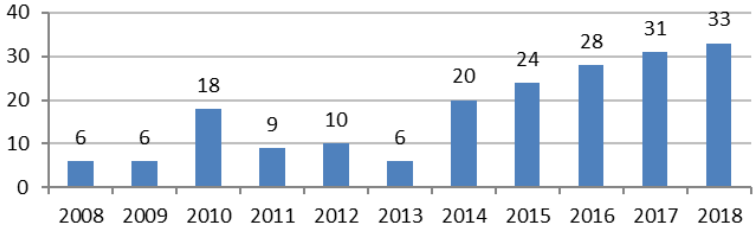
The indicator is a response indicator. In 2018, there were 199 laboratories operating under environmental legislation in our country. Issues such as laboratories, qualifications and provinces can be queried at https://elab.cevre.gov.tr/LabSorgu/.

"Proficiency Tests" have been organized since 2008 for laboratories authorized by our ministry under Remote Inspections. The Organized Proficiency Test parameter was 33 parameters in 2018.

GRAPH 116- NUMBER OF LABORATORIES OPERATING UNDER ENVIRONMENTAL LEGISLATION BY YEARS



GRAPH 117- NUMBER OF PARAMETERS OF PROFICIENCY TESTS ORGANIZED THROUGHOUT YEARS



Source: Ministry of Environment and Urbanization, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring

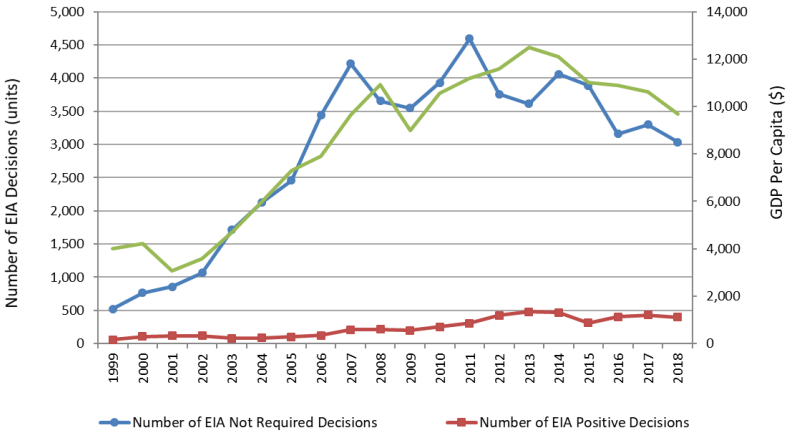
12.5- Environmental Impact Assessment Decisions

D P S I R

The indicator is a response indicator. Environmental Impact Assessment (EIA), one of the most important tools of sustainable development, has been used in our country since 1993. EIA is an important tool used in the prevention of the possible impact of the planned projects on the environment and in the determination of the chosen site and technological alternatives. Before the projects are put into practice, it has become mandatory under the EIA legislation to obtain an EIA Positive/EIA Not Required certificate.

EIA decisions are significant in that they are a projection of the point at which industrialization and development has arrived in our country.

GRAPH 118- THE NUMBER OF EIA POSITIVE AND EIA NOT REQUIRED DECISIONS BETWEEN 1999 AND 2018 AND GDP PER CAPITA IN TURKEY



Sources: 1) The Ministry of Environment and Urbanization, General Directorate of EIA, Permit and Inspection for EIA data,

2) TURKSTAT for GDP per capita data, tuik.gov.tr/PreIstatistikTablo.do?istab_id=2218

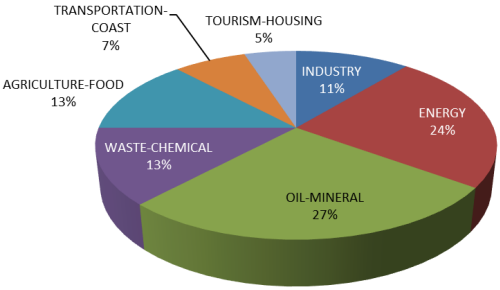
Note: EIA decisions subject to EIA statistics are not revised retroactively with respect to the issues of failure to start the investment without force majeure within the time limit established under the EIA Legislation, or revocation or invalidity of the EIA decision with the Court Decision.

In summary, "EIA Positive Decisions" are defined as positive decisions taken as a result of the assessment of projects that are present in the list of Annex-1 of the Legislation and have relatively high environmental impacts. "EIA Not Required Decisions", on the other hand, are positive decisions made as a result of the assessment of projects that are present in the list of Annex-2 of the Legislation and have relatively low environmental impacts compared to ANNEX -1.

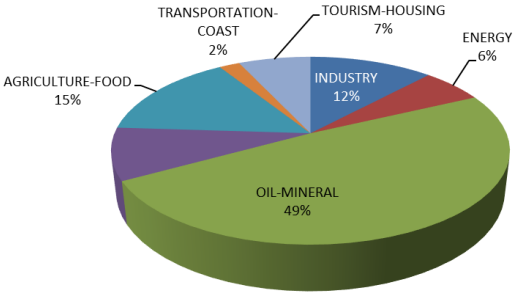
In Turkey, the first EIA Legislation was published in 1993 and by the end of 2018, a total of 5,288 "EIA Positive" decisions had been made. When the distribution of these decisions is analyzed by sector, we can see that investments in petroleum and mining took the lead with 27%, followed by investments in the energy sector with 24% and investments in the waste and chemical sector and the agriculture and food sector with 13%.

When the distribution of the 60,694 "EIA Not Required" decisions by sector between 1993 and the end of 2018 is analyzed, investments in oil and mining are again in the lead with 49%. This is followed by investments in agriculture-food with 15% and industrial investments with 12%.

GRAPH 119- SECTORAL DISTRIBUTION OF EIA POSITIVE DECISIONS BETWEEN 1993-2018



GRAPH 120- SECTORAL DISTRIBUTION OF EIA NOT REQUIRED DECISIONS BETWEEN 1993-2018



Source: Ministry of Environment and Urbanization, General Directorate of the EIA, Permit and Inspection.

Note: EIA decisions, which are subject to EIA Statistics, are not revised retrospectively regarding the issues of not starting investment without force majeure within the period specified within the scope of the EIA Legislation, or canceling or voiding the EIA decision with the Court Decision

13

AGRICULTURE

13.1- Agricultural Land Per Capita

D P **S** I R

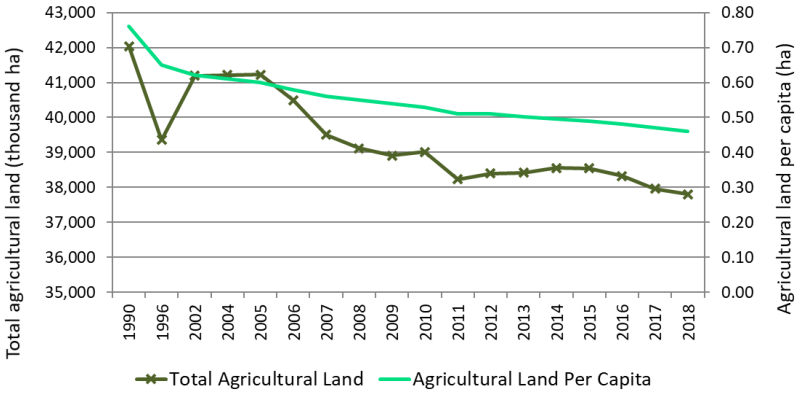
The indicator is a state indicator. Agricultural land is important to our herbal production, and our pastures, while summer pasture and winter quarters are important to our livestock development and nature conservation.

According to 2018 TURKSTAT data, total agricultural land is 37,802 thousand hectares (meadow and pasture land are also included). 52.3% of the total agricultural land is cultivated land, 9.1% is land with perennial crops (perennial orchards), 38.6% is permanent meadows and pastures.

As a result of population growth in Turkey and decrease in total agricultural land, agricultural land per capita has decreased. From 1990 to 2018, Turkey's population has increased by approximately 45.2%, and agricultural land contraction per capita has decreased by 39.3% during the same period.

The total agricultural land per capita, which was 0.76 ha in 1990, decreased to 0.46 ha in 2018. In terms of total arable land (23,180 thousand ha) in 2018, it was 0.28 ha per person. According to the data of 2016, the agricultural land per capita in the world was 0.19 ha and in European Union 0.22 ha[119].

GRAPH 121- TOTAL AGRICULTURAL LAND AND PER CAPITAL AGRICULTURAL LAND BY YEARS



Source: TURKSTAT, Ministry of Agriculture and Forestry.

Notes:

1) The data for meadow and pasture land are the results of the general agricultural censuses of 1980, 1991 and 2001.

2) Since 1995, only closed orchards and olive groves are reported, the area with scattered trees is not included.

3) Since 1995, they are grouped according to the activities of European Union in accordance with the Statistical Classification of Products by Activity (CPA 2002).

4) More than one plantation is not included since 2011

13.2- Chemical Fertilizer Consumption

D P S I R

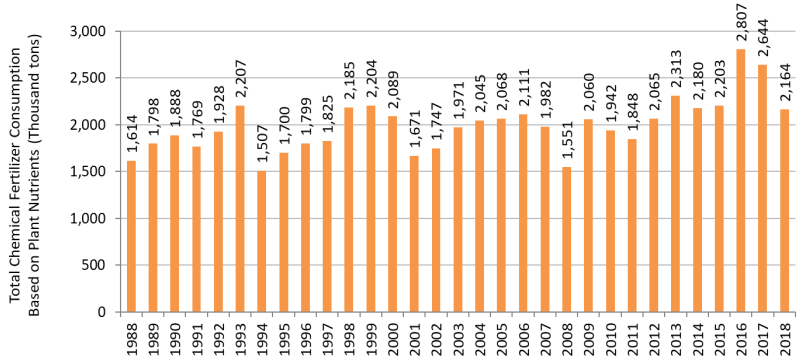
This indicator is a pressure indicator for eutrophication factors. The portion of fertilizer used in agriculture that escapes without being absorbed by plants is a major cause of eutrophication in the environment.

The amount of chemical fertilizers as pure plant nutrients (N, P_2O_5, K_2O) consumed in Turkey at the end of 2018 decreased by 18.15% compared to 2017 and reached 2,164,158 tons. The total amount of cultivated agricultural land was 23,185,463 hectares. At the end of 2018, the consumption of chemical fertilizers as a pure plant nutrient per hectare of agricultural land in Turkey was 93.34 kg. Excessive consumption of fertilizers is not in question in dry agricultural areas, but in some local and irrigated areas[120].

According to the World Bank 2016 data, the average consumption of fertilizers per hectare of arable land based on plant nutrients was 152.6 kg / ha in European Union countries, 140.6 kg / ha in the world and 137.7 kg / ha in Turkey[121].

The goal in fertilizer use is to use fertilizer at the right time, appropriately and in the right amount based on soil analysis, to avoid practices that cause water pollution and reduce soil fertility, to popularize organic farming and to practice sustainable agriculture. To increase the efficiency of fertilizer use, it is important to expand the use of organic and organomineral fertilizers in addition to chemical fertilizers [122].

GRAPH 122- TOTAL CHEMICAL FERTILIZER CONSUMPTION ON THE BASIS OF PLANT NUTRIENT MATERIAL BY YEAR



Source: Ministry of Agriculture and Forestry, 2019

13.3- Use of Pesticides

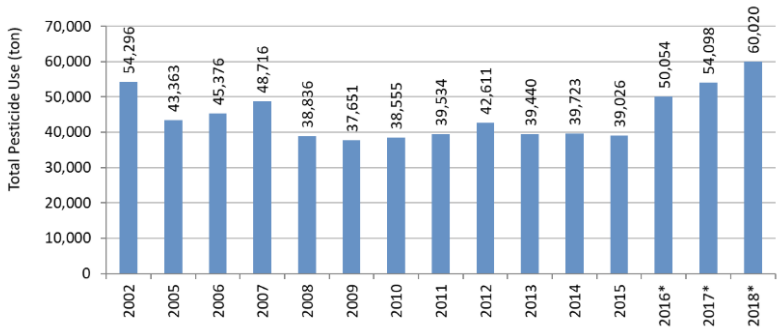
D P S I R

The indicator is a pressure indicator. In 2018, the total amount of pesticide used in Turkey increased by 10.9% compared to 2017 and reached 60,020 tons. When the amount of pesticide use is studied on the basis of groups, fungicides (fungus killers) form the largest group both in our country and in the world. In 2018, the total pesticide use includes 38.4% fungicides, 24.6% herbicides, 22.6% insecticides, 4.1% acaricides, 0.5% rodenticides and 9,6% others (plant activator, plant growth regulator, insect attractant, fumigant, nematicide, sulfur, mineral oils).

In our country, most agricultural pesticides were used in Mediterranean Region (28.7%) in 2018. It was followed by the Aegean, Marmara and Central Anatolia Regions. The East and Southeastern Anatolia Regions accounted for only 11.1% of consumption in Turkey. The Black Sea region is at the last place with 4.1%. The five provinces with the highest percentage of pesticide use in 2018 were Antalya with 8.8%, Manisa with 8.1%, Adana with 7.4%, Mersin with 6.2% and Aydın with 5.8%.

The Ministry of Agriculture and Forestry maintains efforts to prevent the use of defective pesticides. These efforts include: disseminating the globally accepted Integrated Pest Management activities in the fight against harmful organisms that are defective in herbal products, conducting pre-harvest pesticide control studies, incorporating and disseminating biological and biotechnical control methods among alternative control methods, focusing on non-formal and applied education and publication studies such as farmer field school. The share of cultivated area in the total cultivated area in Turkey with the principles of Integrated Pest Management was 44.2% in 2018 and is expected to increase to 50% by 2023[123].

GRAPH 123- TOTAL AMOUNT OF PESTICIDE USE BY YEAR



Sources: Ministry of Agriculture and Forestry, 2019

(*) The amount of use seems to be high due to the change in calculation method after 2016.

13.4- Organic Farming Lands and Production Amounts

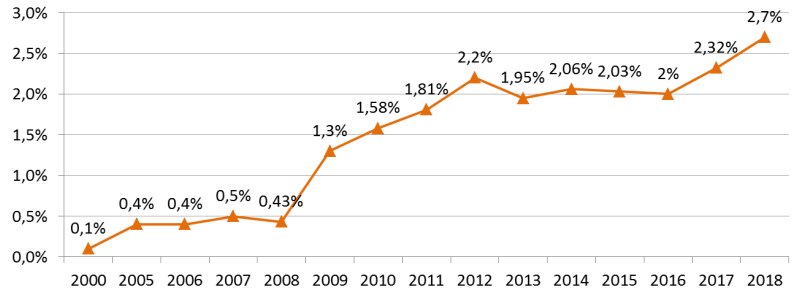
D P S I R

Organic farming is an environmentally friendly agricultural practice, and the area and amount of organic farming is a response indicator. Organic farming started in Turkey in 1985 with 8 types of products that only met export requirements. In 2002, 12,428 farmers planted 89,827 hectares (including wild collection areas) and harvested 310,125 tons and 150 types of organic products. In 2018, this increased to 213 types of products with 2,371,612 tons on 626,885 hectares planted by 79,563 farmers. Organic farmland (including wild collection areas) increased by 15.4% in 2018 compared to 2017, while the volume of products decreased by 1.5%.

According to 2018 data, organic farming area accounted for 2.7% of the total agricultural area in Turkey. According to 2017 data, organic farming was practiced on 1.4% of the

total agricultural land worldwide[124]. In European Union countries, organic farming was practiced on 7% of the total agricultural land[125].

GRAPH 124- SHARE OF THE ORGANIC FARMING LANDS TO THE TOTAL AGRICULTURAL LANDS (%)

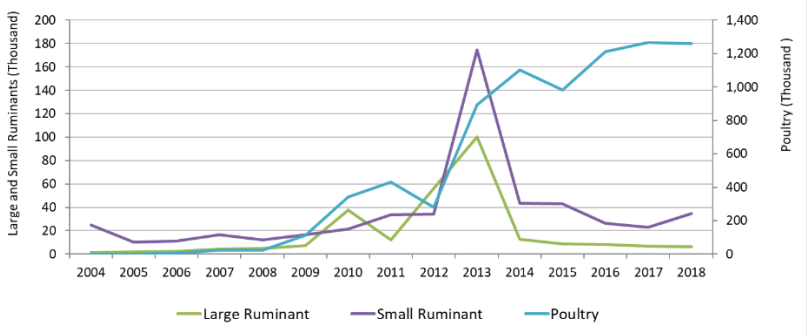


Source: Ministry of Agriculture and Forestry

Notes: (1) Transition data is included. (2) Production areas include wild harvesting areas.

Large and Small Ruminants (Thousand)

GRAPH 125- ORGANIC LIVESTOCK DATA



Source: Ministry of Agriculture and Forestry, 2019

13.5- Good Agricultural Practices

D P S I R

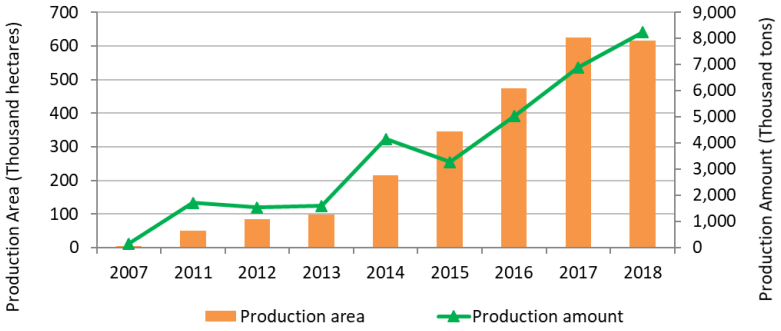
Good agricultural practices are agricultural production that does not harm the environment and human and animal health. These practices seek to protect natural resources, ensure traceability and sustainability in agriculture and food safety. In this regard, the indicator is a response indicator.

Good Agricultural Practices are carried out according to the legislation on good agricultural practices published by the Ministry of Agriculture and Forestry. This requires the product to be traceable from the field to the dining table and each process must be recorded. The use of pesticides, fertilizers, etc. is carried out according to the results of analysis and under control. The final product is certified according to the report issued by the inspection body.

Good agricultural practices were introduced in Turkey in 2007 in 18 provinces with 651 producers on 615,614 hectares. In 2018, this figure reached 8,230,026 tons of production with 73,286 producers in 63 provinces on 615,614 hectares. In 2018, the number of producers adopting Good Agricultural Practices increased 112 times, the production area increased 124 times and the production amount increased 55 times compared to 2007.

In 2018, the share of production land with good agricultural practices in the total agricultural land, excluding fallow lands, was 3.13%. By 2023, the target is to increase the share of good agricultural practices in the total agricultural land excluding fallow land to 6.1%[126].

GRAPH 126- GOOD AGRICULTURAL PRACTICES PRODUCTION AREA AND AMOUNT BY YEARS



Source: Ministry of Agriculture and Forestry, 2019

14

FISHERIES

14.1- Aquaculture Production

D P S I R

This indicator is a pressure indicator.

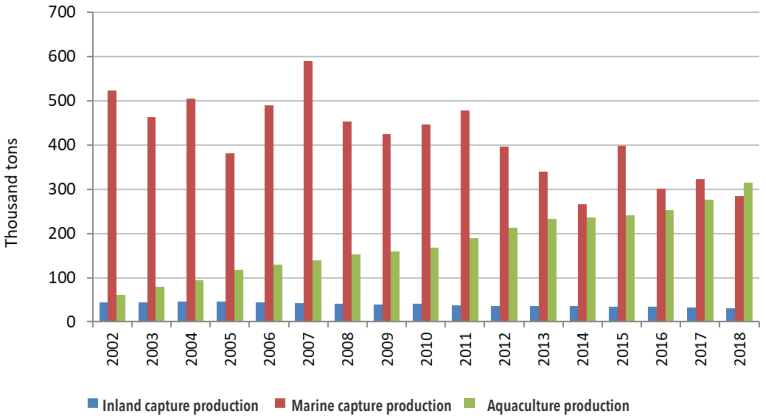
There is 24 million ha of marine area and 1.5 million ha of inland water area. According to TURKSTAT data, aquaculture production decreased by 0.3% in 2018 compared to 2017 and amounted to 628,631 tons. Marine fish accounted for 35.3% of production, other marine products 9.9%, inland aquaculture 4.8% and aquaculture products 50%.

In 2018, marine and inland fisheries decreased by 11.4%, while aquaculture production increased by 13.8% compared to the previous year. While the production from hunting was 314,094 tons, aquaculture production was 314,537 tons. 33.4% of aquaculture production took place in inland waters and 66.6% in the seas. In mariculture, aquaculture production surpassed hunting production the first time.

The Eastern Black Sea Region took the first place with a rate of 31.5% in marine fisheries production. It was followed by the Western Black Sea region with 30.6%, the Marmara with 18.4%, the Aegean with 15% and the Mediterranean Regions with 4.5%[127].

Regulations regarding zones, time, season, length, species, distance, depth as well as fishing tools and equipment for aquaculture are drawn up to protect fishery resources and to ensure sustainable management[128]. In addition, various activities are carried out to monitor fish stocks, protect endangered species, increase stocks through fish restocking, monitor water resources in terms of pollution and take preventive measures.

GRAPH 127- FISHERIES PRODUCTION DATA BY THE YEARS (2002-2018)



Source: TURKSTAT, Ministry of Agriculture and Forestry, 2019

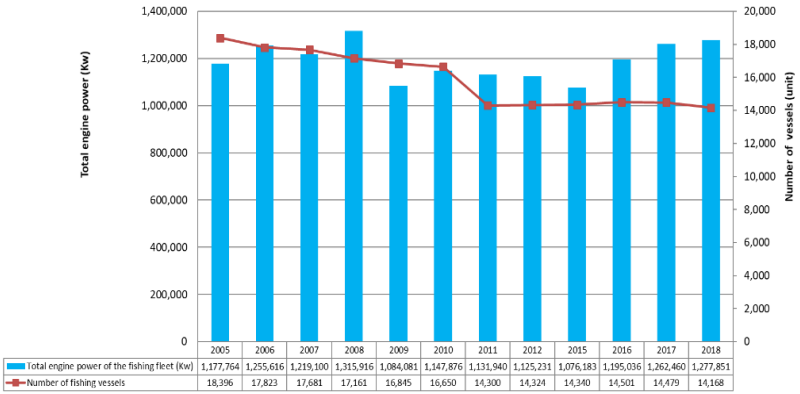
14.2- Fishing Fleet Capacity

D P S I R

This indicator is a measure of the size and capacity of the fishing fleet, which is assumed to exert pressure on marine fish populations and their environment. As in the world, the production of fishery products obtained through hunting is within limits in our country. For this reason, the basic approach accepted by scientists to hunting is to maintain production while conserving stocks. The fishing fleet has grown and developed in terms of power, number, technology and fishing gear until the 2000s. According to TURKSTAT data, the number of active sea fishing vessels was 13,381 in 2000, this figure increased to 18,396 in 2005, but decreased to 14,168 in 2018.

To protect fisheries resources and ensure the sustainability of our fisheries, the further growth of the fleet has been limited by not issuing new vessel licenses since 2002. Taking into account the balance between the fish stocks and the fishing fleet in Turkey, support payments have been made to the fishermen who want to exclude their vessels from fishing, according to the size of the vessels, since 2012 in return for the cancellation of their licenses. In this context, a total of 1,264 fishing vessels (with a length of 10 meters or more) were withdrawn from the fleet between the period 2012-2018[128]. Although the total number of vessels is reduced by this policy, the commercial fishing pressure in the fish stocks cannot be reduced as the total fishing effort, namely the total engine power of the fishing fleet, is on the rise.

GRAPH 128- NUMBER OF SEA FISHING VESSELS BY YEAR



	2005	2006	2007	2008	2009	2010	2011	2012	2015	2016	2017	2018
Total engine power of the fishing fleet (Kw)	1,177,764	1,255,616	1,219,100	1,315,916	1,084,081	1,147,876	1,131,940	1,125,231	1,076,183	1,195,036	1,262,460	1,277,851
Number of fishing vessels	18,396	17,823	17,681	17,161	16,845	16,650	14,300	14,324	14,340	14,501	14,479	14,168

TABLE 30- NUMBER OF BOATS WITDRAWN BY YEAR

Years	2013	2014	2015	2016	2017	2018	Toplam
Number of Boats Withdrawn	364	456	191	-	214	39	1.264

Source: Ministry of Agriculture and Forestry, General Directorate of Fisheries and Aquaculture, 2019

15

TOURISM

15.1- Number of Tourists

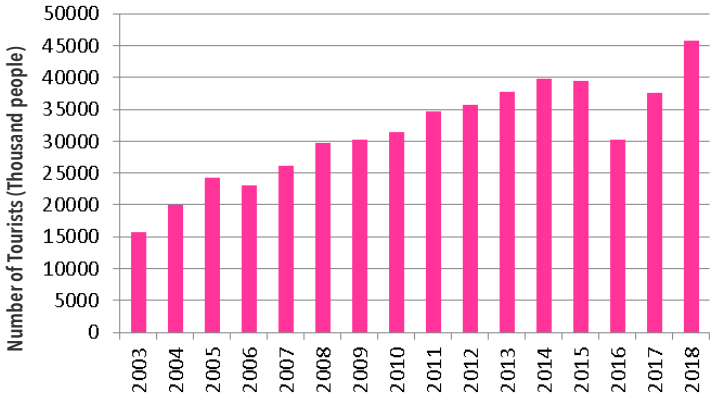
D P S I R

The high number of visitors to the country in a given period of time places a burden on the environment because of the reasons such as excessive consumption of natural resources during certain periods of the year, wastewater, waste generation, noise, etc.

The number of tourists is the number obtained by subtracting the number of overnight tourists from the total number of foreign visitors coming to Turkey and the number of citizens living abroad.

The number of tourists in Turkey, which was 15,775,021 in 2003, reached 45,767,714 in 2018. In 2018, the number of tourists increased by 21.71% compared to 2017[129].

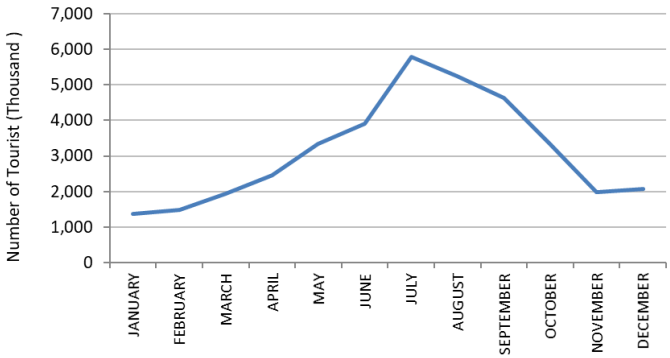
GRAPH 129- NUMBER OF TOURIST IN THE PERIOD 2003-2018



Source: Ministry of Culture and Tourism,2019

Looking at the distribution of the number of tourists by month, it can be seen that tourists visit Turkey mainly in the summer months. The per capita water consumption in tourist facilities, which exceeds the norms, and the fact that this consumption takes place in summer, when water resources are at their lowest, lead to environmental problems related to water. There is also a risk that excessive water extraction from deep wells will exacerbate the water problem.

GRAPH 130- MONTHLY DISTRIBUTION OF TOURISTS VISITING TURKEY IN 2018



Source: Ministry of Culture and Tourism, 2019

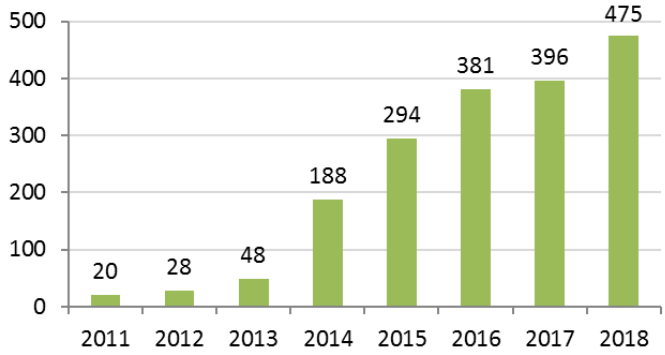
15.2- Number of Environment-Friendly Accommodation Facilities

D P S I R

The indicator is a response indicator. The Ministry of Culture and Tourism, within the framework of the legislation, awards a "Environment Friendly Accommodation Facility Certificate" and a plaque to the accommodation facilities that have "Tourism Facility Certificate" and operate in an environmentally friendly manner in order to protect the environment, increase environmental awareness, promote and support the positive contribution of tourism facilities to the environment.

At the end of 2018, the number of accommodation facilities with Tourism Facility Certificate was 3,925, of which 475 facilities (12.10%) were certified with a "Environment-Friendly Accommodation Facility" certificate (Green Star badge)[130].

GRAPH 131- NUMBER OF FACILITIES WITH GREEN STAR CERTIFICATES BY YEAR



Source: Ministry of Culture and Tourism

15.3- Number of Tourist Overnights and Beds per 1000 Inhabitants

D P S I R

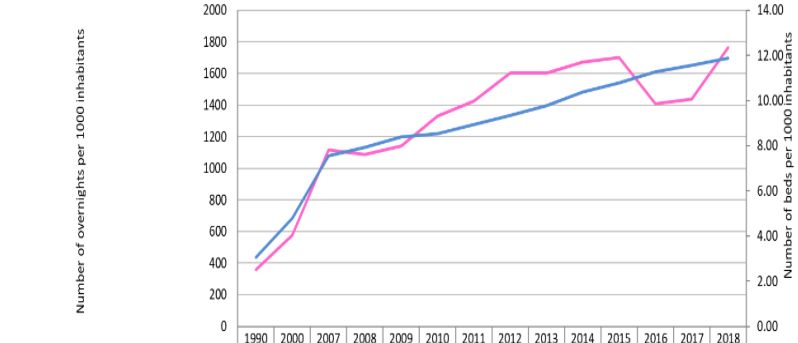
The indicator is obtained by calculating the figures per inhabitants, based on the total number of overnight stays in touristic facilities and the ratio of the number of beds in the facilities with tourism management certificate to the total population. It is a pressure indicator.

The increasing number of tourists can have a negative impact on the environment. The excessive consumption of resources in this region (water consumption and waste generation) at certain times of the year can lead to serious environmental problems.

The number of beds in tourist-operated certificate facilities per 1000 inhabitants in Turkey has steadily increased over the years. There have been ups and downs in the number of overnight stays per 1000 inhabitants. In 2018, the number of beds per 1000 inhabitants in Turkey was 11.9 and the number of overnight stays was 1,761.

According to EUROSTAT data, the number of beds per 1000 inhabitants in the EU-28 countries in 2018 was 55.2 and the number of overnight stays was 5445[131].

GRAPH 132- NUMBER OF TOURIST OVERNIGHTS AND BEDS PER 1000 INHABITANTS



	1990	2000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Number of overnights per 1000 inhabitants	357	577	1116	1087	1143	1331	1425	1602	1600	1674	1700	1410	1438	1761
Number of beds per 1000 inhabitants	3.07	4.80	7.54	7.93	8.39	8.54	8.95	9.34	9.77	10.39	10.78	11.27	11.57	11.88

Note: When comparing the number of overnight stays in the facility by years, the factor of constant change in the number of facilities and beds should be taken into account.

Sources: The number of overnight stays and beds data for Ministry of Culture and Tourism, population data for TURKSTAT.

15.4- Blue Flag Applications

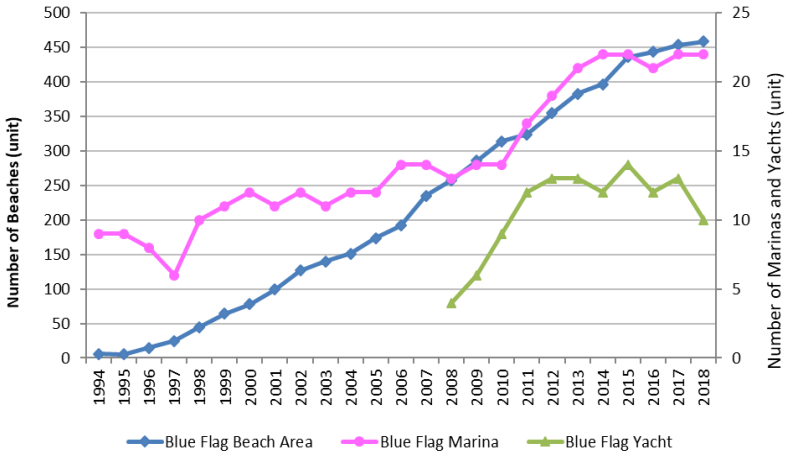
D P **S** I R

The indicator is a state indicator. Blue Flag is an international environmental award given to qualified beaches, marinas and yachts that meet the required standards. Blue Flag Applications, which began in 1987 in Europe and 1993 in Turkey, aims to establish high standards for beaches, marinas and yachts.

In the period from 1994 to 2018, the number of Blue Flag in Turkey increased steadily and reached 459 beaches, 22 marinas and 10 yachts in 2018.

Within the scope of the Blue Flag Program carried out in coordination with the Turkey Foundation for Environmental Education (TURCEV) in our country, Turkey ranked third with 459 beaches after Spain's 590 beaches and Greece's 519 beaches. It was ranked eighth in the world in marinas.

GRAPH 133- THE NUMBER OF BLUE FLAG BEACHES, MARINAS AND YACHTS BY YEARS IN TURKEY



Source: Ministry of Culture and Tourism, 2019

16

DISASTERS

16.1- Forest Fires

D P S I R

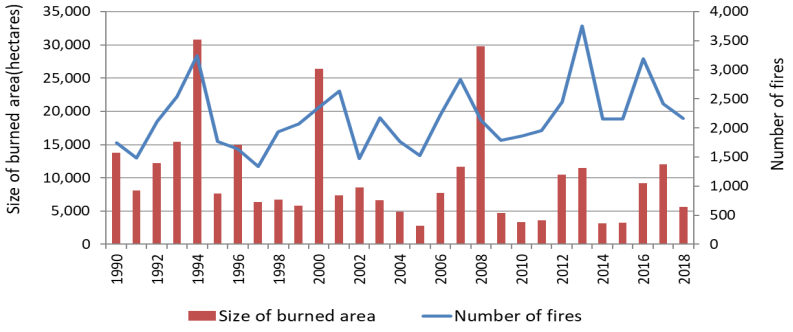
The indicator is an impact indicator. A large part of Turkey's forests, located in the Mediterranean climate zone, are threatened by forest fires.

In 2018, 2,167 forest fires broke out and 5,644 hectares of forest area were damaged in these fires. The average area burned per fire was 2.6 hectares. In 2018, there was a 10.12% decrease in the number of fires started compared to the previous year. The area of forest burned decreased by 53% compared to the previous year.

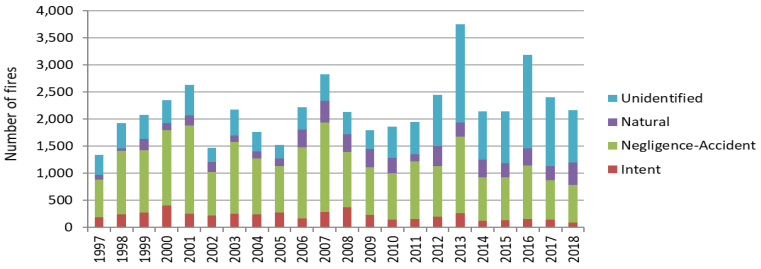
The majority of forest fires are caused by humans. In 45% of the forest fires in 2018, the cause could not be identified. 32 % of forest fires were caused by negligence-accidents, 19 % by natural causes and 4 % by intent.

According to the European Forest Fire Information System (EFFIS) data, the average size of burned areas per 10-year fire (2007-2016) in the European countries of the Mediterranean climate zone was 41.98 ha in Greece, 12.72 ha in Italy, 6.83 ha in Spain, 4.6 ha in Portugal, 3.73 ha in Turkey and 2.65 ha in France[132]. In the EU-28 countries, a total of 137,539 ha of forest area was burned in 2018[133].

GRAPH 134- FOREST FIRES (1990-2018)



GRAPH 135- THE NUMBER OF FIRES ACCORDING TO THEIR CAUSES (1997-2018)



Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, https://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatis- tikler.aspx

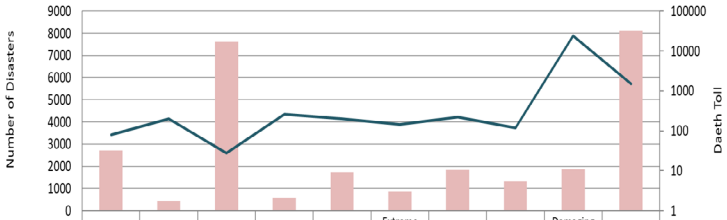
16.2- Disasters by Type

D P S I R / D P S I R

Natural disasters are impact indicators, while technical accidents are pressure indicators. According to the data from Turkish Disaster Data Bank (TABB), a total of 27,049 disasters (excluding road/vehicle accidents) occurred between 1990 and 2018. Among them, it can be seen that other disasters took the first place with 8,114. This was followed by landslides with 7,616 and earthquakes (damaging earthquakes) with 1,871.

A total of 27,119 people died in disasters (excluding road/vehicle accidents) in Turkey between 1990 and 2018. Earthquakes (damaging earthquakes) had the highest death toll with 24,348 people[134].

GRAPH 136- NUMBER OF DISASTERS IN TURKEY BY THEIR TYPES AND DEATH TOLL BETWEEN 1990-2018, ACCORDING TO THE DATA OF THE TURKISH DISASTER DATA BANK (TABB)



	Fire / Urban Fire	Terrorist Incidents	Landslide	Explosion	Storm / Typhoon	Extreme winter conditions	Flood	Avalanche	Damaging Earthquakes	Other
Number of Disasters	2705	441	7616	570	1733	843	1839	1317	1871	8114
Death Toll	79	202	28	261	202	143	221	117	24348	1518

Source: https://tabb-analiz.afad.gov.tr/Genel/Raporlar.aspx

Note: Road / vehicle accidents are excluded.

16.3- Numbers of Risk Assessment and Emergency Response Plans

D P S I R

In order to be prepared for accidents caused by ships and coastal facilities, coastal facilities that carry out activities that may cause pollution of the seas with oil and other harmful substances are required to prepare risk assessment and emergency response plans under Law No. 5312 "On Principles of Emergency Response and Compensation for Damages in Pollution of Marine Environment by Oil and Other Harmful Substances" and the Implementation By-Law and submit them to the Ministry of Environment and Urbanization for approval. In this regard, the Ministry of Environment and Urbanization has approved the risk assessment and emergency response plans of 35 coastal facilities, and in 2018, this number represents 97% of all coastal facilities in our country. One national and six regional emergency response plans were prepared by the Ministry of Environment and Urbanization and came into force on 08/02/2012. Annual efforts are made to keep the plans up to date. The prepared risk assessment and emergency response plans of coastal facilities are included as sub-elements of the national and regional plans.

TABLE 31- THE RATIOS OF THE COASTAL FACILITIES OF WHICH THE PLANS APPROVED BY THE MINISTRY OF ENVIRONMENT AND URBANIZATION BY YEAR

PROVINCES	YEARS									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
ADANA	75%	75%	83%	83%	83%	91%	100%	92%	93%	100%
ANTALYA	7%	36%	36%	43%	43%	75%	88%	88%	89%	100%
ARTVİN	0%	50%	50%	50%	100%	100%	100%	100%	100%	100%
AYDIN	0%	0%	0%	0%	0%	0%	50%	100%	100%	100%
BALIKESİR	10%	20%	20%	30%	30%	43%	43%	57%	57%	71%
BARTIN	0%	0%	0%	0%	0%	25%	40%	67%	67%	67%
BURSA	20%	60%	60%	60%	60%	86%	86%	86%	100%	100%
ÇANAKKALE	13%	25%	25%	38%	50%	67%	83%	75%	100%	100%
DÜZCE	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EDİRNE	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
GİRESUN	0%	40%	40%	40%	40%	100%	100%	100%	100%	100%
HATAY	14%	81%	86%	86%	90%	90%	95%	95%	91%	100%

PROVINCES	YEARS									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
İSTANBUL	4%	81%	82%	84%	84%	93%	94%	98%	99%	100%
İZMİR	65%	79%	79%	79%	81%	95%	100%	91%	100%	100%
KASTAMONU	0%	0%	0%	0%	0%	0%	33%	67%	67%	67%
KIRKLARELİ	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
KOCAELİ	25%	63%	78%	85%	85%	95%	100%	93%	93%	98%
MERSİN	44%	68%	76%	80%	80%	91%	91%	88%	92%	100%
MUĞLA	0%	4%	4%	12%	12%	57%	71%	83%	100%	100%
ORDU	0%	14%	14%	14%	14%	60%	60%	60%	75%	100%
RİZE	7%	7%	7%	7%	7%	100%	100%	100%	100%	100%
SAKARYA	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%
SAMSUN	11%	67%	78%	89%	89%	90%	91%	100%	100%	100%
SİNOP	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
TEKİRDAĞ	25%	42%	50%	67%	75%	75%	92%	100%	91%	100%
TRABZON	0%	8%	15%	23%	23%	60%	67%	100%	100%	100%
YALOVA	7%	7%	7%	21%	21%	98%	98%	98%	95%	100%
ZONGULDAK	40%	60%	80%	80%	100%	100%	71%	83%	98%	100%
Total	21%	52%	56%	60%	62%	85%	90%	92%	94%	97%

Source: Ministry of Environment and Urbanization, General Directorate of Environmental Management

16.4- Liability Insurances within the Scope of Environmental Legislation

D P S I **R**

The indicator is a response indicator. The concept of risk brings along the concept of insurance, which requires the risk to be secured. In this sense, environmental liability insurance is used as a tool in the management of environmental risks nowadays.

Within the scope of environmental legislation, General Conditions of Compulsory Marine Pollution Financial Liability Insurance for Coastal Facilities, General Conditions of Compulsory Financial Liability Insurance for Hazardous Substances and Hazardous Wastes, and General Conditions of Financial Liability Insurance for Environmental

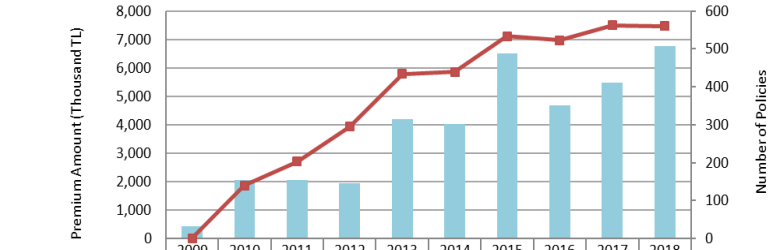
Pollution entered into force on 01 July 2007, 11 March 2010 and 01 September 2011, respectively.

With Coastal Facilities Sea Pollution Compulsory Third Party Liability Insurance some material and physical damages caused by marine pollution of coastal facilities are compensated within the guarantee limits set by the State. Regarding this insurance, 560 policies were issued in 2018 and a total of 6,764,263 TL premium production was generated.

Environment Pollution Third Party Liability Insurance provides coverage for damages caused by companies that pollute the soil, water or air. In 2018, 50 policies were issued for the said insurance and a total of 25,516 TL premium production was generated.

Compulsory Third Party Liability Insurance for Hazardous Substances and Hazardous Wastes compensates physical and material damages that may be caused by professional activities related to hazardous materials. For this insurance, 75,368 policies were issued in 2018 and a total of 63,149,777 TL premium production was generated[135].

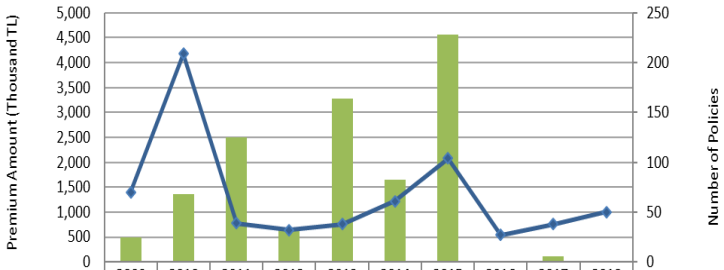
GRAPH 137- COASTAL FACILITIES SEA POLLUTION COMPULSORY THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Premium Amount (Thousand TL)	439	2,068	2,069	1,956	4,187	4,017	6,497	4,670	5,489	6,764
Number of Policies	1	140	203	295	434	439	534	523	563	560

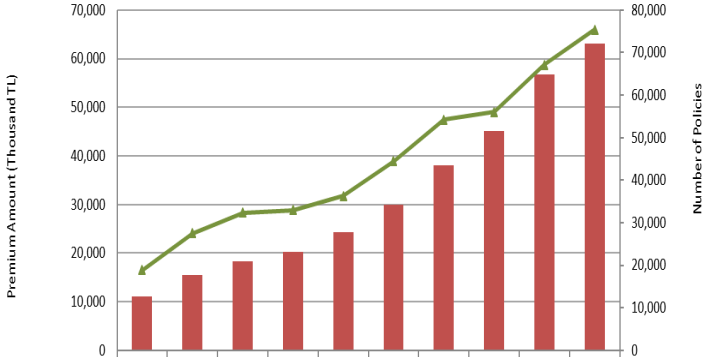
Source: Association of the Insurance, Reinsurance and Pension Companies of Turkey,2019 Ministry of Treasury and Finance, General Directorate of Insurance

GRAPH 138- ENVIRONMENT POLLUTION THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Premium Amount (Thousand TL)	498	1,369	2,500	665	3,275	1,649	4,561	1	113	25
Number of Policies	70	209	39	32	38	61	104	27	38	50

GRAPH 139- HAZARDOUS MATERIALS AND HAZARDOUS WASTE COMPULSORY THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Premium Amount (Thousand TL)	11,079	15,509	18,266	20,266	24,291	29,864	37,987	45,135	56,772	63,150
Number of Policies	18,893	27,484	32,383	32,998	36,298	44,420	54,175	56,083	67,096	75,368

Source: Association of the Insurance, Reinsurance and Pension Companies of Turkey,
Ministry of Treasury and Finance, General Directorate of Insurance

DEFINITIONS

POPULATION

Population Growth Rate

This indicator is the average annual increase in the size of the population in a given period or year. It is expressed as the annual increase in population per 100 inhabitants.

Urban Population

This indicator shows the expression of the population within the boundaries of provincial and district centers municipalities as a percentage of the total population.

Migrant Population

Internal migration is the change of permanent residence in certain areas within the borders of the country within one year.

ECONOMY

Resource Efficiency/Productivity

Resource efficiency/productivity is the ratio of GDP to domestic material consumption. Domestic material consumption measures the total amount of materials used directly in the economy. The indicator is obtained by adding the annual quantity of raw materials extracted at the borders of the economy concerned and the quantity of physical imports, and subtracting the physical quantity exported. It was emphasized that the term "consumption" used here does not refer to final consumption, but to apparent consumption. The indicator does not include upward flows of imports and exports of raw materials from outside the economy.

Domestic Material Consumption

The indicator Domestic Material Consumption is defined as the total amount of material used directly in the economy. The indicator is equal to Domestic Material Input minus exports. Domestic material input measures the materials that enter the economy for use. Domestic material input is equal to the sum of domestic material withdrawals and imports.

Environmental Protection Expenditures

Environmental protection expenditures are expenditures on activities to prevent, reduce, and eliminate environmental impacts caused by production processes and consumption of goods and services. In the public sector, expenditure on administration, monitoring and implementation of laws is also included. Environmental protection includes activities related to the prevention and reduction of pollution as well as activities related to the degradation of the environment. The primary purpose of activities under this heading is to protect the environment. Activities carried out for other purposes but which also have a positive impact on the environment are not included in environmental protection. Similarly, activities that are carried out for technical reasons, internal needs such as hygiene or safety and that have environmental benefits are not included.

Sectoral Distribution of Employment

This indicator gives the percentage of the active population of agriculture, industry, construction and services sectors out of the total active population.

HEALTH

Piped water supply (Mains Water)

Piped water supply is the supply of water under pressure through pipes from the municipal water supply system to the interior of the dwelling. Force pumps, wells, spring supplies, cisterns, rain puddles, fountains outside the houses are not considered as piped water system. If the "piped water system" brought into the yard is shared, the piped water system is accepted as "existing".

CLIMATE CHANGE

Greenhouse Gas Emissions

Emissions from energy, industrial processes and product use, agricultural activities and waste disposal comprise of direct greenhouse gases such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs) and sulfur hexafluoride (SF6) and indirect greenhouse gases such as nitrogen oxides (NOX), non-methane volatile organic compounds (NMVOCs) and carbon monoxide (CO) emissions. National Greenhouse Gas Emissions are calculated using the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines.

Greenhouse Gas Emissions by Sector

The indicator refers to the amount of greenhouse gas emissions from the different sectors in CO_2 equivalents.

Carbon Sink

Natural or man-made systems that absorb and store carbon dioxide from the atmosphere. Forests are the most common type of sink. In addition, soil, peat, permafrost (permafrost) soil layers, ocean water and carbonate deposits in the deep ocean are other sinks.

Carbon Sequestration

It is the process of sequestering carbon in a way that prevents it from being released into the atmosphere for a period of time. It is the process of removing carbon from the atmosphere and depositing it in a reservoir.

Precipitation

It is the term for the average amount of precipitation per unit area..

Temperature

This refers to the monitoring of average surface temperatures in time series.

Seawater Temperature

It expresses the annual change in the surface temperature of seawater in time series.

Heating Degree Days – HDD

This expresses the severity of cold considering the outdoor and indoor temperature at a given time (day, month, year). In order to create a comparable and common use, the European Community Statistics Office (Eurostat) recommends the following method to calculate the HDD.

HDD = (18 °C - Tm) x value Tm ≤ 15 °C (heating threshold)

HDD = 0 if Tm> 15 °C

Here; Tm = Daily average temperature, d = Number of days.

The calculation is done on a daily basis. Monthly and annual daily degrees are found by summing them up.

Cooling Degree Days – CDD

This explains the intensity of the temperature taking into account the outdoor temperature at a given time (day, month, year). Although there is no officially defined threshold temperature, in the practice of energy management in the construction industry, the threshold temperature is considered to be 22°C. According to this:

CDD = (Tm - 22) x value Tm> 22 °C (cooling threshold)

CDD = 0 if Tm ≤ 22 °C

AIR POLLUTION

Air Pollutant Emissions

Air Pollutants Emission is the mass expression (KiloTon, GigaGram, etc.) of the sum of emissions obtained by multiplying annual activity data and emission factors for specific pollutants.

Air Quality

This indicator shows the concentration of SO_2 and PM (Particulate Matter) in the ambient air. SO2 is a polluting, asphyxiating, colorless, acidic gas produced when sulfur compounds naturally occurring in the structure of fuels are released during combustion. Particulate Matter (PM) is formed when gaseous emissions are chemically converted and formed into bulk material. Particles with a diameter of 5 to 10 micrometers are defined as airborne particles. They are usually heterogeneous mixtures whose properties vary greatly from place to place Particulate Matters are referred to as PM10 if the aerodynamic diameter of the particles is less than 10 micrometers.

Limit value: This refers to the value that is scientifically determined with the aim of avoiding, preventing or reducing harmful effects on the environment and/or human health, and which must be reached within a certain period of time and should not be exceeded once reached.

Large Combustion Plant: These are combustion plants with a rated thermal input of 50 MW or more, built exclusively for the production of electricity and using solid, liquid or gaseous fuels

WATER-WASTEWATER

Water Consumption

This indicator shows the total amount of water abstracted from sources on a sectoral basis, including municipal, irrigation, drinking and utilization, and industry.

Oxygen-Consuming Substances in River Waters

The primary indicator of oxygenation status in water bodies is biochemical oxygen demand (BOD), which expresses the oxygen demand of living organisms in water that consume oxidizable organic matter. This indicator shows the current status and trends regarding ammonia (NH_4) concentrations and BOD in rivers.

Nutrients in Fresh Water Resources

This indicator can be used to show current nutrient concentrations - orthophosphate and nitrate concentrations in rivers, total phosphorus and nitrate in lakes, and nitrate in groundwater formations - and geographic changes in trends over time.

Classification by trophic status (nutrients) is as oligotrophic (with few nutrients), mesotrophic (with normal, medium nutrients), eutrophic (with good nutrients).

Oligotrophic

Limited nutrient salt input to water bodies, organic matter formation and biomass concentration are very low.

Mesotrophic

Nitrogen and phosphorus are low. Organic matter and calcium are at normal levels. Biological productivity is seen higher compared to oligotrophic.

Eutrophic

Rich in essential plant nutrients and organic matter. The amount of nitrogen, phosphorus and organic material is high. The amount of phytoplankton is high. High biological activity is observed.

Bathing Water Quality

This indicator shows the quality of bathing waters in coastal areas. In the framework of the By-law on Bathing Water Quality, following qualities represent Class A: Very Good/Excellent, Class B: Good Quality, Class C: Poor Quality and Class D: Very Poor Quality/ Should be prohibited.

Municipal Drinking and Potable Water Resources

It expresses the proportion of water taken by municipalities from dams, wells, natural springs, rivers, lakes and ponds to supply them with drinking and potable water.

Municipalities Supplied by Wastewater Treatment Plants

This indicator shows the number of municipalities providing service with wastewater treatment plants and the population that benefits from this service.

Wastewater treatment includes one or more of the physical, chemical and biological processes applied to prevent changes in the physical, chemical, bacteriological and environmental characteristics of the receiving environment from which the wastewater originates as a result of various uses.

Wastewater Treatment Plant: It is a unit in which foreign matter causing pollution of wastewater is removed from wastewater by various methods (physical, biological, advanced).

Treatment Methods

- Physical Treatment: This is the treatment system in which the undissolved pollutants are separated from the wastewater by precipitation or flotation. Grids, sieves, sand arresters, balancing, sedimentation and flotation ponds are the most common physical treatment units.

- Chemical Treatment: This is the separation of substances dissolved or suspended in wastewater, which cannot precipitate spontaneously, using chemicals such as coagulants and polyelectrolytes, etc.

- Biological Treatment: This is the process of eliminating organic-based solids dissolved in wastewater, which cannot be removed from the wastewater in the desired amount by physical or chemical methods, using microorganisms. The trickling filter, activated sludge, stabilization tank (oxidation tank) are the main biological treatment units.

- Advanced Treatment: This is a treatment method for the removal of pollutants (nitrogen, phosphorus, heavy metals, toxic organic substances, etc.) that cannot be treated adequately or at all by physical or biological treatment methods. Nitrification, denitrification, adsorption, ion exchange, etc. are the main methods of advanced treatment.

- Natural Treatment: This is the process of sedimentation of pollutants in artificial wetlands and treatment of wastewater with plants that can live in this environment.

Population Served by at least Secondary (Biological) Wastewater Treatment Plant

This is the percentage of the population whose wastewater is treated by the least secondary treatment methods. Accordingly, urban wastewater is generally subjected to biological treatment through the use of secondary precipitation or similar methods, and the biochemical oxygen demand (BOD) in the wastewater is reduced by at least 70% and the chemical oxygen demand (COD) is reduced by at least 75%.

WASTE

Municipal Waste and Disposal

This indicator shows the amount of waste collected by or on behalf of municipalities and the amount of municipal waste landfilled. The main amount of municipal waste is waste produced by households.

It also includes waste produced by commercial and industrial establishments, office buildings, institutions and small workplaces.

Landfilling of Wastes

Landfills are those areas where waste is temporarily stored for recovery, pretreatment, or disposal within the facility where the waste is generated, facilities where waste is stored for recovery or pretreatment for less than 3 years, and interim waste disposal facilities for no more than one year. Except for the facilities where the waste is stored, these are the sites where the waste is disposed of under certain technical standards. This indicator contains information on the number of waste landfill facilities and the percentage of the population served.

Medical Waste

It is the total amount of infectious, pathological and cutting-piercing wastes collected from health institutions.

Waste Oils

This indicator expresses the amount of collected oil from the gasoline engine, diesel engine, transmission and differential box, transmission, grease and other private vehicle oils and hydraulic system, turbine and compressor, slide, open-closed gearbox, circulation, metal cutting and processing, metal rolling textile, thermal processing, metal cutting and machining, metal rolling textile, thermal processing, heat transfer, insulation and protection, insulation, transformer, casting, steam cylinder, pneumatic system protection, food and medical industry, paper machine, bearings and other industrial oils and industrial greases, used thickening, protective, cleaning and other similar preparations and oil products that are not suitable for use.

Waste Vegetable Oils

This is the total amount of vegetable oils collected, such as refined soap-stocks residues (residues resulting from the removal of fatty acids in crude oil with a base), tank bottom residues, oil-containing bottoms, used frying oils, oil extracted from oil slingers of various plants and the expired vegetable oils.

Waste Batteries and Accumulators

It shows the collected quantities and recycling of spent batteries and accumulators, which must be collected, transported and disposed of separately from household waste.

Packaging Waste

It provides information on the quantity and recycling of waste sales, repackaging and shipping packaging, including expired reusable packaging used for the presentation of the product during the process of transferring the products or any material to the consumer or end user. This includes the end-of-life reusable packaging but excludes production waste that is disposed of or left in the environment.

Economic Facilities (for packaging waste)

This includes packaging manufacturers, distributors and suppliers.

End of Life Tires

It refers to the amount of tires that have reached the end of their life and are used as additional fuel in recycling plants and cement factories.

End of Life Vehicles

It includes vehicles of category M1 (motor vehicles for passenger transport with a maximum of 8 seats other than the driver), N1 (motorized goods transport vehicles with a maximum mass not exceeding 3500 kg) under the "By-Law on the Control of End-of- Life Vehicles".

Waste Electrical and Electronic Equipment

It refers to the amount of WEEE (waste electrical and electronic equipment) collected and the number of treatment facilities.

Mining Waste

This is the waste identified from the results of the survey in all mining establishments in the sector of hard coal and lignite extraction, metal ore mining, mining and other activities supporting the quarrying sector, and in all mining establishments with 10 or more employees in the other mining and quarrying sector.

Hazardous Wastes

It contains information on the quantity and recovery of wastes that are explosive, flammable, spontaneously combustible, emit flammable gasses in contact with water, contain oxidizing organic peroxides, are toxic, corrosive, emit toxic gasses in contact with air and water, and have toxic and ecotoxic properties.

Ship Generated Wastes

Ship generated wastes refer to wastes generated during the normal operation of a ship and falling within the scope of MARPOL 73/78 Annex-I (petroleum and petroleum derived wastes), Annex-2 (toxic liquid wastes), Annex- IV (sewage) and Annex-V (garbage).

Recovery

It is the conversion of waste into a similar substance or a new raw material, product or energy by going through certain processes. For example, obtaining nylon fibers from plastic bottles, converting waste paper back into paper, obtaining energy by using waste as fuel in incinerators, producing compost or biogas from organic waste, etc.

LAND USE

Distribution of General Land Cover

According to the CORINE project (Coordination of Information on the Environment), land use types are divided into two.

1-Land Cover: It refers to the condition of the land covered with biological or physical elements such as natural maquis shrublands, natural cliffs, natural pastures, etc.

2-Land Use: It refers to the land use caused by human impact.

This indicator shows a comparison between the land use changes and the proportional indication of the land use types identified according to the Coordination of Information on the Environment-CORINE project.

The land use categories identified according to CORINE are:

1. Artificial Zones: Most of these areas are covered with buildings and a transportation network.

2. Agricultural Areas: Both cultivated agricultural areas and pasture areas fall under this heading.

3. Forest and Semi-Natural Areas: These are the areas consisting of forests, maquis, herbaceous plants and un-planted and less planted open areas.

4. Wetlands: These areas consist of all water bodies, swamps, reedbeds and turbines, which are important as habitats for living organisms, especially waterfowl, and which have a depth of not more than six meters during the retreat phase of tidal movements of natural or artificial, continuous or temporary, with calm or flowing, sweet, bitter or salty seas, and the ecologically wetlands from the coastline to the land side of these areas.

5.Water Bodies: This includes the water bodies such as continental waters (stream areas) and marine waters (lagoons, bays, sea and oceans).

Misuse of Agricultural Land

It refers to allowing the lands that have the characteristic of agricultural land to be taken out of agriculture for the purpose of using it with laws or by-laws.

Zone at Risk of Erosion

Erosion is the transport of soil from its natural environment by effects such as water flow, wind, and gravity. Although erosion is a natural occurrence, it is exacerbated by effects such as water flow, wind, and gravity as a result of degradation of the natural structure of the soil. Although different types of erosion can be observed in almost all soils in the country, the most common is water erosion. This indicator shows the erosion phenomena occurring in agriculture, forests and grasslands along with their severity.

BIODIVERSITY

Biodiversity

Biodiversity is the set of genes, species, ecosystems and ecological events in a given region. In other words, biodiversity includes all the genes in a given region, the species that carry those genes, the ecosystems that host those species, and the events (processes) that link them.

Protected Areas

According to the definition updated in 2008 by the International Union for Conservation of Nature (IUCN) in 2008, protected areas are areas with clearly defined geographical boundaries that serve the long-term conservation of nature and associated ecosystem services and cultural values and are recognized, dedicated and managed through legal or other effective methods.

Forest Area

It is the size of the area covered by forest in a given closed area in terms of measurement hectares.

Normal Closed Forest (Productive)

These are forests where the canopies of the trees cover 11-100% of the area.

Degraded Forest

These are forests where less than 10% of the tree canopy covers the area.

Growing Stock

The sum of the cylindrical body volumes in m^3 of the standing tree trunks with a breast diameter of 8 cm or more.

Definitions Related to Forestry Studies;

Functional Forestry

This indicator refers to the areas reserved in the total forest area according to forest products production, nature conservation, erosion prevention, hydrological, aesthetic, ecotourism and recreation, climate protection, public health, national defense and scientific use purposes.

Growing Stock

The sum of the cylindrical body volumes in m^3 of the standing tree trunks with a breast diameter of 8 cm or more.

Pasture improvement

It includes measures such as irrigation, fertilization, weeding, seeding, planting, sapling planting and similar biological techniques to increase the forage yield of meadows and pastures in quality and quantity, construction of plants that facilitate grazing, implementation of various physical, technical and administrative measures for soil conservation.

Rehabilitation

This refers to efforts that include protection, inoculation, revitalization pruning of existing species in degraded or unproductive forest areas, cultivation of species that grow naturally in forests in vacant areas, and planting of grafted or non-grafted seedlings of these species.

Erosion Control

This includes efforts to take measures against erosion and transport of soil on the earth subsoil due to various factors.

Artificial Tensile

This includes the work of tillage, weed removal and wire encircling with machinery and labor.

Private Afforestation

It is the afforestation carried out in accordance with the project approved by the Ministry of Agriculture and Forestry by village legal entities, municipalities, associations, foundations, chambers, legal entities and real persons in degraded forest areas, treasure lands and own lands, the timber and fruits of which belong to the respective person.

INFRASTRUCTURE AND TRANSPORT

Road and Railway Road Network

It refers to the total road (highways, state roads, provincial roads) and railway expansion and length.

The Amount of Freight and Passengers Transported by Mode of Transport

This indicator shows the percentage distribution among transport modes within the country for freight and passengers.

Number of Motor Vehicles

It indicates the total number of road motor vehicles such as automobiles (including off-road vehicles), minibuses, buses, pickup trucks, trucks, and motorcycles, special purposed vehicles, road and work machinery and tractors.

ENERGY

Energy Consumption

This is the amount of energy resources that businesses consume as final energy, energy conversion and non-energy.

Total Energy Consumption by Sectors

This indicator shows the total energy consumption for residential, industrial, transportation, agriculture, non-energy, petroleum equivalent conversion sectors.

Gross Domestic Energy Consumption,

It represents the amount of energy needed to meet a country's domestic consumption. Gross domestic energy consumption is calculated as primary production + recovered products + total imports - stock fluctuations - total exports - bunker formulation.

Primary Energy Consumption

Primary energy consumption is the value obtained by subtracting non-energy use of energy from gross domestic energy consumption.

Final energy consumption

It is the amount of final energy used by enterprises for the production of goods and services, space heating and transport purposes. This indicator expresses the total energy available to final consumers for all energy sources. It corresponds to the total final energy consumption in the energy balance tables. Final energy consumption in industry includes consumption in all industrial sectors except the energy sector. Petrochemical Feedstock Values are evaluated in the transformation sector. The amount of fuel converted in industrial automotive power plants and the amount of coke converted to blast furnace gas are part of the transformation sector, not industrial consumption. The amount of final energy consumed in the transportation sector includes all modes of transportation such as rail, road, airlines, and national maritime. Consumption figures in the household and service sectors are aggregated.

Primary Energy Production

It expresses the amount of energy produced from solid fuels such as coal and wood, petroleum, gas and renewable sources and the ratio of each resource to the total amount of energy produced.

Share of Renewable Energy Resources in Consumption

This indicator shows the share of energy produced from renewable energy sources (wood, animal and plant residues, hydraulic, geothermal, wind and solar) in total consumption. Renewable energy sources refer to energy provided from existing external environmental energy flows or materials derived from them.

Primary and Final Energy Intensity

The intensity calculated as a result of the ratio of primary energy consumption to GDP, and the intensity calculated as a result of the ratio of final energy consumption to GDP is called final energy intensity.

Energy Consumption in Conversion Processes

It is the amount of energy consumed by enterprises in electricity production, heat generation, coking/ blast furnaces.

Non-Energy Consumption

It is the amount of energy consumed when companies use an energy source as a raw material, etc., rather than for energy purposes.

INDUSTRY AND MINING

Environmental Impact Assessment (EIA)

It includes the efforts to identify the positive and negative impacts of the proposed projects on the environment, the definition and evaluation of the measures to avoid the negative impacts or minimize the environmental damage, the choice of the site and technological alternatives, and the monitoring and control of the implementation of the projects.

EIA Positive

It is the decision of the Ministry stating that the negative impact of the project on the environment is at an acceptable level in accordance with the relevant legislation and scientific principles as a result of the measures to be taken, taking into account the assessments made by the Commission for Scope Determination and Evaluation/Assessment about Environmental Impact Assessment Report.

EIA Negative

The decision of the Ministry stating that the implementation of the project is inappropriate due to the negative impact on the environment, taking into account the assessments made by the Commission for Scope Determination and Evaluation/Assessment.

AGRICULTURE

Agricultural Land Per Capita

It is defined as the ratio of total arable agricultural area to the total population.

Chemical Fertilizer Consumption

The amount of active substance (ton / year) in the amount of artificial fertilizers consumed in agriculture gives the amount of nitrogen, phosphorus, Nitrogen-Phosphorus-Calcium mixed.

Use of Pesticides

It refers to the total annual use of pesticides.

Organic Farming

Organic farming is a controlled and certified form of agricultural production that avoids the use of chemical agents in production at every stage from production to consumption, using instead those allowed by By-Law. This indicator expresses the amount and area of agricultural products produced using organic farming methods.

Good Agricultural Practices

According to By-Law, published in Official Gazette of 7 December 2010 and numbered 27778, good agricultural practices refer to the procedures that should be followed in order to make the agricultural

production system socially viable, economically profitable and efficient, while protecting human health and giving importance to animal health and welfare and the environment.

FISHERIES

Aquaculture Production

It expresses the amount of fish produced, including marine fish, shellfish, molluscs, freshwater and aquaculture products caught in our inland waters each year. Production data is expressed in live weight, which is the weight of the resource at the time of catch or production.

Fishing Fleet Capacity

It expresses the expression of the total fishing vessels in terms of engine power.

TOURISM

Number of Tourists

The number of tourists is the figure obtained by subtracting the number of daily tourists from the total number of foreign visitors coming to Turkey and the number of citizens living abroad.

Blue Flag Applications

The Blue Flag, an international environmental award given to qualified beaches and marinas that meet the required standards, has been implemented in Turkey since 1994. This is the indication of the total number of beaches, marinas and yachts over the years, with the inclusion of yachts since 2008.

DISASTERS

Forest Fires

This indicator is the expression of total forest area burned in total forest area by year.

Disasters by Types

This indicator expresses the number of periodic hydrological (flood, landslide), meteorological (storm, avalanche), geophysical (earthquake, volcanic activity) and climatic (temperature anomalies, drought, fire) natural disasters and industrial accidents, traffic accidents, pipeline transports, as well as the loss of life and property caused by them.

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