GENERAL DIRECTORATE OF ENVIRONMENTAL IMPACT ASSESSMENT, PERMIT AND INSPECTION
ENVIRONMENTAL INVENTORY AND INFORMATION MANAGEMENT DEPARTMENT

ENVIRONMENTAL INDICATORS 2017

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OTHER PUBLICATIONS

Issue No		Name of Publication	Year of Publication
Issue No 1	:	Ankara Province Environmental Status Report	1994
Issue No 2	:	Provincial Environmental Problems and Priorities Inventory Assessment Report	1996
Issue No 3	:	Industries Affecting Environment Primarily and Main Sector Activities	1996
Issue No 4	:	Environmental Atlas of Turkey 96	1997
Issue No 5	:	Environmental Status Report of Turkey	2007
Issue No 6	:	Inventory of Environmental Problems and Priorities Assessment Report of Turkey (2005 - 2006)	2008
Issue No 7	:	Environmental Indicators 2008	2009
Issue No 8	:	Environmental Indicators 2009	2010
Issue No 9	:	Inventory of Environmental Problems Priorities Assessment Report of Turkey 2007-2008	2010
Issue No 10	:	Environmental Indicators 2010	2011
Issue No 11	:	Environmental Status Report of Turkey, 2011	2012
Issue No 12	:	Environmental Indicators 2011	2012
Issue No 13	:	Environmental Inspection Report of Turkiye in 2011	2012
Issue No 14	:	Inventory of Environmental Problems and Priorities Assessment Report of Turkey	2012
Issue No 15	:	Environmental Status Report - 2012 Annual Summary - Provinces	2013
Issue No 16	:	Environmental Inspection Report: 2012	2013
Issue No 17	:	Environmental Indicators 2012	2013
Issue No 18	:	Environmental Impact Assessment Impacts - Precautions, 2013	2013
Issue No 19	:	Environmental Permits and Licenses, 2013	2013
Issue No 20	:	Fundamentals of Environmental Inspection & Environmental Inspection in Turkey, 2013	2013
Issue No 21	:	International Congress of EIA Proceedings	2013
Issue No 22	:	Environmental Inspection Report of Turkey in 2013	2014
Issue No 23	:	Environmental Problems and Priorities Assessment Report of Turkey	2014
Issue No 24	:	Environmental Indicators 2013	2014
Issue No 25	:	Environmental Inspection Report of Turkey in 2014	2015
Issue No 26	:	Environmental Status Report - 2013 Annual Summary – Provinces	2015
Issue No 27	:	Environmental Indicators 2014	2016
Issue No 28	:	Environmental Inspection Report of Turkey in 2015	2016
Issue No 29	:	Environmental Status Report – 2014 Annual Summary – Provinces	2016
Issue No 30	:	State of the Environment Report for Republic of Turkey	2016
Issue No 31	:	Environmental Problems and Priorities Assessment Report of Turkey 2013	2015
Issue No 32	:	Environmental Problems and Priorities Assessment Report of Turkey 2014	2016
Issue No 33	:	Environmental Indicators 2015	2017
Issue No 34	:	Environmental Status Report – 2015 Annual Summary – Provinces	2017
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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. In 1994, the OECD (Organization for Economic Cooperation and Development) developed and established a comprehensive indicator system in order to provide a basis for reporting environmental policies. Another model, DPSIR was produced developing the framework of PSR by EEA (European Environment Agency) in 2004 to define the relationship between the society and the environment. This model contains five elements; "driving force, pressure, state, impact, and response". By this approach, it is possible to measure the effectiveness of applied precautions, in other words, it is possible to explain entity relationship between the driving forces and impacts;

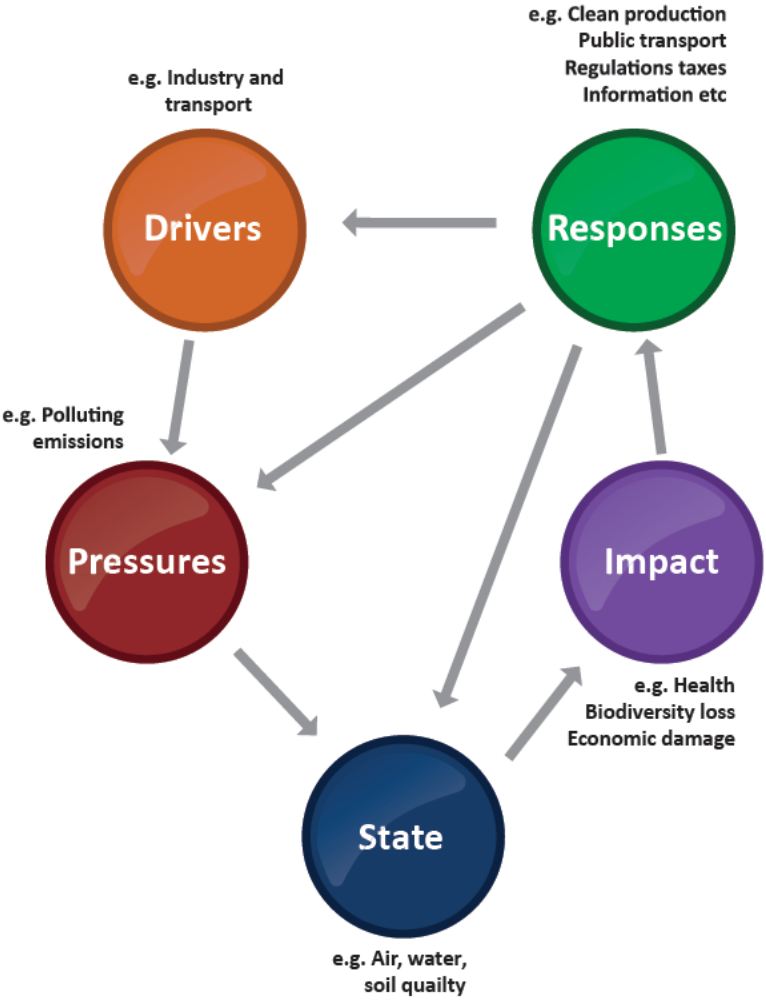
D Driving force indicators: These indicators are the factors behind various variables. If we need to express in general, all economic activities are classified in this group.

P Pressure indicators: They define environmental variables that may cause problems. These indicators directly focus on the sources of the problems. In general, all emissions are classified in this group.

S State indicators: These indicators aim to show the current situation of the environment. In general, 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 official attempts to prevent, compensate, and enhance reactions given by individuals or the society against any changes in the situation of the environment or to adapt to these changes. In other words, indicators about the solutions to prevent environmental pollution fall into this category.


e.g. Clean production
Public transport
Regulations taxes
Information etc
e.g. Industry and
transport
Drivers
Responses
e.g. Polluting
emissions
Pressures
Impact
e.g. Health
Biodiversity loss
Economic damage
State
e.g. Air, water,
soil quailty

Indicators of the booklet are classified as follows;

Driving Force Indicators	Pressure Indicators	State Indicators	Impact Indicators	Response 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 • 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 Land • Invasive Alien Species • Highway - Railway Network Intensity • Greenhouse Gases Emissions by Transport Types • Emissions of Air Pollutants by Transport • Number of the Road Motor Vehicles in Use • Number of Mining Facilities According to Their Groups • Chemical Fertilizer Consumption • Pesticide Use • Fisheries Production • Fishing Fleet Capacity • The Number of Tourists • Tourist Overnights and Bed Capacity 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 PM_{10} and SO_2 in Ambient Air • Number of Exceedances of Air Quality Limit Values • Oxygen Consuming Substances in Rivers • Nutrients in Freshwater • Chlorophyll-a Concentration in Coastal and Marine Waters • Nutrients in Coastal and Marine Waters • Bathing Water Quality • General Distribution of Land Cover • Zones Under Threat of Erosion • The Distribution of the Forest Areas • Distribution of Forests by Tree Species • Agricultural Land Per Capita • Blue Flag Implementations	• Waterborne Diseases • Precipitation • Sea Water Temperature • The Number of Endangered Species (Biodiversity) • Natural Disasters • Forest Fires	• Environmental Protection Expenditure • Carbon Sinks and Capture • The 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 • Waste Disposal and Recycling • Protected Areas for Biodiversity • Wildlife Protection Activities • Regulation and Control of the trade of Wild Animals According to the International Conventions • Forest Establishment Activities • Share of Renewable Energy Sources in Gross Final Energy Consumption • Share of Renewable Electricity in Gross Electricity Production • Primary Energy Intensity • Energy Efficiency in Buildings • Ratio of the industrial installations operating in organized industrial zones to total industrial installations in terms of domestic and international sales • Number and Area of Abandoned Licenced Mining Facilities • Laboratories Operating within Environmental Legislation • Environmental Impact Assessment Decisions • Area Under Organic Farming • Good Agricultural Practices • The Number of Environment-Friendly Accommodation Facilities • Number of Risk Assessment and Emergency Response Plans • Liability Insurance

TREND OVER THE PREVIOUS YEAR IN TERMS OF ENVIRONMENTAL IMPROVEMENTS

Keys

↑	ADVERSE GROWING TREND
↓	ADVERSE DECREASING TREND

↑	POSITIVE GROWING TREND
↓	POSITIVE DECREASING TREND

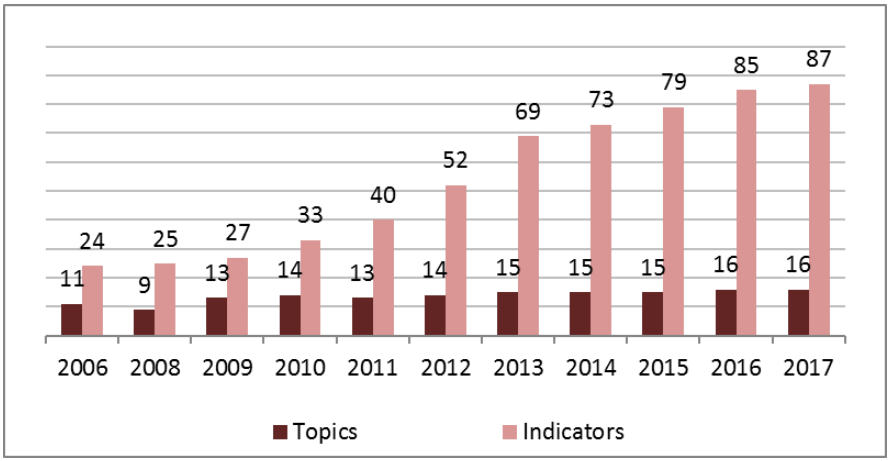
→	NEUTRAL DEVELOPMENTS
X	COMPARATIVE DATA NOT FOUND

POPULATION	
Population	↑
Population Growth Rate	↓
Urban- Rural Population Ratio	↑
Migrant Population	↑
ECONOMY	
Resource Efficiency	↓
Domestic Material Consumption per Capita	↑
Share of Agriculture in Employment	↓
Environmental Protection Expenditure	↑
Share of Total Environmental Protection Expenditures in GDP (%)	↑
HEALTH	
Life Expectancy at Birth	↑
Access to Reliable Drinking Water	→
Waterborne Diseases	↑
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	↓
AIR POLLUTION	
SO_2, NH_3 ve NO_X Emissions	↑
PM_{10}, CO ve NMVOC Emissions	↓
Number of large combustion plants and total Installed thermal capacity in large combustion plants	↑
Number of Exceedance of Air Quality Limit Value for PM_{10}	↑
Number of Exceedance of Air Quality Limit Value for SO_2	↓
The Number of Air Quality Monitoring Stations	↑
WATER – WASTEWATER	
Use of Freshwater Resources	↑
Oxygen Consuming Substances in the rivers in Gediz, North Aegean (Bakircay) and Sakarya Basins	↑
Oxygen Consuming Substances in the rivers in Ergene, Kucuk Menderes and Susurluk Basins	↓
Nitrate Nitrogen in Ergene, Gediz and Kucuk Menderes Basins	↑
Nitrate Nitrogen in North Aegean (Bakircay), Sakarya and Susurluk Basins	↓
Rate of Class A Quality Bathing Waters	↓
Water Abstracted for Municipal Water Supply	↑
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 Wastewater Discharged Per Capita Per Day	↑
WASTE	
Number of Landfills	↑
The Ratio of the Population Covered by Landfill to Municipality Population	↑
Recovery Rate of the Hazardous Waste	↑
Percentage of the number of End of Life Vehicles (vehicles in M1 and N1 category) to total number of cars and small trucks in traffic	↓
Amount of Mining Waste	↑
Amount of Packaging Waste Recoverered	↓
The Number of the Licensed Waste Receiving Facilities that Serve for Receiving Wastes from the Vessels in the Ports	↑
LAND USE	
Artificial Areas	↑
Agricultural Areas	↓
Forest and Semi-Natural Areas	↓
Wetlands	→
Zones Under Threat of Erosion	X

BIODIVERSITY	
Total Number of Species, Endangered Species, Endemism Rate	X
Number of Invasive Alien Species	→
Designated Protected Areas	↑
Protected Coastal Zones	↑
Forested Areas	↑
Forest Establishment Activities	↓
INFRASTRUCTURE AND TRANSPORTATION	
Highway Network	↑
Railway Network	↑
Transportation of Passenger on Road (passenger-km)	↓
Transportation of Freight on Road (tonnes-km)	↓
Transportation of Passenger on Railway (passenger-km)	→
Transportation of Freight on Railway (tonnes-km)	↑
Capacity Use Ratio İn Railway Freight Transport	→
Greenhouse Gases Emissions by Transport Types	↑
Emissions of Air Pollutants by Transport	↓
Final Energy Consumption by Mode of Transport	↑
Number of Motor Vehicles	↑
Average Age of Vehicles Registered to the Traffic	↑
ENERGY	
Total Energy Consumption	↑
The Rate of Coal and Its Derivatives in Primary Energy Consumption	↓
Total Final Energy Consumption	↑
Energy Consumption per Capita	↑
Primary Energy Production	→
Share of Renewable Energy Sources in Gross Final Energy Consumption	↓
Share of Renewable Electricity in Gross Electricity Production	↓
Primary Energy Intensity	↑
Final Energy Intensity	↑
INDUSRY AND MINING	
Ratio of the industrial installations operating in organized industrial zones to total industrial installations in terms of domestic and international sales	↑
Yearly Number of Issued Mining Licenses	↓
Number of Mining Sites/Facilities Rehabilitated After Operation	↑
Total Mining Site/Facility Area Rehabilitated After Operation	↑
The Number of Laboratories Operating within Environmental Legislation	↑

AGRICULTURE	
Agricultural Land Per Capita	↓
Chemical Fertilizer Consumption	↓
Pesticide Use	↑
The Ratio of The Organic Agricultural Areas to the Total Agricultural Areas	↑
Production Areas to the Total Good Agricultural Practices	↑
FISHERIES	
Capture Production	↑
Aquaculture Production	↑
Number of Fishing Vessel	↓
TOURISM	
Number of Tourists	↑
Number of Environment-Friendly Accommodation Facilities	↑
Number of Nights Spent Per 1000 Inhabitants	↑
Number of Beds Per 1000 Inhabitants	↑
Number of Beaches with Blue Flag	↑
Number of Marinas with Blue Flag	↑
DISASTERS	
Number of Forest Fires	↓
Amount of Forest Burnt Area	↑
Number of Coastal Facility Emergency Plans Approved	↑
Number of liability insurance policies	↑

Environmental Indicators Booklet provides a summary of the annual environmental performance of Turkey. The main purpose of the booklet is to represent the relationship between the environment and other sectors, monitor environmental trends over time, and the results of environmental policies. Indicators are important in determining plans, programs and policies, preparing legislations and provide information thereof. Following the publication of the very first booklet "Environmental Indicators 2006" consisting of 11 headings and 24 indicators, indicators study has been improving in terms of scope and content. "Environmental Indicators 2017" (present publication) contains 87 indicators under 16 topics. Data quality is an important concern in environmental information management. In general, data and its assessment regarding the indicators in this booklet were received from the related competent instituitions where data is produced. Hence, it should be emphasized that accuracy and reliability of these data are under the responsibility of the data provider institutions.



Highlights of each topics of the "Environmental Indicators 2017" booklet are laid down as follows:

Population

Total poulation of Turkey was 80,810,525 in 2017. Annual population growth rate decreased to 12.4‰ in 2017 from 13.5‰ in 2016.

If the current trends of demographic indicators continue, the population of Turkey is expected to reach 86 million 907 thousand 367 people in 2023 and 100 million 331 thousand 233 people in 2040. The population will increase until the year 2069, and will reach its highest value with 107 million 664 thousand 79 people in this year. The population of the country is forecasted to decline after this year.

The world population was more than 7.6 billion according to the population projections calculated by United Nations in 2017. Constituting 1.1% of the world population, Turkey was the world's 19th most populous country.

According to the –data from the World Bank, ratio of urban population was 74.4% in Turkey and 76.4% in the EU-28, both were above the World average, which was 54.3% [5].

Provinces with the highest net migration (the difference between in-migration and out-migration) in 2016-2017 period were Ankara (32.042 people), Kocaeli (27.538 people) and İzmir (24.618 people). Provinces with the lowest net migration were Ağrı (-17.931 people), Van (-16.298 people) and Adana (-13.325 people) [6].

Economy

Economic activities put pressure on the environment; thus, in order to indicate the environmental efficiency of the economy, resource efficiency or productivity has been identified. Resource efficiency/productivity is the ratio of GDP to domestic material consumption (DMC). In Turkey in 2015 1.5 euros of gross domestic product (GDP) was produced per every kilogram of material consumed. In the EU-28 countries, 2017 figure was 2.2 euros/kg [5].

Domestic material consumption per capita represents the level of efficient use of production and material input for the national economy. In Turkey, domestic material consumption (DMC) per capita has increased from 9.5 tons in 2000 to 12.9 tons in 2015 with a 35.8% incerease. For the year 2015, Turkey's domestic material consumption per capita was 12.9 tons, lower than the average value of the EU-28 countries (13.5 tons), buthigher than the world average of 11.9 tonnes[8].

Category distribution of the material consumption in Turkey shows that non-metallic minareals consumption constituted nearly half of the total material consumed. The consumption of non-metallic minerals is influenced by countries' by levels of construction activities (investments), population densities, and size of infrastructures such as e.g. road networks [8].

Sectorial distribution of GDP and employment are indicators of the national economy. As of 2017, in Turkey, services sector receives the highest share of employees with 54.1%; in more developed countries employment share of services sector is about 70-80%, due to a shift from agriculture and industry to the services sector.

Considering the data from TURKSTAT, GDP contributions of sectorial activities in Turkey at current prices in 2017 were as follows: the share of agriculture, forestry and fisheries sector was 6,9%, industrial sector's share was 23,2%, construction sector share was 9,7% and services sector's share was 60,2%.

Share of environmental protection expenditure in gross domestic product (GDP) increased from 1.18% in 2013, to 1.11% in 2017.

Health

Life expectancy at birth is used to measure status of the socio-economic development, quality of life, effectiveness of the healthcare services and the levels of mortality for countries. According to TURKSTAT data, in Turkey, life expectancy at birth was 78 years in general, 75.3 years for men and 80.8 years for women. In general, women appeared to live longer than men and the difference in life expectancy at birth was 5.5 years in 2015-2017 period [13]. Despite the increase in Turkey, life expectancy is still below that of European Union.

Every year all over the world 2 million persons are estimated to have acute gastroenteritis. Diseases with diarrhea is the second largest cause of death among kids below 5 years of age. In Turkey, number of infectious diarrhea and gastro enteritis cases decreased by 45.7% from 2011 to 2016.

Climate Change

In Turkey, total greenhouse gas emissions (CO_2-equivalent,) increased in 2016 by 135% compared to 1990, 5.6% compared to 2015. The biggest cause of the emission increase seems to be the rapid increase in energy consumption due to the high economic and industrial development rate after 1990. Turkey's total primary energy consumption was 145.3 million TOE (Tonnes of Oil Equivalent) in 2017. Increase in 2017 was 177% compared to 1990. Despite the increase, per capita primary energy consumption (1.8 TOE in 2017) in Turkey is still lower than average of European Union Countries (3.22 TOE in 2016).

In Turkey, parallel to the energy consumption, CO_2 equivalent emissions were calculated as 3.88 tonnes per capita in 1990's but in 2016, this value went up to 6.3 tonnes per capita [19]. CO_2 equivalent EU-28 emissions per capita were calculated as 8.7 tonnes in 2016 [21] Turkey's per capita CO_2 equivalent emissions are still lower than the average of the EU Member States. Looking at the sectoral distribution of greenhouse gas emissions, In 2016, when greenhouse gas emissions were considered as CO_2 equivalent, fuel combustion (without transport) in energy sector, industry sector and others had the largest portion with 56.2%, and it was followed by fuel combustion for transport with 16.2%, industrial processes and product use with 12.6%, agricultural activities with 11.4% and waste sector with 3.3% [19].

Energy

Utilization of renewable energy resources is important in terms of reducing the greenhouse gases emitted per unit energy consumption. In Turkey, while contribution of renewables to total energy consumption was 19.4% in 1990, in parallel with decreasing firewood consumption and increasing total energy consumption, this figure came to 11.9% in 2017. However, the amount of energy

obtained from renewable resources increased by 79% compared to 1990. In addition, the ratio of electricity generated from renewable sources in gross electricity consumption was 19.2% in 2001 and this ratio increased to 29.7% in 2017.

Another important issue regarding the environment in energy consumption is energy efficiency. Primary energy intensity, which is an indicator of energy efficiency, was 0.12 kTOE/2010$ in the primary energy density, the world average is 0.18 kTOE / 2010 $ and the average of OECD and EU-28 countries is 0.11 and 0.09 kTOE / 2010 $, respectively.Turkey's primary energy intensity is quite close to the average of OECD countries, but higher, hence worse than the average of EU countries [76].

In the period 2000-2016, primary energy consumption increased by 3.4% on an annual basis, while GDP growth in the same period was annually 4.9%. In 2005-2015 period, Turkey's GDP increased by one unit, energy consumption increased by 0.8 units. In the same period, France, which increased its GDP by one unit, reduced energy consumption by 1.1, Germany 0.5, Japan 3.5 and the UK by 1.8 [76].

Industry

Organized Industrial Zones are being established for the purposes of disciplining the industrial installations, improve development plans of cities and regions, improve efficiency and benefits, facilitate industrialization in less developed regions, control misuse of agricultural land, provide common, more effective and efficient infrastructural, environmental and other facilities and reduce pollution.

According to the data in the Register of Industrial installations maintained by the Ministry of Science, Industry and Technology, the ratio of the domestic and foreign sale values of the products produced by the enterprises operating in the organized industrial zones to all industrial enterprises registered in the industrial registeris 19% for 2015, 24% for 2016 and 25% for 2017.

Air Quality

If the last five-year period between 2013-2017 is examined, it is seen that Bursa, Iğdır and Siirt stations had higher rates 4 times and Kayseri (Hürriyet) station 3 times between the first 10 stations with the highest annual PM_{10} averages. In the last five years, Edirne (Keşan) and Çanakkale (Çan) stations, Amasya (Suluova) and Tekirdağ (Central MTHM) stations have had highest rates 3 times between the first 10 stations with the highest annual SO_2 averages.

Number of exceedances has been increasing over the years; one reason of this is the air quality limit values decreasing in cascades since 2009 as identified in the By-Law on Air Quality Assessment and Management (BAQAM). Accordingly, in 2017, the national limit value was exceeded by 16% and the European Union limit by 28%.

In Turkey, regarding the limit overruns, there was 36% PM_{10} increase in 2017 compared to 2016 and 20% decrease in SO_2 parameters. The effect of heating-related pollutants on air pollution during winter remains a problem. In order to improve air quality, additional measures are considered necessary, in addition to current ones.

Water- wastewater

According to the data, water quality of rivers in the basins of Ergene, Kucuk Menderes, Gediz, North Aegean, Sakarya and Susurluk are in class IV (highly polluted water). This does not conclude for all-over Turkey, since monitoring studies were done in the most polluted basins with the most intensive population and industry activity, and the data does not represent whole country. When the averages of all stations belonging to basins were compared in years, a decrease trend was observed in BOD parameter in general.

The water exploitation index of Turkey is 21.3% in 2010, 23.9% in 2012, 21.6% for 2014 and %25.8 in 2016. The warning threshold of 20% for this indicator distinguishes a non-stressed from a water scarce region, with severe scarcity occurring where the water exploitation index (WEI) exceeds 40% [35].

Discharges of nitrogen and phosphorus from land based sources like urban, industry or agricultural sources cause eutrophication. In the 2014-2017 Chl-a assessments showed that all marine waters of Turkey have sufficient solarination. Peak values of Chl-a concentrations occur due to primary production in winter seasons when land based nutrient loads increase. Besides this, no significant difference is observed among years during 2014-2017 monitoring period.

Assessing the nutrients in marine and coastal waters, in 2017; in Mediterranean coastal waters, the values of total dissolved inorganic nitrogen (DIN) reached the highest levels (>3.0 µM) at the low salty surface waters of coastal regions affected by terrestrial inputs; while they are in the range from 0.1 to 0.5 µM at the surface waters of the open marine waters. In Aegean Sea, Nox values were observed to be generally low in both seasons; however the concentrations were found to be higher by 2 to 4 times especially at Büyük Menderes River Mouth and Inner Gulf of İzmir. In Black Sea although it is observed that winter periods reveal generally higher levels; the most prominent fact is that the CWBs (2, 7, 10) under the influence of rivers reveal high values of nitrogen and silicate. Besides, which is under the influence of Samsun city, reveals a significantly high phosphorus level. In Marmara Sea Phosphorus compounds measured at Gulf of Bandırma indicated the highest level in all seasons, which reveals the permanent existence of industrial and domestic pressures. Besides, relatively high nitrogen compounds and silicate were detected at the under the influence of Susurluk River.

Rate of Class A (very good) bathing waters decreased from 75% in 2016 to 73% in 2017.

As a result of studies for environmental protection and financial and technical assistance given by the Ministry of Environment and Urbanisation, the number of municipalities and population serviced by sewerage system and waste water treatment plant increased significantly in recent years. The ratio of municipality population serviced by wastewater treatment facilities to the total municipal population has reached to 75% by year 2016 [40]. However, with reference to the data presented by TURKSTAT, the population rate connected to at least secondary (biological) wastewater treatment plant was 43.1% in 2014 [41].

Waste

Regarding the waste management principles; the Waste should be reduced at source, then recovery, energy recovery and finally disposal methods should be applied. According to Ministry of Environment and Urbanisation data, 74% of the population (in total municipal population) was served by waste disposal and recovery facilities is in 2017.

Nation-wide data on hazardous waste is collected by Hazardous Waste Declaration System (HWDS), with data entry by the operators of industrial plants that generate waste in their operational processes. By the end of 2017, 63,741 plants in total provided data to HWDS. The total amount of the hazardous waste generated in 2017 was calculated as 1,425,045 tonnes, excluding the waste generated by the mining industry. 83.6% of the mentioned total was directed to recycling; 14.7% was disposed of; 1% stored and 0.7% was exported.

In 2016, recycling rates of municipal waste in the EU-28 countries had reached to 45.3% [43]. According to National Waste Management and Action Plan this figure in Turkey is 13% at 2016.

Land use

According to CORINE (Coordination of Information on the Environment) datas, in Turkey between 1990 and 2012, while forests and semi-natural areas decreased by 1,212,900 ha, all other areas have increased, such as artificial surfaces by 424,867 ha, agricultural areas by 423,756 ha, water bodies by 173,305 ha and wetlands by 159,604 ha. Increasing population, urbanisation and industrialization posed threat to natural and agricultural areas.

700,975 hectares of agricultural land was allowed for non-agricultural use in 2005-2017 period. 61.7% of this land was dry marginal agricultural land and 23.8% was absolute agricultural land [47].

Turkey's geographical position, climate, topography and soil conditions are the main factors which affect the deterioration of the land and increase the sensitivity of drought. According to Dynamic Erosion Model and Monitoring System results; maximum 642 million tons of soil has been displaced due to water erosion in Turkey ever year. The mean soil loss is 8,24 tons/ha/yr. If we classify this amount according to the surface area of Turkey's; Very low in 60.28%, Low in 19.13%, Moderate im 7.93%, Severe 5.97%, and Very Severe in 6.7% respectively [48].

Biodiversity

Turkey is a gene centre for several plant species. The country has a special position as for biological diversity, however, some plant and animal species are endangered and a number of species that existed before, has already been extinct.

The rate of endemism is very high in Angiospermae, which belongs to flowering plant groups. Of the level of species and subspecies, there are nearly 11,000 flowering plant types, 3,925 of which are endemic, and the endemism rate is close to 34%, in Turkey. Turkey is very rich country in terms of endemic plants; however, these endemic species are under serious threats. According to the criteria of IUCN, 2001, approximately 600 of our endemic species are in the category of "seriously endangered CR" and 700 of them are categorised as "endangered EN". Among wild animals, 121 mammals, 378 birds and 130 reptiles, in total 629 species have been under protection.

While the number of invasive alien species in Turkish seas was 263 in 2005, this number approached to 500 in 2017. In inland water bodies 25 invasive alien species have been identified. While most of the invasive species in the Mediterranean Sea come through the Suez Canal, most of those in Black Sea are transported to the Black Sea via the ballast waters of vessels [50].

As of 2017, total areas (terrestrial and marine) protected by Ministry of Agriculture and Forestry and Ministry of Environment and Urbanisation General Directorate for Preservation of Natural Heritage summed up to 8.9% of the total country surface area. This is below the World average which was 14.3% in 2017 [52].

In 2015, total size of forests in Turkey was 22,342,935 hectares which constitutes 28.6% of the country's total surface area. However, 43% of this area constitutes of degraded and either lightly covered or not covered areas. The World average ratio of forest zones has been 30.8% according to the Worldbank data [55], is higher than the ratio in Turkey.

The majority of the forest fires are caused by people. Cause of the 53% of forest fires in 2017 could not be identified. 30% of fires were caused by negligence-accidents, 11% by natural causes and 6% by intention.

Infrastructure and Transportation

Compared to roads, railways release less greenhouse gas to the atmosphere as they consume energy more efficiently. In addition, less land is used for the construction of railways, thus this plays a significant role in the preservation of the natural environment. In 2017, 88.8% of the domestic passenger transportation and 89.2% of the domestic freight transportation are made by roads in Turkey.

Besides extending the railway network, effective use is also an important concern. Average capacity use ratio in railway freight transport between 1990 and 2017 was 55%. The ratio was 75% in 2013 and 43% in 2017.

Despite the increase in the number of cars, average car possesion is still quite low in Turkey due to high prices and taxes. According to 2016 figures, average number of cars per thousand people in the EU-28 is 505, nearly four-fold of Turkey with average possesion value of 142 cars per thousand people [67]. Share of old (over 20 years) cars is rather high in Turkey, 22% as of 2017. Average age of cars was 12.4 in Turkey in 2017, compared to 7.4 in the EU-27 (in 2014) [68].

Oil derivatives constituted 99% of the 28,033 thosand TOE energy consumed in transport sector (excluding the pipelines) in 2017 while natural gas had the 0.2%, biofuels and waste 0.4% and electricity had 0.3% share [64].

At the end of 2017, among 12 million 35 thousand 978 registered cars, the share of LPG-fuelled cars was 38.4% followed by diesel-fuelled cars with 35.4% and gasoline-fuelled cars with 25.9%. The ratio of the cars with unknown fuel type was 0.4% [64]. In 2016, Polland was the country with the highest rate of LPG-fueled cars in the EU, while Turkey has a much higher rate of LPG fueled cars compared to the EU countries.

Agriculture

In Turkey plant nutrient (N, P_2O_5, K_2O) usage was 2,644,333 tons in 2017 with 5.8% decrease compared to 2016. Fertilizer aplication rate in Turkey is 110 kg/hectare (2017 data). Overuse of fertilizers does not occur on dry agricultural land but generally on some irrigated land [82]. Fertilizer consumption (Plant nutrient base) per hectare of arable land has been 107 kg/ha in Turkey, 157 kg/ha in the EU countries and 138 kg/ha as World average (Worldbank 2015 data) [81]. Pesticide consumption in Turkey has increased to 54,098 tons in 2017 with a 8.08% increase rate compared to consumptİon in 2016.

Fisheries

It is known that neither in the world nor in Turkey the amount obtained by catching will not increase significantly. For this reason, the basic approach accepted by scientists in hunting is to maintain production while preserving stocks[86]. Based on the TURKSTAT data, in 2017, fisheries production increased by 7.2% in 2017 with respect to the previous year and occured as 630,820 tonnes.

The size of the fishing fleet has been limited by denying licenses for new vessels since 2002. Moreover, in order to reduce the fishing pressure over the resources, considering the balance between the fish seafood stocks and fishing fleet, subsidies according to the vessel size is made to those who cancel their licenses and stop fishing.

Tourism

Turkey is one of the leading countries in tourism, regarding the number of visiting tourists and tourism income. In 2017, the number of tourists increased by 24% compared to 2016. However, number of tourists visiting a particular location exert a pressure on the local environment due to land use, water consumption, waste and waste water generation and noise. This requires higher concern and more measures on environmental issues in touristic areas.

As a response in 2017, 396 of 3,771 (10.5%) tourism accommodation facilities have been issued "Environment-Friendly Accommodation Facility" certificate (Green star badge). Moreover, in 2017, with 454 beaches that possess Blue Flag, Turkey is ranked third place following Spain and Greece; with 22 marinas ranked 7th place in the World. This situation necessitates more measures in environmental issues in touristic areas.

Conclusions

Environmental problems are not only resulted from production processes, but they are also related with our life styles and our consumption habits. These habits which form our life style have a significant importance on environmental impacts. Accordingly, the increase in consuming environmentally-friendly products and improving the awareness about the effects of our consumption habits on environment will decrease the pressure in this subject. Besides applying the policies legislated by law, environmental problems can also be reduced by using technological approaches in production, changing our consumption habits, and focusing on more environmentally friendly means and methods especially in transportation, energy and agriculture sectors. In this regard, information management and use of environmental indicators are crucial in policy making, target setting and progress monitoring.

1.1- Population Growth Rate

Population growth rate is the most significant driving force among human activities that create impact on the environment.

Although the population growth rate in Turkey had a declining trend in time, Turkey's population has continued to increase constantly. While the population growth rate was 1.35% in 2016, it decreased to 1.24% in 2017. In 2015, the population of Turkey became 80 million 810 thousand 525 people. The population density which is the number of persons per square kilometre increased by 1 person compared to 2016 and reached to 105 in 2017. The median age of the population in Turkey increased from 31.4 in 2016 to 31.7 in 2017 [2].

The world population was more than 7.6 billion according to the population projections calculated by United Nations in 2017. Constituting 1.1% of the world population, Turkey was the world's 19th most populous country.

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

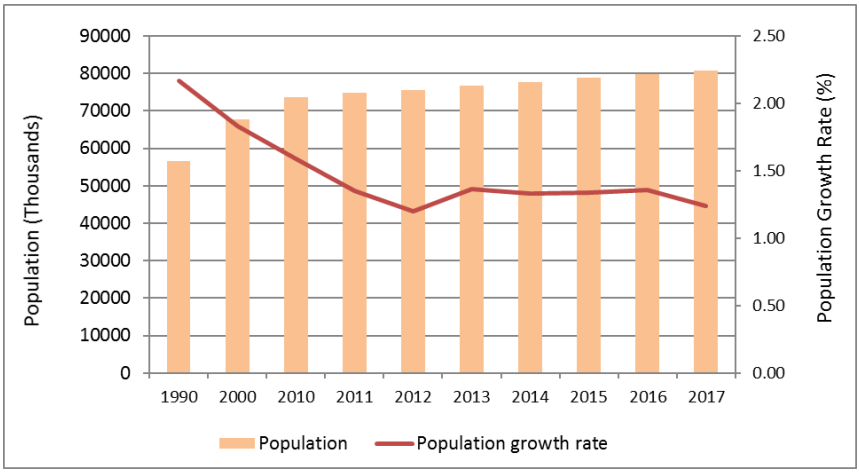


TABLE 1- POPULATION AND POPULATION GROWTH RATE CHANGES OVER THE YEARS

YEARS	1990	2000	2010	2015	2016	2017
Population (1000 persons)	56,473	67,804	73,723	78,741	79,815	80,811
Population Growth Rate (%)	2.17	1.83	1.59	1.34	1.35	1.24
Population density (persons/km²)	73	88	96	102	104	105

Source: TURKSTAT Population Censuses 1990-2000, Address Based Population Registration System 2010-2017

Note: In the calculation of annual growth rate of population, latest year's administrative division was taken into consideration.

Population projections are very important for future policy-making. Determination of current population trends and predicting future population structure according to these trends provide making healthier policies.

According to the estimates, the population of Turkey will be 86,907,367 in 2023 and 100,331,233 in 2040; will increase slowly to its peak value of 107,664,079 until the year 2069. After 2050, the population is expected to start to decline, and it is expected to be 107,100,904 in 2080.

Life expectancy at birth is expected to continue rising in Turkey together with the ageing of the society. Median age, which is a majör indicator of age pattern of the population, is anticipated to be 33.5 in 2023, 38.5 in 2040, 42.3 in 2060 and 45 in 2080 [3].

İf fertility and mortality rates stay at current levels (i.e. assuming the 'no change' projection variant), growth rates are projected to be substantially higher, with global population possibly rising to 10.2 billion by 2050 and 19.3 billion by 2100 [4].

GRAPH 2- POPULATION PROJECTIONS BY YEARS, 2018-2080

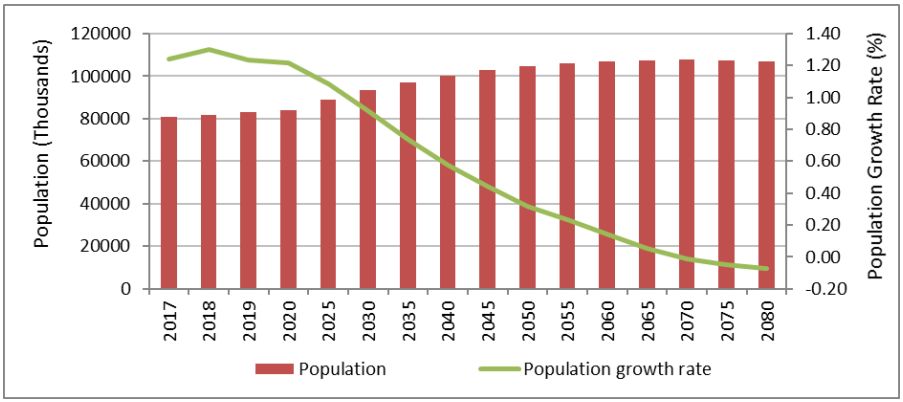


TABLE 2- POPULATION PROJECTIONS BY YEARS, 2018-2080

YEARS	2017	2018	2019	2020	2025	2030	2035	2040
Population (1000 persons)	80,811	81,867	82,886	83,900	88,845	93,329	97,177	100,331
Population Growth Rate (%)	1.24	1.30	1.24	1.22	1.09	0.92	0.74	0.58
Population density (persons/km²)	105	106	108	109	115	121	126	130

YEARS	2045	2050	2055	2060	2065	2070	2075	2080
Population (1000 persons)	102,844	104,749	106,150	107,096	107,577	107,653	107,453	107,101
Population Growth Rate (%)	0.44	0.32	0.23	0.14	0.06	-0.01	-0.05	-0.07
Population density (persons/km²)	134	136	138	139	140	140	140	139

Source: TURKSTAT, Population Projections, 2018-2080

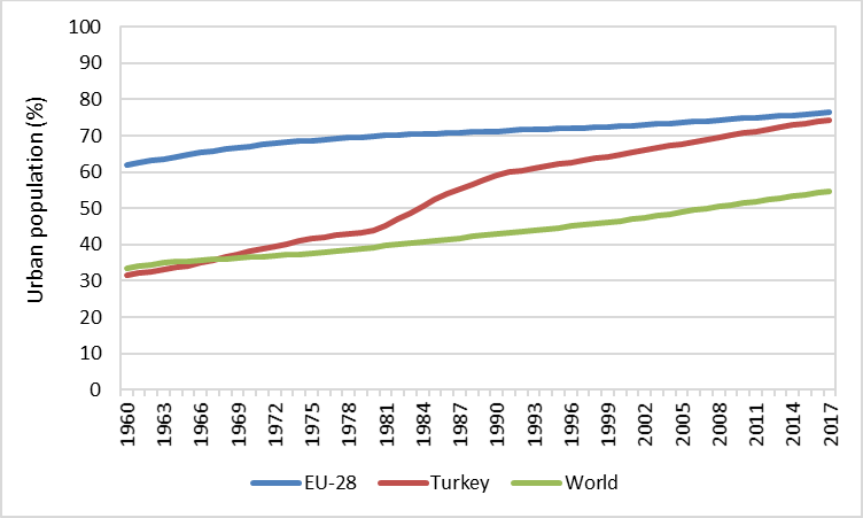
1.2- Urban-Rural Population Ratio

Urban population appears to be a driving force leading to pressure on environmental assets. Rapid growth of urban population, correspondingly brings about an increase in urban expansion, infrastructure, transportation, housing, industrial area, and energy needs, which in the end leads to environmental problems such as air pollution, wastewater and noise. Urbanisation is one of the most important processes which are experienced parallel to industrialization and economic development.

According to the first census conducted in 1927 In Turkey, population was 13,648,270, and 75.8% of the people lived in towns and villages and 24.2% in cities; however, after 1950 population started to agglomerate in urban areas.

According to the World Bank data, The proportion of population living in urban areas in 2017 was 74.4% in Turkey and 76.4% in the EU-28 countries, both are , considerably above the world average of 54.3% [5].

GRAPH 3- URBAN POPULATION (% of total population)



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

1.3- Migrant Population

Internal migration is defined as changes in usual residence addresses of population within one year in the specific areas (region, province, district, etc.) inside the country. the conditions that economic development requires. The conditions that economic development requires are the cause of the demographic movements such as rapid population growth and rural-urban migration.

While population migrated across provinces was 2,273,492 people in 2007-2008 period, 2,684,820 people migrated across provinces in 2016-2017 period according to Address Based Population Registration System. Foreigners residing in Turkey are not included in these figures.

Provinces with the highest net migration (the difference between in-migration and out-migration) in 2016-2017 period were Ankara (32,042 people), Kocaeli (27,538 people) and İzmir (24,618 people). Provinces with the lowest net migration were Ağrı (-17,931 people), Van (-16,298 people) and Adana (-13,325 people) [6].

GRAPH 4- MIGRANT POPULATION, 2008-2017

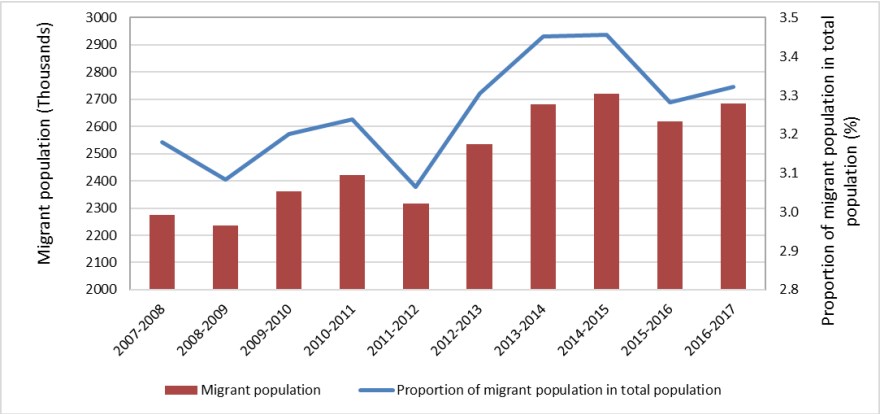


TABLE 3- MIGRANT POPULATION, 2008-2017

Period	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Total Population (1000 persons)	71,517	72,561	73,723	74,724	75,627
Migrant Population (1000 persons)	2,273	2,237	2,360	2,420	2,318
Rate of Migrant Population to Total Population (%)	3.2	3.1	3.2	3.2	3.1

Period	2012-2013	2013-2014	2014-2015	2015-2016	2016-2017
Total Population (1000 persons)	76,668	77,696	78,741	79,815	80,811
Migrant Population (1000 persons)	2,534	2,681	2,720	2,619	2,685
Rate of Migrant Population to Total Population (%)	3.3	3.5	3.5	3.3	3.3

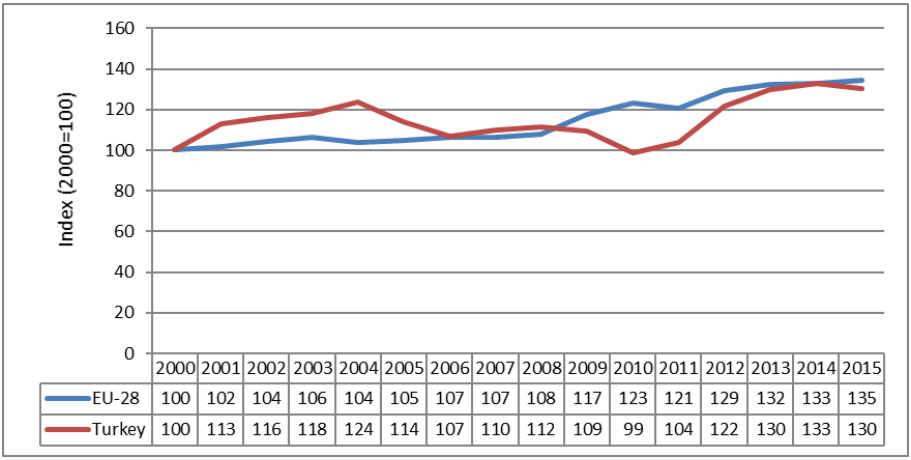
Source: TURKSTAT, Address Based Population Registration System, 2007-2017
Note: Foreigners residing in Turkey are not included.

2.1- Resource Efficiency

Resource efficiency is the ratio of GDP to domestic material consumption (DMC). DMC equals the extractions of materials used by producer units in the economy plus imports — called direct material input (DMI) — minus exports.

In the EU-28 economy based on a comparison to the 2000 resource efficiency by 35% between 2015 and 2000, while in Turkey has increased by 30% [7].

GRAPH 5- RESOURCE EFFICIENCY



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EU-28	100	102	104	106	104	105	107	107	108	117	123	121	129	132	133	135
Turkey	100	113	116	118	124	114	107	110	112	109	99	104	122	130	133	130

Source: EUROSTAT, http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do

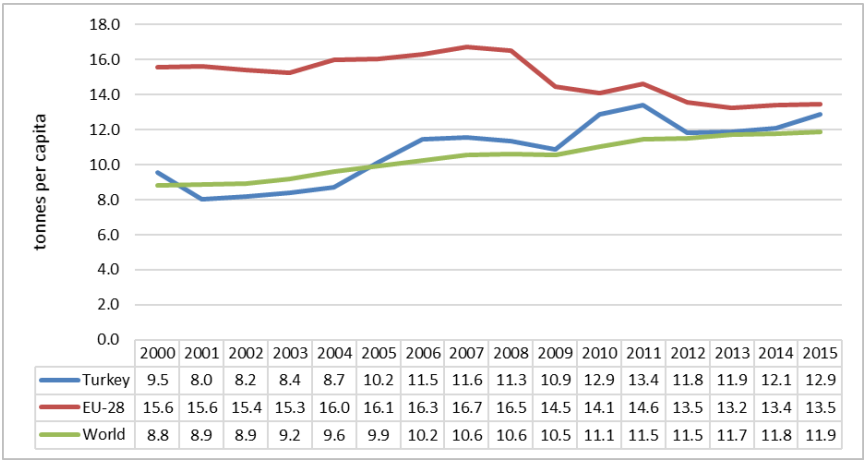
If comparisons of resource efficiency between countries are to be made then the GDP in purchasing power standards should be used (code: RP_PPS). According to this, while the gross domestic product (GDP) of 1.5 euros was generated for every kilogram of material consumed in 2015 in Turkey, while this figure was 2.2 euros in 2017 in EU-28 countries [8].

Domestic material consumption per capita represents the level of efficienct use of production and material input for the national economy. In Turkey, domestic material consumption (DMC) per capita has increased from 9.5 tons in 2000 to 12.9 tons in 2015 with a 35.8% incerease. Between 2000 and 2015 per capita DMC of the EU-28 decreased from 15.6 tonnes to 13.5 tonnes, decreasing by 14.1%.

Worldwide material extraction — which equals the world's DMC as the global trade balance is zero — was 11.9 tonnes per capita in 2015, having increased steadily from 8.5 tonnes per capita in 2000 [8].

As seen on the Graph 6, per capita DMC of Turkey was below the EU-28 average, but higher than the world average in 2015.

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
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
EU-28	15.6	15.6	15.4	15.3	16.0	16.1	16.3	16.7	16.5	14.5	14.1	14.6	13.5	13.2	13.4	13.5
World	8.8	8.9	8.9	9.2	9.6	9.9	10.2	10.6	10.6	10.5	11.1	11.5	11.5	11.7	11.8	11.9

Sources: https://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_and_resource_productivity#Material_consumption_by_EU_Member_State

Category distribution of the material consumption both in Turkey and in the EU-28 shows that non- metallic minareals consumption constituted nearly half of the total material consumed. The consumption of non-metallic minerals is influenced by countries' by levels of construction activities (investments), population densities, and size of infrastructures such as e.g. road networks [8].

GRAPH 7- DOMESTIC MATERIAL CONSUMPTION by MAIN MATERIAL CATEGORY (tonnes per capita)

Sources:
1) TURKSTAT
2) EUROSTAT (online data code: env_ac_mfa; demo_gind)

2.2- Sectoral Distribution of Employment

This indicator is a state indicator. Distribution of the working population of a country among sectors has an effect on the quality and size of the pressure of the population on the environment.

Over the years in Turkey, there has been a decrease in the number of people employed in agriculture while employment in service sector has been increasing. In 2017, while the rate of employment in the service sector was 71.9% in EU-28 average, in Turkey this rate was 54.1%.

In 2017, sectoral distribution of employment in EU-28 countries were 4.2% in agriculture, 6.7% in construction, 17.2% in industry, 71.9% in services. These figures in OECD countries are 4.6% in agriculture, 7.2% in construction, 14.9% in industry, 73.3% in services [9].

GRAPH 8- SECTORAL DISTRIBUTION OF EMPLOYMENT

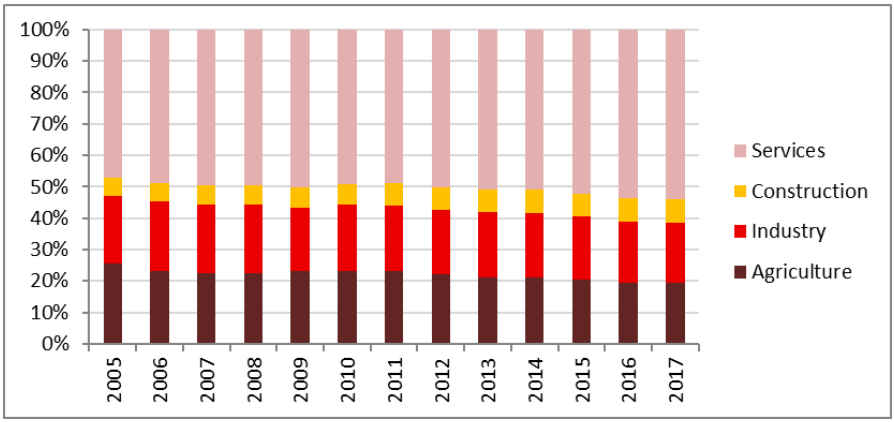


TABLE 4- SECTORAL DISTRIBUTION OF EMPLOYMENT

(+15 age)

YEARS	2005		2010		2015		2016		2017	
	Thousand person	%	Thousand person	%	Thousand person	%	Thousand person	%	Thousand person	%
TOTAL	**19,633**	**100.0**	**21,858**	**100.0**	**26,621**	**100.0**	**27,205**	**100.0**	**28,189**	**100.0**
Agriculture	5,015	25.5	5,084	23.3	5,483	20.6	5,305	19.5	5,464	19.4
Industry	4,241	21.6	4,615	21.1	5,332	20.0	5,296	19.5	5,383	19.1
Construction	1,097	5.6	1,434	6.6	1,914	7.2	1,987	7.3	2,095	7.4
Services	9,281	47.3	10,725	49.1	13,891	52.2	14,617	53.7	15,246	54.1

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

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

2.3- Sectoral Distribution of Gross Domestic Product

This indicator is a state indicator that shows contribution to GDP by agriculture, industry and services sectors.

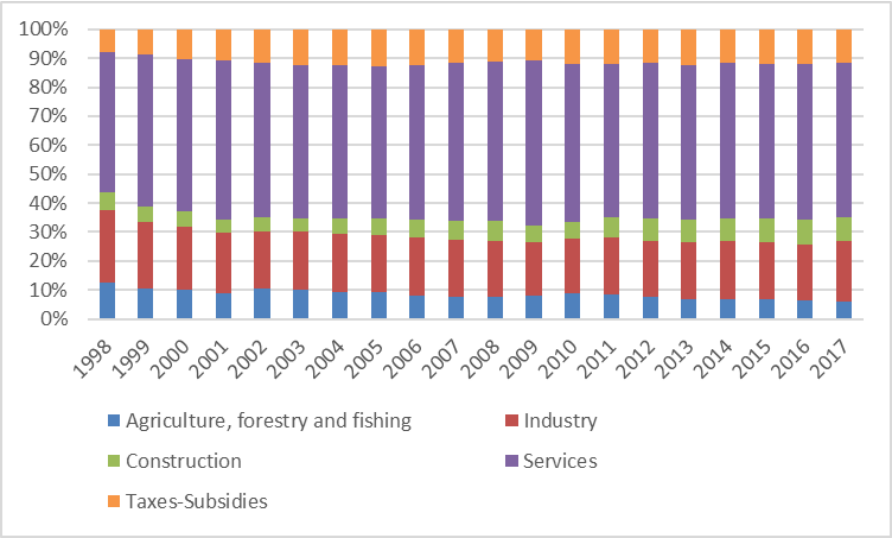
The indicator represents as percentage, shares of economic activity branches in the GDP (consumer price index with current prices).

According to the TURKSTAT data, GDP at current prices according to the production method has increased by 19% compared to the previous year in 2017 to 3,106,536,751 TL.

GDP with current prices (excluding tax and subsidies) in 2017 was 2,752,641,848 TL. To this, agriculture, forestry and fisheries sector contributed by 6,9%, , industry by 23.2%, construction actvities by 9.7% and services sector by 60.9%.

GDP distribution for 2017 in the EU-28 was as follows: agriculture, forestry and fisheries sector 1.6%, , industry 19.6%, construction actvities 5.4% and services sector 73.4% [10].

GRAPH 9- IN 2015-2017, GROSS DOMESTIC PRODUCT AT CURRENT PRICES BY KIND OF ECONOMIC ACTIVITY (A10) (%)



Source: TURKSTAT
Notes:
1) Figures may not sum up to 100 due to rounding.
2) NACE Rev. 2 used for classification of Economic Activities.

2.4- Environmental Protection Expenditure

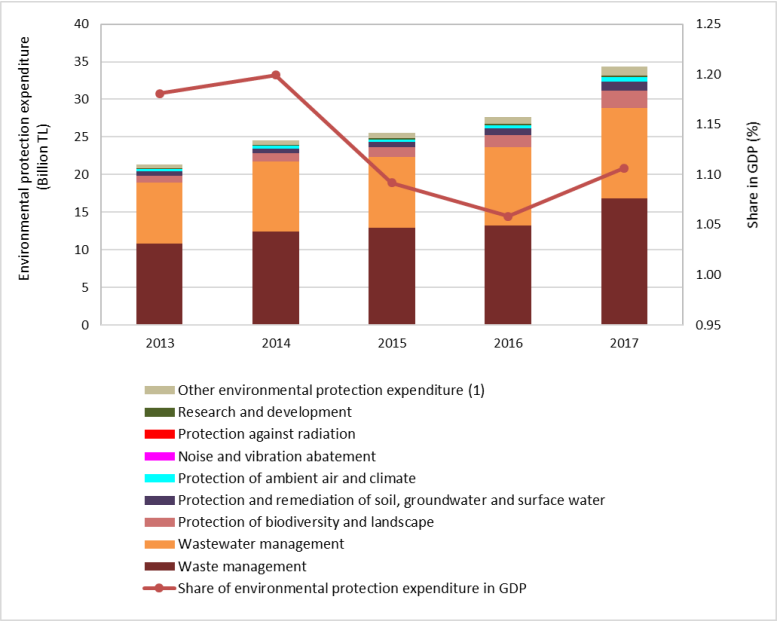
The environmental expenditures of the countries are directly related with their environmental performances and economic welfare. Environmental expenditures appear as a response indicator for the protection of the environment.

Total environmental protection expenditure was 34.4 billion TL in 2017. Out of total environmental protection expenditure, 57.7% was realized by financial and non-financial corporations, 35% was realized by general government and non-profit institutions serving households and 7.3% was realized by households. While share of environmental protection expenditure in gross domestic product was 1.18% in 2013, it was 1.11% in 2017.

In total environmental protection expenditure, waste management services accounted for 49%, wastewater management services accounted for 35%, protection of biodiversity and landscapes accounted for 6.6%, protection and remediation of soil, groundwater and surface water accounted for 3.5% and other environmental protection domains accounted for 5.9% in 2017 [11].

In the EU-28, environmental protection expenditure of private and public sectors in total was 1.11% of the GDP in 2013 [12].

GRAPH 10- ENVIRONMENTAL PROTECTION EXPENDITURE BY DOMAINS



Source: TURKSTAT, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=27673

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

3.1- Life Expectancy at Birth

Life expectancy at birth is used to measure status of the socio-economic development, quality of life, effectiveness of the healthcare services and the levels of mortality for countries. It's higher in more developed countries.

According to TURKSTAT data, in Turkey, life expectancy at birth was 78 years in general, 75.3 years for men and 80.8 years for women. In general, women appeared to live longer than men and the difference in life expectancy at birth was 5.5 years in the 2015-2017 period [13].

According to EUROSTAT (Statistics Office of the European Union) data, in 2016, life expectancy at birth was 81.0 years in general, 78.2 years for men and 83.6 years for women in the EU-28 countries [14].

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

Period	Total	Male	Female
2013-2014	78.0	75.3	80.7
2015-2017	78.0	75.3	80.8

Source: TURKSTAT

3.2- Waterborne Diseases

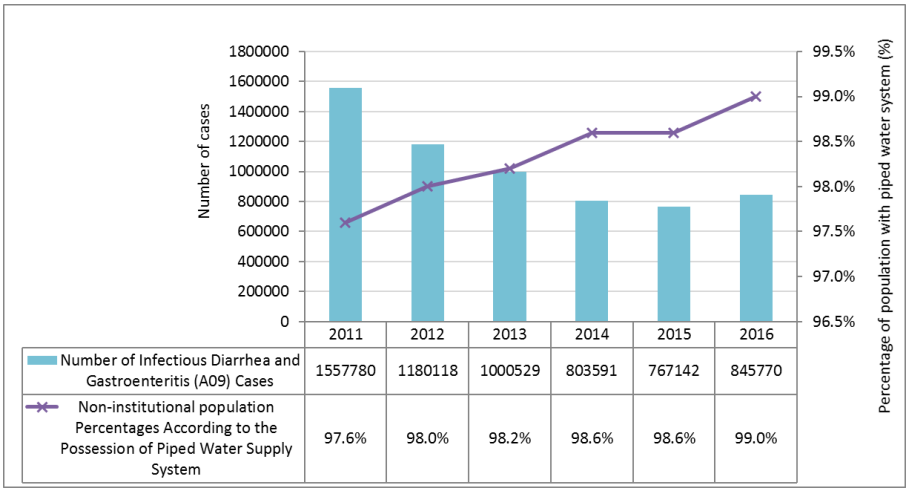
Every year all over the world 2 million people are estimated to have acute gastroenteritis. Diseases with diarrhea cause 1.5 million child deaths and are the second largest cause of death among kids below 5 years of age.

Diarrhea is a symptom of infection caused by bacteria, virüs or parasites ingested by the body by consuming water mainly contaminated by feces. In a community, frequency of occurence of diarrheal diseases increase with lack of access to clean water for drinking, cooking or cleaning purposes. In conditions where personal hygene levels are poor, diseases may be transfered among individuals. Food prepared or stored in poor conditions, or cleaned with contaminated water, even seafood caught in contaminated water might be causes of the diseases [15].

In developing countries, bacteria and parasites are the major causes of gastroenteritis and the incidents increase during the summer months, while in developed countries main causes are viruses and the cases extend to winter season [16].

Diarrhea and gastro enteritis is estimated that the number of infectious origin in Turkey decreased by 45.7% between the years 2011-2016.

GRAPH 11- NUMBER OF INFECTIOUS DIARRHEA AND GASTROENTERITIS (A09) CASES and POPULATION PERCENTAGES ACCORDING TO THE POSSESSION OF PIPED WATER SUPPLY SYSTEM (2011-2016)



	2011	2012	2013	2014	2015	2016
Number of Infectious Diarrhea and Gastroenteritis (A09) Cases	1557780	1180118	1000529	803591	767142	845770
Non-institutional population Percentages According to the Possession of Piped Water Supply System	97.6%	98.0%	98.2%	98.6%	98.6%	99.0%

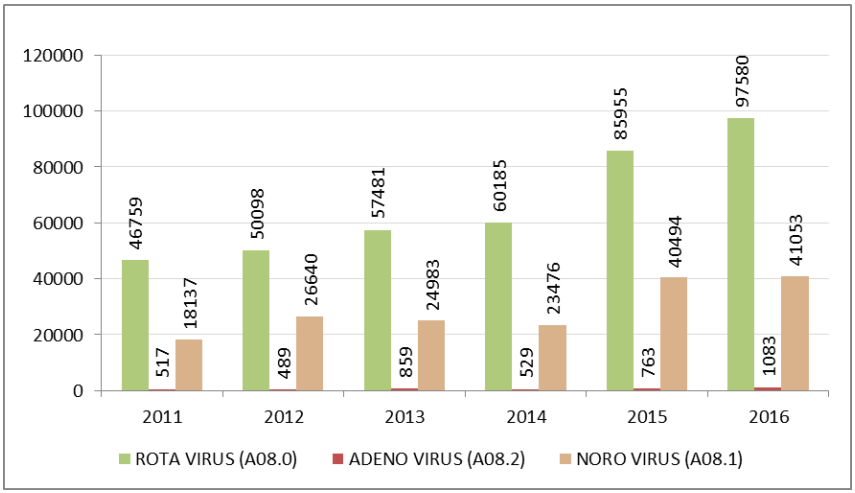
Sources:
For case numbers; Ministry Of Health, Public Health Institution of Turkey, 2016, http://yeni.thsk.gov.tr/depo/thsk/strateji-db/birimler/stratejik-yoneti-planlama/idari-faaliyet-raporu/2016_faaliyet_raporu-13.03.2017.pdf

For data on ownership status of the piped water system; TURKSTAT, Income and Living Conditions Survey

Major factors of acute viral gastroenteritis are; rotavirus and adenovirus esp. for children under 2 years; norovirus and sapovirus in sporadic or epidemic forms for individuals at any age; astroviruses for children less than 6 [15].

According to the assessment done on the data on incidents notified according to the 2016 ICD10 diagnostic codes identified by the Ministry of Health, it's concluded that incidents raise between June and september, while rotavirus is the most observed factor in the samples submitted to the reference laboratory[17].

GRAPH 12- YEARLY DISTRIBUTION OF NUMBER OF ACUTE VIRAL ENTERIC INFECTION CASES



Kaynak: Directorate General for Public Health, 2016, http://yeni.thsk.gov.tr/depo/thsk/strateji-db/birimler/stratejik-yoneti-planlama/idari-faaliyet-raporu/2016_faaliyet_raporu-13.03.2017.pdf

Lack of access to reliable drinking water is a major cause of diseases and death due to contaminants, chemical pollutants and lack of hygiene.

TURKSTAT data implies that, while 95.3% of the non-institutional population benefited piped water supply system in 2006 (non-institutional population: all population living in dwellings within the country), this ratio was 99% in 2017. Piped water supply system is identified as supply of potable water by pipes into the dwellings in municipal water network.

The share of the world population with access to an improved water source rose from 86 % in 2005 to 91 % in 2015 [18].

4.1- Greenhouse Gas Emissions

This indicator is a pressure indicator. Greenhouse gas emissions are important with regard to Turkey's contribution to climate change with respect to the source sector distribution and also for monitoring and controlling activities.

Total greenhouse gas emissions (CO_2-equivalent,) increased in 2016 by 135% compared to 1990, 5.6% compared to 2015 [19]. In 2016, greenhouse gas emissions in the EU-28 were down by 22% compared to 1990 levels [20].
In Turkey, CO_2 equivalent emissions were calculated as 3.8 tonnes per capita in 1990's but in 2016, this value went up to 6.3 tonnes per capita [19]. CO_2 equivalent EU-28 emissions per capita were calculated as 8.7 tonnes in 2016 [21].

GRAPH 13- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS

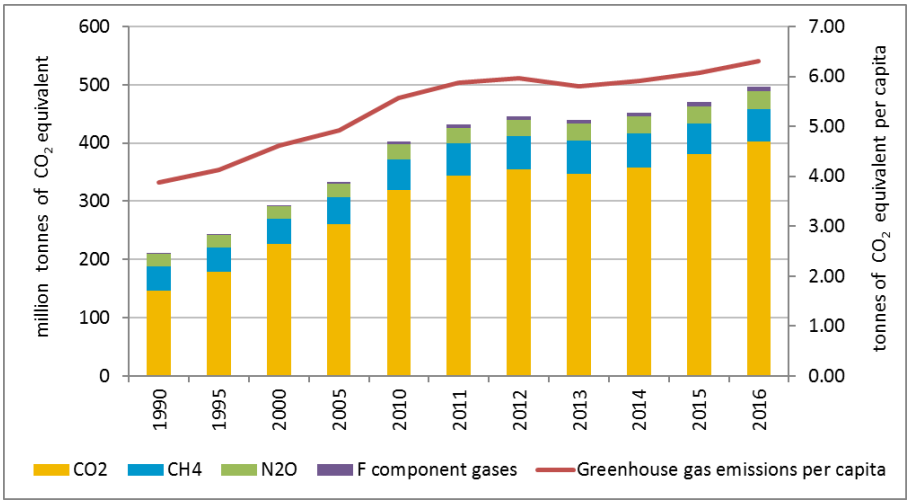


TABLE 6- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS (million tonnes of CO_2 equivalent)

Year	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
CO_2	146.5	178.3	226.0	260.9	319.5	344.7	354.1	346.8	357.6	380.9	402.8
CH_4	42.2	42.4	43.5	45.5	52.5	54.7	58.0	56.8	58.1	52.4	54.7
N_2O	21.4	20.9	22.6	23.7	25.9	26.8	27.6	29.3	29.3	29.8	32.0
F Component Gases	0.6	0.6	1.4	2.6	4.7	5.2	5.9	6.1	6.8	6.9	6.6
Total	**210.7**	**242.2**	**293.5**	**332.7**	**402.6**	**431.4**	**445.6**	**439.0**	**451.8**	**469.9**	**496.1**

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990-2016
Notes:
(1) Data for 1990-2015 are revised.
(2) Land use, land use change and forestry emissions and sinks are not included.

4.2- Total Greenhouse Gas Emissions by Sectors

Main increase in greenhouse gas emissions in Turkey is observed in energy production and consumption. This is followed by emissions from industrial processes and product use. While greenhouse gas emissions generated by energy sector were 134.3 million tonnes CO_2 equivalent in 1990, this figure increased to 361 million tonnes CO_2 equivalent in 2016. In 2016, when greenhouse gas emissions were considered as CO_2 equivalent, fuel combustion and fugitive emissions from fuels (without transport) had the largest portion with 56.3%, and it was followed by fuel combustion for transport with 16.5%, industrial processes and product use with 12.6%, agricultural activities with 11.4% and waste sector with 3.3% [19].

'Fuel combustion and fugitive emissions from fuels (without transport)' is responsible for 54% of EU-28 greenhouse gas emissions in 2016. Fuel combustion for transport (including international aviation) is the second most important source sector with 19.3% in 2016. Greenhouse gas emissions from agriculture contribute with 10% to EU-28 total greenhouse gas emissions. Industrial processes and product use contribute another 8%. Management of waste contributes with 3% [20].

GRAPH 14- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS

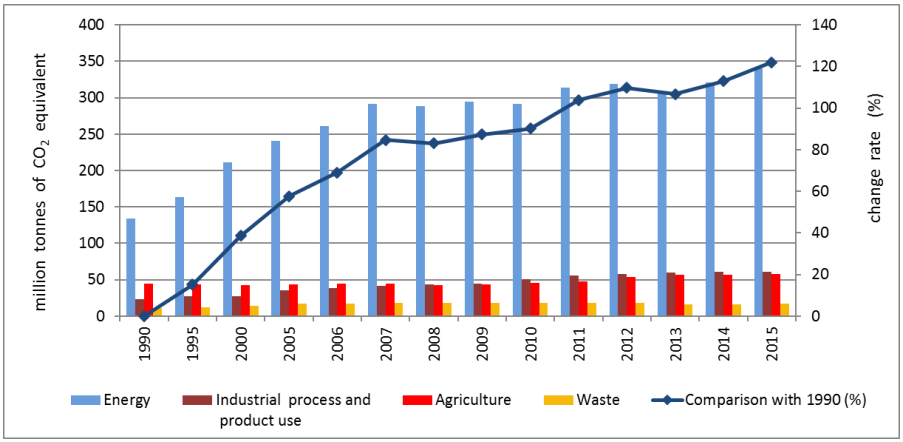


TABLE 7- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS (million tonnes of CO_2 equivalent)

YEARS	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Energy	134.3	162.7	212.3	240.3	292.3	313.4	320.1	308.8	321.3	339.7	361.0
Industrial process and product use	22.9	26.1	26.6	34.6	49.2	54.4	56.8	59.8	60.2	59.6	62.4
Agriculture	42.4	41.0	40.0	40.8	42.8	45.1	50.6	53.6	53.7	53.7	56.5
Waste	11.1	12.4	14.5	16.9	18.2	18.5	18.1	16.8	16.6	17.0	16.2
Comparison with 1990 (%)	-	14.9	39.3	57.9	91.0	104.7	111.5	108.3	114.4	123.0	135.4

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990-2016
Notes: (1) Data for 1990-2015 are revised.
(2) Land use, land use change and forestry emissions and sinks are not included.

4.3- Carbon Sinks and Capture

CO_2 in the atmosphere can accumulate as carbon in vegetation and soil in terrestrial ecosystems. Under the United Nations Framework Convention on Climate Change, any process, activity or mechanism which removes greenhouse gas from the atmosphere is referred to as "sink". Human activities impact terrestrial sinks through land use, land-use change and forestry (LULUCF) activities, consequently, the exchange of CO_2 (carbon cycle) between the terrestrial biosphere system and the atmosphere can be altered [22].

Carbon captured in forests and processed forest products has been increased by 118.6% between 1990 and 2016 in Turkey.

GRAPH 15- CARBON SINKS IN TURKEY AND ANNUAL CAPTURE (1990-2016) (Gg CO_2 equivalent)

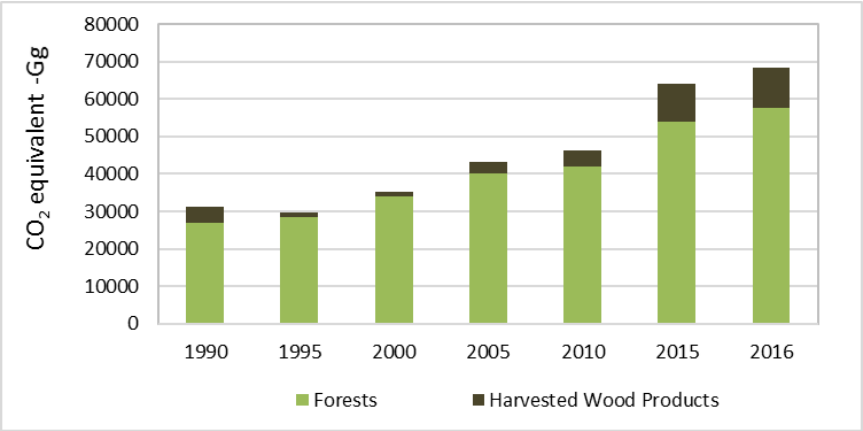


TABLE 8- CARBON SINKS IN TURKEY AND ANNUAL CAPTURE (Gg CO_2 equivalent)

YEARS	1990	1995	2000	2005	2010	2015	2016
Annual Carbon Capture by Foresty	26,869	28,539	33,920	40,106	41,832	53,893	57,673
Annual Greenhouse Gas Capture by Harvested Wood Products	4,368	1,306	1,257	3,164	4,585	10,227	10,622
TOTAL	**31,237**	**29,845**	**35,177**	**43,270**	**46,417**	**64,120**	**68,295**

Source: Ministry of Forestry and Water Affairs, General Directorate of Forestry, NIR 2018

4.4- Consumption of Ozone Depleting Substances (ODS)

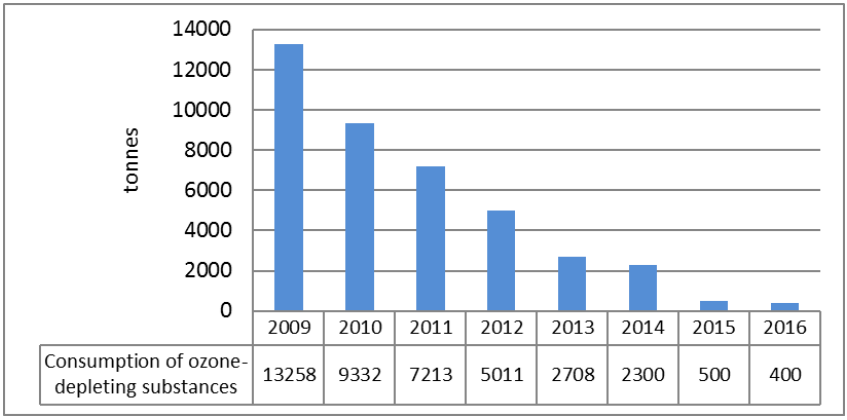
This indicator is a driving force indicator. The release of ozone depleting substances to the atmosphere leads to the depletion of the Earth's ozone layer. The stratospheric ozone layer protects people and environment from harmful ultra-violet (UV) radiation emitted by the sun [24].

Chlorofluorocarbons (CFC) hydrochlorofluorocarbons (HCFC), halons, Carbon Tetrachloride, Methyl Chloroform used as refrigerants, cooling agents and fire extinguishers, are substances that cause depletion of the ozone layer.

Turkey has been a party to the Montreal Protocol on Substances that Deplete the Ozone Layer in 1991 and is among the developing countries of the Protocol as the A5 country. The import and consumption of ODSs' that haven't been produced in our country are gradually terminated in accordance with the Protocol obligations. Projects and public / sector awareness-raising activities are carried out on transition to alternative substances. Turkey is making a successful trend by implementing a faster ODS phase-out calendar than other developing countries. In Turkey, the use of substances that reduce the ozone layer during the period 2009-2017 has decreased by 97%.

Globally, consumption of ODS's controlled under the Montreal Protocol has declined by some 98.36% worldwide in the period 1986-2016 [24].

GRAPH 16- OZONE DEPLETING SUBSTANCES (ODS) CONSUMPTION LEVELS



	2009	2010	2011	2012	2013	2014	2015	2016
Consumption of ozone-depleting substances	13258	9332	7213	5011	2708	2300	500	400

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

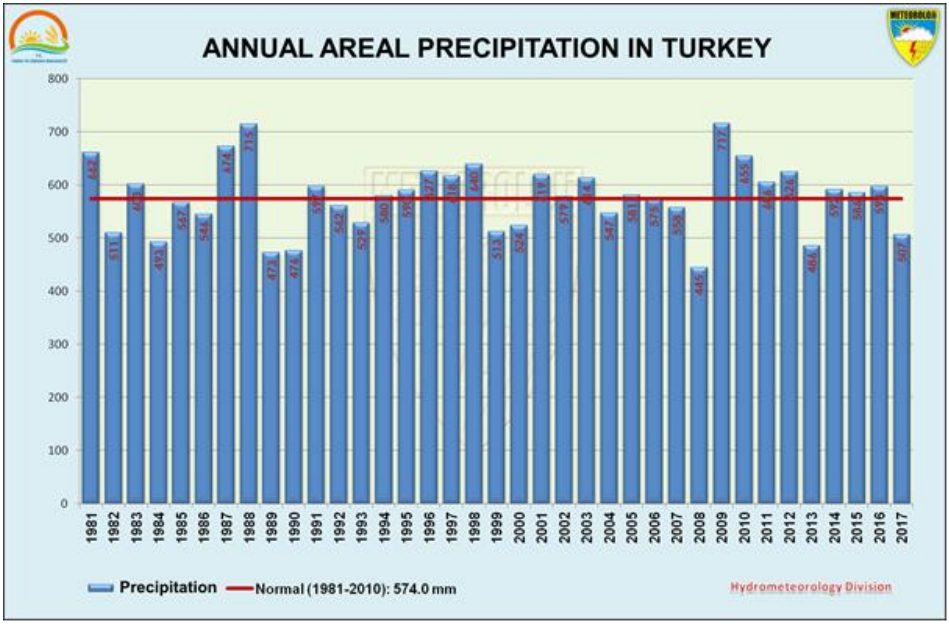
4.5- Precipitation

This impact indicator represents amount of average precipitation on unit area in time series.

The long term annual average precipitation is about 574 mm in Turkey. 507 mm average rainfall was recorded in 2017 (January 1 to December 31). When the rainfall distribution over the years is studied, it is observed that a rainy period started after the very dry year occurred in 2008. After the drought was observed again in 2013, rainfall occurred higher than the long term annual average during the next 3 years in Turkey; although in 2017 observed precipitation is less than normal.

It was observed that mean areal precipitation in 2017 was 12% less than the long term annual average, and 15% less than the average in 2016. Regionally, while there is increase only in Marmara and decrease has been seen in other regions. The highest increase was in Marmara region with 4% and the highest decrease was in South East Anatolia region with 32% [26].

GRAPH 17- ANNUAL AREAL PRECIPITATION IN TURKEY



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

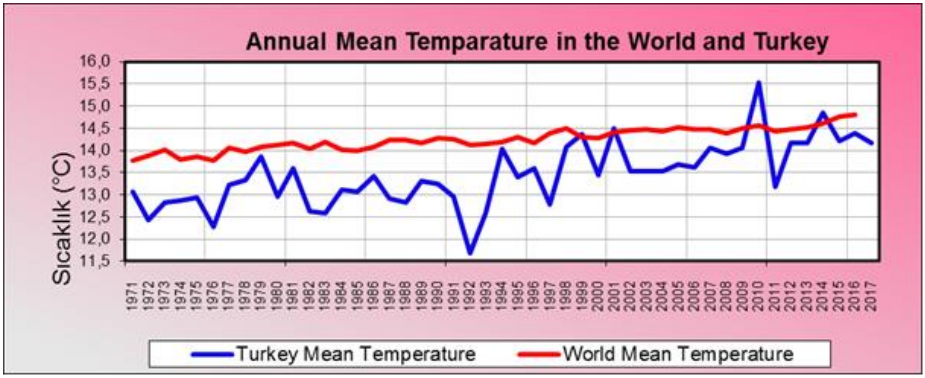
4.6- Temperature

This state indicator represents the change in annual average temperature in time series, globally and in Turkey.

The combined average temperature over global land and ocean surfaces in 2017 was 14.7°C, which was 0.42 °C above the 1981-2010 average (14.3°C). Annual mean temperature for Turkey in 2017 is 14.2°C, which is 0.7°C above the 1981-2010 average (13.5°C). Lowest temperature in 2017 was in February as -31.9°C in Ağrı while highest temperature was observed in August as 46.9°C in Cizre.

From 1971 to 2017, highest mean temperature in Turkey was recorded in 2010 as 15.5°C while the lowest was in 1992 as 11.8°C. There have been positive temperature anomalies in Turkey since 1994 (except 1997 and 2011) [26].

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

4.7- Sea Surface Temperature

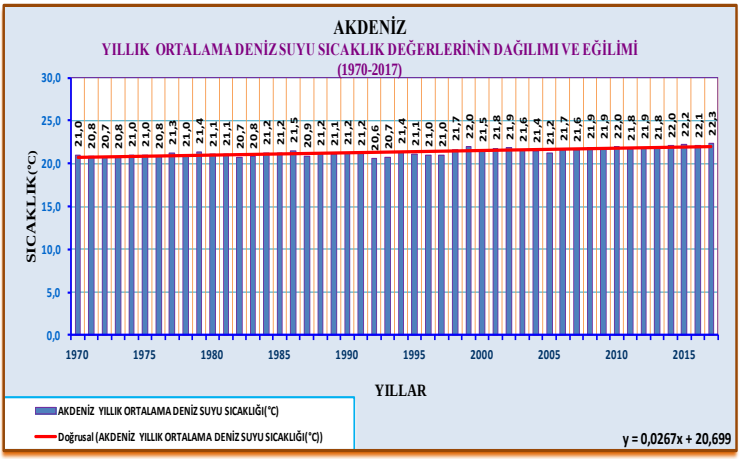
Indicator represents the annual change in sea surface temperature. The main sources of atmospheric weather events and air masses are oceans and seas. Warming and cooling trends in sea surface are the most accurate indicators of climate change, and changes in sea surface temperature affect many living creatures by changing the ecological structure in oceans.

Sea water temperature does not give a quick response to atmospheric warming or cooling; however, air temperature responds immediately to any change. Sea water heats up and cools down slower than land; and therefore sea surface temperature is a meteorological parameter which does not show any sudden change. The major factors affecting sea surface temperature are latitude, salinity, cold water currents, and direction of blowing wind.

The long-term annual mean sea temperature data recorded by Turkish State Meteorological Service (TSMS) indicate a slight increase, but we cannot mention a warming at a global scale. To monitor this process, measurements of sea surface temperature covering all of our coasts and seas are taken by TSMS. That will allow establishing a dataset at a higher resolution in the future.

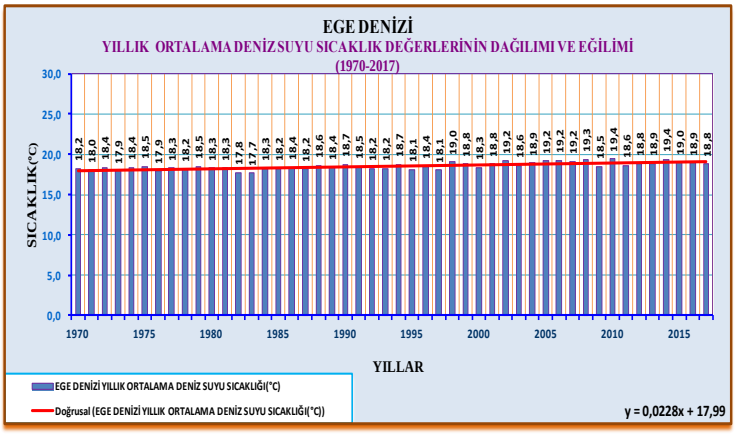
The mean sea temperature values in 2017 are 22.3 °C in the Mediterranean Sea, 18.8 °C in the Aegean Sea, 16.4 °C in the Marmara Sea, and 1564 °C in the Black Sea. The annual mean sea surface temperatures (in °C) recorded in years between 1970-2076 are given in the following figure [26].

GRAPH 19- YEARLY MEAN SEA SURFACE TEMPERATURE VALUES DISTRIBUTION AND TREND IN MEDITERRANEAN SEA (°C)

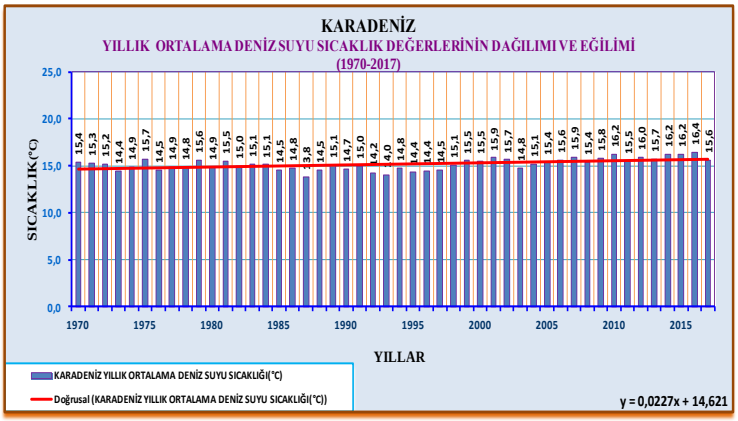


Source: Ministry of Agriculture And Forestry, Turkish State Meteorological Service

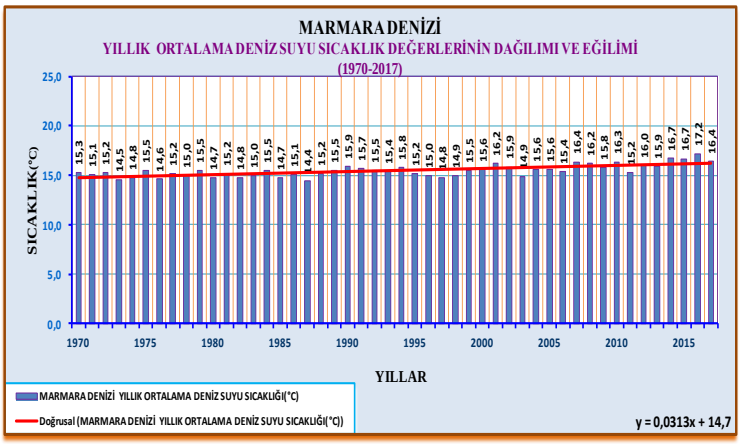
GRAPH 20- YEARLY MEAN SEA SURFACE TEMPERATURE VALUES DISTRIBUTION AND TREND IN AEGEN SEA (°C)



GRAPH 21- YEARLY MEAN SEA SURFACE TEMPERATURE VALUES DISTRIBUTION AND TREND IN BLACK SEA (°C)



GRAPH 22- YEARLY MEAN SEA SURFACE TEMPERATURE VALUES DISTRIBUTION AND TREND IN MARMARA SEA (°C)



Source: Minitsry of Agriculture and Forestry Turkish State Meteorological Service

5.1- Air Pollutant Emissions

An important pressure indicator is identified as the emissions of air pollutants and shows the amount of national emissions of major air pollutants by years and source sectors.

Within the reporting requirements of the UNECE CLRTAP (United Nations Economic Commission for Europe, Convention on Long-Range Transboundary Air Pollution (CLRTAP), a national air emissions inventory for, NOX (nitrogen oxides), SO_2 (sulphur dioxide), NMVOC (non-methane volatile organic compounds), NH_3 (ammonia), PM_{10} (particulate matter) and CO (carbon monoxide) is prepared each year by the Ministry of Environment and Urbanization and reported to the UNECE Secretariat through European Environment Agency, comprising the inventory data of the second previous year.

When the situation in Graph 23 of the 1990-2016 emissions covered by the 2018 reporting is examined; it is observed that there has been a significant decrease in some pollutants caused by combustion especially in recent years. This may be due to reduced fuel consumption in power plants and updated emission factors due to changing technologies. However, there is an increase in emissions compared to 1990 levels, highest increase was observed in NOx emissions with a rate of 63%, followed by SO_2 and the other pollutants.

When the emissions compared to 2015 are examined; PM_{10} and CO emissions decreased by 12% and 9%, respectively, while other emissions are increased. changes in emissions both in time series and compared to the previous year are given in Table 9.

In 2016, for SO_2 65.1% of the emissions were caused by energy production-power plants, 12.9% by residential heating. 47.2% of NO_X emissions were caused by energy production-power plants and 9.3% by heavy-duty vehicles. Animal waste caused 18.9% and residential heating 13.3% of the total NMVOC emissions. Main reasons of the NH_3 emissions were livestock farming.

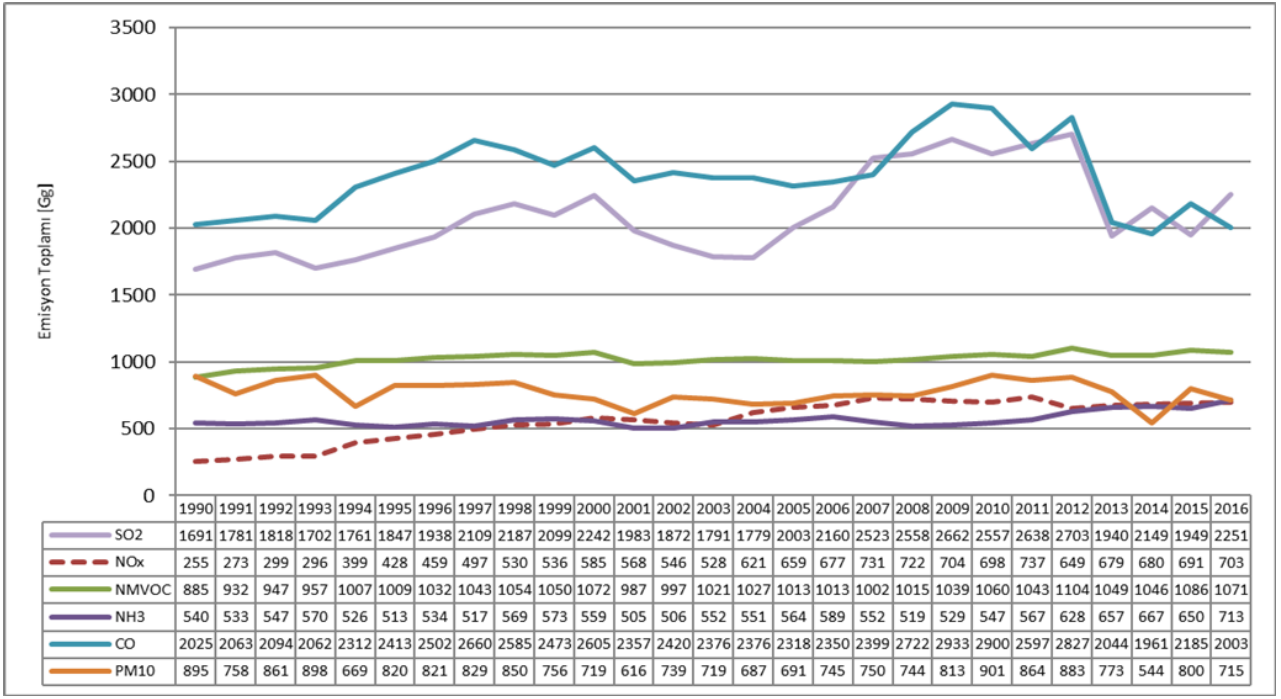
TABLE 9- PERCENT CHANGE OF AIR POLLUTANT EMISSIONS (SO_2, NO_X, NMVOC, NH_3, CO VE PM_{10})

Trend (%)	SO_2	NO_X	NMVOC	NH_3	CO	PM_{10}
1990-2016	24.9%	63.7%	17.3%	24.2%	-1.1%	-25.1%
2015-2016	13%	2%	-1%	9%	-9%	-12%

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

Anthropogenic emissions of the main air pollutants decreased significantly in EU-28 countries between 1990 and 2016; NO_X emissions decreased by 58%, SO_X emissions by 91%, NMVOC emissions by 62%, NH_3 emissions by 23% and $PM_{2.5}$ emissions by 28% [27].

GRAPH 23- 1990-2016 TOTAL EMISSIONS OF SO2, NOX, NMVOC, NH3, CO AND PM10



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
SO2	1691	1781	1818	1702	1761	1847	1938	2109	2187	2099	2242	1983	1872	1791	1779	2003	2160	2523	2558	2662	2557	2638	2703	1940	2149	1949	2251
NOx	255	273	299	296	399	428	459	497	530	536	585	568	546	528	621	659	677	731	722	704	698	737	649	679	680	691	703
NMVOC	885	932	947	957	1007	1009	1032	1043	1054	1050	1072	987	997	1021	1027	1013	1013	1002	1015	1039	1060	1043	1104	1049	1046	1086	1071
NH3	540	533	547	570	526	513	534	517	569	573	559	505	506	552	551	564	589	552	519	529	547	567	628	657	667	650	713
CO	2025	2063	2094	2062	2312	2413	2502	2660	2585	2473	2605	2357	2420	2376	2376	2318	2350	2399	2722	2933	2900	2597	2827	2044	1961	2185	2003
PM10	895	758	861	898	669	820	821	829	850	756	719	616	739	719	687	691	745	750	744	813	901	864	883	773	544	800	715

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

5.2- Large Combustion Plants (LCP)

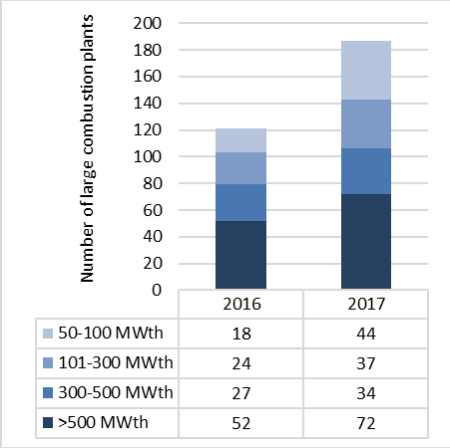
This pressure indicator is significant as an important source of air pollution. LCPs use large amounts of fuels, mostly fossil fuels, to produce useful forms of energy. These plants generate a number of residues and waste products, and large amounts of emissions to all environmental media. Emissions from LCPs constitute a large proportion of total anthropogenic emissions. The aim of the legislation in this field is to reduce the emissions of acidifying pollutants, particulate matter and ozone precursors. More effective pollution reduction requires transition to lower carbon emitting energy production alternatives [28].

The draft By-Law on Integrated Pollution Prevention and Control, transposing the first and second chapters of the Industrial Emissions Directive (2010/75/EU) has been drafted and was expected to be issued within 2018.

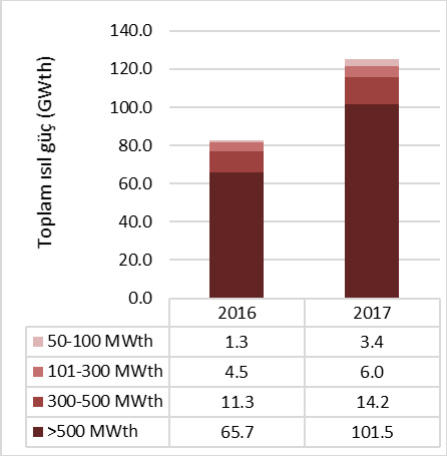
Total thermal capacity of the LCP's in Turkey was 82 GWth in 2016 and elevated to 125 GWth in 2017 with a 42% increase rate.

LCPs are not distributed evenly across Europe, with a few countries dominating in terms of total fuel input and operating capacity. In 2015, four countries (Germany, Italy, Spain and the United Kingdom) contributed 52% of total operating capacity. As of 2015, total thermal capacity of the LCP's in Germany was 287 GWth, and in Italy 165 GWth [28].

GRAPH 24- NUMBER OF LARGE COMBUSTION PLANTS



GRAPH 25- INSTALLED THERMAL CAPACITY IN LARGE COMBUSTION PLANTS



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

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

Pollutant concentration in ambient air is a major state indicator regarding air pollution. Hence, air quality is continuously monitored in all 81 provinces by the monitoring stations operated within "National Air Quality Monitoring Network". Data provided by these monitoring stations are publicly available online at: www.havaizleme.gov.tr.

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

If the last five-year period between 2013-2017 is examined, it is seen that Bursa, Iğdır and Siirt stations had higher rates 4 times and Kayseri (Hürriyet) station 3 times between the first 10 stations with the highest annual PM_{10} averages. In the last five years, Edirne (Keşan) and Çanakkale (Çan) stations, Amasya (Suluova) and Tekirdağ (Central MTHM) stations have had highest rates 3 times between the first 10 stations with the highest annual SO_2 averages.

TABLE 10- AIR QUALITY MONITORING STATIONS WITH THE HIGHEST PM_{10} AND SO_2 AVERAGES IN 2017

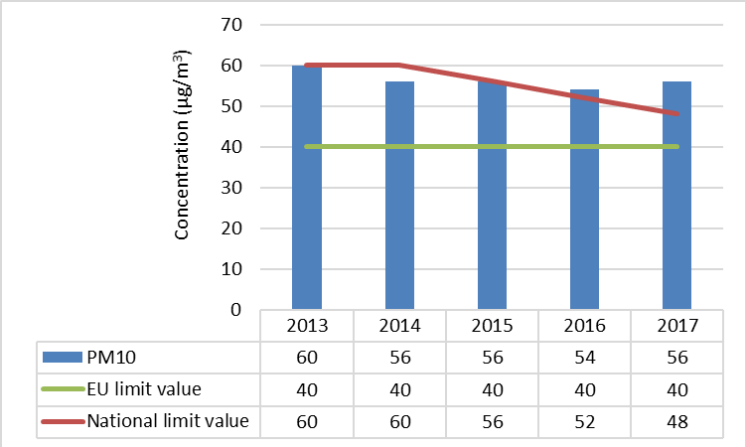
STATIONS	PM_{10} ($\mu g/m^3$)*
ANKARA (Kayaş)	100
BURSA	99
ADANA (Meteoroloji)	88
TOKAT (Erbaa)	87
ANKARA (Sıhhiye)	85
AMASYA (Şehzade)	84
AFYONKARAHİSAR	82
BURSA (BeyazıtCad. MCAC)	81
NİĞDE	81
TEKİRDAĞ (Center MCAC)	81

STATIONS	SO_2 ($\mu g/m^3$)*
EDİRNE (Keşan MCAC)	167
AMASYA (Suluova)	40
ÇORUM (Mimar Sinan)	40
EDİRNE	27
TEKİRDAĞ	26
AFYON	23
ÇANAKKALE (Çan MCAC)	23
SAMSUN (Canik)	23
AĞRI	21
KOCAELİ (Dilovası)	21

** Assessment done with the validated hourly average values where data availability is above 90%.*
MCAC: Marmara Clean Air Center
Source: Ministry of Environment and Urbanisation General Directorate for EIA, Permitting and Inspection, Department of Laboratory, Measurement and Monitoring.

Graph 26 shows the average concentrations of PM_{10} for the last five years. Accordingly, in 2017, the national limit value was exceeded by 16% and the European Union limit by 28%.

GRAPH 26-AVERAGE PM_{10} CONCENTRATIONS OF THE LAST FIVE YEARS (2013-2017)



	2013	2014	2015	2016	2017
PM10	60	56	56	54	56
EU limit value	40	40	40	40	40
National limit value	60	60	56	52	48

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

Within the scope of "Clean Air Action Plans' to improve air quality; The necessary studies are carried out to increase the efficiency of the measures related to the control of the fuel type used for heating, improvement of the combustion systems, jacketing in buildings, training of the firemen and reduction of the pollution loads caused by motor vehicles. Both local administrations and our Ministry and Provincial Directorates continue to work on air pollution control.

5.4- Number of Exceedences of Air Quality Limit Values

This state indicator shows how often the air pollution exceeds the (daily) limits. Increasing number of exceedences shows a decline in air quality.

Number of exceedances has been increasing over the years; one reason of this is the air quality limit values decreasing in cascades since 2009 as identified in the By-Law on Air Quality Assessment and Management (BAQAM). Besides the reality that the targeted improvement in air quality is not being achieved, two reasons to the increasing number of exceedences are: lowering of the limit values every year and increasing number of monitoring stations.

In 2017, the daily limit value was set to 70 $\mu g/m^3$ for PM_{10} parameter and 175 $\mu g/m^3$ for parameter SO_2. In 2017, the total number of overshoots is 13827 for the PM_{10} parameter and 256 for the SO_2 parameter. In the period between 2015-2017, according to the number of border crossings calculated on the basis of all stations; Although there was a 12.5% decrease in both limit values in 2017 compared to 2016, there was a 36% increase in the number of overshoots for the PM_{10} parameter and a 20% decrease in the number of overshoots for the SO_2 parameter [29].

5.5- Number of Air Quality Monitoring Stations

As a response indicator, this shows the number and qualifications of the monitoring stations in order to obtain more reliable air quality data.

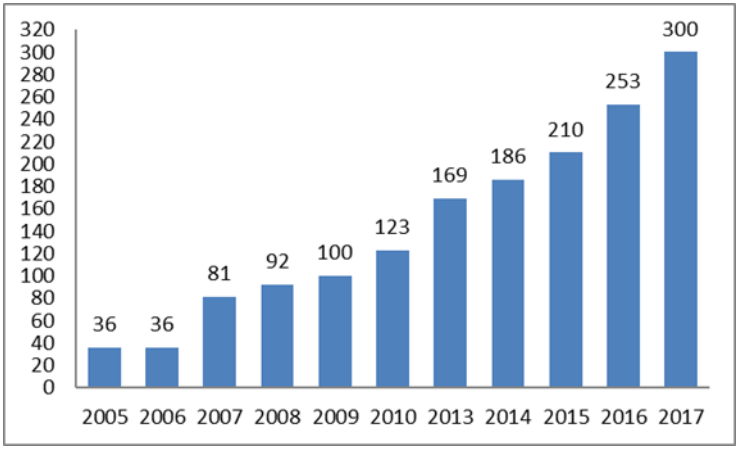
The 300 stations established in our country have been established in accordance with the European Union norms by being clissified based on both resource and area.

Air quality pre-evaluation studies conducted by the Ministry were utilized during the establishment of the stations.

Of the existing stations, PM_{10} paarmeters are measured in 285, $PM_{2.5}$ in 132, SO_2 in 258, NO_X in 234, O_3 in 160 and CO in 143 stations.

While determining the number of stations to be set up according to the European Union norms, the number of existing stations should be at least 330 with regard to population data reference. Establishment of new stations are ongoing in this regard.

GRAPH 27- NUMBER OF AIR QUALITY MONITORING STATIONS THROUGH THE YEARS



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

6.1- Use of Freshwater Resources

This indicator is a pressure indicator. Total water consumption indicates the use of water sources (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 the fresh water bodies.

Based on the data of General Directorate of State Hydraulic Works about irrigation and the data of TURKSTAT about other types of water consumption, 71.3% of the water drawn was used for agricultural irrigation, 18.4% for industry, and 10.3% as drinking and potable water use, in 2016.

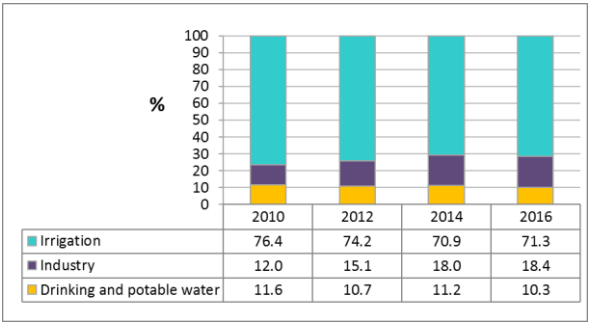
Based on the 2010 data presented by United Nations Food and Agriculture Organization (FAO) and published in 2016, 69% of the water source is used for irrigation, 19% for industry and 12% for domestic use in the World [30].
According to the data provided by the European Environöment Agency (EEA) , as of 2015, in the EEA members other than Southern Cyprus and Turkey, Avrupa Çevre Ajansı verilerine göre ise 2015 yılı itibariyle, Güney Kıbrıs, Türkiye dışındaki ajans üyesi avrupa ülkelerinde su kaynaklarının 40.4% of water resources were consumed in agriculture, forestry and fishing, 27.8 % in electricity, gas, steam and air conditioning supply, 17.7% in mining and quarrying, manufacturing and construction, 11.6% in households, 2,6% in service industry [31].

TABLE 11- AMOUNT OF WATER DRAWN FROM WATER BODIES WITH REGARD TO USAGE (Billion m³/year)

YEARS	2008	2010	2012	2014	2016
Municipalities	4.55	4.78	4.94	5.23	5.83
Villages	1.22	1.01	1.04	0.43	0.38
Manufacturing Industry Activities	1.31	1.56	1.79	2.20	2.12
Thermal Power Plants	4.54	4.27	6.40	6.53	8.61
Organized Industrial Zones	0.11	0.11	0.14	0.14	0.15
Mining Facilities	... (*)	0.05	0.11	0.21	0.23
Irrigation	33.77	38.15	41.55	35.85	43.06
Total		**49.95**	**55.96**	**50.59**	**60.38**

(*) No Information
Note: TURKSTAT data includes sea water use.
Source: TURSTAT, "Sectoral Water and Wastewater Statistics" Press Release,
Source For 'Irrigation' Values: Ministry of Forestry and Water Affairs General Directorate of State Hydraulic Works, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=27672

GRAPH 28- WATER USAGE BY SECTORS, (2010-2016)



Water exploitation index (WEI) is the annual total fresh water abstraction in a country as a percentage of its long term average available water (LTAA) from renewable fresh water resources.

Annual mean precipitation in Turkey is 643 mm, which corresponds to 501 Bm^3 (billion m^3) of annual water volume in the country. A volume of 274 Bm^3 water evaporates from water bodies, plants and soils to atmosphere, 158 Bm^3 flows through rivers towards seas and lakes. 69 Bm^3 of volume of water leaks into groundwater, whereas 28 Bm^3 is retrieved by springs from groundwater contributing to surface water. Also, there are 7 billion m^3 volume of water coming from neighboring countries. Thus, total annual surface runoff amounts to a volume of 193 Bm^3 of water.

Including 41 (69-28) Bm^3 net discharging into groundwater, the gross (surface and groundwater) renewable water potential of Turkey is estimated as 234 (193+41) Bm^3 [34].

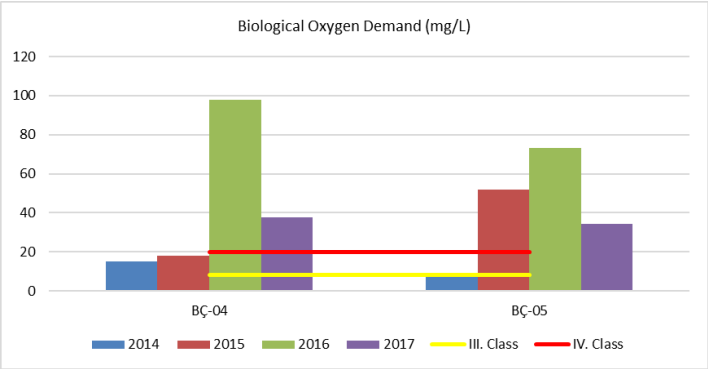
WEI of Turkey is 21.3% in 2010, 23.9% in 2012, 21.6% for 2014 and 25.8% in 2016. Index being above 20% shows water scarcity for Turkey. Index above 40% means severe water scarcity [35]. Data on this indicator concludes that Turkey needs to take measures for sustainable water resources management.

6.2- Oxygen Consuming Substances in Rivers

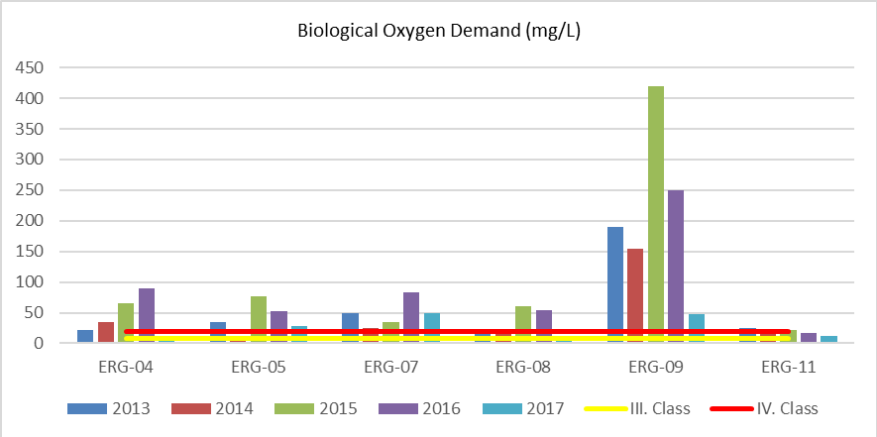
The primary indicator of the oxygenation state in water bodies is biochemical oxygen demand (BOD) which expresses the demand of oxygen by the living creatures consuming oxidizable organic materials in a body of water. This indicator is a state indicator which shows the present situation and the tendency related with ammonium concentrations (NH4) and BOD in rivers.

Laboratory, Measuring and Monitoring Department of the Ministry of Environment and Urbanisation carried out Domestic and Industrial Pollution Monitoring Programmes in 2012, 2013, 2014, 2015, 2016 and 2017. Seasonal monitoring studies have been done in the basins: Ergene, Küçük Menderes, Gediz, North Aegean, Sakarya and Susurluk that have the highest pollution loads. As a result of the studies, Rivers in these basins were found out to be at the class IV quality (highly polluted) water according to the By-Law on Surface Water Quality Management for all these years of monitoring.

GRAPH 29- NORTH AEGEAN (BAKIRCAY) BASIN BOD (mg/L)

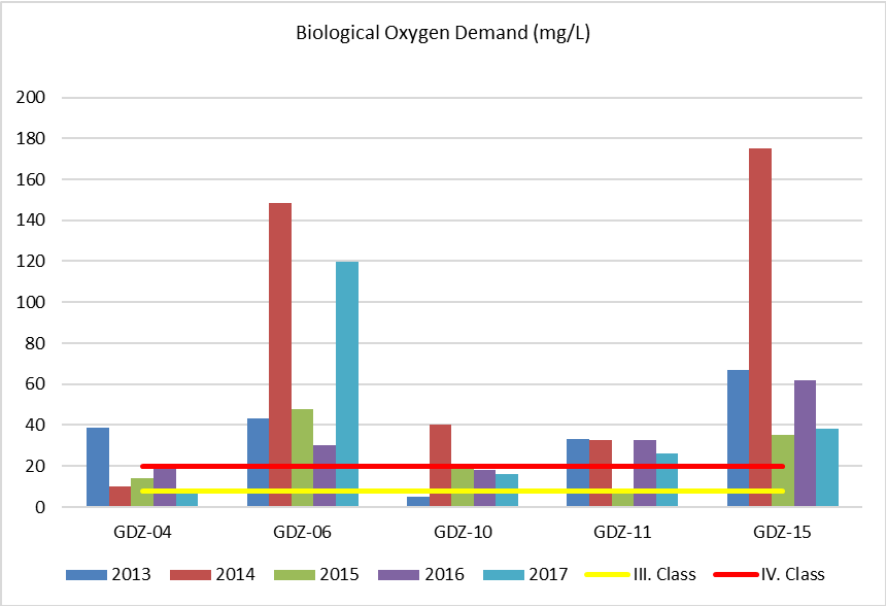


GRAPH 30- ERGENE BASIN BOD (mg/L)

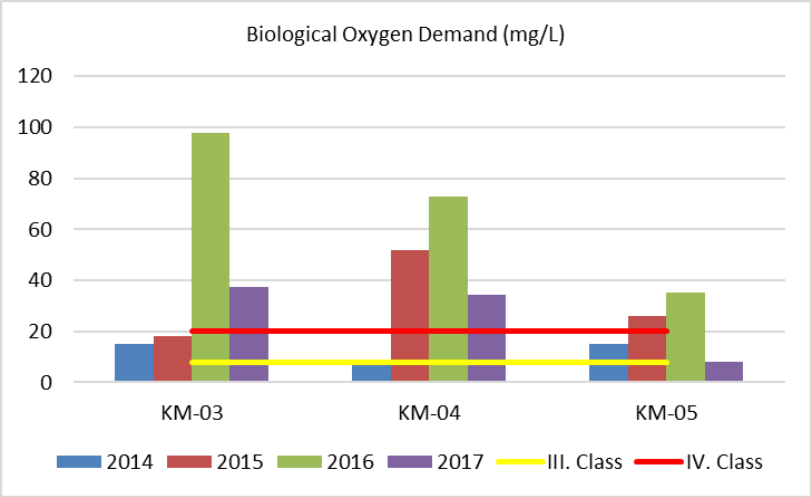


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017)

GRAPH 31- GEDIZ BASIN BOD (mg/L)

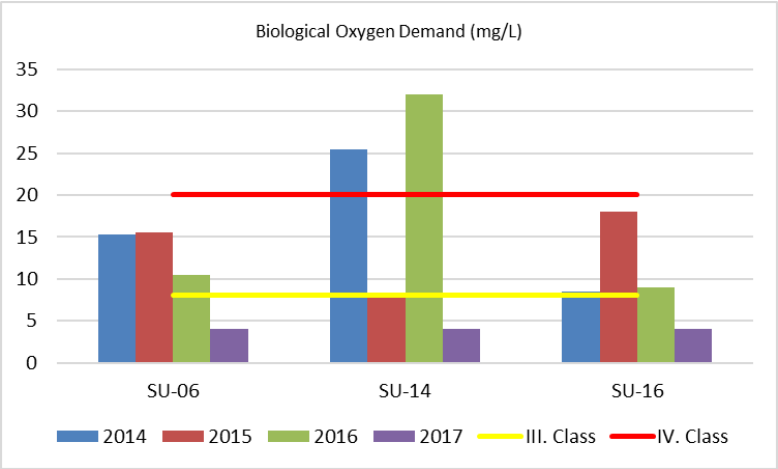


GRAPH 32- KUCUK MENDERES BASIN BOD (mg/L)

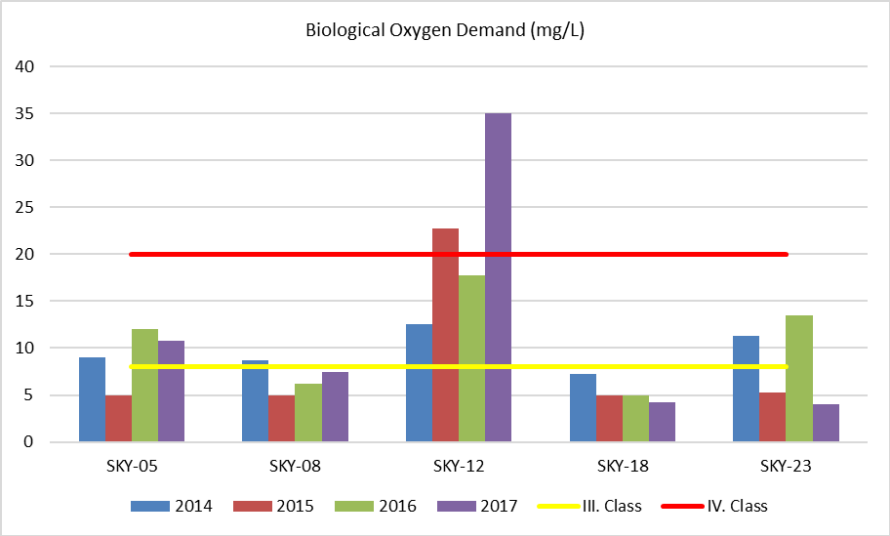


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017)

GRAPH 33- SUSURLUK BASIN BOD (mg/L)



GRAPH 34- SAKARYA BASIN BOD (mg/L)

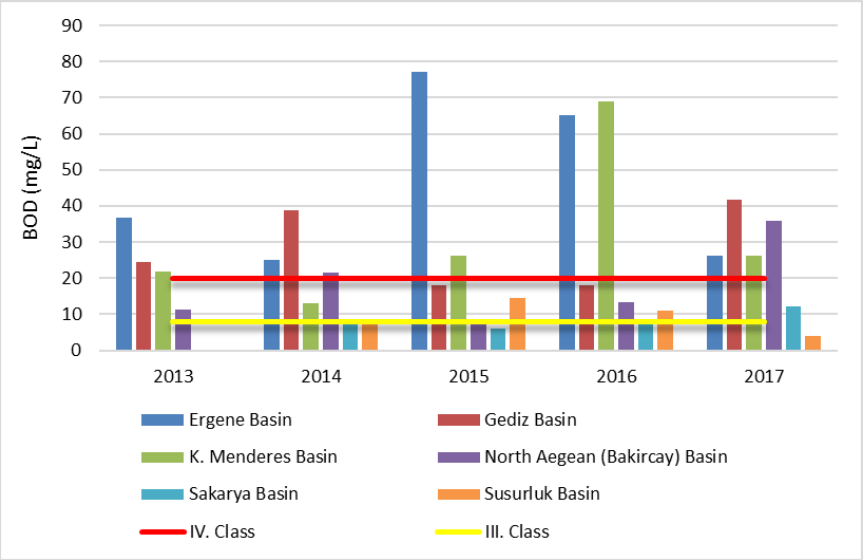


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017)

When the averages of all stations belonging to basins were compared in years, a decrease tendency was observed in BOD parameter in general.

In order to determine the pollution real-time and take rapid mitigation measures at source, the Ministry of Environment and Urbanisation is monitoring the pollutant emissions by installing online continuous monitoring stations at the discharge points of wastewater treatment units of installations with a capacity of 10,000 m3/day or higher. The system starts sampling automatically when triggered, measures are taken depending on the results of the analysis by authorised laboratories.

GRAPH 35- AVERAGE BOD IN THE HIGHEST POLLUTION LOADS BASINS ANNUALLY (mg/L)



Notes:
1) Basin averages are arithmetic mean of the values from the stations in the basin.
2) Values below detection limits have been asumed zero.
3) There is no measurement in Susurluk and Sakarya Basins for 2013.

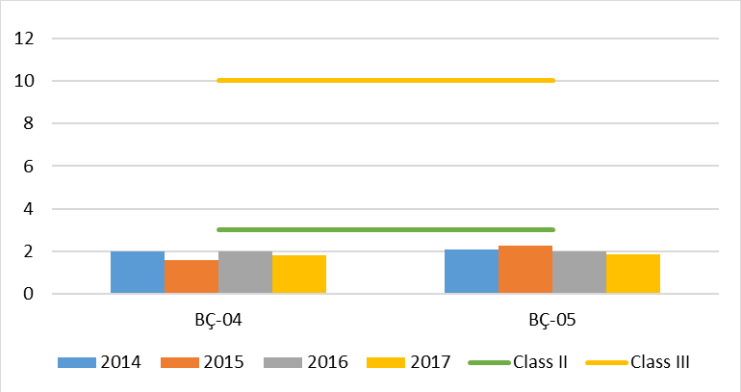
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017)

6.3- Nutrients in Freshwater

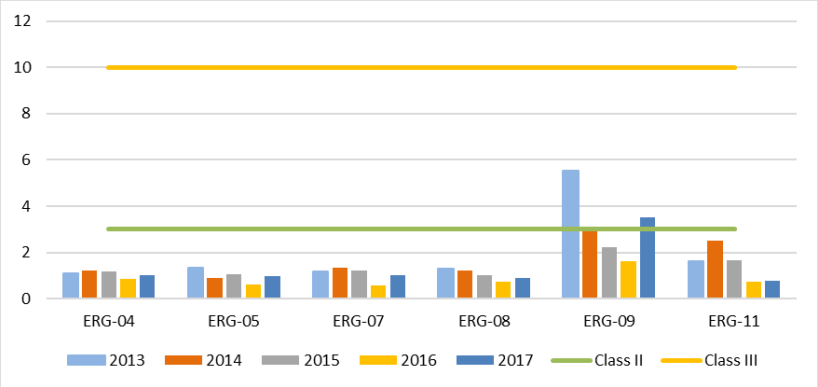
The state indicator is used to show the current nutrient intensity and the time-wise trends in geographic variations. Widespread nitrogen and phosphorus entry from urban, industrial and agricultural sources to the water bodies can cause eutrophication.

Laboratory, Measuring and Monitoring Department of the Ministry of Environment and Urbanisation carried out Domestic and Industrial Pollution Monitoring Programmes in 2012, 2013, 2014, 2015, 2016 and 2017. Seasonal monitoring studies have been done in the basins: Ergene, Küçük Menderes, Gediz, North Aegean, Sakarya and Susurluk that have the highest pollution loads. As a result of the studies, rivers in these basins were found out to be at the class IV quality (highly polluted) water according to the By-Law on Surface Water Quality Management for all these years of monitoring.

GRAPH 36- NORTH AEGEAN (BAKIRCAY) BASIN NITRATE NITROGEN (mg/L)

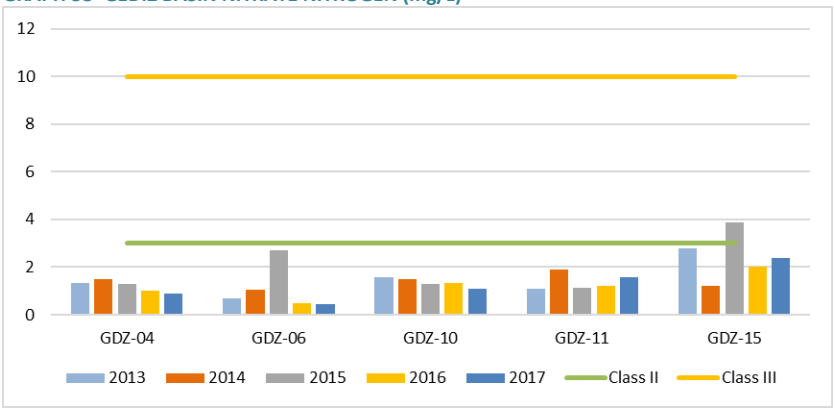


GRAPH 37- ERGENE BASIN NITRATE NITROGEN (mg/L)

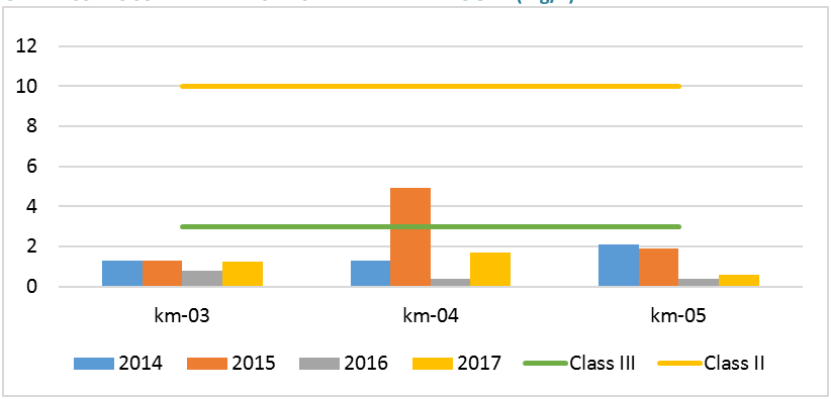


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017).

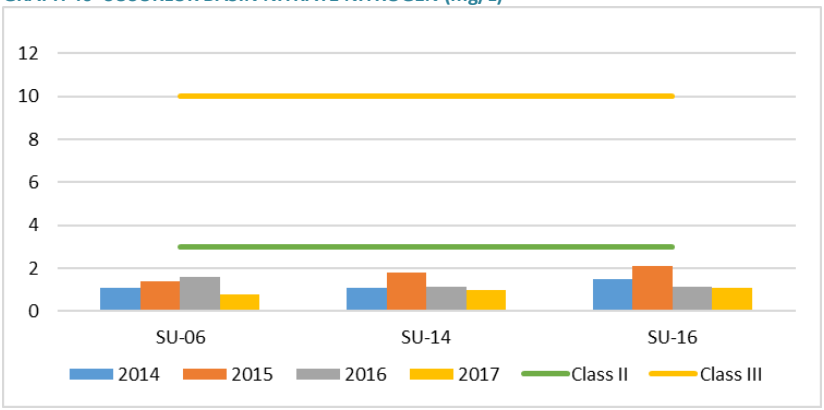
GRAPH 38- GEDIZ BASIN NITRATE NITROGEN (mg/L)



GRAPH 39- KUCUK MENDERES BASIN NITRATE NITROGEN (mg/L)

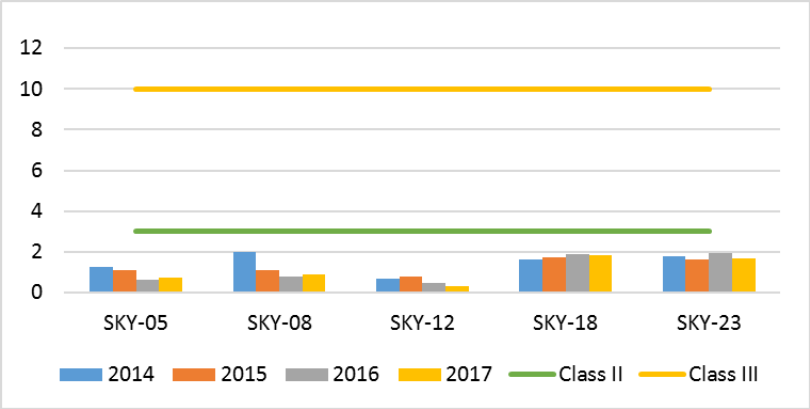


GRAPH 40- SUSURLUK BASIN NITRATE NITROGEN (mg/L)



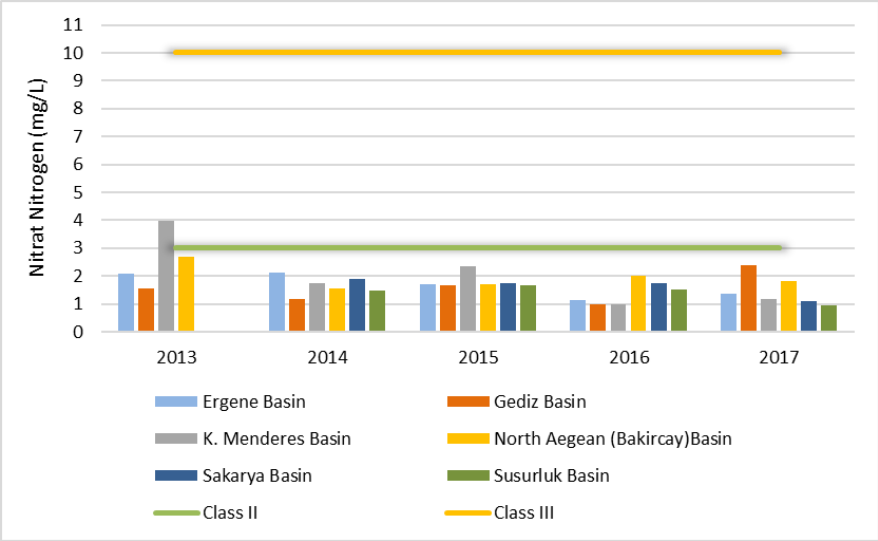
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017)

GRAPH 41- SAKARYA BASIN NITRATE NITROGEN (mg/L)



Comparing yearly trends of the averages of the stations within the basins, generally a decrease is observed in 2017 in the Nitrate.

GRAPH 42- AVERAGE NITRATE NITROGEN IN THE BASINS WITH HIGHEST POLLUTION LOADS (mg/L)



Notes:
1) Basin averages are arithmetic mean of the values from the stations in the basin.
2) Values below detection limits are asumed as zero.
3) No measurements were done in Susurluk and Sakarya Basins for 2013.

Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2017).

6.4- Chlorophyll Concentration in Coastal and Marine Waters

Chlorophyll-a (Chl-a), as an indicator of phytoplankton biomass, carries out the photosynthesis, by which primary organic matter is introduced into the food chain. Organic matter produced in the euphotic zone, is degraded by bacterial activity, depletes oxygen essential for aquatic life. This indicator is also regarded as an indicator of eutrophication.

Laboratory, Measurement and Monitoring Department of the Ministry of Environment and Urbanization implemented "Integrated Marine Pollution Monitoring Programme" with the coordination of TUBITAK-Marmara Research Center. In the programme, quality and pollution are assessed through various indicators in all of seas of Turkey: Mediterranean Sea, Aegean Sea, Black Sea and Marmara Sea.

Marine pollution and quality are assessed in Coastal Water Bodies (CWB). Coastal Water Bodies or in other words Water Management Unit defines a surface water section, which has been separated according to their typologies that are being determined according to physical, hydromorphological, ecological properties and pressures. They are considered as the smallest management units dealt by WFD.

2014-2017 Chl-a assessments showed that all marine waters of Turkey have sufficient solarination. Peak values of Chl-a concentrations occur due to primary production in winter seasons when land based nutrient loads increase. Besides this, no significant difference is observed among years during 2014-2017 monitoring period.

In Mediterranean Sea, in Graph 43, in general, relatively higher chlorophyll-a values were observed in shallow and less salty coastal areas under the effects of rivers and other terrestrial inputs like urban wastewaters (AKD01: Asi River, AKD04: Ceyhan River, AKD05: Seyhan River) where almost all winter concentrations were higher than the summer values. Chlorophyll-a was observed to decrease to its natural level in open sea surface waters where the effects of land-based inputs diminish and in clean coastal areas (the area between Anamur and Marmaris). The inputs were more effective in the upper 5-10 meters of the water column. The changes in the 2017 summer values with depth revealed a similar distribution to the oxygen profiles. While the coastal areas of Mersin and İskenderun gulfs fed by rivers with less salty waters and low SDD values were observed to have high levels of Chl-a; the surface waters of coastal areas where the effect of land-based inputs diminished and the reference conditions were observed to have the natural open sea levels of Chl-a, displaying typical eastern Mediterranean properties.

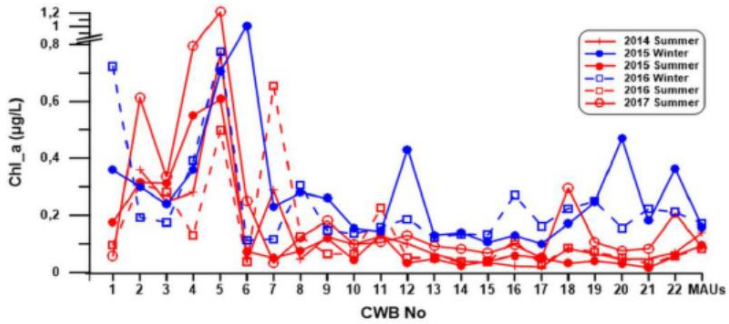
In Aegean Sea the evaluation of the 2014-2017 surface layer chlorophyll-concentrations at CWBs revealed no significant variation between the summer and winter periods; while relatively high values were observed in the Inner and Central Gulf of İzmir and in the Gulf of Güllük (Graph 44). The relatively high

values in the Northern Aegean Sea in winter months might be the result of the Marmara Sea inputs and winter mixing causing nutrient enrichment of the surface waters.

The 2017 summer period surface distributions of the chlorophyll-a, reveal that the concentration across the Black Sea is <1 µg/L (Graph 45). Relatively higher values (>1-1.5 µg/L) were observed generally at the near-coastal stations in the Eastern Black Sea. All of the stations in the open sea revealed values <1 µg/L. The highest chlorophyll-a value was measured at TRK61 station. The comparison of the 2014-2017 data from the CWBs on surface layer chlorophyll-concentrations indicates that the concentrations in the winter periods were generally higher than those in the summer periods. Summer concentrations in 2017 revealed comparable values with the previous summer periods.

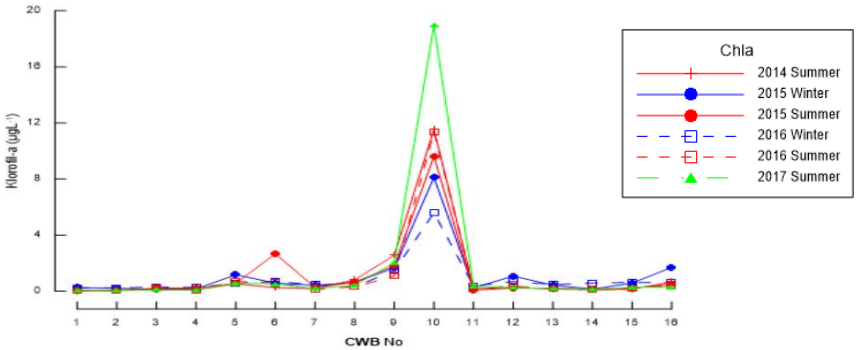
2014-2017 surface layer chlorophyll-a concentrations at the Marmara Sea CWBs are shown in Graph 46. The highest concentrations are observed in Bandırma and İzmit Gulf and in İstanbul Strait. Spring concentrations those were measured in 2017 for the first time within the monitoring programme, turns out to be close to the summer concentration levels. The summer concentrations in 2017 reveal compatibility with the ones in previous periods

GRAPH 43- MEDITERRANEAN SEA CHLOROPHYLL-A AVERAGE CONCENTRATIONS 2014-2017 COMPARISON



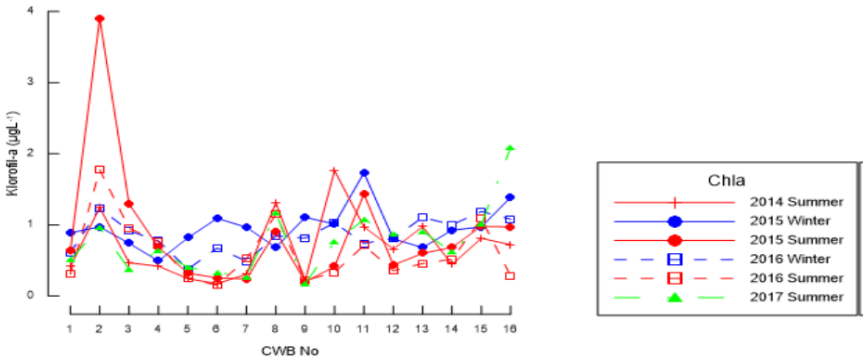
Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2111 (Mediterranean Final Report, 2017), February 2018, Gebze-Kocaeli.

GRAPH 44- AEGEAN SEA CHLOROPHYLL-A AVERAGE CONCENTRATIONS 2014-2017 COMPARISON



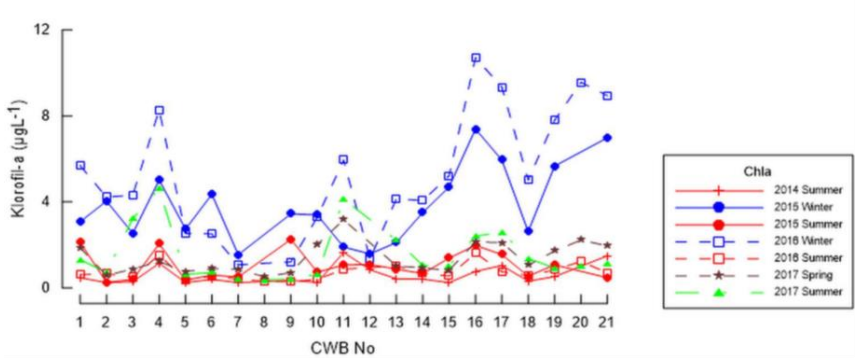
Source:ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2113 (Aegean Sea Final Report, 2017), February 2018, Gebze-Kocaeli.

GRAPH 45- BLACK SEA CHLOROPHYLL-A AVERAGE CONCENTRATIONS 2014-2017 COMPARISON



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

GRAPH 46- MARMARA SEA CHOROPHYLL-A AVERAGE CONCENTRATIONS 2014-2017 COMPARISON



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

6.5- Nutrients in Coastal and Marine Waters

The nutrient indicators show current nutrient concentrations in geographical changes and temporal trends. Discharges of nitrogen and phosphorus from land based sources like urban, industry or agricultural sources cause eutrophication.

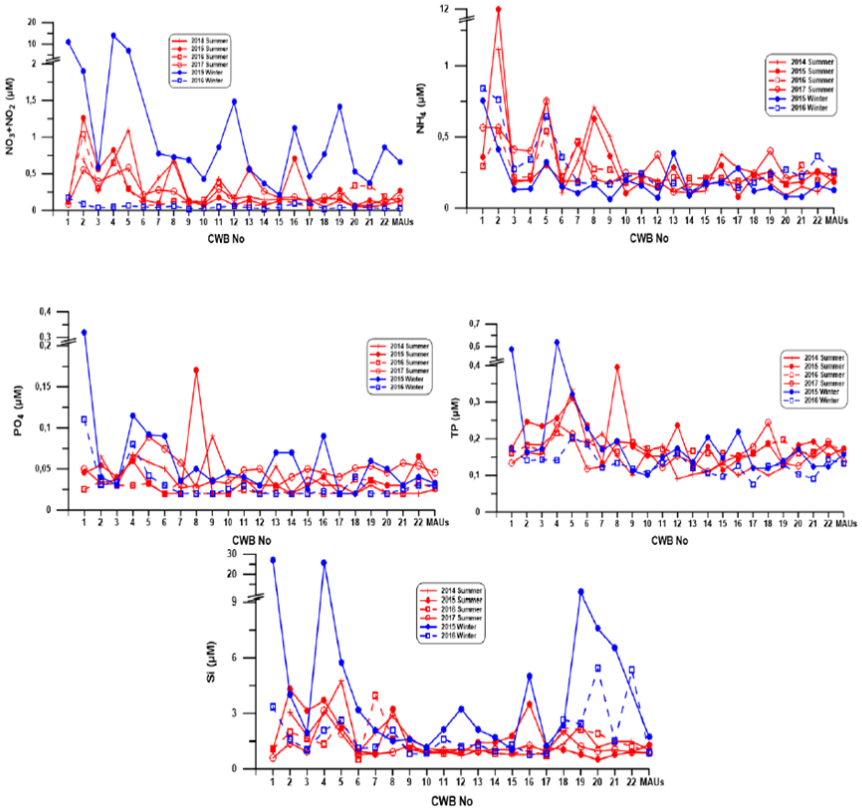
Laboratory, Measurement and Monitoring Department of the Ministry of Environment and Urbanization implemented "Integrated Marine Pollution Monitoring Programme" with the coordination of TUBITAK-Marmara Research Center. In the programme, quality and pollution are assessed through various indicators in all of seas of Turkey: Mediterranean Sea, Aegean Sea, Black Sea and Marmara Sea

Marine pollution and quality are assessed in Coastal Water Bodies (CWB). Coastal Water Bodies or in other words Water Management Unit defines a surface water section, which has been separated according to their typologies that are being determined according to physical, hydromorphological, ecological properties and pressures. They are considered as the smallest management units dealt by WFD.

For nutrient distribution in surface waters total phosphorus (TP), dissolved inorganic nitrogen (DIN), nitrate+nitrite nitrogen (Nox) and silicate (Si) parameters are evaluated in this section.

TP values obtained in the Mediterranean coastal waters in 2017 summer have reflected the river and urban influences and also the "oligotrophic" (TP <0.5 µM) properties of the salty and clear waters not affected such pressures (Graph 47). In some occasions, TP values of stations under the river influence were even lower than 0.5 µM which is accepted as the threshold for eutrophication and where relatively higher values would indicate a tendency towards eutrophic status. In addition, the values of total dissolved inorganic nitrogen (DIN) reached the highest levels (>3.0 µM) at the low salty surface waters of coastal regions (AKD02 and AKD05) affected by terrestrial inputs; while they are in the range from 0.1 to 0.5 µM at the surface waters of the open marine waters; which is quite low and close to the oligotrophic eastern Mediterranean surface water values. The DIN values of bottom waters whose large percentage was composed of nitrate ions resulted from organic matter degradation.

GRAPH 47- MEDITERRANEAN SEA SURFACE WATER NUTRIENT PARAMETERS 2014-2017 COMPARISON

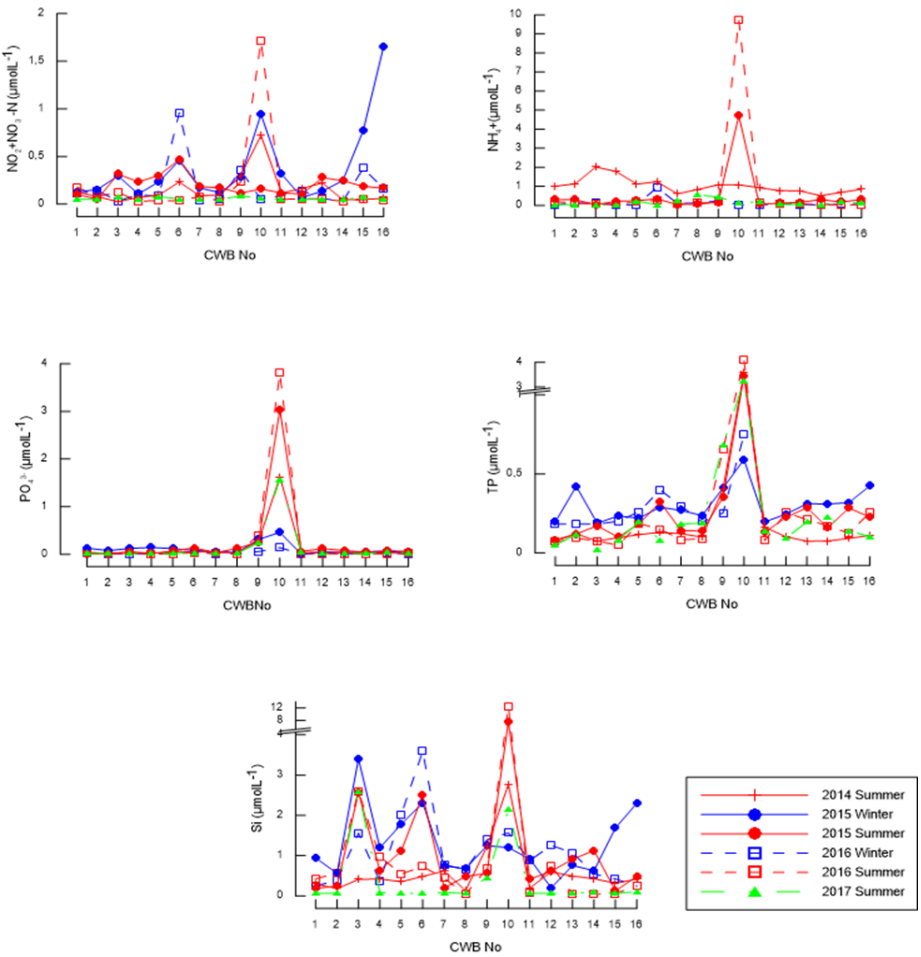


Source: ÇŞB-ÇEDİDGM and TÜBİTAK-MAM (2018). Integrated Pollution Monitoring Project (2017-2019). ÇTÜE 5178702, Report No. ÇTÜE.17.2111 (Mediterranean Final Report, 2017), February 2018, Gebze-Kocaeli.

In Aegean Sea when the nutrient concentrations are assessed seasonally, it is observed that there was no significant difference between the summer and the winter values; however, the measurements of 2017 revealed lower values at all the CWBs (Graph 48). Nox values were observed to be generally low in both seasons; however the concentrations were found to be higher by 2 to 4 times especially at EGE06 (Büyük Menderes River Mouth) and EGE10 (Inner Gulf of İzmir); which could be attributed to the fact that the both CWBs are under river/fresh water input influence. In addition, the Inner Gulf of İzmir is thought to be under the influence of urban discharges. The high concentrations were also detected at EGE15 (exit of the Çanakkale Strait) and EGE16 (Meriç River mouth) in the winter of 2015. In the sampling period, the Meriç river mouth (EGE16) was

under the influence of a large river input, while the Dardanelles is thought to be under the influence of the nutrient-rich surface waters coming from the Marmara Sea. Including the 2017 summer samplings, all the samplings revealed that the CWB EGE10 had significantly larger nutrient concentrations than all the other CWBs.

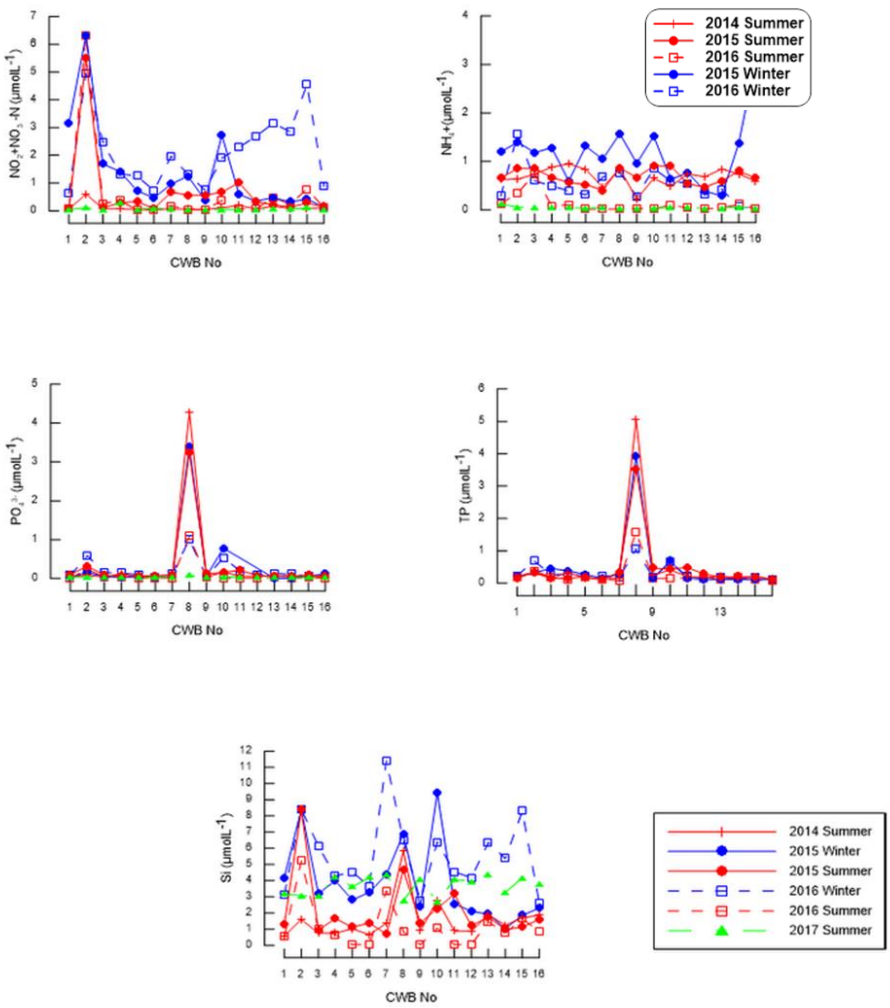
GRAPH 48- AEGEAN SEA SURFACE WATER NUTRIENT PARAMETERS 2014-2017 COMPARISON



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

In Black Sea although it is observed that winter periods reveal generally higher levels; the most prominent fact is that the CWBs (2, 7, 10) under the influence of rivers reveal high values of nitrogen and silicate (Graph 49). Besides, KAR08, which is under the influence of Samsun city, reveals a significantly high phosphorus level.

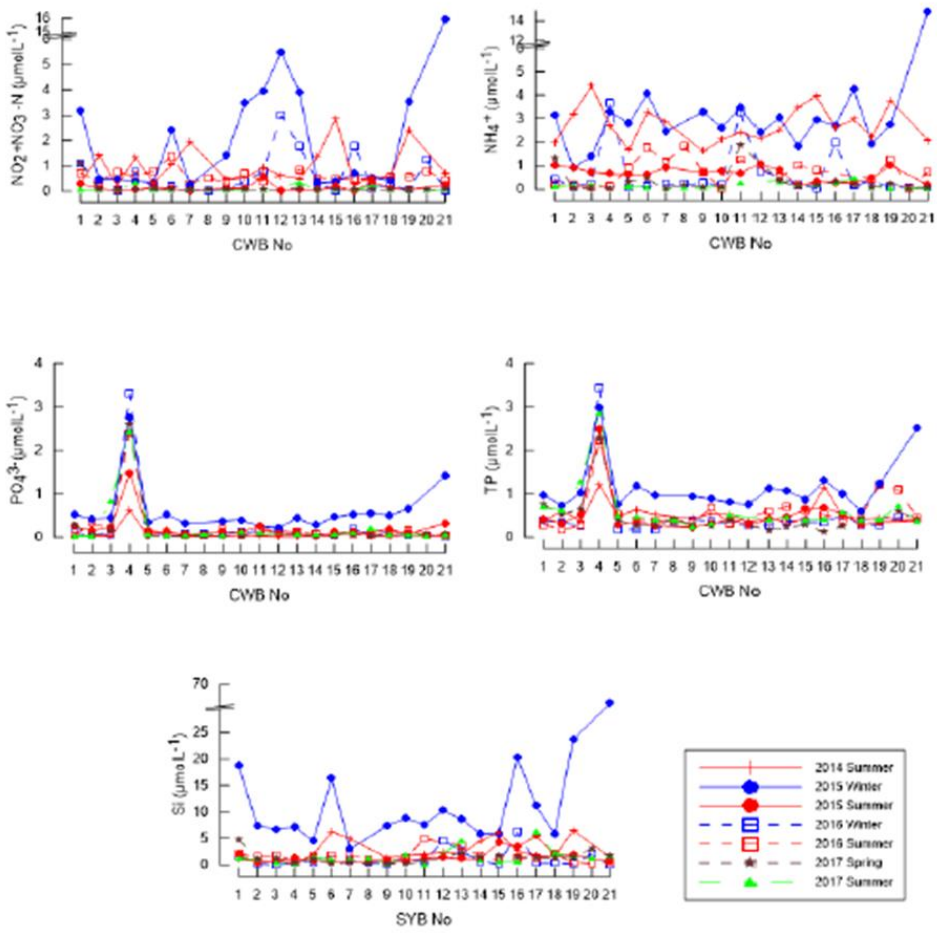
GRAPH 49- BLACK SEA SURFACE WATER NUTRIENT PARAMETERS 2014-2017 COMPARISON



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

In Marmara Sea it is possible to assert that the nutrient levels revealed higher scores in winter periods than in spring and summer periods (with the influence of vertical mixing); however, there are also some differences between the years (Graph 50). All of the nutrients are at the lowest level in the spring period; which indicate that the primary producers (phytoplankton) consume them. Phosphorus compounds measured at MAR04 (Gulf of Bandırma) indicated the highest level in all seasons, which reveals the permanent existence of industrial and domestic pressures. **Besides, relatively high nitrogen compounds and silicate were detected at the CWBs (1-2-20-21) under the influence of Susurluk River.

GRAPH 50- MARMARA SEA SURFACE WATER NUTRIENT PARAMETERS 2014-2017 COMPARISON



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

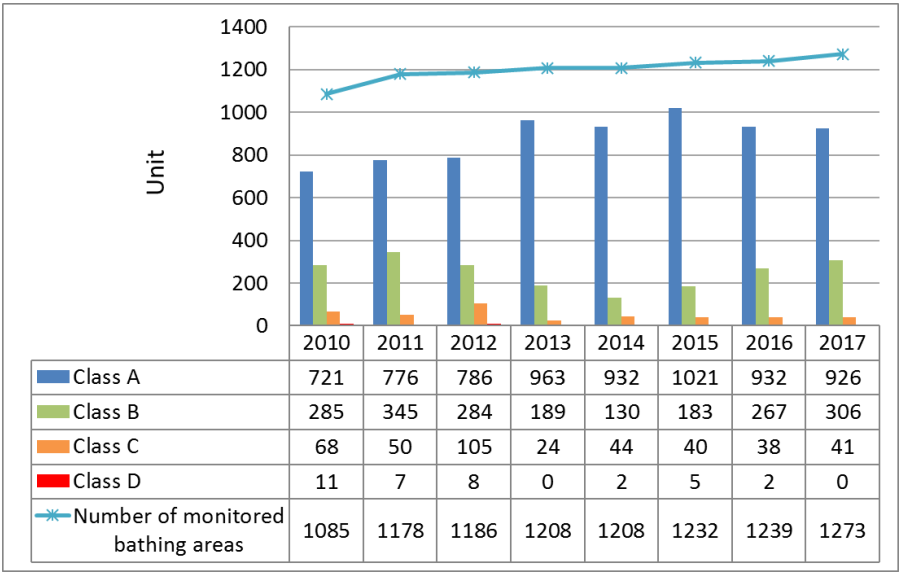
6.6- Bathing Water Quality

Indicator is a state indicator related with the impacts of household wastewaters on the marine and coastal waters.

Every year in bathing season, bacteriological monitoring activities are carried out in sea and in lake water in 34 Provinces with a coast to sea or lake by the Ministry of Health, General Directorate of Public Health in order to protect individual and public health.

The number of bathing area monitored was 1085 in 2010, while it was 1273 in 2017. According to the monitoring results in 2017, among the 1273 bathing areas, 926 bathing areas (73%) were assessed as Class A, 306 bathing areas (24%) as Class B, 41 bathing areas (3%) as Class C and no bathing areas were assessed as Class D [38].

GRAPH 51- COMPARING BATHING AREAS WITH REGARDS TO QUALITY CLASSES (2010-2017)



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

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

6.7- Municipal Water Supply

Indicator represents the pressure on water resources. Reservoirs are the most important and widely used water supply for the municipalities. In years of low precipitation, water drawn from the reservoirs may decrease while exploitation from rivers, lakes or ponds increases. In Turkey, total amount of water abstracted to water supply networks, 44.8% was abstracted from reservoirs, 26.8% from wells, 17.1% from springs, 9.5% from rivers and 1.8% from lakes/artificial lakes and sea in 2016.

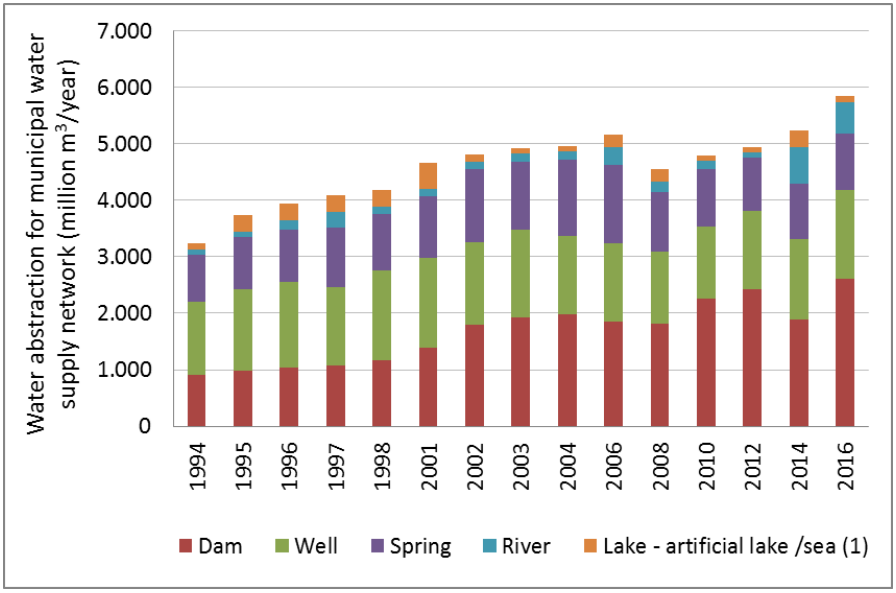
In 2016, rate of the population served by water supply networks was calculated as 92.2% of Turkey's total population and 98.2% of total municipal population.

While in 1994, 3.24 billion m^3 of water was drawn for municipal potable water supply in order to be distributed, this number increased to 5.84 billion m^3 in 2016.

According to 2016 data, the ratio of the population served by drinking water treatment plants was calculated as 55% of the total population and 58.6% of the municipal population.

Out of 5.8 billion m^3 of water delivered through water supply networks, 3.4 billion m^3 (57.4%) was treated in drinking water treatment plants. 92.9% of this amount was treated by conventional methods, 6.1% was treated by advanced methods, and 1% was treated by physical methods [39].

GRAPH 52- WATER ABSTRACTION FOR MUNICIPAL WATER SUPPLY NETWORKS BY SOURCES



(1) Amount of water abstracted from sea is included from 2010 onwards.
Source: TURKSTAT

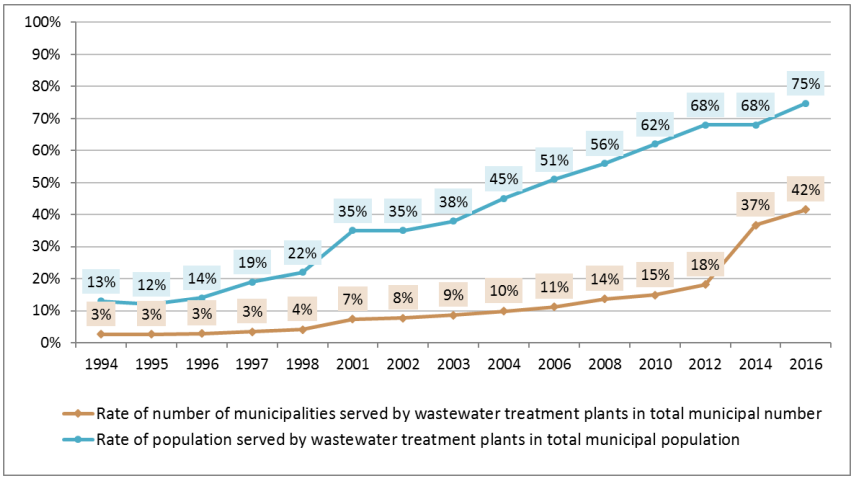
6.8- Municipalities Served by Wastewater Treatment Unit

This indicator is a response indicator and an important tool for monitoring the success of the policies implemented for the control of pollution arising from domestic wastewater. In order to use water more efficiently and protect available water resources, wastewater treatment is an important application. As a result of significant investments made by Turkey in this area, while in 1994, rate of number of municipalities served by wastewater treatment plants in total municipal number was 3%, in 2016 this number reached to 42%. The ratio of municipality population serviced by wastewater treatment facilities to the total municipal population has reached to 75% by year 2016 [40].

The cities with a population of more than 100,000 have priority in constructing wastewater treatment plants. By the end of 2016, 86.8% of the 235 municipalities that have a population of more than 100,000, have been benefiting from the wastewater treatment plant services.

Regarding the share of population connected to urban and other wastewater treatment; The highest connection rates in the EU-28 were recorded in the United Kingdom (100%; 2014 data, estimated), the Netherlands (99.4%; 2015), Malta (98.6%, 2015 data), Luxembourg (98.2%, 2015 data), Spain (96.9%; 2014 data) and Germany (96.2%; 2013 data) [41].

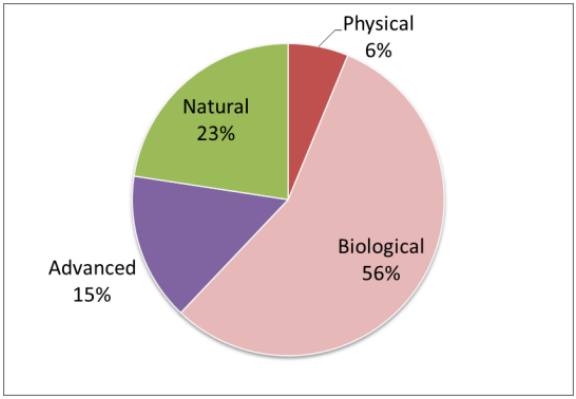
GRAPH 53- NUMBER OF MUNICIPALITIES AND POPULATION RATIOS SERVED BY WASTEWATER TREATMENT PLANTS (%)



Source: TURKSTAT

The number of the domestic wastewater treatment plants which was 145 in 2002, reached to 881 in 2016. Looking at the distribution of these facilities, 15.3% of the wastewater treatment plants do advanced treatment, 55.8% biological treatment, 6.2% physical treatment and 22.6% of the plants were natural treatment facilities.

GRAPH 54- THE NUMBER OF WASTEWATER TREATMENT PLANTS, BY THE END OF 2016



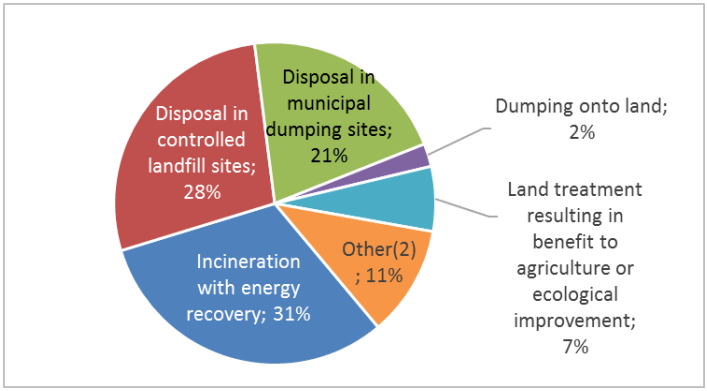
Source: TURKSTAT

According to TURKSTAT data, out of 4.5 billion m^3 of wastewater discharged via sewerage system, 3.8 billion m^3 was treated in wastewater treatment plants. The rate of advanced treatment was 44.5%, while the rate of biological treatment was 31.6%, the rate of physical treatment was 23.6% and the rate of natural treatment was 0.3% in 2016 [40].

The proportion of the population connected to at least secondary wastewater treatment plants has also been generally increasing and was above 80 % in 15 of the EU Member States for which data are available (various reference years). The shares of the population connected to at least secondary wastewater treatment plant were more than 95 % in the United Kingdom (2014 data), the Netherlands, Luxembourg, Germany (2013 data) and Austria (2014 data). This value accoding to 2014 data was 43.1% in Turkey [41].

According to TURKSTAT data, after the treatment operations of wastewater, 299 thousand tonnes of sewage sludge (in dry matter) was occurred in Turkey [40].

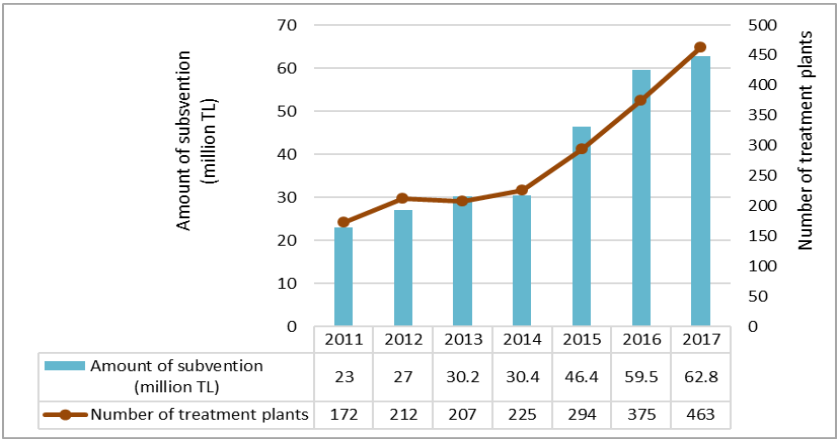
GRAPH 55- AMOUNT OF SEWAGE SLUDGE BY DISPOSAL AND RECOVERY METHODS, 2016 (1)



Source: TURKSTAT
(1) Data on sludge amount is in dry matter. (2) Includes sludge amounts temporarily stored, burried, etc.

Higher energy needs of wastewater treatment plants increase operational costs and negatively affect the operation of the facilities. Because of this reason, in order to provide the operating of wastewater treatment plants effectively, improve the receiving water body quality, Ministry of Environment and Urbanisation has issued a By-Law for Subsidizing Energy Costs of Wastewater Treatment Plants. 50% of the electricity cost of the treatment plants certified by the Ministry is subsidized in this regard. In this context, in 2017, 68.2 million TL to 463 plants were paid as energy incentives.

GRAPH 56- SUBSIDIZING ENERGY COSTS OF WASTEWATER TREATMENT PLANTS



	2011	2012	2013	2014	2015	2016	2017
Amount of subvention (million TL)	23	27	30.2	30.4	46.4	59.5	62.8
Number of treatment plants	172	212	207	225	294	375	463

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

6.9- Municipalities Served by Sewerage Systems

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

In 2016, population that is served by sewerage systems has a share of 84.2% in Turkey's population and a share of 89.7% in total municipal population.

As of year 2016 the total number of municipalities is 1397, of which 1338 (95.8% of the municipalities) are served by sewerage system.

Average daily per capita amount of wastewater discharged from municipal sewerage systems which was 126 litres in 1994, has increased to 183 litres in 2016[40].

GRAPH 57- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

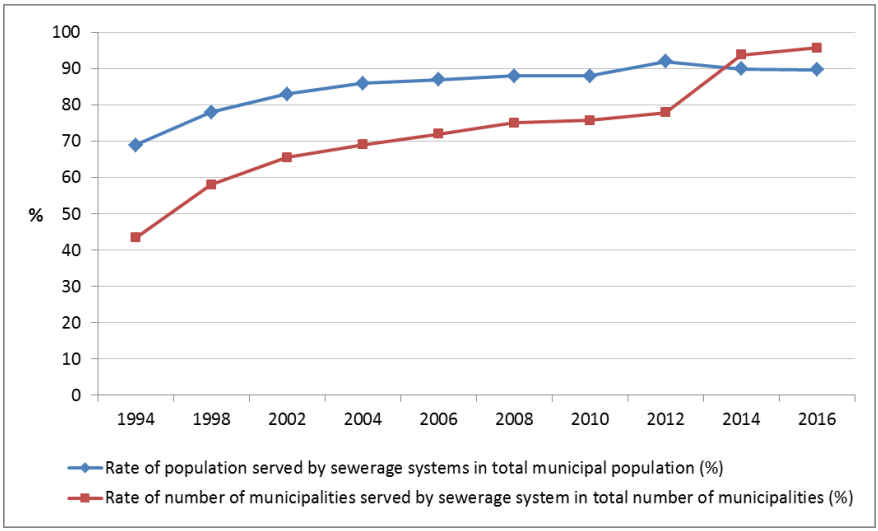


TABLE 12- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

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

Source: TURKSTAT

7.1- Municipal Waste Generation and Disposal

Regarding the waste management principles, the waste should be primarily minimized at source, then recovery, energy recovery and finally disposal methods should be applied in priority order.

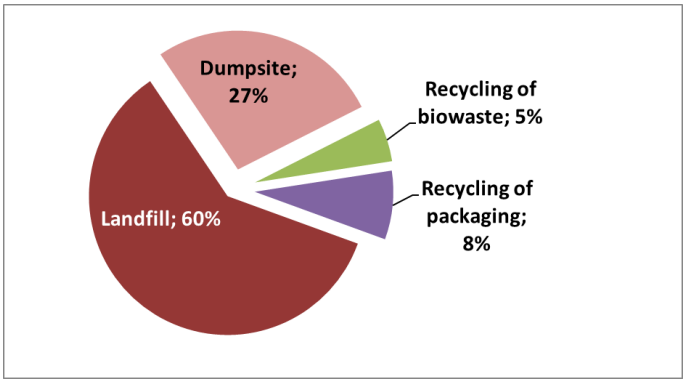
To ensure the creation of a healthy and livable environment for the present and future generations by protecting and developing our natural resources and ecosystems; within the framework of sustainability principle, taking into consideration international norms and national priorities, developing strategies and legislation, minimizing waste at source classifying, collecting, transporting, temporary storage, recovery, disposal, reuse, purification, transformation into energy and final storage. and National Waste Management and Action Plan covering the period of 2016-2023 has been prepared within the framework of the responsibility for determining strategy.

National Waste Management and Action Plan prepared in our country, the current situation in our country, the issues that need to be improved or improved in the management system, population and waste projections, contribution of the stakeholders involved in waste management, periodic waste management activities planned to be completed until 2023, investments in waste management and financing needs.

According to EUROSTAT 2016 data, annual average amount of municipal waste generated per capita in the EU-28 countries is 426 kg, whereas for Turkey this figure is 426 kg [42].

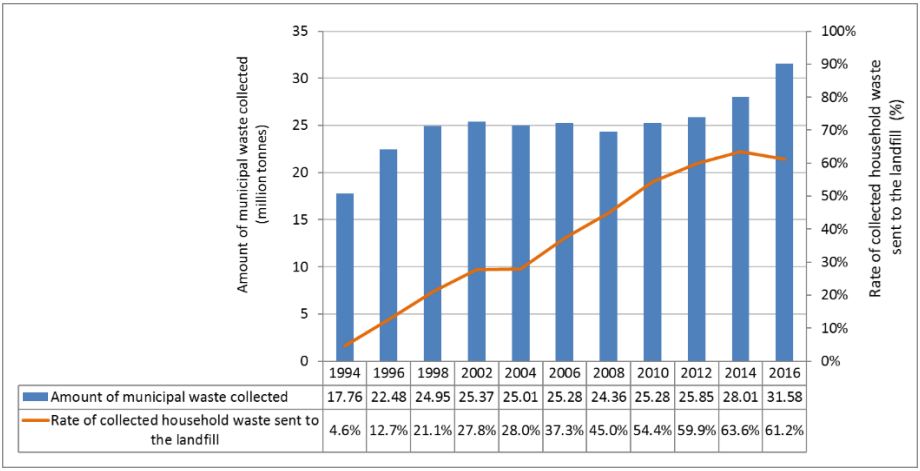
In 2016, recycling rates of municipal waste in the EU-28 countries had reached to 45.3% [43]. According to National Waste Management and Action Plan this figure in Turkey is 13% at 2016.

GRAPH 58- DISTRIBUTION OF MUNICIPAL WASTE ACCORDING TO THE DISPOSAL/ RECYCLING METHODS IN 2016 ACCORDING TO NWMAP(%)



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

GRAPH 59- AMOUNT OF MUNICIPAL WASTE AND LANDFILL THROUGHOUT YEARS



	1994	1996	1998	2002	2004	2006	2008	2010	2012	2014	2016
Amount of 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
Rate of collected household waste sent to the landfill	4.6%	12.7%	21.1%	27.8%	28.0%	37.3%	45.0%	54.4%	59.9%	63.6%	61.2%

Source: TURKSTAT

7.2- Number of Landfills – Municipalities - Population Covered by Landfills

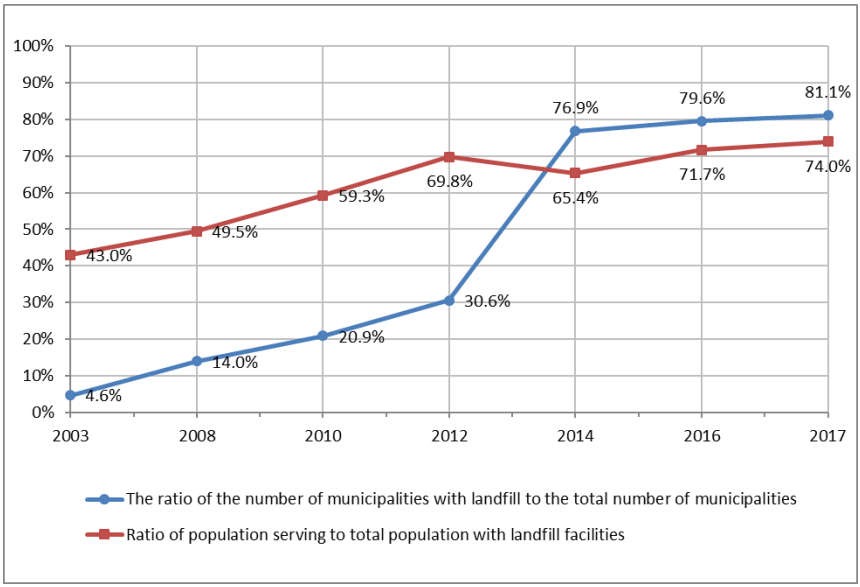
D P S I R

As a result of the studies conducted for the establishment of solid waste disposal facilities in our country; The number of waste landfills, which were 15 by 2003, reached 46 in 2010, 81 in 2015 and 87 in 2017. These facilities serve 54.7 million people in 1134 municipalities.

According to Ministry of Environment and Urbanisation data, 74% of the population (in total municipal population) was served by waste disposal and recovery facilities is in 2017.

By the end of 2023 it is targeted to refurbish the existing infrastructure and raise the ratio to 100%.

GRAPH 60- THE RATE OF POPULATION SERVED BY WASTE DISPOSAL AND RECOVERY FACILITIES IN TOTAL MUNICIPAL POPULATION (%) AND RATIO OF MUNICIPALITIES SERVED BY LANDFILLS THROUGH YEARS



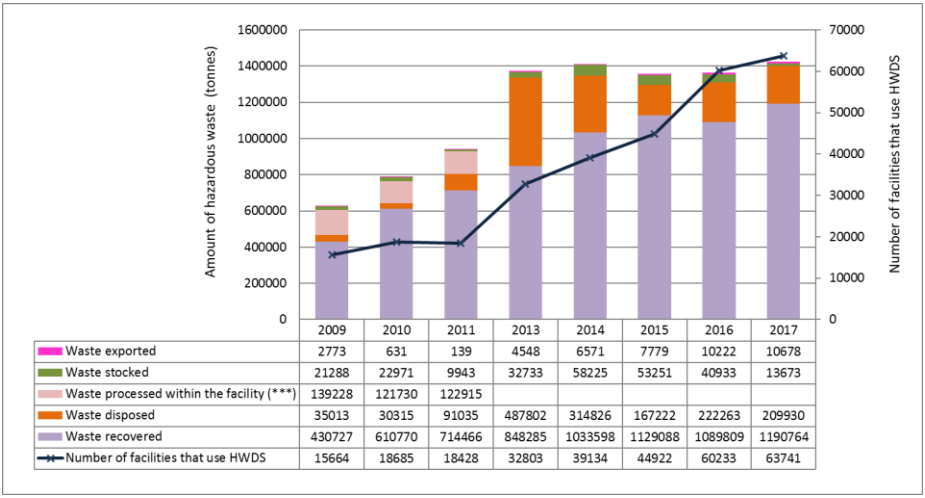
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

7.3- Hazardous Waste

Hazardous waste, especially originating from the industrial plants, is a serious element of pressure indicator for the environment.

Nation-wide data on hazardous waste is collected by Hazardous Waste Declaration System (HWDS), with data entry by the operators of industrial plants that generate waste in their operational processes. By the end of 2017, 63,741 plants in total provided data to HWDS. The total amount of the hazardous waste generated in 2017 was calculated as 1,425,045 tonnes, excluding the waste generated by the mining industry. 83.6% of the mentioned total was directed to recycling; 14.7% was disposed of; 1% stored and 0.7% was exported.

GRAPH 61- DATA FROM THE HAZARDOUS WASTE DECLARATION SYSTEM (2009-2017)



	2009	2010	2011	2013	2014	2015	2016	2017
Waste exported	2773	631	139	4548	6571	7779	10222	10678
Waste stocked	21288	22971	9943	32733	58225	53251	40933	13673
Waste processed within the facility (***)	139228	121730	122915					
Waste disposed	35013	30315	91035	487802	314826	167222	222263	209930
Waste recovered	430727	610770	714466	848285	1033598	1129088	1089809	1190764
Number of facilities that use HWDS	15664	18685	18428	32803	39134	44922	60233	63741

TABLE 13- DATA OF HAZARDOUS WASTE DECLARATION SYSTEM FOR (2009-2017) (**)

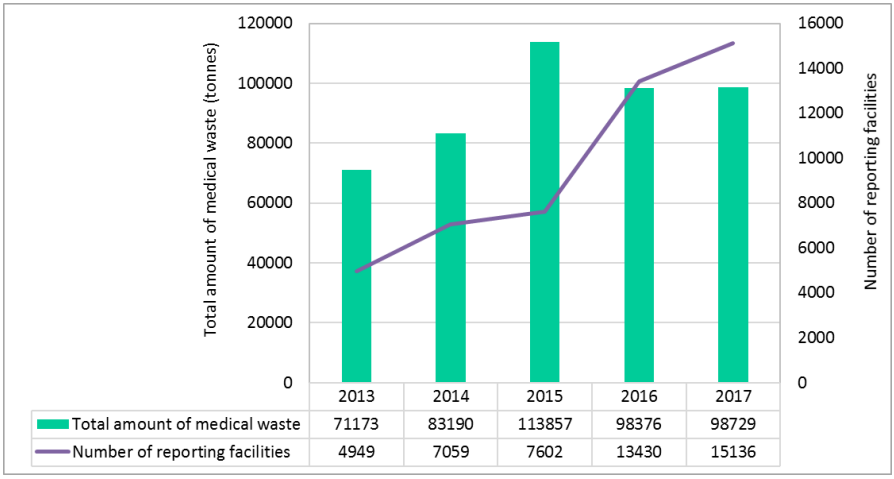
YEARS	2009	2010	2011	2013	2014	2015	2016	2017
The number of firms that use HWDS	15,664	18,685	18,428	32,803(*)	39,134	44,922	60,233	63,741
The amount of total hazardous waste (tonnes)	629,933	786,418	938,498	1,373,368	1,413,220	1,357,340	1,363,227	1,425,045

Source: Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit and Inspection
Notes: Mining Industry hazardous waste amount is not included.
(*) 2013 figures were recalculated after the printing of the 2013 Environmental Indicators Booklet and after the data was updated following entry of the missing declarations.
(**) 2012 data is missing in the table because 2012 hazardous waste statistics bulletin was not published.
(***) In the statistics bulletins for 2013- 2017 amount processed within the facility was reported under either disposal or recoveryg accordingly.

7.4- Medical Waste

Hazardous Waste Declaration System (HWDS) is also used for the declaration of medical waste by the medical facilities. Within 2017, 15,136 facilities reported a total amount of 98,729 tonnes of medical waste, which comprises 6.9% of the total hazardous waste (excluding mining waste). In Turkey, sterilization of medical aste is carried out by sterilization facilities since 2008.

GRAPH 62- MEDICAL WASTE DATA BY THE HAZARDOUS WASTE DECLARATION SYSTEM (2013- 2017)



	2013	2014	2015	2016	2017
Total amount of medical waste	71173	83190	113857	98376	98729
Number of reporting facilities	4949	7059	7602	13430	15136

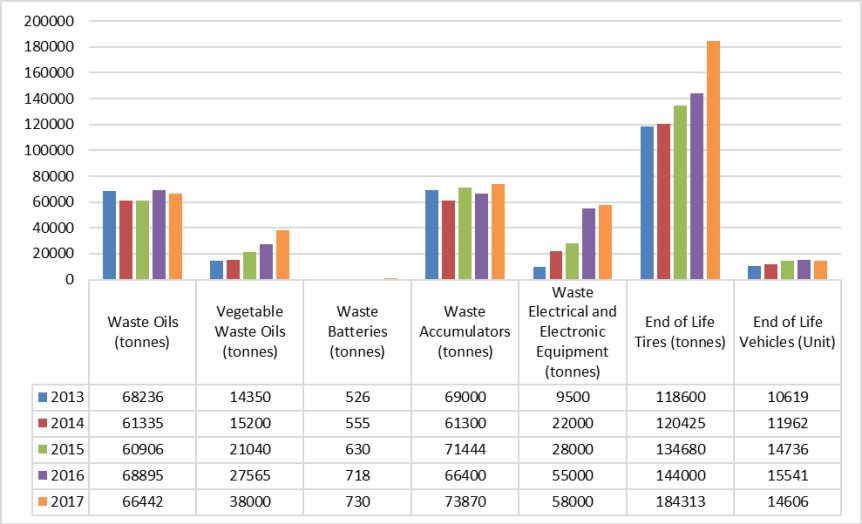
Source: Data from Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit and Inspection, Hazardous Waste Declaration System (HWDS).

7.5- Waste Oils, Vegetable Waste Oils, Waste Batteries And Accumulators, Waste Electrical And Electronic Equipment (WEEE), End of Life Tires, End of Life Vehicles

D P S I R

Waste oil, vegetable waste oils, waste accumulators, waste batteries, end of life tires, end of life vehicles and waste electrical and electronic equipment quantities in the period 2013-2017 are given in Graph 63.

GRAPH 63- WASTE OILS, VEGETABLE WASTE OILS, WASTE BATTERIES AND ACCUMULATORS, WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE), END OF LIFE TIRES, END OF LIFE VEHICLES (2013-2017)



	Waste Oils (tonnes)	Vegetable Waste Oils (tonnes)	Waste Batteries (tonnes)	Waste Accumulators (tonnes)	Waste Electrical and Electronic Equipment (tonnes)	End of Life Tires (tonnes)	End of Life Vehicles (Unit)
2013	68236	14350	526	69000	9500	118600	10619
2014	61335	15200	555	61300	22000	120425	11962
2015	60906	21040	630	71444	28000	134680	14736
2016	68895	27565	718	66400	55000	144000	15541
2017	66442	38000	730	73870	58000	184313	14606

Sources:

1) *For waste oils datas; Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit and Inspection, Hazardous Waste Declaration System (HWDS)*
2) *For other datas; Ministry of Environment and Urbanisation, General Directorate of Environmental Management*

7.6- Mining Waste

According to TURKSTAT data, in 2016, mining establishments generated 811 million tonnes of waste, of which 99.9% was mineral waste. 99% of mineral waste was overburden and tailing.

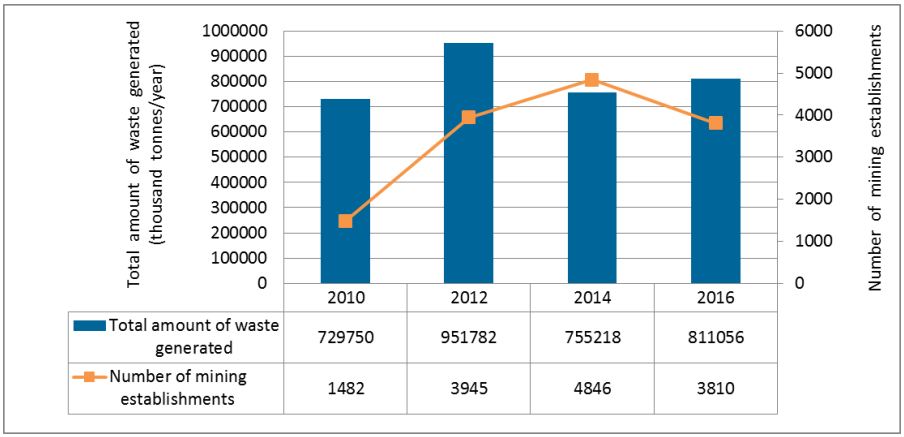
When looking at the distribution of total mining waste by recovery and disposal methods in 2016; 70.4% was disposed of in heaps for overburden or controlled landfill sites, 15.9% was used for backfilling, 13% was used for reclamation purposes in mining sites and 0.7% was recovered or disposed of by other methods[44].

TABLE 14- NUMBER OF MINING WASTE LANDFILLS

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

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

GRAPH 64- MINING WASTE THROUGH YEARS (2010-2016)



Source: TURKSTAT, Mining Establishments Water, Wastewater and Waste Statistics, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24879

(1) All mining establishments in mining of coal and lignite, mining of metal ores, mining support service activities and establishments having 10 or more employees in other mining and quarrying activities are covered in the scope of the survey in 2010.

(2) The scope of Mining Establishments Water, Wastewater and Waste Statistics survey in 2012 was constituted of mining establishments, which submitted production data for 2011 to General Directorate of Mining Affairs or had a new licence for 2012.

(3) The scope of Mining Establishments Water, Wastewater and Waste Statistics survey in 2014 was mining establishments, which submitted production data for 2013 to General Directorate of Mining Affairs or had a new licence for 2014.

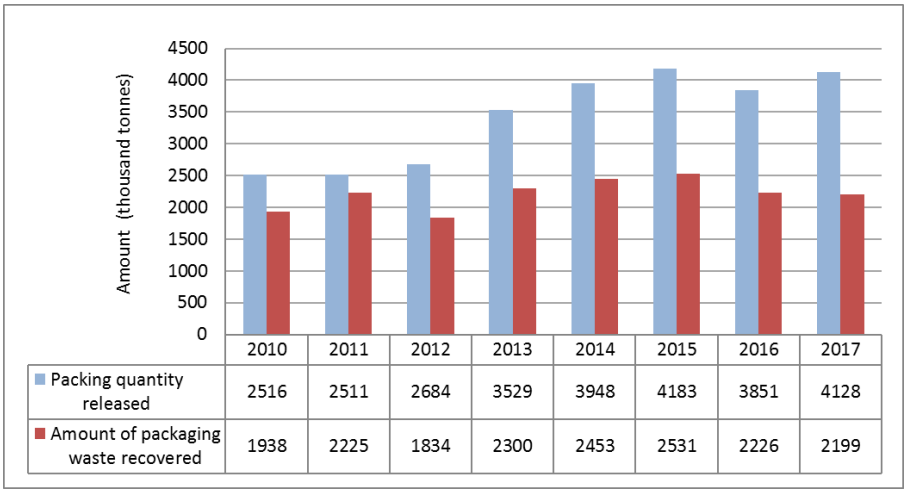
(4) The scope of Mining Establishments Water, Wastewater and Waste Statistics Survey was mining establishments, which submitted production data for 2015 to General Directorate of Mining Affairs or had a new licence for 2016. Establishments dealing only with enrichment processes was out of scope.

7.7- Packaging Waste

Generally, 30% by weight and 50% by volume of all waste constitutes packaging waste.

In accordance with the polluter-pays principle of By-Law on Packaging Waste Control, the operators that release their products with packaging are responsible for meeting the costs of collection of packaging waste. Thus, keeping a registry of packaging waste producers is of great importance.

GRAPH 65-QUANTITY OF THE PACKAGING RELEASED AND OF THE PACKAGING WASTE RECOVERED OVER THE YEARS ACCORDING TO THE DATA FROM PACKAGING WASTE DECLARATION SYSTEM



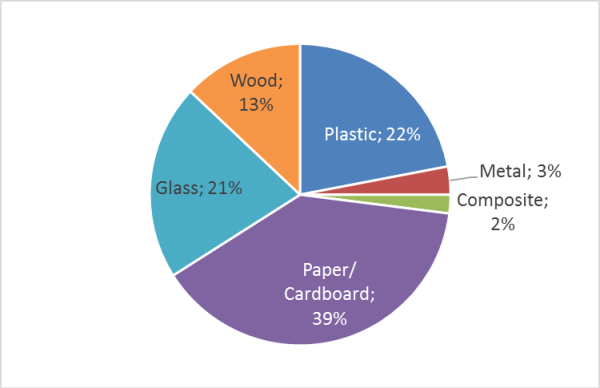
	2010	2011	2012	2013	2014	2015	2016	2017
Packing quantity released	2516	2511	2684	3529	3948	4183	3851	4128
Amount of packaging waste recovered	1938	2225	1834	2300	2453	2531	2226	2199

TABLE 15- PACKAGING WASTE STATISTICS IN 2016

Waste Code	Type of Packaging	Produced Packaging Amount (tonnes)	Packaging under scope B-1 [1]			Packaging released under scope B-2 [2] (tonnes)	Packaging collected under scope C [3] (tonnes)
			Packaging Quantity Released (tonnes)	Recovered Amount (tonnes)	Achieved Recovery Rate (%)		
15.01.02	PLASTIC	3,150,000	915,301	497,089	54	87,742	19,998
15.01.04	METAL	373,682	142,482	81,146	57	71,696	5,332
15.01.05	COMPOSITE	300,519	96,385	55,410	57	6,781	102
15.01.01	PAPER/ CARDBOARD	2,757,848	1,604,823	1,258,128	78	19,853	9,707
15.01.07	GLASS	1,331,265	845,615	193,563	23	37,264	103,471
15.01.03	WOOD	719,741	523,261	113,509	22	5,187	38,517
	TOTAL	**8,633,055**	**4,127,867**	**2,198,845**	**53**	**228,523**	**177,127**

Notes:
[1] B-1: Packaging waste managed under scope of the By-Law on the Control of Packaging Waste
[2] B-2: Packaging waste managed under legislation other than the By-Law on the Control of Packaging Waste
[3] C: Packaging released as returnable under scope of the By-Law on the Control of Packaging Waste
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

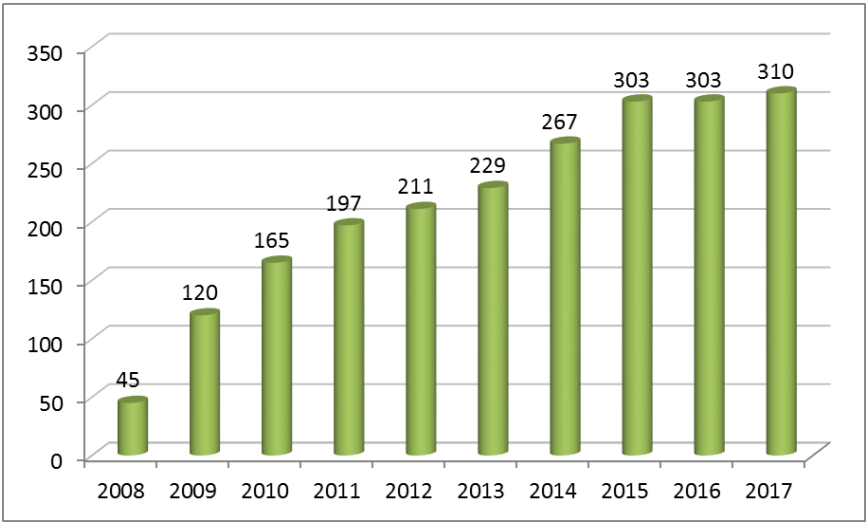
GRAPH 66- PACKAGING QUANTITY RELEASED ACCORDING TO TYPE AND INTENDED USE IN 2017



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

Municipalities are obliged to collect or to have packaging waste collected according to the By-Law. They prepare packaging waste management plans including collection and transport activities of the packaging waste separately from other wastes at the source of the waste in order to indicate how, when, and by whom these studies will be done. Then, packaging waste management plans are submitted to the Ministry. These studies started in 2008 and still continue.

GRAPH 67- NUMBER OF MUNICIPALITIES WHO HAVE APPROPRIATE PACKAGING WASTE MANAGEMENT PLANS



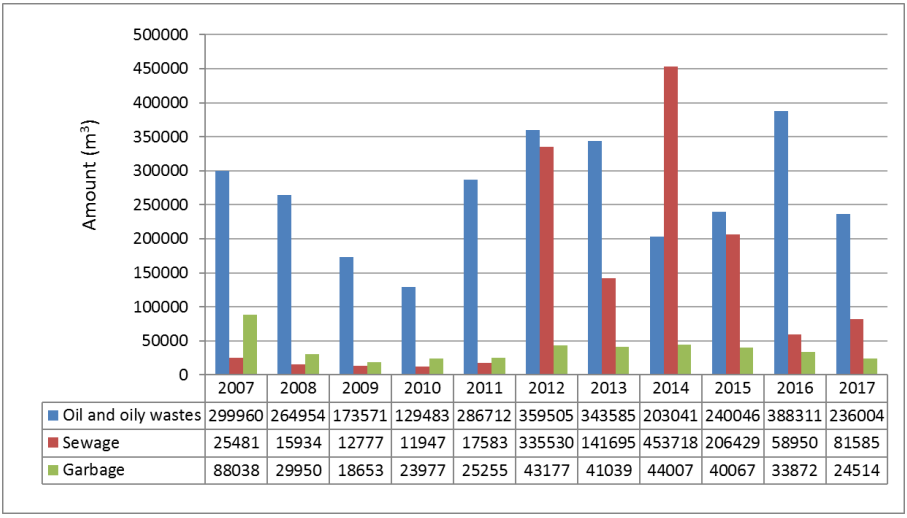
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management
Note: Reorganized within the framework of Law No. 6360

7.8- Ship Waste

As a requirement of both International Convention for the Prevention of Pollution from Ships (MARPOL 73/78), which Turkey is a party to, and national legislation; waste reception facilities are being established and operated by coastal facilities in order to prevent the ships from discharging their waste and residues into the territorial waters of Turkey and to protect the marine areas. In 2017, number of coastal facilities which give waste reception service to the ships was 277.

The waste collected in these waste reception facilities are recycled or disposed of according to characteristics of waste in line with the legislation issued pursuant to Environmental Law. In this way, the ship-sourced pollution caused by the increasing sea traffic can be reduced.

GRAPH 68- DISTRIBUTION OF WASTE ORIGINATED FROM SHIPS OVER THE YEARS (m³)



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Oil and oily wastes	299960	264954	173571	129483	286712	359505	343585	203041	240046	388311	236004
Sewage	25481	15934	12777	11947	17583	335530	141695	453718	206429	58950	81585
Garbage	88038	29950	18653	23977	25255	43177	41039	44007	40067	33872	24514

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

8.1- General Distribution of Land Cover

This indicator is a state indicator. It is very important for land use planning purposes to know the diversity of plantation areas clearly to observe the current and possible improvements in the area and to assess and limit the pressures on land by urbanisation and industrialisation purposes.

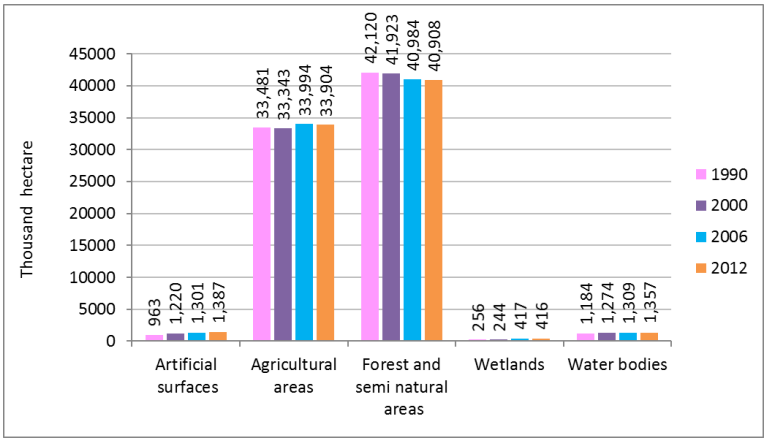
Under the European Union's CORINE (Coordination of Information on the Environment) Land Cover Program, projects were done in years 1990, 2000, 2006 and 2012 in Turkey.

According to the CORINE 2012 data, ratios of artificial areas account for 1.78% of Turkey, whereas agricultural areas account for 43.48%, forest and semi-natural areas for 52.46%, wetlands for 0.53% and water bodies cover 1.74% of the country.

In Turkey between 1990 and 2012, while forests and semi-natural areas decreased by 1,212,900 ha, all other areas have increased, such as artificial surfaces by 424,867 ha, agricultural areas by 423,756 ha, water bodies by 173,305 ha and wetlands by 159,604 ha. Increasing population, urbanisation and industrialization posed threat to natural and agricultural areas.

Looking at the situation in EU-28 countries; forests and other wooded areas occupied 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 cropland (22.2%) and by grassland (20.7%). The remaining types of land cover in the EU-28 were much less prevalent, as shrubland occupied 7.1% of the total area, followed by artificial land — which includes built-up areas, roads and railways — which had a 4.2 % share. The lowest shares of EU-28 land use were recorded as bare land (3.3%), water areas (3.0%) and wetland areas (1.7%) [46].

GRAPH 69- LAND USE BY YEARS (1990-2012)



Source: Former Ministry of Forestry and Water Affairs, IT Department

8.2- Misuse of Agricultural Areas

This is a pressure indicator. Increasing population, urbanisation and industrialization poses pressure on agricultural land and impacts the agricultural land.

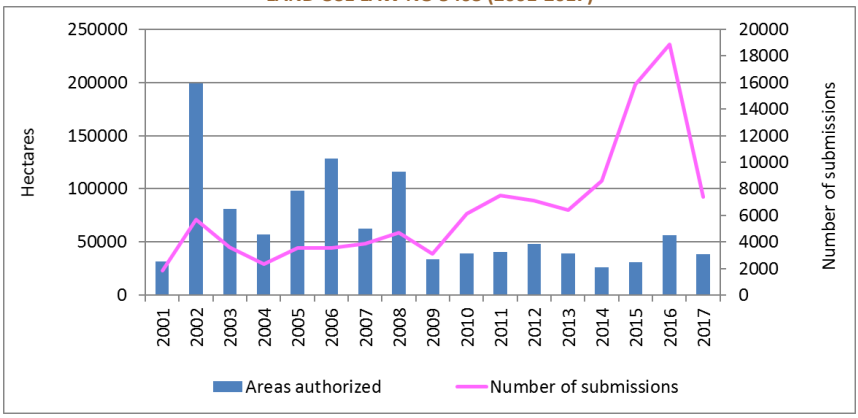
In the 1989-2017 period, a total of 2,583,004 hectares of agricultural land was allowed for non-agricultural activity in Turkey.

700,975 hectares of agricultural land was allowed for non-agricultural use in 2005-2017 period. 61.7% of this land was dry marginal agricultural land and 23.8% was absolute agricultural land [47].

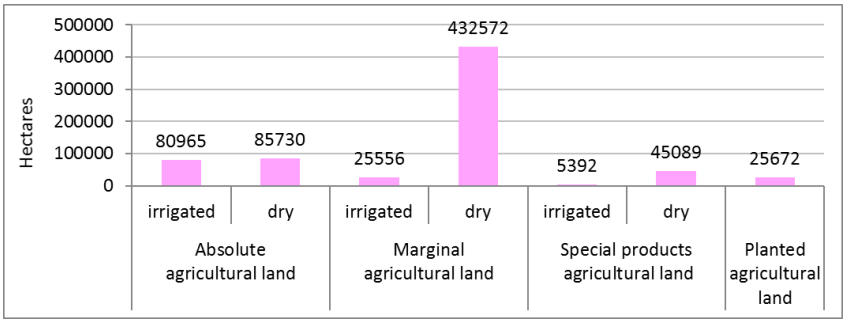
In 2017, 7,401 applications for non-agricultural use have been made and in total 38,678 ha of agriculture land was permitted to be used as non-agricultural area.

According to the Soil Protection and Land Use Law number 5403, irrigated farming and fertile agricultural lands should be conserved and unless absolutely necessary, apart from marginal ones these lands cannot be used for construction.

GRAPH 70- MISUSE OF AGRICULTURAL AREAS WITHIN THE SCOPE OF SOIL CONSERVATION AND LAND USE LAW NO 5403 (2001-2017)



GRAPH 71- DISTRIBUTION OF THE LAND ALLOWED FOR MISUSE ACCORDING TO THEIR CLASSES IN THE 2005-2017 PERIOD



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

8.3- Zones Under Threat of Erosion

The indicator is a status indicator representing the areas exposed to erosion and the degree of this erosion. Turkey is highly susceptible to erosion due to its geographical location, climate, topography, geological structure and soil conditions. In addition, people's improper interference on the nature and excessive use of natural resources increases erosion.

Monitoring and evaluating studies of water and wind erosion in Turkey have been initited by General Directorate of Combating Desertification and Erosion (ÇEM), which were established for soil protection, combating desertification and erosion effectively and identify projects and strategies on these issues, and consultation with the Ankara University Faculty of Agriculture. In this scope, two prediction models were developed under the name of "Dynamic Erosion Model and Monitoring System (DEMİS)" and "National Dynamic Wind Erosion Model and Monitoring System (UDREMİS)".

According to DEMİS results; maximum 642 million tons of soil has been displaced due to water erosion in Turkey ever year. The mean soil loss is 8,24 tons/ha/yr. If we classify this amount according to the surface area of Turkey's; Very low in 60.28%, Low in 19.13%, Moderate im 7.93%, Severe 5.97%, and Very Severe in 6.7% respectively.

Displaced soil in Turkey in terms of land use, agriculture 38.71%, grassland 53.66%, forests 4.17% and other areas (urban, mining sites, etc.) 3.46%.

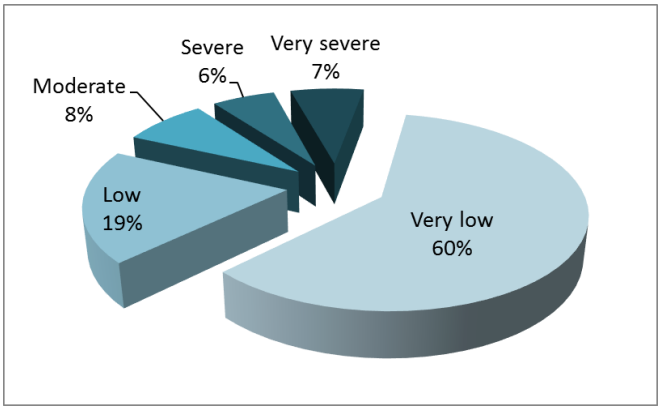
The amount of soil suspended in Turkey's rivers is measured by the General Directorate of State Hydraulic Works by stations.According to the measurement results, 154 million tons of soil are carried by rivers. In other words, 2 tons/ha/yr carried by rivers [48].

TABLE 16- DISTRIBUTION OF WATER AND WIND EROSION BASED ON SEVERETIY AND AREA

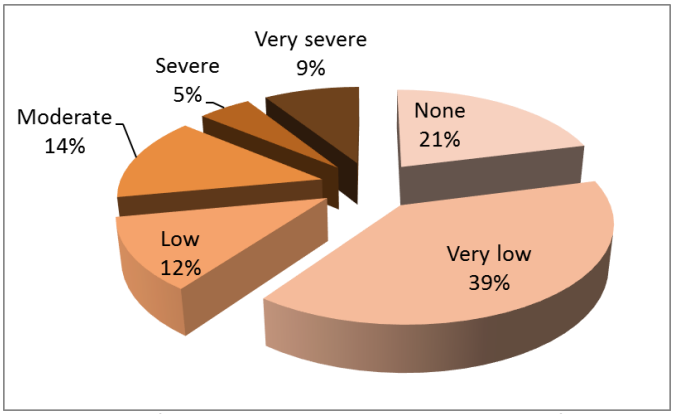
	ERZ – EROSION CLASSES	AREA (million ha)
WATER EROSION	Very low	387
	Low	123
	Moderate	51
	Severe	38
	Very severe	43
WIND EROSION	None	3.56
	Very low	6.78
	Low	1.99
	Moderate	2.36
	Severe	0.95
	Very Severe	1.49

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

GRAPH 72- DISTRIBUTION OF WATER EROSION CLASSES



GRAPH 73- DISTRIBUTION OF WIND EROSION CLASSES



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

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

D P S I R

This is an impact indicator. Impact of human activities is closely related to the biological diversity.

Turkey is an interception zone of Mediterranean and Near East botanic diversity and origin centres; also an origin source for the genetic diversity centres of several cultivated plants.

Turkey has a unique location for plant species especially seed plants, considering its climatic zone. The rate of endemism is very high in Angiospermae, which belongs to flowering plant groups. Of the level of species and subspecies, there are nearly 11,000 flowering plant types, 3,925 of which are endemic, and the endemism rate is close to 34%.

Among the seedless plants, most renowned plant group is the ferns (Pteridophtyes). The number of Sword ferns in species and subspecies in Turkey are 101 and only 3 of them are endemic [49].

Turkey is a very rich country in terms of endemic plants; however, these endemic species are under serious threats. According to the criteria of IUCN, 2001, approximately 600 of our endemic species are in the category of "seriously endangered-CR" and 700 of them are categorised as "endangered-EN".

TABLE 17- NUMBER OF TAXONS BELONGING TO DIFFERENT TYPES OF SPECIES AND SUBSPECIES, STATE OF ENDEMISM, RARE AND ENDANGERED SPECIES AND EXTINCT SPECIES

Plant Groups	Identified Species/Subspecies	Endemic Species	Rare and Endangered Species	Extinct Species
Algae	2150	-	unknown	unknown
Lichen	1000	-	unknown	unknown
Bryophytes	910	2	2	unknown
Sword ferns	101	3	1	unknown
Gymnosperms	35	5	1	unknown
Monocotyledons	1765	420	180	-
Cotyledons	9100	3500	1100	11

Source: National Biological Diversity Strategy and Action Plan 2007

Turkey is also rich and interesting for fauna, owing to its location. 460 bird, 161 mammal, 141 reptile, 480 sea fish and 236 freshwater fish species have been identified in the country.

Among 141 reptile and amphibian species of Turkey, 16 are endemic, of which 10 are threatened. No bird species has been identified as endemic. However, 5 species and 32 subspecies of mammals, 16 species/subspecies of reptiles and 70 species/sub-species of freshwater fish are endemic.

Although invertebrate fauna is not studied as much as vertebrates, 30,000 species have been identified while total number of species is estimated to be 60,000-80,000.

There are 10 sea mammal species spotted in Turkey maritime zones. While 21 sea mammal species either live in or periodically visit the Mediterranean sea, only 3 species live in the Black Sea. It was reported that the Mediterranean seal (monachus monachus) has not been seen in the Black Sea since 1994.

TABLE 18- NUMBER OF TAXONS BELONGING TO DIFFERENT TYPES OF ANIMAL SPECIES AND SUBSPECIES, STATE OF ENDEMISM, NUMBER OF 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	6500	89	89	unknown
Locusts	600	270	-	-
Damselflies	114	-	-	-
Coleoptera	~10,000	~3,000	-	-
Hemiptera	~1400	~200	-	-
Homoptera	~1500	~200	-	-

Source: National biodiversity strategy and action plan 2007

During the combat against bio-smuggling, number of bio-smuggling cases between 2007 and 2016 is as follows.

TABLE 19- NUMBER OF BIO-SMUGGLING CASES RECORDED (2007-2017)

YEARS	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number of bio-smuggling cases	2	2	2	9	21	11	2	5	8	3	3

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

9.2- Invasive Alien Species

The indicator is a pressure indicator since invasive alien species poses threat on indigenous species and habitats.

While the number of invasive alien species in Turkish seas was 263 in 2005, this number increased to 422 in 2011 and approached to 500 in 2017.

While most of the invasive species in the Mediterranean sea come through the Suez Canal, most of those in Black Sea are transported to the Black Sea via the ballast waters of vessels.

In the inland waters, 25 invasive alien species have been identified as of 2017 [50].

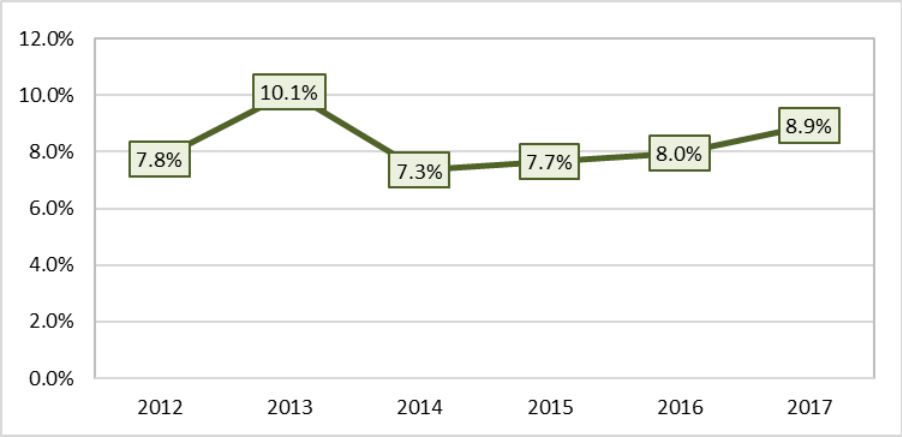
9.3- Protected Areas

This indicator is a response indicator. Designating protected areas aim to conserve biodiversity and natural resources.

As of 2017, total areas (terrestrial and marine) protected by Ministry of Agriculture and Forestry and Ministry of Environment and Urbanisation General Directorate for Preservation of Natural Heritage summed up to 8.9% of the total country surface area. The grasslands, drinking water basins and forest areas (total forest, forest soil, pasture, stony zones), which are allocated as areas of nature conservation as a function were not included in this calculation. The percentage of protected areas was 7.8% in 2012, 7.3% in 2014 and increased to 8.9% in 2017 (the fall in 2014 occurred because a registry procedure was introduced for the wetlands by the the amendment in 2014 in By-Law on Wetlands).

Referring to the situation in the world, according to 2017 World Bank data, ratio of terrestrial and marine protected areas as percent of total terrestrial area was about 14.3% globally [52].

GRAPH 74- THE PERCENTAGE OF TERRESTRIAL AND MARINE PROTECTED AREAS IN TOTAL TERRESTRIAL AREA OF TURKEY (%)



Sources: For areas protected by Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and NationalParks; Status Reports on Nature Conservation (2002-2013), (2014-2015), (2016-2017)

Notes:
(1) Registry procedure was introduced for the wetlands by an amendment in the By-Law on Wetlands.
(2) Sizes of protected areas are expressed for both terrestrial and marine.
(3) The percentage of protected areas is calculated by dividing the size of terrestrial and marine protected area sbyTurkey'slandsurface.

TABLE 20- STATUS AND AREAL DISTRIBUTION OF AREAS UNDER PROTECTION IN TURKEY

YEARS	2013		2017	
The Ministry of Agriculture and Forestry, Protected Areas	**Number**	**Area (ha)**	**Number**	**Area (ha)**
National Parks	40	848,203	42	845,814
Nature Parks	192	90,218	223	102,409
Nature Conservation Areas	31	64,243	30	46,794
Nature Monuments	112	6,684	111	7,206
Wildlife Conservation Areas	80	1,191,340	81	1,189,293
Wetlands (Internationally Important)	135	3,215,500		
Wetland of Local Importance (1)			8	1,657
Ramsar Areas (1)			14	184,487
Nationally Important Wetlands (1)			45	627,188
Protection Forests	55	320,451	55	251,519
Honey Forests	200	24,861		
City Forests	128	11,722	142	10,444
Gene Conservation Forests (in-situ)	257	47,978	308	42,093
Seed Stands (in-situ)	351	47,063	321	42,228
Seed Orchard (ex-situ)	179	1,414	185	1,424
TOTAL OVERLAPPING	**1,760**	**5,373,162**	**1,565**	**3,445,655**
Ministry of Environment and Urbanisation, Protected Areas	**Number**	**Area (ha)**	**Number**	**Area (ha)**
Special Environmental Protection Areas	16	2,459,116	16	2,458,749
Natural Sites	1,273	1,322,749	2,426	2,086,429
GENERAL TOTAL OVERLAPPING	**3,049**	**7,883,511**	**4,007**	**6,960,786**
Ratio of protected areas in the Country's total surface area (%) (3)		**10.1%**		**8.9%**

Sources: For areas protected by Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks; Status Reports on Nature Conservation (2002-2013), (2014-2015), (2016-2017)

Notes:
(1) Registry procedure was introduced for the wetlands by an amendment in the By-Law on Wetlands.
(2) Sizes of protected areas are expressed for both terrestrial and marine.
(3) The percentage of protected areas is calculated by dividing the size of terrestrial and marine protected area sbyTurkey'slandsurface.

9.4- Protected Coastal Zones

It's a response indicator. Coastal zones are more impacted by human activities and climate change. Goal of the protection policy is to mitigate the impact and protect biological diversity.

The total coastal length of Turkey is 8592 km (excluding islands) and 1957 km (23%) of it is under protection, as of 2017 [51].

TABLE 21- LENGTH OF PROTECTED COASTAL ZONES IN TURKEY

YEARS	2002	2012	2013	2014	2015	2016	2017
Length of Protected Coastal Zones in Turkey (km)	1775	1853	1855.3	1855.3	1860	1865	1957
Rate of Length of Protected Coastal Zones to Total Length of Coastal Zones (%)	20	22	22	22	22	22	23

Source: Status Report on Nature Conservation (2016-2017), Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks

9.5- Wildlife Protection Activities

This response indicator represents the activities for the protection of biological diversity. 481 birds, 150 mammals and 130 reptiles are taken under protection by The Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks.

81 protected wildlife reserves have been established by Decision of Council of Ministers to protect wild animals that are under the danger of extinction, and regular inventories of these species are prepared 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. In order to breed endangered wild animal species, stations are established to raise these animals and the grown-up animals are released back to nature in appropriate living spaces.

Within the scope of CITES Convention, studies are performed for the prevention of illegal trade of endangered wild animals [50].

TABLE 22- WILDLIFE PROTECTION ACTIVITIES

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

Source: Status Report on Nature Conservation (2016-2017), Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks

9.6- Regulation and Control of the Trade of Wild Animals According to the International Conventions

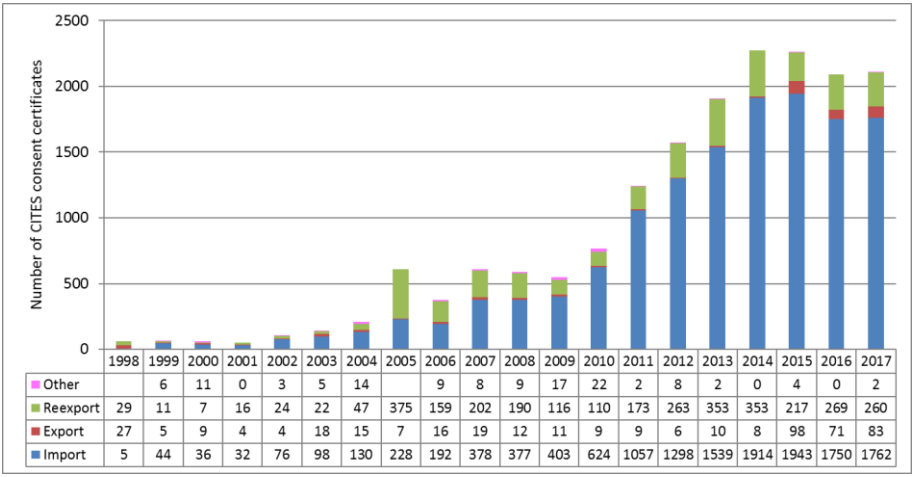
D P S I R

This is a response indicator related with the protection of biological diversity.CITES Convention is the "Convention on International Trade In Endangered Species of Wild Fauna and Flora". Turkey has been party to the CITES Convention since 1996 and By-Law on CITES National Implementation was issued in 2001.

Ministry of Forestry and Water Affairs prepares CITES Documents for live, death, parts or derivatives of wild animals like birds, reptiles, mammals (excluding marine mammals), amphibians and arthropods and forestry products within the scope of the CITES Convention. The Ministry also carries out tasks such as coordination, reporting, training. Due to her successful efforts, Turkey is considered to be in Category A (Category I). Certifications on the export/import suitability are being issued also for the species not covered by CITES annexes.

In 2017, totally 2107 certification documents were issued.

GRAPH 75- NUMBER OF CITES CONSENT CERTIFICATES BY THE DOCUMENT TYPE, (1998-2017)



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

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

9.7- Distribution of the Forest Areas

This state indicator describes the cumulative size of forest cover. In 2015, total size of forest cover in Turkey was 22,342,935 hectares which constitutes 28.6% of the country's total surface area. Out of Turkey's forestland, 12,704 thousand hectare area is normal forest (productive) area (Tree crown cover is 11-100%), 9,639 thousand hectares are degraded areas (Tree crown cover is less than 10%). Thus, 57% of the forest cover is productive while 43% is degraded. Between 1973 and 2015, the forest cover in Turkey increased by 2,144 thousand hectares [53].

As of 2015, Turkey's forest tree growing stock was 1,611,774 thousand m^3. 95% of this land is closed cover while 5% is degraded. Between 1973 and 2015 country forest tree growing stock of the country has increased by 676,262 thousand m^3. The ratio of Turkey's forest cover to the country's surface area has increased from 26.7% in 1999 to 28.6% in 2015.

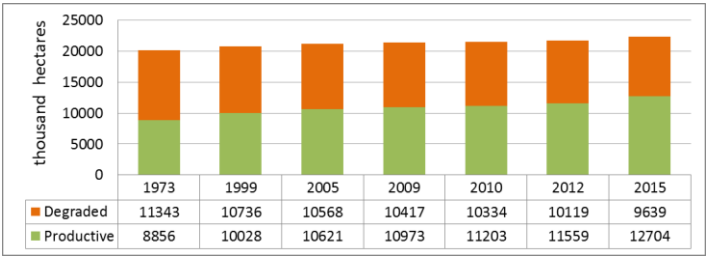
According to the World Bank, the ratio of world's forest cover to the total land area was 31.3% in 2000 and 30.8% in 2015 [55].

TABLE 23- FOREST AREA THROUGH YEARS

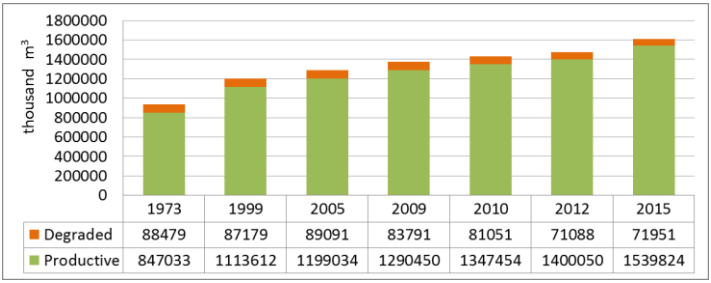
YEARS	1973	1999	2005	2009	2010	2012	2015
Forest Area (hectare)	20,199,296	20,763,248	21,188,747	21,389,783	21,537,091	21,678,134	22,342,935

Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, Forest Management and Planning Department, Existence of Forest in Turkey -2015
Note: these areas which are considered as forests do not include the wooded areas (private Kemp, orchards, hazelnut groves, etc.) but cover natural, seeded or planted forest areas

GRAPH 76- THE DISTRIBUTION OF THE FOREST LAND BY FOREST FORM

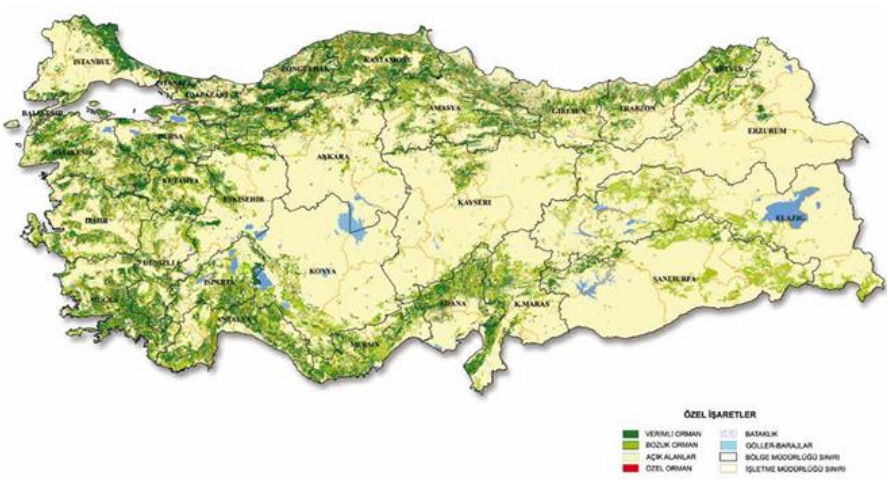


GRAPH 77- DISTRIBUTION OF GROWING STOCK BY FOREST FORM



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

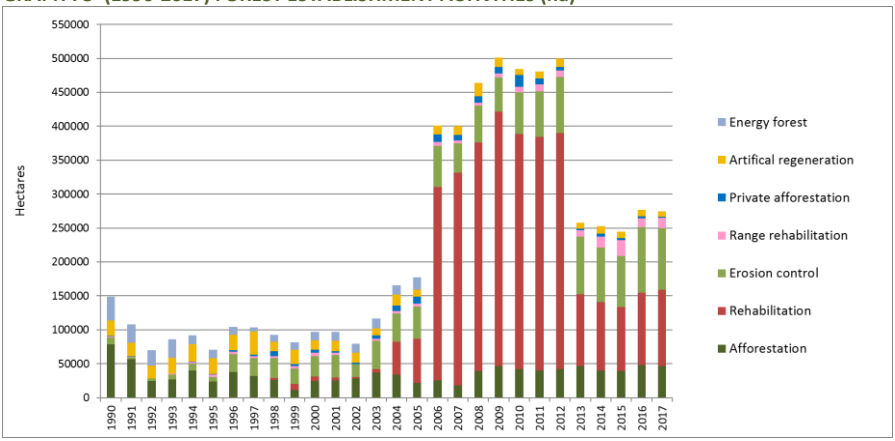
TURKEY FOREST AREAS (2015)



Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, Forest Management and Planning Department, Existence of Forest in Turkey -2015

43% of the forests in Turkey are degraded and inefficient. It is crucial to rehabilitate inefficient forest lands and convert these areas into productive areas. Rehabilitation studies have been more intensive between 2006 and 2012. In 2017, 46,935 ha area was afforested, 112,100 ha area was rehabilitated, in 91,049 ha area erosion was controlled, in 15,167 ha area range rehabilitation has been done, in 1,361 ha area private afforestation were done and in 7,791 ha area artificial regeneration was done as forest establishment activities. A total of 274,403 hectares of forest establishment activities were conducted.

GRAPH 78- (1990-2017) FOREST ESTABLISHMENT ACTIVITIES (ha)



Note: Forest based works are the Works performed by Ministry of Agriculture and Forestry and the 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 Forests by Tree Species

Diversity of tree species is a positive indicator of biodiversity. In 2015, Turkey's total forest cover consists of oak 26.3%, 25.1% Turkish pine, Crimean pine 19%.

TABLE 24- TOTAL FOREST AREA BY TREE SPECIES

Tree species	FOREST FORM (hectare)			% rate
	Productive	Degraded	Total	
Oak (Quercus sp)	2,382,933	3,503,262	5,886,195	26.3
Turkish pine (pinus brutia)	3,451,269	2,158,946	5,610,215	25.1
Crimean pine (pinus nigra)	2,727,524	1,517,397	4,244,921	19.0
Beech (fagus orientalis)	1,630,196	269,733	1,899,929	8.5
Scots pine (pinus sylvestris)	882,231	636,698	1,518,929	6.8
Juniper (Juniperus)	218,303	740,120	958,423	4.3
Fir	383,422	201,359	584,781	2.6
Cedar	247,162	235,229	482,391	2.2
Spruce	229,191	93,666	322,857	1.4
Stone pine	128,721	33,250	161,971	0.7
Alder	113,161	33,569	146,730	0.7
Chestnut	68,229	20,214	88,443	0.4
Hornbeam	28,252	6,737	34,989	0.2
Poplar	6,445	9,843	16,288	0.1
Lime tree	10,408	2,166	12,574	0.1
Ash tree	6,707	505	7,212	0.0
Eucalyptus	1,353	51	1,404	0.0
Other species	188,641	176,042	364,683	1.6
TOTAL	**12,704,148**	**9,638,787**	**22,342,935**	

(*) Other species title covers cypress, Aleppo pine, maritime pine, radiata pine, black locust, sycamore, walnut, Turkish/oriental sweetgum and numerous other tree species not specified here.
Source: Ministry of Agriculture and Forestry, General Directorate of Forestry, Turkey Forest Assets-2015.

9.9- Functional Forestry

Today, forests are planned with ecosystem-based functional planning approach on multi-beneficial basis. According to the data of this plan, 50% of the forests has economical, 42% has ecological and 8% has social and cultural functions.

TABLE 25- DISTRIBUTION OF THE FORESTS DUE TO PRIMARY FUNCTIONS

MAIN FUNCTIONS	FORESTED AREA (hectare)			% rate
	Productive	Degraded	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– Social and Cultural Function	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.

10.1- Highway - Railway Network Intensity

The road network intensity provides information about the fragmentation and decay of wild life habitats and natural landscape because of active transportation. Other important factors are environmental risks such as traffic related pollution and noise. In this respect, the indicator is a pressure indicator.

In 2017, there were 55 airports open to commercial air traffic with a total airway flight line length of 70,879 km in Turkey. The length of highways (state roads, provincial roads, highways) summed up to 67,620 km, the railway network (including both the conventional and high speed lines) to 12,608 km in length.

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

YEARS	2002	2005	2010	2015	2016	2017
Highway Network Length (km)	63,082	63,606	64,865	66,437	67,161	67,620
Railway Network Length (km)	10,925	10,973	11,940	12,532	12,532	12,608

Source: Ministry of Transport and Infrastructure

Compared to roads, railways release less greenhouse gas to the atmosphere as they consume energy more efficiently. In addition, less land is used for the construction of railways, thus this plays a significant role in the preservation of the natural environment. Besides, railways help reduce respiratory deficiencies and other illnesses caused by air pollution.

According to the 2016 data, there were 80 km highways and the 13 km railways (length of mainline) per population of 100,000, in Turkey. In the EU-28 countries, these figures are respectively, 410 km and 44 km in average. Considering the surface area, there were 85 km highways and 13 km railways per 1000 km^2 in Turkey. In the EU-28 countries, these figures were 465 km and 51 km respectively[57].

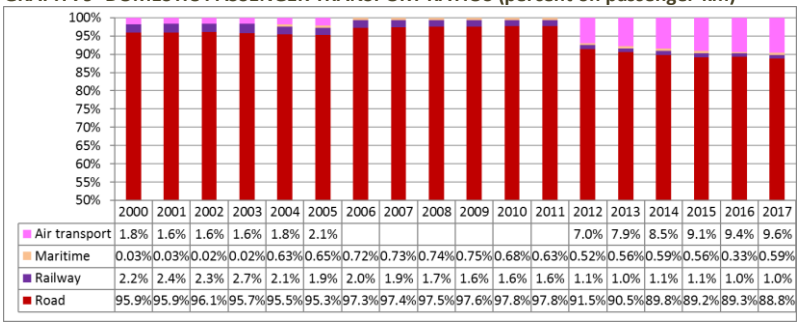
It is estimated that highway network will have reached to 70,000 km and railway network to 25,000 km in length by 2023 [58]. Then the highway network intensity will have reached to 86 km and railway network to 32 km per 1000 km^2.

10.2- Passengers and Freight Carried by Transport Types

This indicator is a driving force indicator and it takes part on transport related environmental impacts. In terms of domestic passenger transport, share of the air transport rose to 9.6% in 2017 from 1.8% in 2000; in the same period, share of highway transport reduced from 95.9% to 88.8% and railway transport from 2.2% to 1%. The share of maritime passenger transport was 0.6% in 2017. It is targeted to reduce the share of domestic passenger transport by road (as a passenger /km) to 76% by the end of 2023 [58].

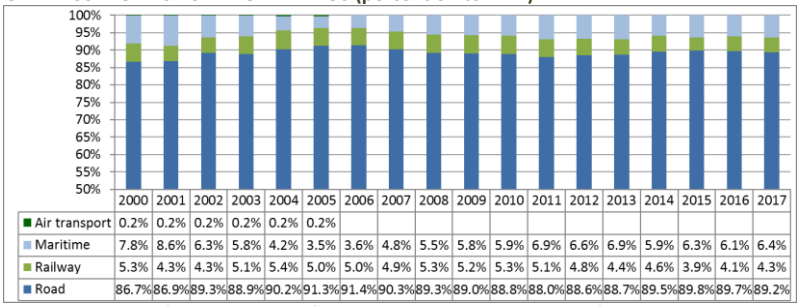
In 2017, considering the domestic freight transport, it seems that the highways (89.2%) take the major share. In 2017, it is observed that the shares of railway and maritime freight decreased in domestic freight transport compared to 2000.

GRAPH 79- DOMESTIC PASSENGER TRANSPORT RATIOS (percent on passenger-km)*



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Air transport	1.8%	1.6%	1.6%	1.6%	1.8%	2.1%							7.0%	7.9%	8.5%	9.1%	9.4%	9.6%
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%
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%
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%

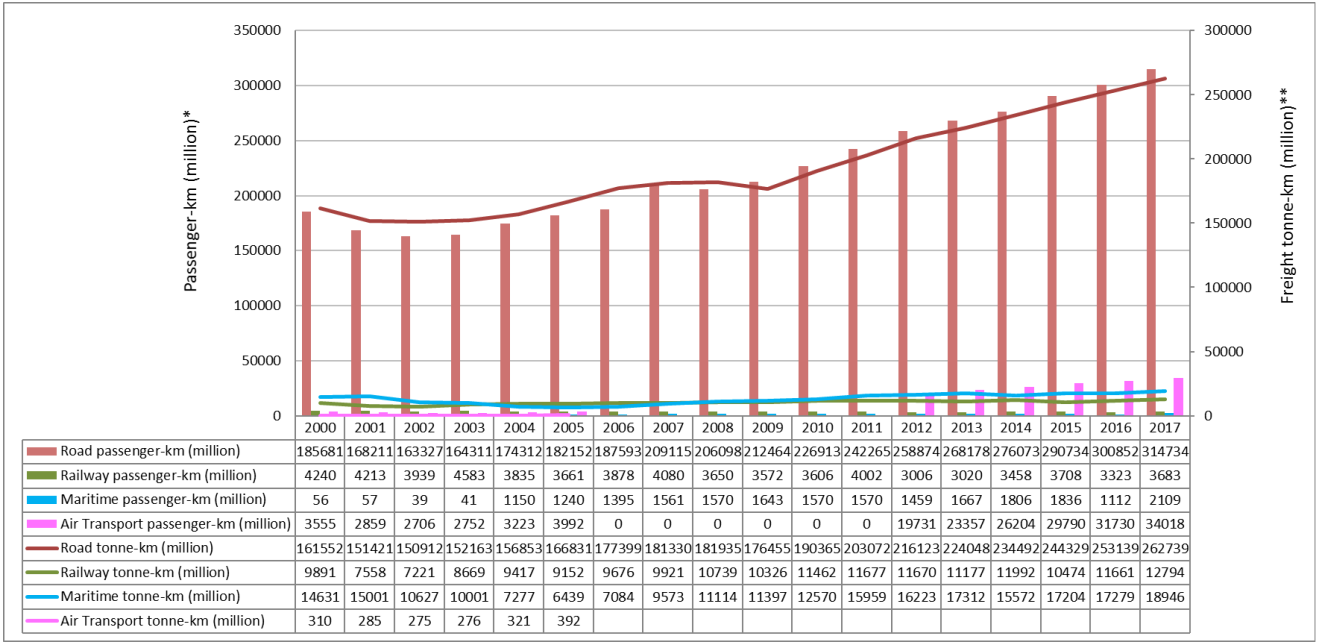
GRAPH 80- DOMESTIC FREIGHT RATIOS (percent on ton-km)**



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Air transport	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%												
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%
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%
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%

Sources: Ministry of Transport and Infrastructure, Directorate General of State Railways
Notes: 1) Urban transport is not included.
2) Data on passenger and freight transport over the road network of Directorate General for State Highways were taken.
3) Data on passenger and freight transport of the General Directorate of State Railways were taken. Urban and suburban passenger transport data was exempted.
4) Data for the domestic passenger and freight transport of the General Directorate of State Airports Authority were considered. For the empty cells there is no data.
5) Data on maritime passenger and freight transport on exclusive maritime lines were taken from the General Directorate for Maritime Trade. Units were converted from mile to km.
** Passenger/Km: Unit of traffic measurement obtained from the transportation of one passenger over one kilometre.*
***Tonne/Km: Unit of traffic measurement obtained from the transportation of one ton of goods over a distance of one kilometre*

GRAPH 81- DOMESTIC TRANSPORT OF FREIGHT AND PASSENGER ACCORDING TO TRANSPORT PATHS

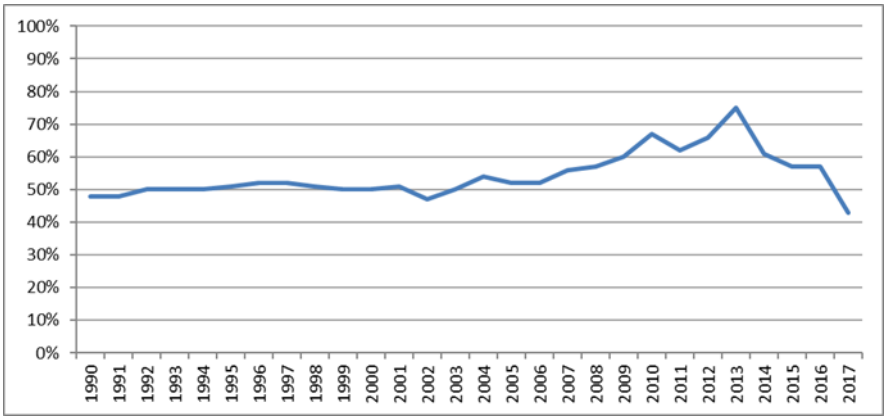


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Road passenger-km (million)	185681	168211	163327	164311	174312	182152	187593	209115	206098	212464	226913	242265	258874	268178	276073	290734	300852	314734
Railway passenger-km (million)	4240	4213	3939	4583	3835	3661	3878	4080	3650	3572	3606	4002	3006	3020	3458	3708	3323	3683
Maritime passenger-km (million)	56	57	39	41	1150	1240	1395	1561	1570	1643	1570	1570	1459	1667	1806	1836	1112	2109
Air Transport passenger-km (million)	3555	2859	2706	2752	3223	3992	0	0	0	0	0	0	19731	23357	26204	29790	31730	34018
Road tonne-km (million)	161552	151421	150912	152163	156853	166831	177399	181330	181935	176455	190365	203072	216123	224048	234492	244329	253139	262739
Railway tonne-km (million)	9891	7558	7221	8669	9417	9152	9676	9921	10739	10326	11462	11677	11670	11177	11992	10474	11661	12794
Maritime tonne-km (million)	14631	15001	10627	10001	7277	6439	7084	9573	11114	11397	12570	15959	16223	17312	15572	17204	17279	18946
Air Transport tonne-km (million)	310	285	275	276	321	392												

Sources: Ministry of Transport and Infrastructure, Directorate General of State Railways
Notes: 1) Urban transport is not included. 2) Data on passenger and freight transport over the road network of Directorate General for State Highways were taken. 3) Data on passenger and freight transport of the General Drectorate of State Railways were taken. Urban and suburban passenger transport data was exempted.4) Data for the domestic passenger and freight transport of the General Directorate of State Airports Authority were considered. For the empty cells there is no data. 5) Data on maritime passenger and freight transport on exclusive maritime lineswere taken from the General Directorate for Maritime Trade. Units were converted from mile to km.
** Passenger/Km: Unit of traffic measurement obtained from the transportation of one passenger over one kilometre.*
***Tonne/Km: Unit of traffic measurement obtained from the transportation of one ton of goods over a distance of one kilometre.*

Use of railways are promoted against road transport in sense of environmental concerns. Besides extending the railway network, effective use is also an important concern. Average capacity use ratio in railway freight transport between 1990 and 2017 was 55%. The ratio was 75% in 2013 and 43% in 2017.

GRAPH 82- CAPACITY USE RATIO IN RAILWAY FREIGHT TRANSPORT (%)



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

10.3- Greenhouse Gases Emissions by Transport Types

This indicator is a pressure indicator. Contribution of transport to climate change and the distribution of this contribution according to transport modes, are important for the monitoring and control of emissions.

According to the TURKSTAT 2016 greenhouse gas emission inventory datas, Turkey's total greenhouse gas emissions were 496.1 million tonnes CO_2 equivalent, in 2016. Out of this, 81,841 kilotonnes of CO_2 equivalent are transport related emissions. The share of transport related emissions in total greenhouse gas emissions was about 12.8% in 1990 and 16.5% in 2016.

92.4% of transport related CO_2 emission was originated from road transport, 5.2% from domestic aviation, 1.2% from domestic navigation, 0.5% from railways and 0.8% from other transport modes.

In 2016, the transport sector contributed 20% of total EU-28 greenhouse gas emissions (international aviation and maritime emissions are excluded) [59].

GRAPH 83- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT

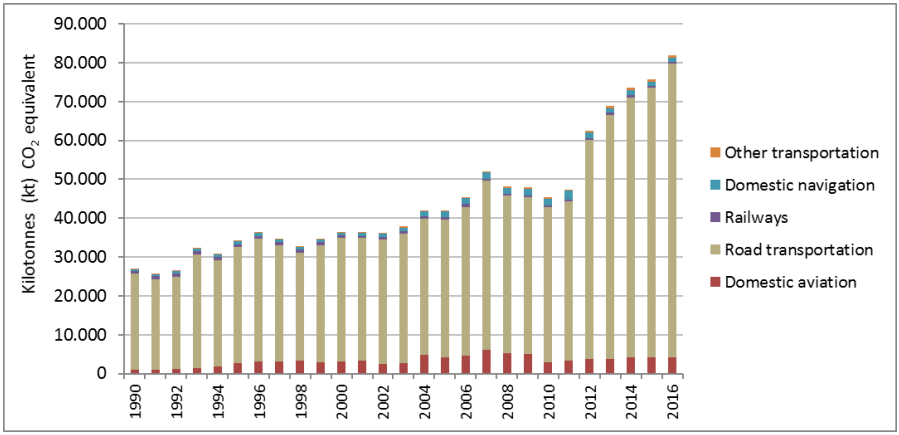


TABLE 27- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT (kilotonnes CO_2 equivalent)

Years	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016
Total Transport	**26,969**	**34,113**	**36,465**	**42,041**	**45,392**	**47,386**	**62,525**	**68,865**	**73,559**	**75,789**	**81,841**
Domestic aviation	923	2,775	3,099	4,089	2,862	3,344	3,727	3,754	4,090	4,205	4,281
Road transportation	24,777	29,760	31,850	35,532	39,941	40,899	56,310	62,889	66,967	69,309	75,595
Railways	721	768	713	757	517	532	492	505	562	480	374
Domestic navigation	509	726	623	1,299	1,682	2,242	1,614	1,154	1,348	1,147	970
Other transportation	39	83	180	364	390	370	381	563	593	647	621

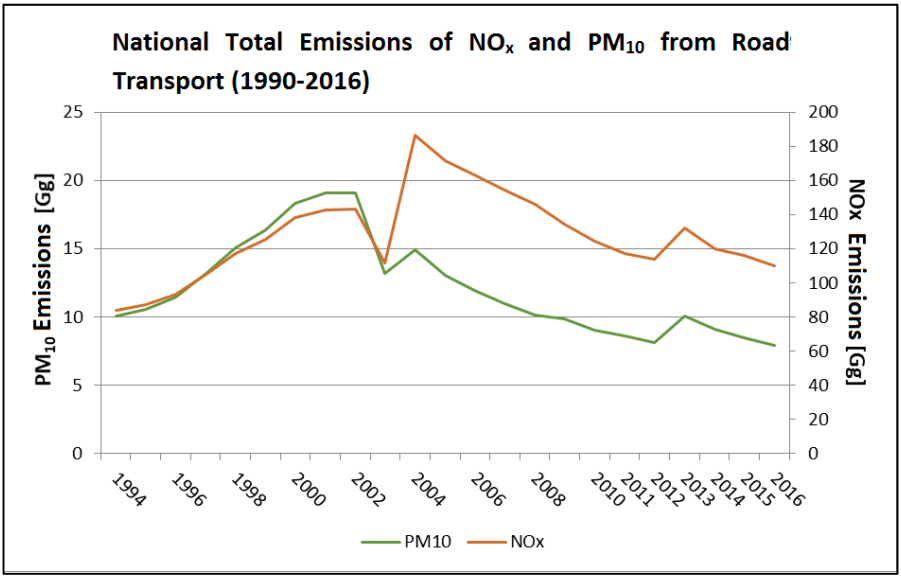
Source: TURKSTAT, https://unfccc.int/documents/65716

10.4- Emissions of Air Pollutants from Transport

Air pollutant emissions from transport are a significant pressure indicator on the effect of transportation on air pollution.

The transport is an important sector in the National Air Pollutants Emission Inventory. Emissions originated from road transport, navigation, aviation and railways are calculated separately. 1990-2016 trends of NO_x and PM_{10} emissions show a significant decrease in the recent years.

GRAPH 84- NO_x and PM_{10} EMISSIONS ARISING FROM ROAD TRANSPORT (1990-2016)



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

10.5- Final Energy Consumption by Mode of Transport

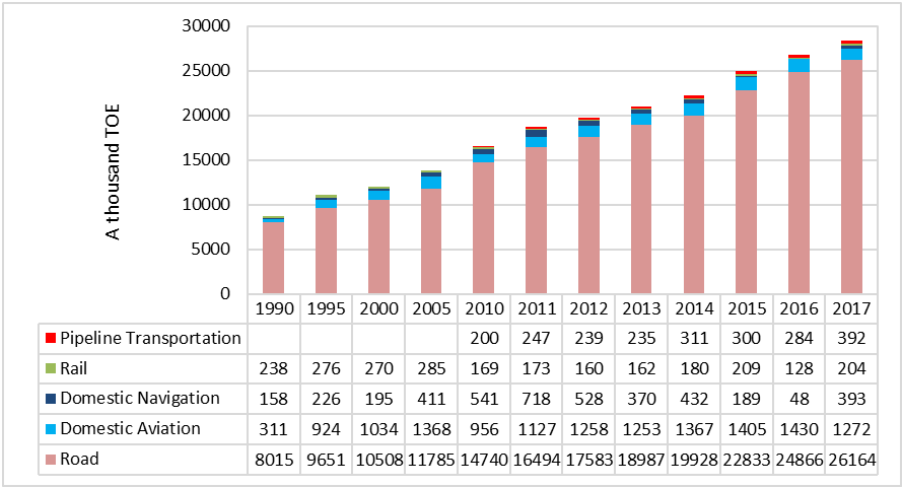
Energy consumption is an important driver of environmental pressures, most notably climate change. Reductions in fuel consumption in the transport sector, and/or reductions of its related impacts, may be achieved via three primary measures: reduce transport demand by limiting the number of trips and their length; shift to more fuel efficient transport modes; increase the energy efficiency of vehicles and their energy sources; i.e: fuel switching (shifting to renewable or low carbon fuels such as sustainable biofuels or using renewable generation technologies for electric or fuel cell vehicles) [60].

Total energy consumption by the transport sector as a whole was 28,425 thousand TOE (Tonnes of Oil Equivalent) in 2017, with a 225.9% increase compared to 1990. Excluding the 392 thousand TOE consumed by pipeline transport, 93.3% of the total transport consumption of 28,033 thousand TOE was consumed by road transport. 4.5% of the consumption was by aviation, 1.4% by domestic navigation and 0.7% consumed by rail transport.

Energy consumption by aviation increased by 309% from 1990 to 2017. This was followed by road transport with an increase of 226% and by maritime transport with an increase of 149%. The amount of energy consumed for rail transport has decreased by 14%.

According to 2016 EU-28 data, 94.7% of the final energy consumption by transportation was by road transport, 2% by railway transport, 1.8% by domestic aviation and 1.4% by domestic navigation [61].

GRAPH 85- FINAL ENERGY CONSUMPTION BY MODE OF TRANSPORT



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

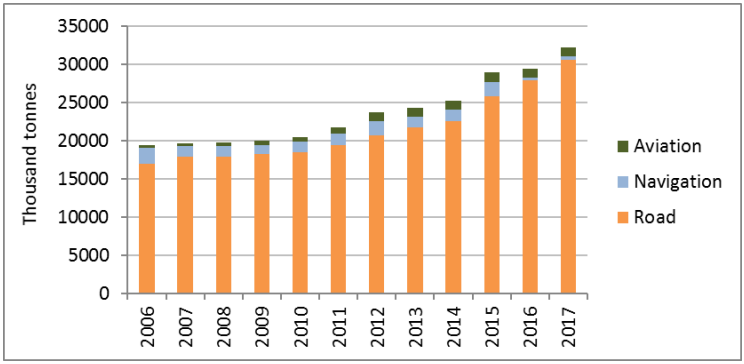
Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/en-US/Balance-Sheets

Oil derivatives constituted 99% of the 28,033 thosand TOE energy consumed in transport sector (excluding the pipelines) in 2017 while natural gas had the 0.2%, biofuels and waste 0.4% and electricity had 0.3% share.

In the EU-28 countries, in 2016, energy consumption of the transport sector (including road, rail, domestic aviation and navigation) was broken down as: oil derivatives 93.6%, biofuels 4.4%, electricity 1.4% and natural gas 0.4% [62].

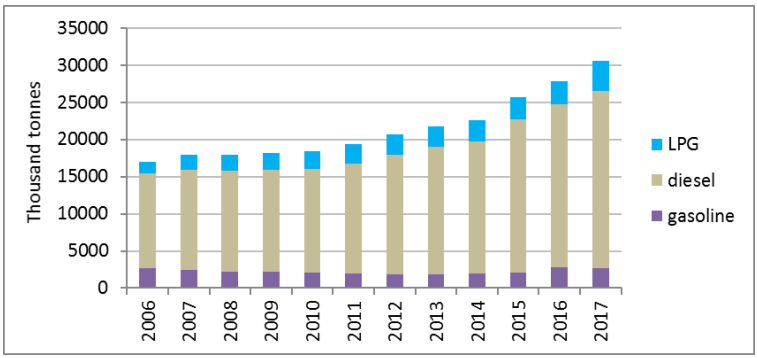
In 2016, fuel consumption was 30,565,439 tons in road transport, 430,870 tons in maritime transport and 1,129,055 tons in aviation. Out of the 30,565,439 tons consumed in road transport, 77.8% (23,777,421 tons) was diesel fuel, 13.3% (4,080,359 tons) were LPG and 8.9% (2,707,659 tons) was gasoline.

GRAPH 86- FUEL CONSUMPTION BY MODE OF TRANSPORT



Source: Republic of Turkey Energy Market Regulatory

GRAPH 87- FUEL CONSUMPTION BY ROAD TRANSPORT ACCORDING TO THE FUEL TYPES (1)



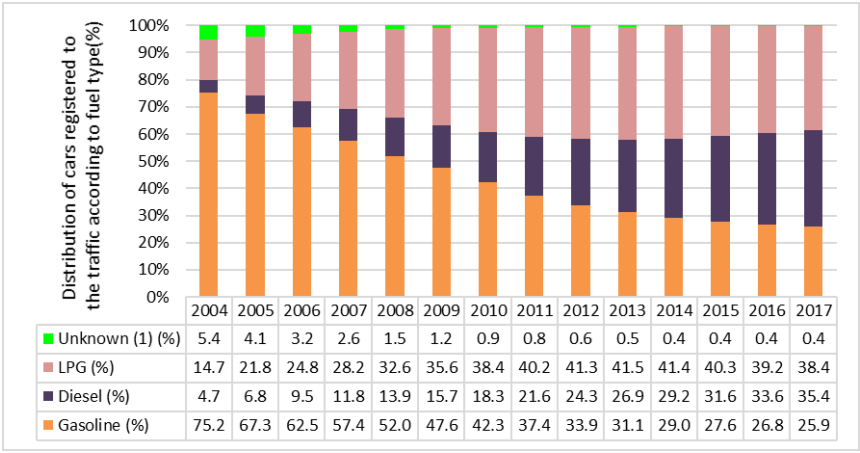
Source: Republic of Turkey Energy Market Regulatory

(1) Data includes dealer sales (including vehicle recognition system sales), sales to the free user license holders and military deliveries; but military sales directly by the refineries are excluded

At the end of 2017, among 12 million 35 thousand 978 registered cars, the share of LPG-fuelled cars was 38.4% followed by diesel-fuelled cars with 35.4% and gasoline-fuelled cars with 25.9%. 0.4% of the cars utilised unknown types of fuel[64]. According to 2016 data, Poland is the EU country with the highest rate of LPG cars with 16%; yet the proportion of LPG cars in Turkey is significantly high compared to EU countries.

In 16 of the 24 Member States for which information is available, the majority of passenger cars were powered by a petrol engine in 2016 [65]. In 2016, 42 % of the EU-28 car fleet had diesel engines. The ratio of alternatively fuelled new cars in the fleet was around 3 % of total new passenger cars registered in the EU in 2017[66].

GRAPH 88- DISTRIBUTION OF CARS REGISTERED TO THE TRAFFIC ACCORDING TO FUEL TYPE, 2004-2017



	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
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
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
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
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

Source:TURKSTAT, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=27640

(1) Unknown includes the cars that the type of fuel field in the licence is filled incorrectly or left blank and electric cars.

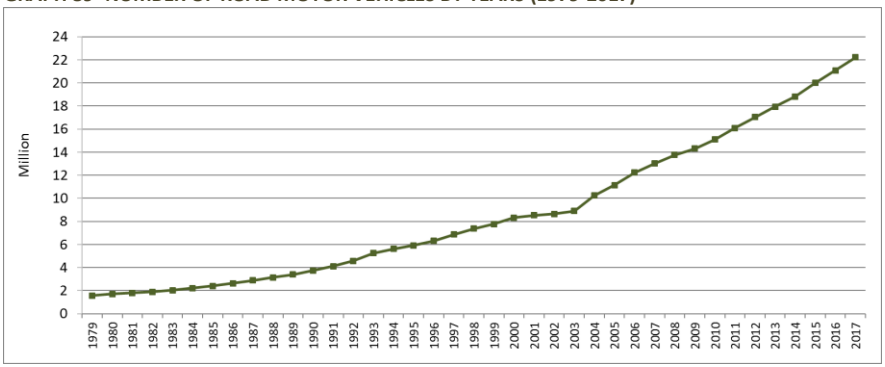
10.6- Number of the Road Motor Vehicles in Use

Emissions resulting from road motor vehicles is one of the major causes of air pollution especially in metropolitan cities. The number of vehicles is a pressure indicator.

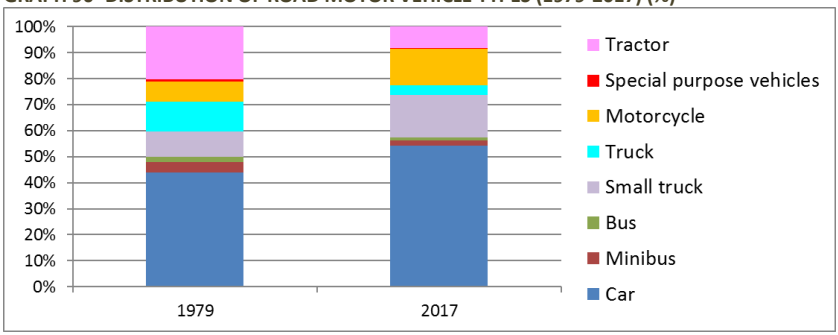
The number of total road motor vehicles, which was 1,566,405 in 1979, increased especially after 2004 and reached to 22,218,945 in 2017. When types of road motor vehicles share between 1979 and 2016 are compared, the increase in the rates of automobiles, small trucks and motorcycles are remarkable. Automobiles constitute 54.2% of the total road motor vehicles in 2017, small trucks 16.4%, motorcycles 14%, tractors 8.3%, trucks 3.8%, minibuses 2.2%, buses 1% and special purposed vehicles 0.3%.

Despite the increase in the number of cars, average car possesion is still quite low in Turkey due to high prices and taxes. According to 2016 figures, average number of cars per thousand people in the EU-28 is 505, nearly four-fold of Turkey with average possesion value of 142 cars per thousand people [67].

GRAPH 89- NUMBER OF ROAD MOTOR VEHICLES BY YEARS (1979-2017)



GRAPH 90- DISTRIBUTION OF ROAD MOTOR VEHICLE TYPES (1979-2017) (%)



Source: TURKSTAT. Note: Since 2004, vehicles covered under work machinery and heavy vehicles covered under special purpose vehicles are shown under "Truck" figures.

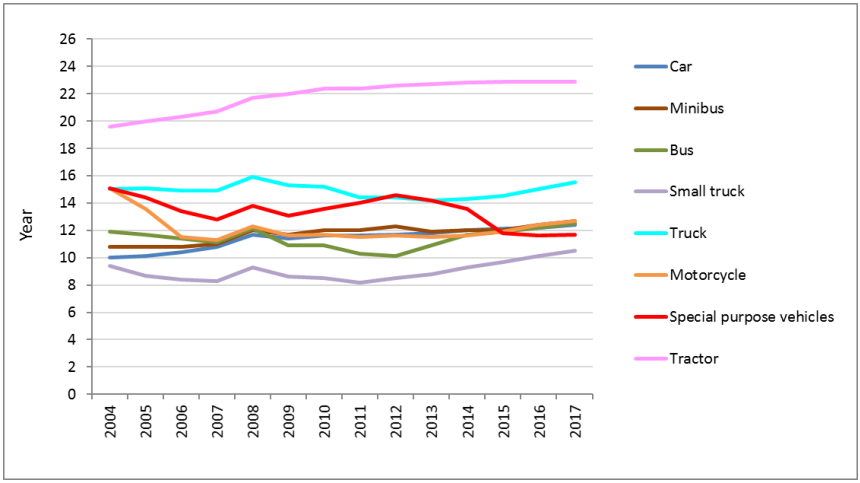
10.7- Average Age of Vehicles Registered to the Traffic

This indicator is a driving force indicator. Average age of the vehicle fleet is an indirect indicator of environmental performance of road transport. By exchanging old and polluting vehicles with younger and less polluting ones, the value of this indicator and the impact on the environment is expected to reduce.

However despite this expectation, data shows that, average age of the total registered cars increased from 12 in 2004 to 13.1 in 2017. During the same period, average age of passenger cars has increased from 10 to 12.4 by 24%. Average ages for various vehicle types in 2017 are as follows: 12.7 for minibuses, 12.5 for buses, 10.5 for small trucks, 15.5 for trucks, 12.7 for motorcycles, 11.7 for special purpose vehicles, 22.9 for tractors [64].

In EU-27, the average age of passenger cars, even though still lower than that figure in Turkey, has increased with 8% since 2000 and reached to 7.4 years in 2014. For other vehicle types, the average age was 8.4 years for vans, 8.1 years for heavy duty vehicles, 9.1 years for two-wheelers, and 9.4 years for buses [68].

GRAPH 91- AVERAGE AGE OF REGISTERED VEHICLES ACCORDING TO THE TYPES

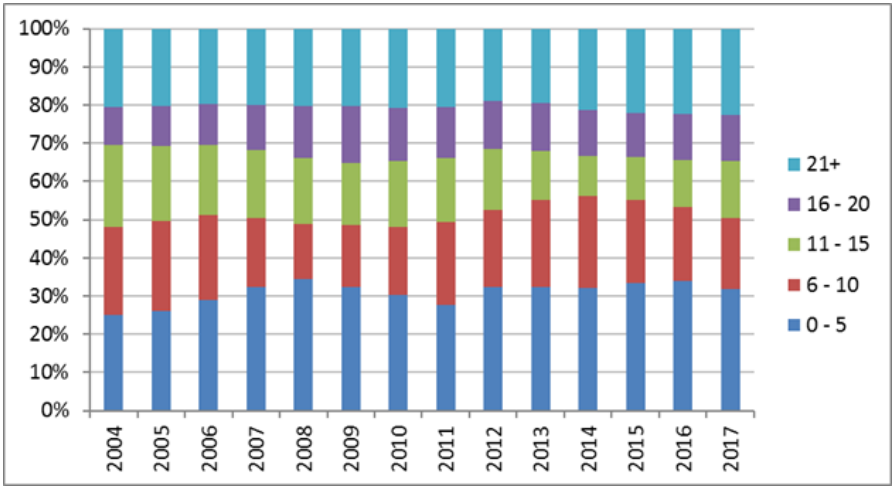


Source: TURKSTAT

Share of old (over 20 years) passenger cars is rather high in Turkey, 22% as of 2017 [64]. This rate was 1.9% in the United Kingdom and 6% in Germany in 2016[69].

By the end of year 2017, in Turkey, age group distribution of vehicles registered: 31.7% of the vehicles are at 0-5 years age range, 18.8% at 6-10 years, 14.9% at 11-15 years, 11.8% at 16-20 years range and 22.7% of the vehicles are older than 20 years.

GRAPH 92- AGE GROUP DISTRIBUTION OF VEHICLES (%), 2004-2017



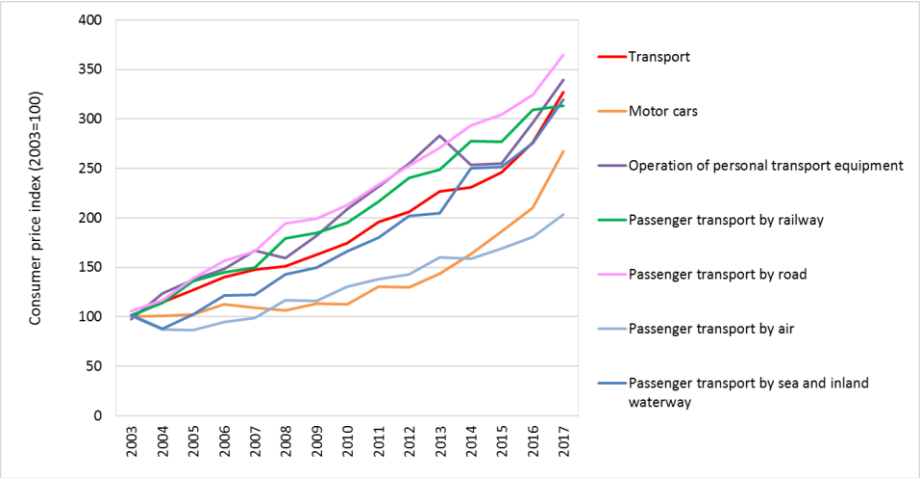
Source: TURKSTAT

10.8- Real Change in Transport Prices By Mode

This indicator is a driving force indicator. Transport prices are important drivers of individual and business transport decisions. They affect transport growth and modal split development, and can also lead to changes in distribution management, location decisions and spatial planning. It is important that prices are monitored to see if users are given appropriate incentives to use more environmentally-friendly modes of transport. However, there are variations that take place over time that can affect the reliability of the comparison. For example, people tend not to purchase the same cars as ten years ago, and don't use the same package of transport services (price/quality) as previously [70].

According to 2003 prices and Consumer Price Index (CPI), cost of car purchasing has increased by 167.2% from 2003 to end of 2017. Withni same period and same imndex, The cost of passenger transport by road increased by 245.2%, by rail increased by 209.2%, by sea and domestic navigation by 213.2% and by air increased by 101.4% [71].

GRAPH 93- REAL CHANGE IN TRANSPORT PRICES BY MODE



Source: TURKSTAT

Notes:

(1) Consumer price index (2003=100)

(2) United Nations (UN) Classification of individual consumption by purpose (COICOP)

11.1- Total Energy Consumption by Sectors

The indicator is a driving force indicator that identifies energy consumption. In Turkey the total energy consumption in 2017 was 145.3 Mtoe (million tons of oil equivalent). The total energy consumption of Turkey increased by 177% compared to 1990, 64% compared to 2005 and 6.7% compared to 2016.

In 2016, gross inland consumption in the EU-28 countries decreased by 1.7% compared to 1990, by 10.4% compared to 2005. In 2016, gross inland consumption in the EU-28 countries increased by 0.7% compared to 2015 [73].

In Turkey, the breakdown of primary energy consumption in 2017 shows that the highest consumption takes place in the residential and services sector with 24.8% and industry sector with 24.4%. These are followed by transformation and energy sector with 23.1%, transportation with 19.6%, non-energy consumption with 5.1% and agriculture/forestry and fishing sector with 2.9%.

GRAPH 94- TOTAL ENERGY CONSUMPTION BY SECTORS (Mtoe)

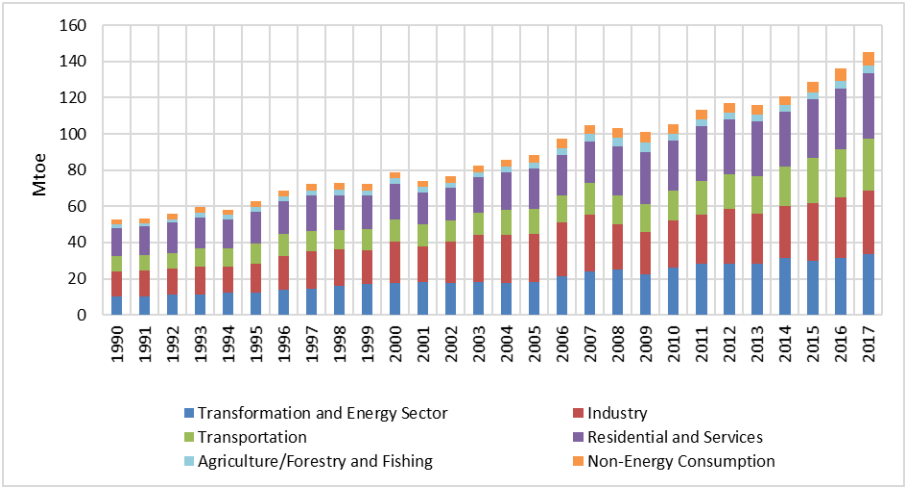


TABLE 28- TOTAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)

Years	1990	1995	2000	2005	2010	2015	2016	2017
Energy Supply	**52,465**	**62,968**	**79,428**	**88,672**	**105,888**	**129,139**	**136,229**	**145,305**
Transformation and Energy Sector	10,228	12,442	17,834	18,347	26,048	29,672	31,655	33,522
Industry	13,641	15,986	22,876	26,410	26,077	32,157	33,254	35,329
Transportation	8,723	11,077	12,007	13,849	16,314	24,936	26,812	28,425
Residential and Services	15,356	17,514	19,557	22,285	27,762	32,329	33,222	36,013
Agriculture/Forestry and Fishing	1,956	2,556	3,073	3,359	3,736	3,932	4,056	4,273
Non-Energy Consumption	2,543	3,087	3,455	4,089	5,314	5,652	6,989	7,372

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

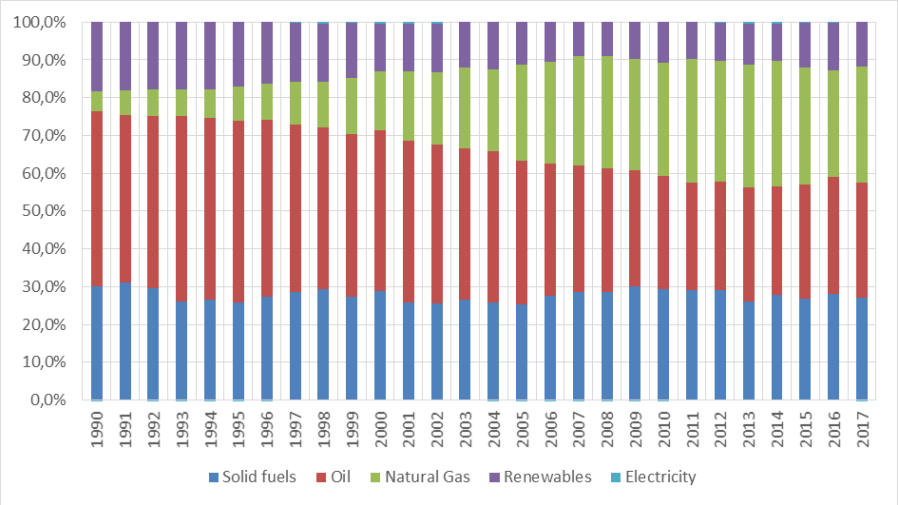
11.2- Primary Energy Consumption by Fuel Type

Total primary energy consumption according to type of fuel is an indicator of a driving force, which describes the improvement in energy resources and the level of consumption. Fossil fuel consumption (crude oil, petroleum products, mineral coal, lignite, natural and derivative gases) is a surrogate indicator of resource consumption, greenhouse gas emissions and air pollution (SO_2 and NO_X) levels. The level of the environmental impact depends on the relative portions of the fossil fuels used and the magnitude of the precautions taken to reduce pollution.

Primary energy consumption of Turkey increased from 52.5 Mtep in 1990 to 145.3 Mtep in 2017. As of 1990, the share of solid fuels in primary energy consumption of Turkey was 30.2%. While the share of oil was 46.1%, that of natural gas was 5.4% and that of renewable energy resources was 18.4%. As of 2017, 27.2% of Turkey's primary energy consumption was met by solid fuels. While the share of oil decreased to 30.5%, that share of natural gas increased to 30.5%. The share of renewable energy resources was 11.9%.

As of 2016, 14.7% of the total primary energy consumption in the EU-28 countries was from solid fuels, 34.6% from oil, 23.3% from natural gas, 13.2% from nuclear, 13.2% from renewable energy resources and 1% from other resources [73].

GRAPH 95- 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

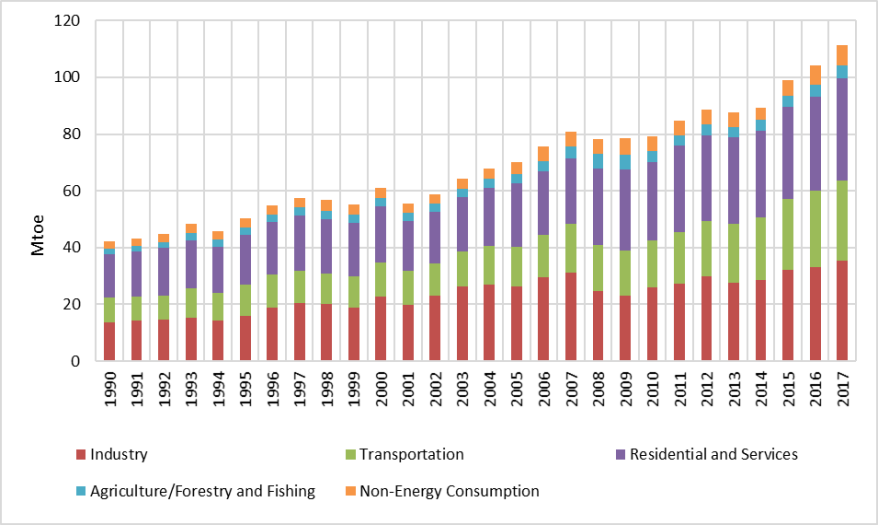
Final energy consumption by sector type is a driving force indicator. The trend in final energy consumption by fuel type and by sector provides a broad indication of progress in reducing final energy consumption and associated environmental impacts by the different end-use sectors (transportation, industry, services and households).

The total final energy consumption in Turkey was 111.4 Mtoe in 2017, with an increase of 164% compared to 1990, 59% compared to 2005 and 6.79% compared to 2016 (Table 28). Large increases in final energy consumption could be attributes to the growing economy in Turkey. However, in order to mention an improvement, energy intensity must decrease with improvement in energy efficiency. For instance, in the EU-28, owing to improvements in energy efficiency, the final energy consumption decreased by 6.6% in the last 10 years according data of 2016 [73].

In 2017 in Turkey, the highest share of final energy consumption occured in residential and services sector (%32.32) and industrial sector (31.71%), followed by transportation (25.51%) and agriculture/forestry and fishing sectors (3.84%). The share of non-energy consumption was 6.62%

Compared to the EU countries, in 2016, the residential and services sector took the highest share in energy consumption with 36.4%; followed by transportation (30.5%), industry (23.0%) and agriculture/forestry and fishing (2.1%) in the EU-28 member states. The remaining 8% belonged to non-energy consumption [73].

GRAPH 96- 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

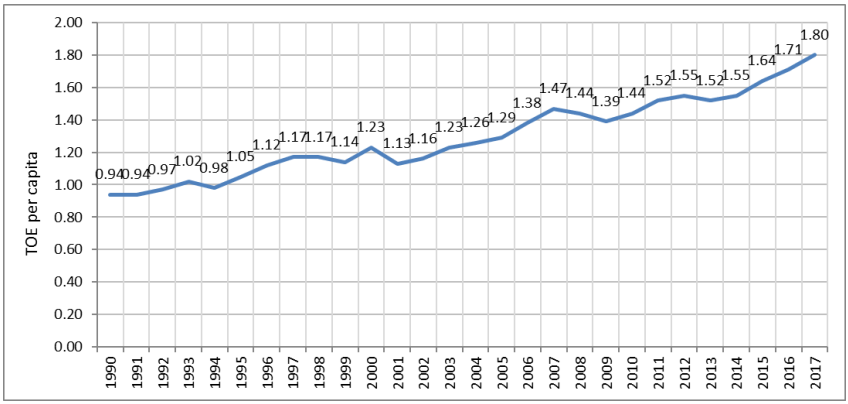
This driving force indicator shows energy consumption levels and is one of the indicators used for comparison among countries, regions, etc.

In Turkey, the energy consumption per capita was 0.94 toe in 1990 and 1.80 toe in 2017.

In European Union countries, per capita primary energy consumption was 3.51 toe in 1990 and 3.22 toe in 2016 [72].

The average of 28 EU countries was 2.1 TOE, while the final energy use per capita in Turkey was 1.1 TOE in 2014 [74].

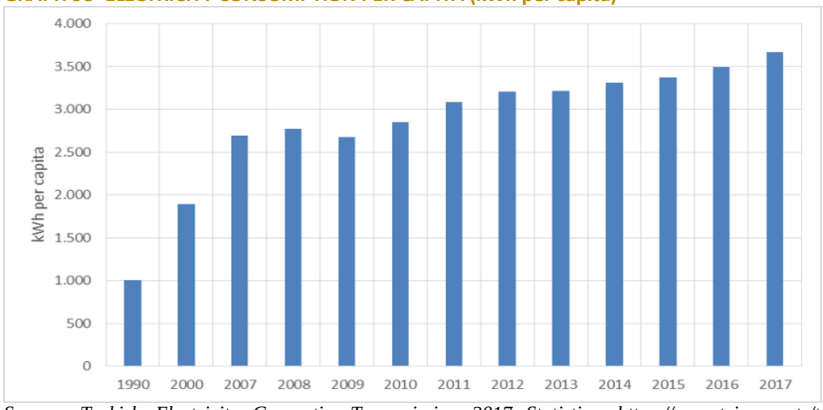
GRAPH 97- PRIMARY ENERGY CONSUMPTION PER CAPITA (TOE per capita)



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

In Turkey, electricity consumption per capita was 3.672 kWh in 2017 and around 1.000 kWh in 1990.

GRAPH 98- ELECTRICITY CONSUMPTION PER CAPITA (kWh per capita)

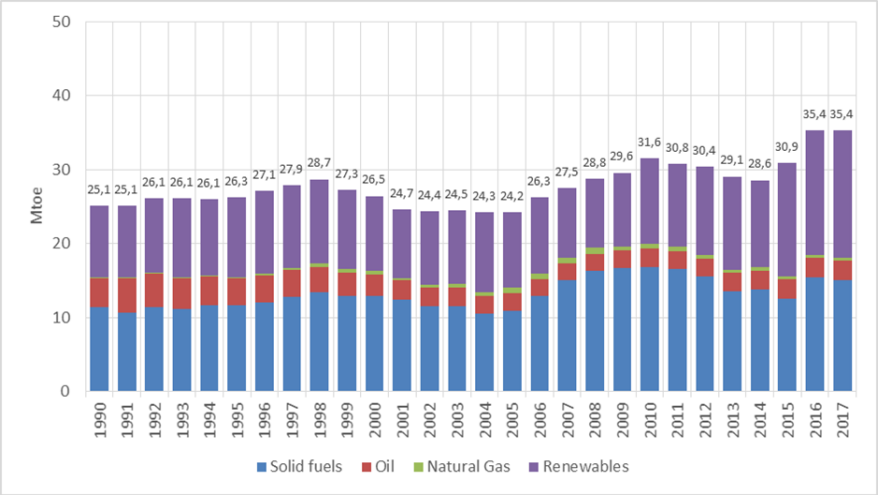


Source: Turkish Electricity Generation-Transmission 2017 Statistics, https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-2017-yili-istatistikleri

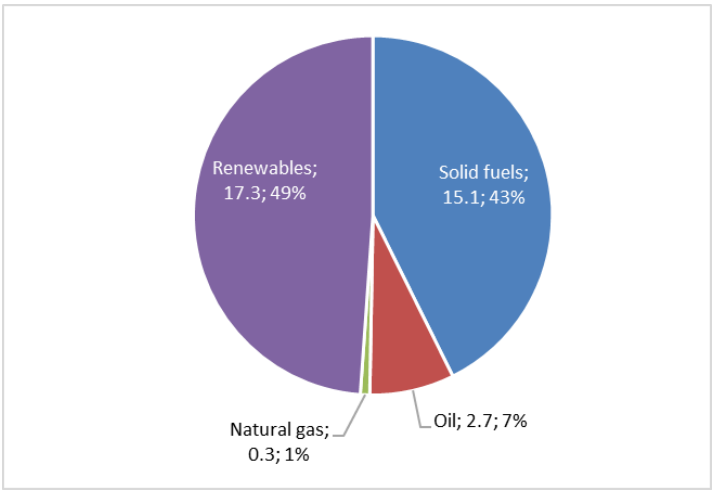
11.5- Primary Energy Production

This indicator is a driving force indicator. While total primary energy produced in Turkey in 1990 was 25.1 Mtoe, this figure increased to 35.4 Mtoe in 2017. From 1990 to 2017, the increase in total primary energy production is 40.7%.

GRAPH 99- PRIMARY ENERGY PRODUCTION BY THE YEARS (Mtoe)



GRAPH 100- DISTRIBUTION OF PRIMARY ENERGY PRODUCTION BY RESOURCES (Mtoe and %) IN 2017



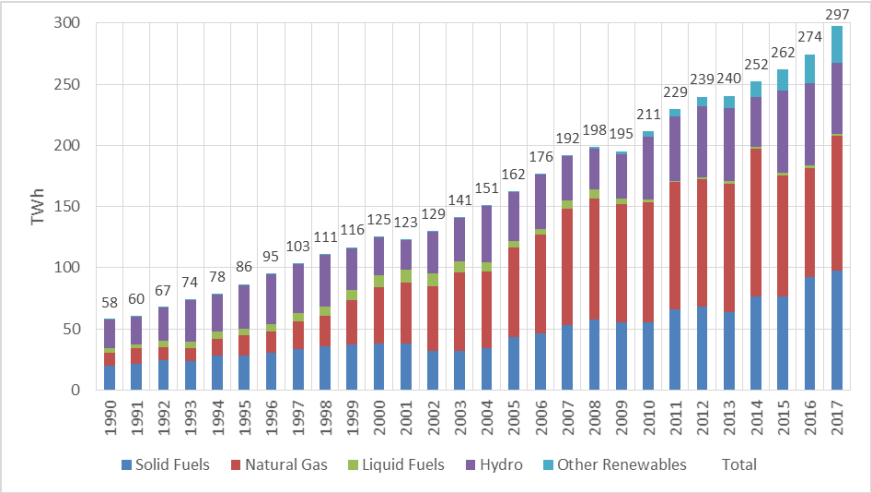
Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari

Electricity generation by resources;

In Turkey the total electricity generation was 297,3 TWh in 2017. The total electricity generation of Turkey increased by 417% compared to 1990, 84% compared to 2005 and 8.3% compared to 2016.

In Turkey, the breakdown of total electricity generation in 2017 shows that the share of solid fuels was 33%, natural gas 37%, hydro 20% and other renewable energy sources 10%. In 1990, it was 35% for solid fuels, 18% for natural gas, 7% for liquid fuels and 40% for hydro.

GRAPH 101- TOTAL ELECTRICITY GENERATION BY SECTORS (TWh)



Source: Turkish Electricity Generation-Transmission 2017 Statistics, https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-2017-yili-istatistikleri

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

D P S I R

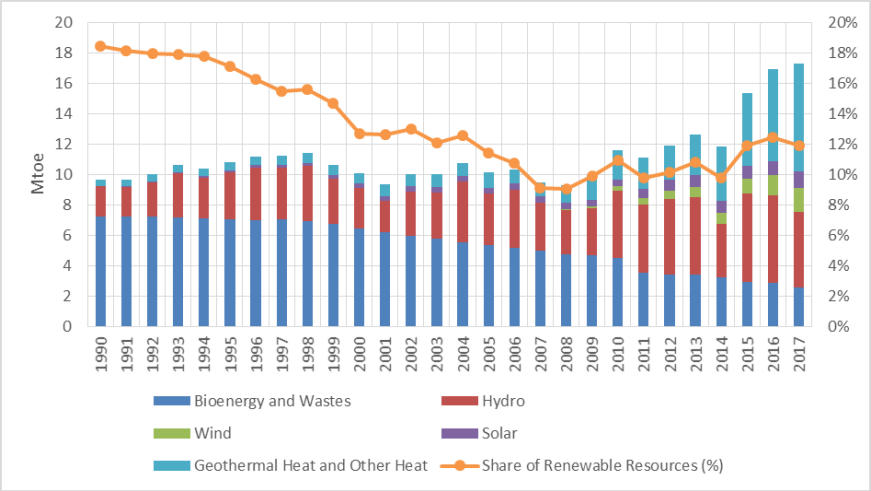
This response indicator displays the ratio of the energy produced by the renewable sources. Renewable energy sources are environment-friendly and have much lower CO_2 emission values per power unit generated.

The most common renewable energy sources in Turkey are solar, wind, hydraulic, geothermal and biomass (wood, animal and plant residues) energy forms. While the primary energy supply is 145.3 Mtoe, domestic gross energy production has reached to 35.4 Mtoe at the end of 2017. Renewable resources provide 49%, equal to 17.3 Mtoe, within the domestic gross energy production. The amount of energy from renewable resources increased by 79% compared to 1990.

In Turkey, while contribution of renewables to total energy consumption was 19.4% in 1990, in parallel with decreasing firewood consumption and increasing total energy consumption, this figure decreased to 11.9% in 2017. However, the amount of energy obtained from renewable resources increased by 79% compared to 1990.

The share of renewable energy in EU-28 primary energy consumption increased from around 4.3% in 1990 to 13.2% in 2016 [73].

GRAPH 102- 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- Share of Renewable Electricity in Gross Electricity Production

D P S I R

This response indicator is the ratio of the amount of the electricity produced by renewable sources to the (total) gross electricity consumption (total electricity produced + electricity imported – electricity exported).

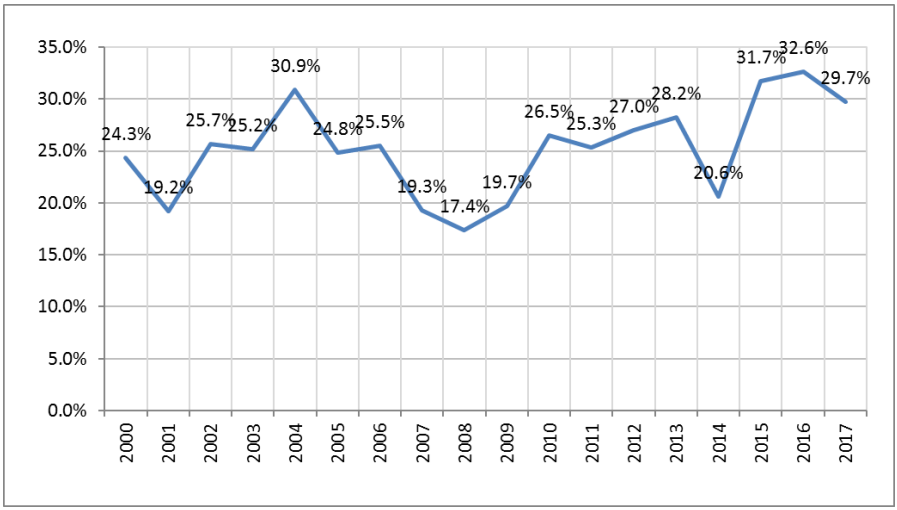
As of the end of 2017, Turkey's gross electricity consumption was 296,702.1 GWh. Electricity produced from renewable sources (88,111.4 GWh) was 29.7% of gross electricity consumption.

According to European Statistical Office (EUROSTAT), In 2016, the share of renewable electricity in gross electricity consumption was 29.6% in the EU-28 [75].

TABLE 29- GROSS ELECTRICITY PRODUCTION FROM RENEWABLE ENERGY SOURCES IN 2017 (GWh)

Resource	Generation (GWh)	Share (%)
Hydro	58,218.5	66.07
Wind	17,903.8	20.32
Geothermal	6,127.5	6.95
Bioenergy and Wastes	2,972.3	3.37
Solar	2,889.3	3.28
Total	88,111.4	100

GRAPH 103- SHARE OF RENEWABLE ELECTRICITY IN GROSS ELECTRICITY CONSUMPTION (%)



Source: Turkish Electricity Generation-Transmission 2017 Statistics, https://www.teias.gov.tr/tr/turkiye-elektrik-uretim-iletim-2017-yili-istatistikleri

11.8- Primary and Final Energy Intensity

Primary energy intensity is a response; final energy intensity is a driving force indicator. The decrease in the indicator values means improvement of energy efficiency. Primary energy intensity is an energy efficiency indicator measuring how much energy required to create one unit of Gross National Product on the regional and country basis. The level of the indicator indicates the economic structure of regions or countries, the energy consumption structure, climatical conditions and technical energy efficiency. Energy intensity trend is affected by the structural changes in economy and industry, changes in energy consumption structure and the equipment used by final users and efficiency in the building sector.

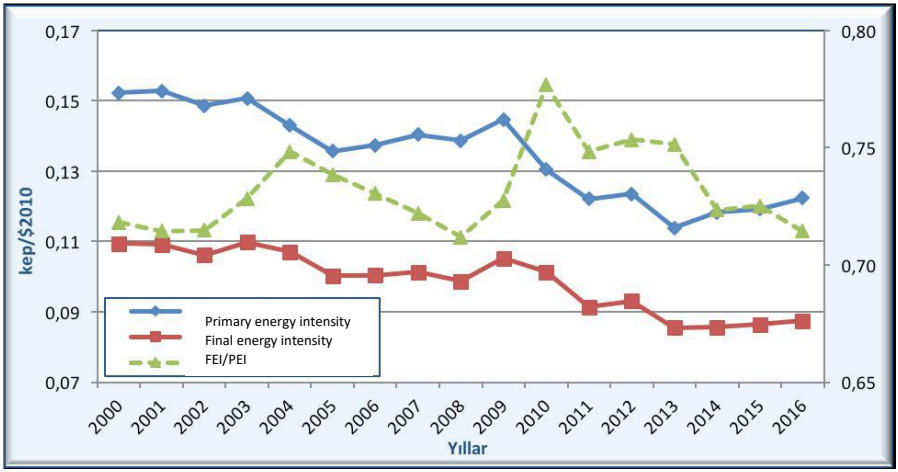
Primary energy intensity of Turkey was 0.12 TOE/2010$ with a decrease of 19.6% compared to year 2000. World average was 0.18 TOE/2010$ in 2015 while averages of OECD and the European Union countries (EU-28) were 0.11 and 0.09 TOE/2010$ respectively. According to primary energy intensity, Turkey performs considerably close to the OECD, but well quite poorer than the EU countries.

In 2005-2015 period, GDP of Turkey increased one unit while energy consumption increased by 0.8 unit. For comparison, France decreased energy consumption by 1.1 unit, Germany by 0.5, Japan 3.5 and the United Kingdom 1.8 while increasing thier GDP's by 1 unit.

There is a similar decrease trend also in the final energy intensity. The final energy intensity of Turkey has reached to 0.09 TOE/2010$ level with a decrease 20.1% from 2000 to 2016.

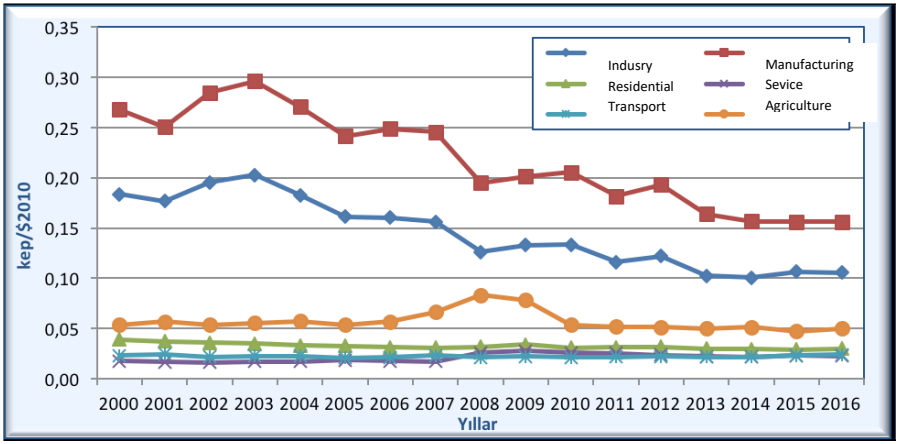
Graph 104 displays the trends in primary and final energy intensities, with an apparent increase in Final/Primary energy intensity ratio. Increase trend in this ratio means that the end-users get higher electricity [76].

GRAPH 104- PRIMARY and FINAL ENERGY INTENSITY THROUGH THE YEARS (with climatic correction)



Source: Ministry of Energy and Natural Resources, General Directorate of Renewable Energy.
http://www.enerji.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fSayfalar%2fenver_gelisim_rapor_2018.pdf
Note: Primary and final energy intensities were calculated taking into account the GDP data based on 2009 GDP series as published by TURKSTAT on 12.12.2016.

GRAPH 105- FINAL ENERGY INTENSITIES OF SECTORS BY YEARS



Source: Ministry of Energy and Natural Resources, General Directorate of Renewable Energy.
http://www.enerji.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fSayfalar%2fenver_gelisim_rapor_2018.pdf
Note: Primary and final energy intensities were calculated taking into account the GDP data based on 2009 GDP series as published by TURKSTAT on 12.12.2016.

Comparison of final energy intensities of various sectors shows that the manufacturing industry sector leads with the highest intensity, folowed by other industries, agriculture, buildings, transport and services sectors [77].

11.9- Energy Efficiency in Buildings

When energy efficiency and savings potential of the construction sector is compared with current consumption, an achievable rate of 50% saving is foreseen. Within the scope of the 'By-Law on Energy Efficiency in Buildings (Official Journal DATE: 05.12.2008 and No:27075)', to have an Energy Performance Certificate that determines the energy consumption class of the building is obligatory. Until the end of 2017, energy identity certificates issued to total 675,750 buildings which 570,996 is new and 104,754 is existing. Renewable energy system is used in 19,745 of these buildings which have energy identification certificate.

Within the scope of the "By-Law on sharing the heating and hot water expenses in central heating and hot water systems" (as published in the official journal No: 26847 and date: 14.04.2008) all existing and new buildings are required to fulfil expense-sharing applications in central heating systems. The number of authorized measuring companies who would be preparing a measurement and expenditure sharing documents became 95 at the end of 2017. Target is to reduce the fuel consumption by average of 30% without hampering the comfort conditions in these buildings [78].

12.1- Ratio of The Industrial Installations Operating in Organized Industrial Zones to Total Industrial Installations in Terms of Domestic And International Sales

Organized Industrial Zones are being established for the purposes of disciplining the industrial installations, improve development plans of cities and regions, improve efficiency and benefits, facilitate industrialization in less developed regions, control misuse of agricultural land, provide common, more effective and efficient infrastructural, environmental and other facilities and reduce pollution.

Ministry of Industry and Technology holds a register of industrial installations, based on the Law No. 6948 on Industrial Register. This register is in a dynamic form with instantaneous entries and deletions. According to the data obtained in this register, which is not an official statistics unit, the ratio of the domestic and foreign sale values of the products produced by the enterprises operating in the organized industrial zones to all industrial enterprises registered in the industrial registeris 19% for 2015, 24% for 2016 and 25% for 2017.

12.2- Number of Mining Facilities According to Their Groups

D P S I R

This indicator is a pressure indicator that shows the amount of mines registered in a given year according to the different regulatory groups defined. Mining has a significant economical role due to the direct contribution to the economy and especially inputs provided to the manufacturing sector. However, for the sake of general benefit of the country, decisions in mining activities should be made and implemented considering both commercial interest and environmental concerns together.

In 2017, a total of 17,220 mining licenses were granted by the General Directorate of Mining Affairs. of these licenses, 6,144 have been granted as exploration license and 11,076 have been granted as running license. Total number of licenses decreased in 2008-2017 period. The share of mining and quarrying in GDP decreased from 1.1% in 2008 to 0.9% in 2017.

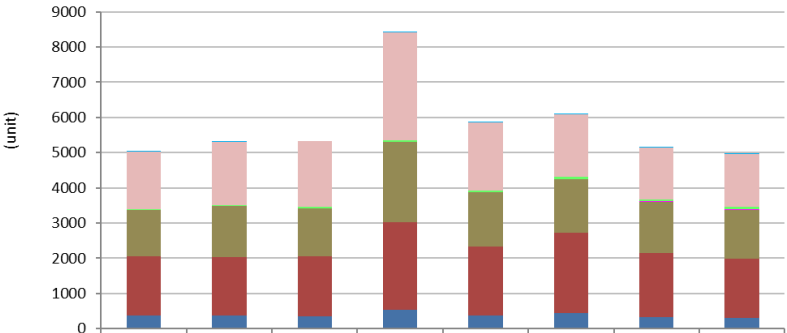
As of 2017, 4,951 licensed mining sites were in operation. Out of these, 34.2 % were in Group II(a), 30.5 % in group IV and 27.9% were in group II(b) [80].

GRAPH 106- MINING LICENCES (2008-2017)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Operation licenses	9802	10935	11604	13323	13068	13382	13464	13331	12355	11076
Exploration licenses	36098	33407	31562	18417	12945	9984	7341	6864	5445	6144
Share of mining and quarrying in GDP (%)	1.1	1.1	1.1	1.1	1.1	1.1	0.9	0.8	0.8	0.9

Source: Ministry of Energy and Natural Resources, General Dectorate of Mining Affairs (MİGEM) http://www.migem.gov.tr/Istatistik.aspx

GRAPH 107- NUMBER OF MINING LICENSES ACCORDING TO MINING GROUPS (2010-2017)



	2010	2011	2012	2013	2014	2015	2016	2017
V. Group	3	2		3	1	1	2	3
IV. Group	1637	1798	1869	3056	1944	1783	1467	1499
III. Group	26	33	35	47	44	61	59	52
II(c) Group						11	13	22
II(b) Group	1301	1450	1360	2279	1536	1521	1451	1379
II(a) Group	1686	1642	1707	2507	1957	2264	1809	1694
I(b) Group	377	380	357	526	380	449	338	302

Source: Ministry of Energy and Natural Resources, General Dectorate of Mining Affairs (MİGEM) http://www.migem.gov.tr/Istatistik.aspx

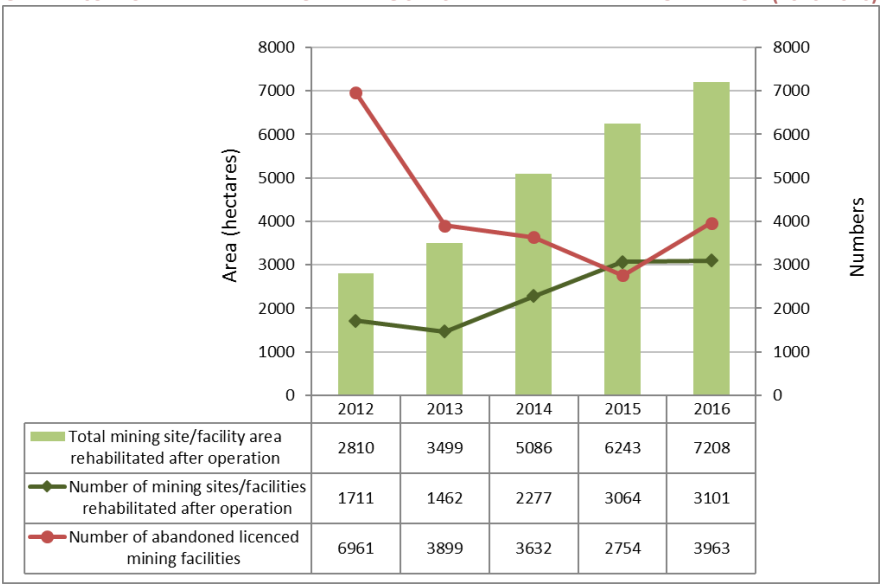
12.3- Number and Area of Abandoned Licenced Mining Facilities

D P S I R

The indicator is a response indicator. Reclamation activities should be carried out in the course of the closure of the activities. It is aimed to restore the areas damaged by mining activities in order to bring the damaged areas closer to the initial economic and environmental conditions by reclamation.

According to the data from General Directorate for Forestry, 3101 mining sites/ facilities covering a total area of 7208 hectares were rehabilitated in 2016.

GRAPH 108- NUMBER AND AREA OF MINING SITES REHABILITATED AFTER OPERATION (2010-2016)



	2012	2013	2014	2015	2016
Total mining site/facility area rehabilitated after operation	2810	3499	5086	6243	7208
Number of mining sites/facilities rehabilitated after operation	1711	1462	2277	3064	3101
Number of abandoned licenced mining facilities	6961	3899	3632	2754	3963

Sources:

(1) For the data on mining sites/facilities rehabilitated after operation: General Directorate for Forestry

(2) For the data on abandoned licenced mining facilities: Ministry of Energy and Natural Resources, General Dectorate of Mining Affairs (MİGEM) Oracle Discovery Database.

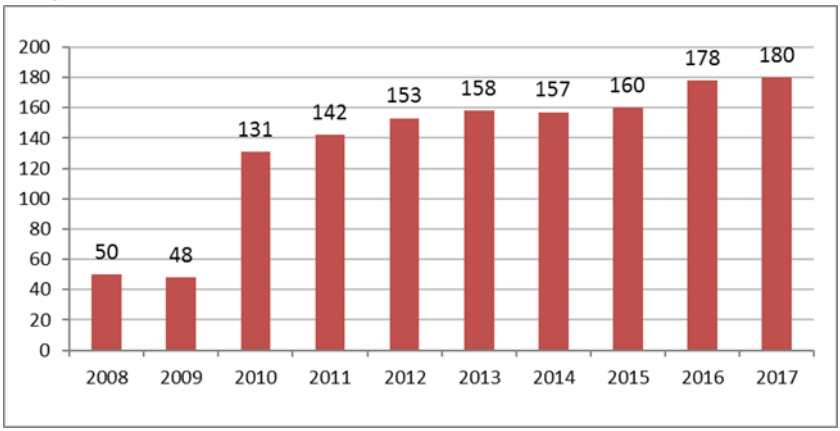
12.4- Laboratories Operating within Environmental Legislation

D P S I R

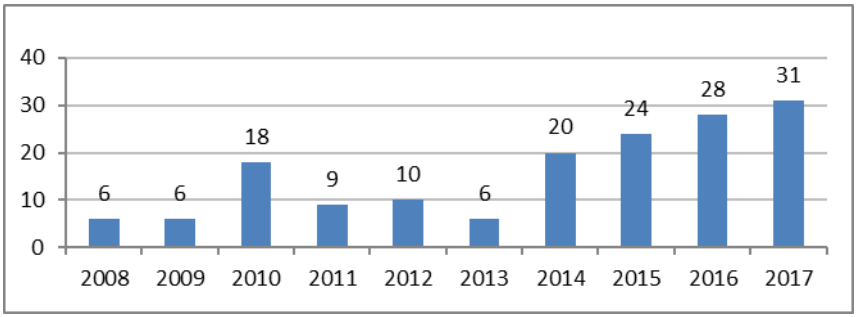
The indicator is a response indicator. In 2017, in Turkey there were 180 laboratories operating within the scope of environmental legislation. The qualifications and the provinces of these laboratories can be inquired at the following location: http://lab.csb.gov.tr/yetkili-cevre-laboratuvarlari-i-82329

Within the scope of remote inspections, proficiency assessment tests have been being conducted for laboratories authorized by the Ministry since 2008. Number of profficiency assessment testing parameters was 31 in 2017.

GRAPH 109- NUMBER of LABORATORIES OPERATING WITHIN ENVIRONMENTAL LEGISLATION BY YEARS



GRAPH 110- NUMBER OF PARAMETERS USED IN PROFICIENCY TESTS THROUGHOUT YEARS



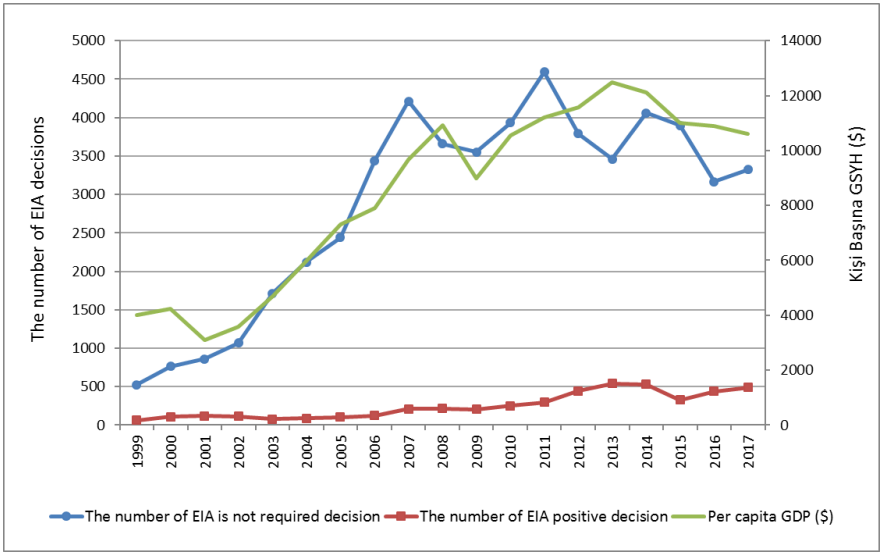
Source: Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring

12.5- Environmental Impact Assessment Decisions

The indicator is a response indicator. Environmental impact assessment (EIA), one of the most important tools of sustainable development, has been in implementation in Turkey since 1993. EIA is a tool implemented to prevent the potential impacts of the projects planned on the environment and in determining the technological alternatives together with the selected location. Before the projects are put into practice, it is mandatory to receive a certificate of EIA Positive/ EIA not necessary within the scope of EIA legislation.

EIA decisions are significant as a reflection of the level of industrialization and development process of Turkey.

GRAPH 111- THE NUMBER OF EIA POSITIVE AND EIA NOT NECESSARY DECISIONS BETWEEN 1999 AND 2017 AND GDP PER CAPITA



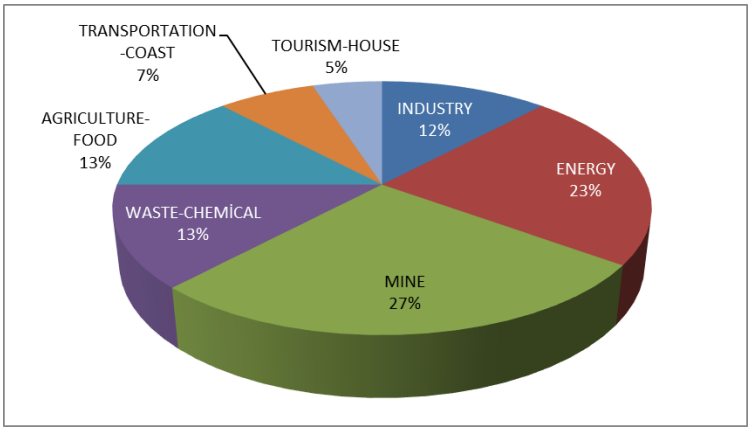
Sources: EIA data of the Ministry of Environment and Urbanisation, General Directorate of EIA, Permit and Inspection, the TURKSTAT data for GDP per capita; http://www.turkstat.gov.tr/PreTablo.do?alt_id=1108

In summary, the "EIA Positive Decisions" are defined as the positive decisions made after investigating projects existing in the list in annex 1 of the Legislation which have relatively high environmental impacts. "EIA not necessary" decisions are the positive decisions given through the screening of the projects existing in the list annex 2 of the legislation which have relatively fewer impacts on the environment when compared to annex 1.

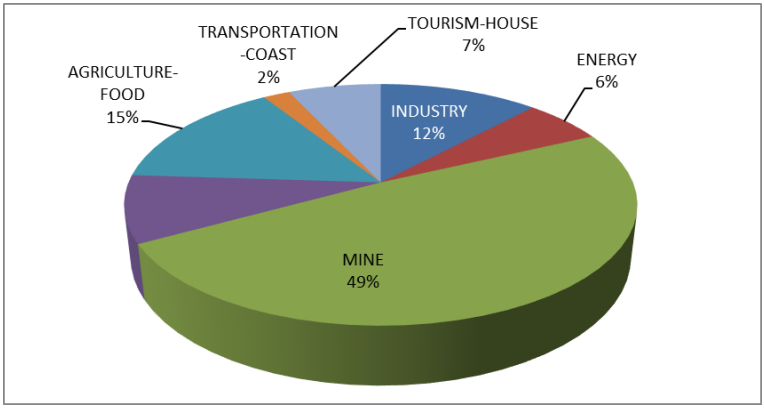
In Turkey, the first EIA Regulation was published in 1993 and by the end of 2017, a total of 5122 "EIA positive" decisions were given. When these decisions are investigated according to the distribution by sector we can see that oil and mining investments ranked the first with 27%, followed by energy investments with 23% and waste and chemical industry investments with 13%.

From 1993 up to the end of 2017 a total of 57,561 "EIA not required" decisions were issued. According to the distribution by sector, oil and mining investments again ranked the first with 49%, followed by agriculture and food investments with 15% and industrial investments with 12%.

GRAPH 112- DISTRIBUTION OF EIA POSITIVE DECISIONS BY SECTOR BETWEEN 1993-2017



GRAPH 113- DISTRIBUTION OF EIA IS NOT REQUIRED DECISIONS BY SECTOR BETWEEN 1993-2017



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

13.1- Agricultural Land Per Person

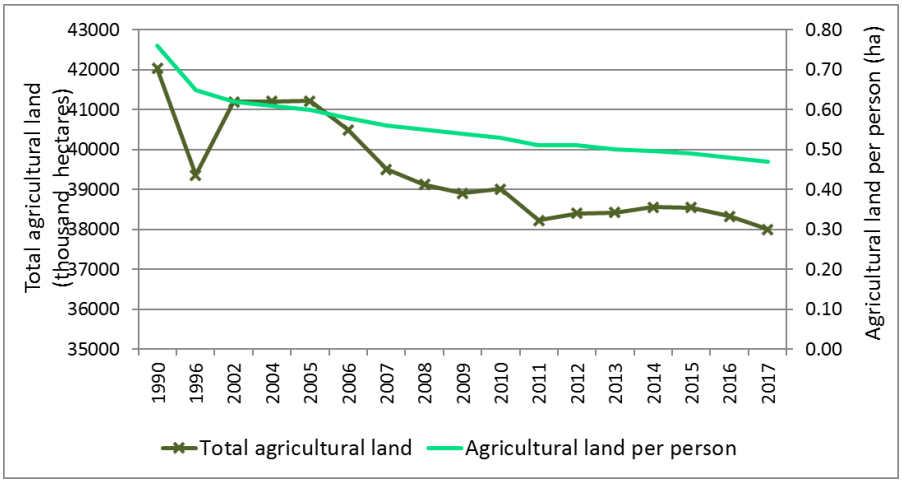
This indicator is a state indicator. While the agricultural land is essential for herbal production, pastures, winter quarters and summer pasture are necessary for the improvement of animal husbandry and protection of the nature.

According to the data from TURKSTAT, in 2017, total utilized agricultural land was approximately 38,002 thousand hectares (including permanent meadows and pastures). Of the total agricultural land, 52.7% was arable areas, 8.8% was permanent crops areas (perennial fruits), and 38.5% was permanent meadows and pastures areas.

Increase in Turkish population and decrease in total agricultural area resulted in a decline in the size of agricultural land per capita. From 1990 to 2017, Turkish population rose by 43.1% while agricultural land per capita decreased by 38.12%.

In 1990, agricultural land per capita was 0.76 hectares, this number decreased to 0.47 hectares by 2017. As of 2017, when total arable land and land under permanent crops are considered (23,385 thousand hectares), area per person was 0.29. Arable land available per person for the world is 0.19 hectares and 0.21 hectares in European Union in 2015 [81].

GRAPH 114- AGRICULTURAL LAND (TOTAL AND PER CAPITA) THROUGH THE YEARS



Sources: Ministry of Agriculture and Forestry, TURKSTAT

Notes:

1) *Data are results of 1980, 1991 and 2001 General Agricultural Censuses.*
2) *Since 1995, only the closed area of fruit and olive trees have been given and the area of scattered trees have not been included.*
3) *Data are grouped according to Statistical Classification of Products By Activity in European Economic Community (CPA 2002) since 1995.*
4) *Data are not included secondery area since 2011.*

13.2- Chemical Fertilizer Consumption

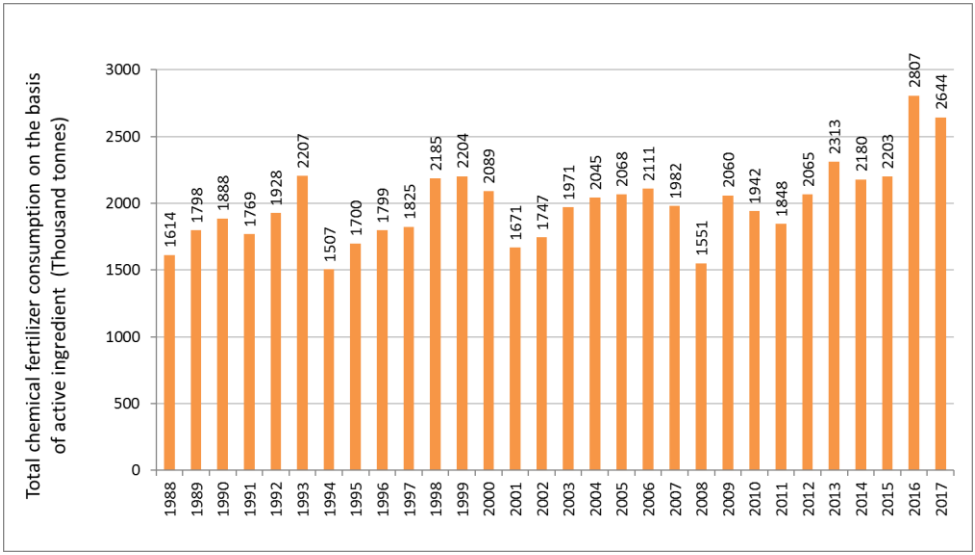
This indicator is a pressure indicator in demonstrating the factors causing eutrophication. In agricultural sector, the part of fertilizer not absorbed by plants and leaking to surface waters is an important cause of eutrophication.

In Turkey plant nutrient (N, P_2O_5, K_2O) usage was 2,644,333 tons in 2017 with 5.8% decrease compared to 2016. Fertilizers were applied on a total of 24,000,000 hectares of agricultural land. Chemical fertilizer usage amount as basis of active ingredient in Turkey is around 110 kg per hectare of agricultural land as of end of 2017. Fertilizer overdose does not occur on dry agricultural land but generally on some irrigated land [82].

Fertilizer consumption (Plant nutrient base) per hectare of arable land has been 107 kg/ha in Turkey, 157 kg/ha in the EU countries and 138 kg/ha as World average (Worldbank 2015 data) [81].

Main goal of managing the fertilizer use is to use the fertilizer with appropriate timing and methods and at appropriate rate based on soil analysis, to avoid the practices that will cause water pollution, disrupt the soil structure and reduce the efficiency of the soil, to widespread the use of organic agriculture and help achieve sustainable agriculture [82].

GRAPH 115- CONSUMPTION OF CHEMICAL FERTILIZER ON NUTRIENT BASIS OVER THE YEARS



Source: Ministry of Agriculture and Forestry

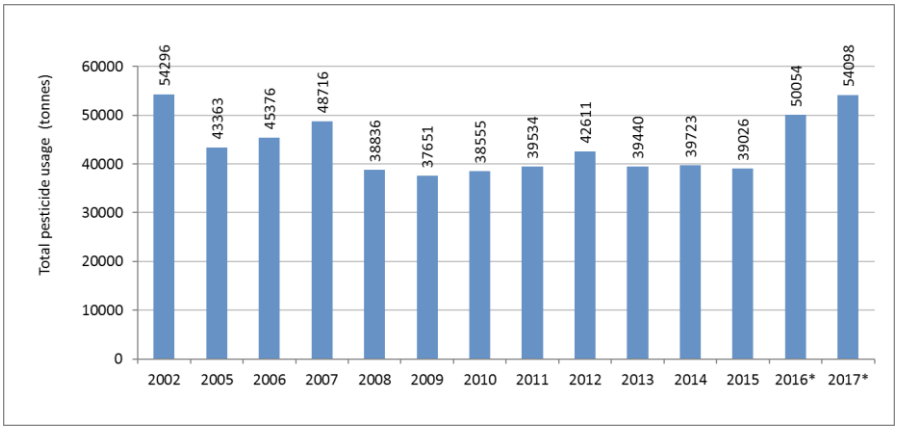
13.3- Pesticide Use

This indicator is a pressure indicator. Pesticide consumption in Turkey has increased to 54,098 tons in 2017 with a 8.08% increase rate compared to consumptİon in 2016. When the amount of pesticide use was evaluated based on groups, the largest group is fungicides (fungi killers) in Turkey as well as in the world. 2017 total pesticide use composition was as follows: 44% fungicides, 22.8% insecticides, 23.5% herbicides, 4.9% acaricides, 0.5% rodenticides and 12.4% others (nematocides, mollucides, and mineral oils).

As of 2017, five provinces with the highest share of pesticide use are Antalya, with 10.1%, Manisa with 9%, Adana with 9%, Mersin with 5.7% and Aydın with 5.7% of total national consumption.

Dissemination of Integrated Pest Management (IPM), as accepted all over the world in struggle with harmful organisms in plants, the implementation of pre-harvest pesticide control program, the inclusion of alternative methods that do not use any chemicals:such as biologic and biotechnical combat methods to agricultural support programs, and such as the introduction of educational programs such as farmers' field schools in Turkey have made a significant contribution to the reduction of pesticide use in Turkey. In Turkey, Integrated Pest Management (IPM) principles are implemented on 44% of the total cultivated land in 2017 and the target is to increase this rate to 50% in 2023 [83].

GRAPH 116- TOTAL PESTICIDE USE OVER THE YEARS



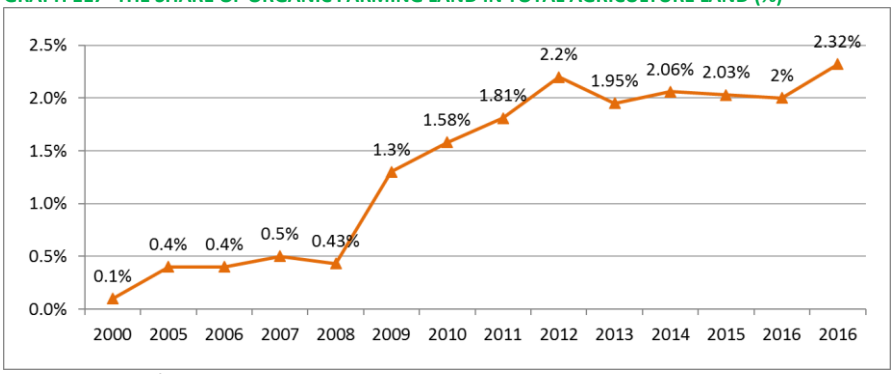
Sources: For 2002-2005 data, Ministry of Agriculture and Forestry, for 2006-2017 data: TURKSTAT
(*) Increase in 2016 and 2017 data is caused by the change of calculation method..

13.4- Organic Farming Areas and Amount of Production

Organic farming is an environmentally friendly farming practice and size of the land that organic farming is practiced or the production amount can be deemed as a response indicator. In 1985 organic agriculture applications started with 8 types of crops due to export demand. In 2002, 12,428 farmers planted on 89,827 hectares (including wild harvesting areas) and harvested 310,125 tonnes and 150 types of organic products. In 2017 this amount reached to 2,406,606 tonnes in 214 product types and 75,067 farmers who planted on 543,033 hectares. Within the 543,033 hectares including wild harvesting areas, 520,885 hectare land is used for cultural farming. In 2017, total land used for organic farming (including wild harvesting areas) increased by 3.7% while the product yield decreased by 2.7% compared to those in 2016.

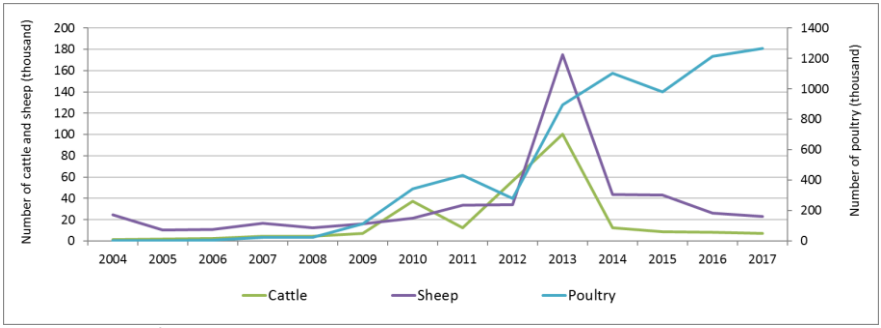
According to 2017 data, the share of land used for organic farming in total agricultural land is 2.32% in Turkey and the target is to increase this rate to 3% in 2023. According to 2016 data, World average is 1.2% and the EU average is 6.7%[84].

GRAPH 117- THE SHARE OF ORGANIC FARMING LAND IN TOTAL AGRICULTURE LAND (%)



Source: Ministry of Agriculture and Forestry.
Notes: (1) Transition period included. (2) Wild harvesting areas are included.

GRAPH 118- DATA ON ORGANIC LIVESTOCK



Source: Ministry of Agriculture and Forestry

13.5- Good Agricultural Practices

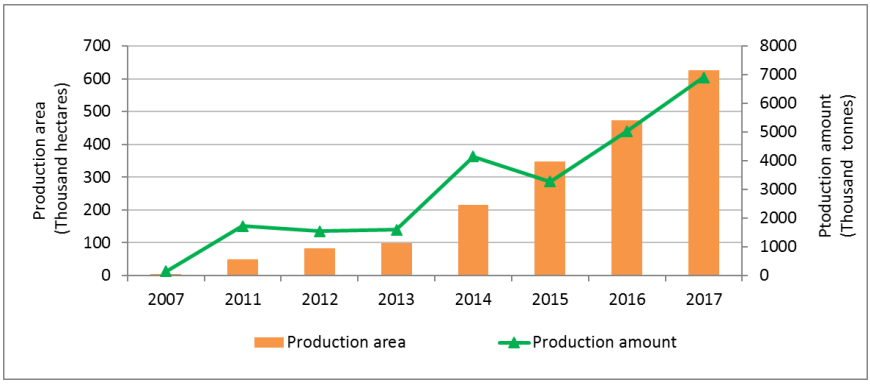
Good agricultural practice is an agricultural production which is not harmful to enviroment, human and animal health. With these practices protection of natural resorces, tracebility and sustainability are enhanced in agriculture and food safety. In this regard, the indicator is a response indicator.

Good Agriculture Practices (GAP) are carried out according to good agricultural practices legislation published by Ministry of Food, Agriculture and Livestock. to ensure GAP, product has to be traceable from the field to the dining table, and every process has to be recorded. Pesticides, fertilizers and etc. should be used according to the results of analyses and be kept under control. The last product is certificated according to the report given by the control institution.

In Turkey, Good Agricultural Practices Certificate started to be given in 2007. In 2007, GAP certification has been extended to 149,693 tons of production amount on 5,361 hectares of land while this figure increased to 6,898,748 tons of production on 624,710 hectares in 2017. Compared to 2016, good agriculture practices application area increased by 31.8% and the production amount by 37.2% in 2017.

Turkey aims to increase the rate of good agriculture practices production areas over total agricultural land (excluding fallows) upto 6.1% by 2023 [82].

GRAPH 119- GOOD AGRICULTURAL PRACTICES PRODUCTION AREAS AND PRODUCER NUMBER BY THE YEARS



Source: Ministry of Agriculture and Forestry

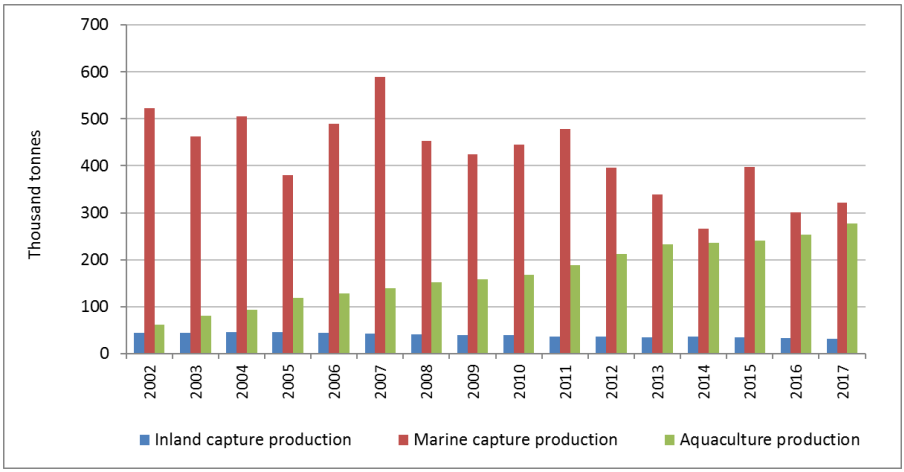
14.1- Fisheries Production

This indicator is a pressure indicator. There is 24 million ha sea area and 1.5 million ha inland water in Turkey. Based on the TURKSTAT data, in 2017, fisheries production increased by 7.2% in 2017 with respect to the previous year and occured as 630,820 tonnes. The total production composed of marine fish by 42.8%, other seafood by 8.3%, inland fish and aquatic food by 5.1% and aquaculture production by 43.8%.

In 2017, capture of fishery products increased by 5.7% and aquaculture increased by 9.1% compared to the previous year. While the production made by capture was 354,318 tonnes, aquaculture production occurred as 276,502 tonnes. 37.6% of the amount of aquaculture production took place in inland waters and 62.4% in seas. Within all the production of seafood by capture, East Black Sea Region lead with 49% of the total production It's followed by West Black Sea Region with 24.2%, Aegean Region with 14.8%, Marmara with 7.7% and Mediterranean with 4.3% [85].

In order to protect fishery resources and ensure sustainable management thereof, regulations regarding zones, season, size, species, distance, depth and equipment related to fishing are issued [86]. Furthermore, effectiveness of the activities such as monitoring of fish stocks, protection of endangered species, replenishing of the fish stocks, monitoring and mitigation of water pollution should be enhanced.

GRAPH 120- FISHERIES PRODUCTION DATA BY THE YEARS



Source: Ministry of Agriculture and Forestry, TURKSTAT

14.2- Fishing Fleet Capacity

Indicator represents the measurement of the size and capacity of the fishing fleet that is assumed to have a pressure on fish populations and environment. It is known that both in the world and in Turkey, the amount of seafood obtained by hunting is at its limits. For this reason, basic approach accepted by scientists is to maintain production while preserving the stocks. Fishing fleet of Turkey has grown and developed regarding power, amount, technology and fishing tools until the years 2000. According to TURKSTAT data, while in 2000 number of the marine fishing vessels was 13,381, this increased to 18,396 in 2005, but reduced to 14,479 in 2017.

The size of the fishing fleet has been limited by declining licenses for new vessels since 2002. Moreover, in order to reduce the fishing pressure over the resources, considering the balance between the fish stock and fishing fleet, subsidies according to the vessel size is made to those who cancel their licenses and stop fishing. In this scope; during the period of 2012-2017, a total of 1,225 fishing vessels (total length: 10 meters and over) were removed from the fleet [86].

GRAPH 121- NUMBER OF FISHING VESSELS

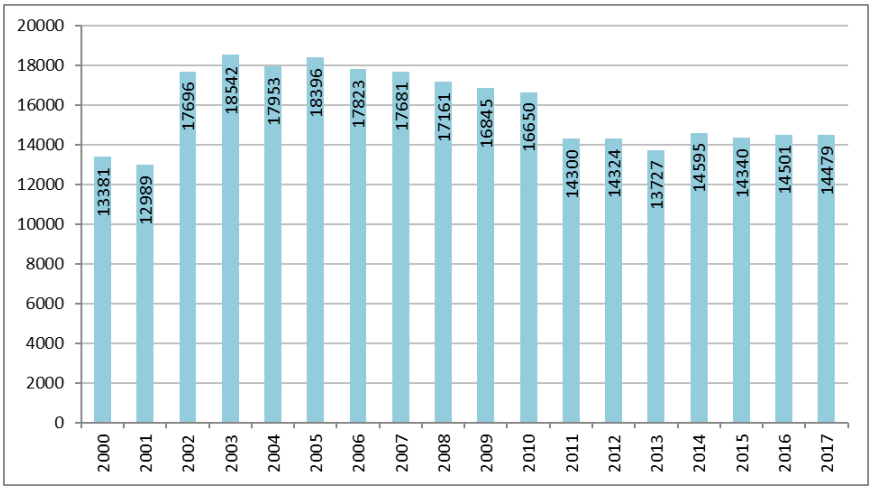


TABLE 30- NUMBER OF FISHING VESSEL RETURNED BY YEARS

Years	2013	2014	2015	2016	2017
Fishing vessel (number)	364	456	191	-	214

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

15.1- Number of Tourists

Number of visitors to Turkey within a particular time represents the amount of pressure put on the environment due to extensive consumption of natural resources in that period, besides wastewater, waste, noise, etc.

The number of tourists is found by subtracting the number of daily tourists from the total of foreign visitors and the visiting Turkish citizens residing abroad.

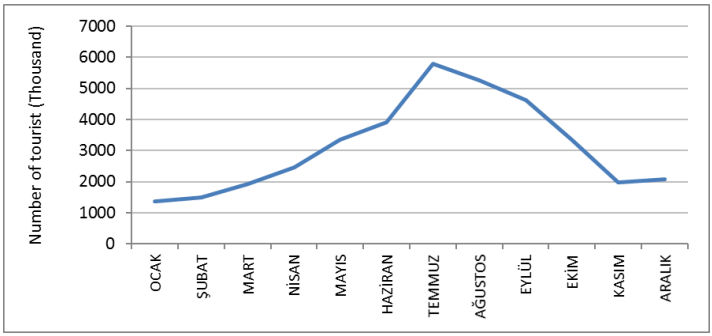
In 2003, 15,774,505 tourists visited Turkey, and this number increased to 37,599,529 in 2017. In 2017, the number of tourists increased by 24% compared to 2016.

GRAPH 122- 2003-2017 PERIOD NUMBER OF TOURISTS

Source: Ministry of Culture and Tourism

When the distribution of tourists visiting Turkey is considered by months, it is seen that tourists visited the country mostly in summer. In summer while water resource capacities are at minimum level, increasing water consumption per capita in touristic facilities bring about environmental problems related with water. Drawing an excessive amount of water from deep water wells is also a risk which increases the problem in sustainability of water resources.

GRAPH 123- MONTHLY DISTRIBUTION OF TOURISTS VISITING TURKEY IN 2017



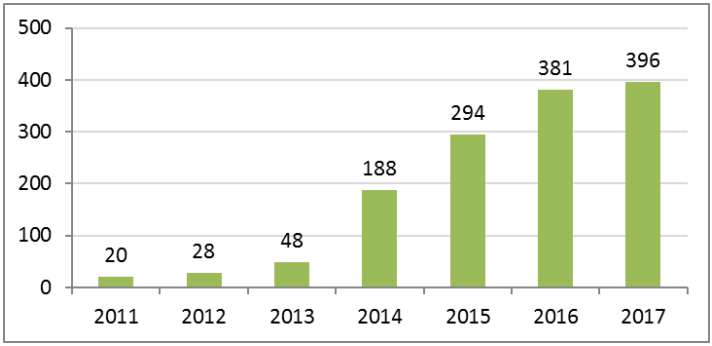
Source: Ministry of Culture and Tourism

15.2- Environment-Friendly Accommodation Facilities

This is a response indicator. In order to protect the environment, increase environmental awareness and promote contributions by the tourism operators to the environmental compliance activities, Ministry of Culture and Tourism grants the certificate and badge of "Environment-Friendly Accommodation Facility" (Green Star) to the accommodation facilities that have "Tourism Facility Certificate" and perform environmentally friendly activities.

As of the end of 2017, number of the facilities with the "Tourism Facility Certificate" was 3,771. 396 of these (10.5%) possess "Environment-Friendly Accommodation Facility" certificate (Green star badge).

GRAPH 124- NUMBER OF GREEN STAR CERTIFICATED ACCOMODATION FACILITIES OVER THE YEARS



Source: Ministry of Culture and Tourism

15.3- Tourist Overnights and Bed Places per 1000 Inhabitants

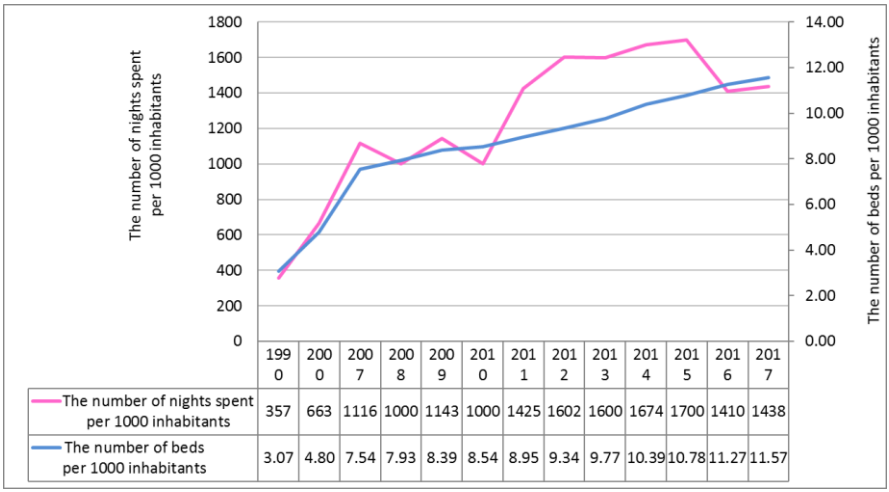
This pressure indicator is obtained by dividing the total overnight stays in the tourism facilities and the total bed places capacity of the certificated tourism facilities by total population; expressed as per 1000 people.

Increasing tourist number may have adverse effects on environment especially in a region within particular time period by excessive consumption of resources (water use, waste generation) causing serious environmental problems.

The number of bed places per 1000 inhabitants in Turkey with tourism facility certificate has increased steadily over the years. Both figures show a general increasing trend in years; while tourist overnights per 1000 inhabitants show fluctuations in some years. As of 2017, the number of beds per 1000 inhabitants in Turkey 12, while the number of nights spent per 1000 inhabitants was in 1438.

According to EUROSTAT data, there were an estimated average of 27 bed places in hotels and similar establishments in the EU-28 and 1662 nights spent by non-residents per 1000 inhabitants in 2013 [88].

GRAPH 125- TOURIST OVERNIGHTS AND BED PLACES PER 1000 INHABITANTS



	1990	2000	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
The number of nights spent per 1000 inhabitants	357	663	1116	1000	1143	1000	1425	1602	1600	1674	1700	1410	1438
The 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

Note: One most consider which that total number of accommodation establishments and bed places currently differs from on a statistical year to another which will be reflected in the final number of overnights and tourist arrivals.

Sources: The number of nights spent and bed places data for Ministry of Culture and Tourism, population data for TURKSTAT.

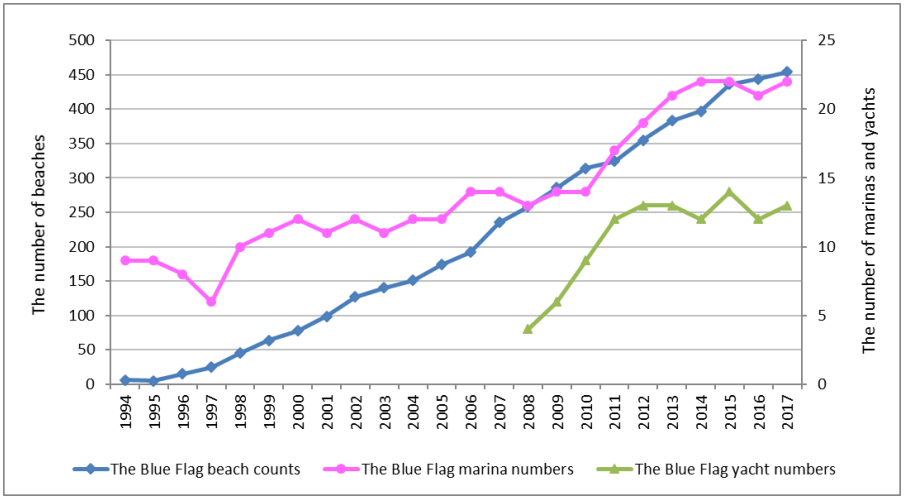
15.4- Blue Flag Implementations

This indicator is a state indicator. Blue Flag is an international environmental award given to beaches, marinas and yachts having reached to a standard as stated in the criteria. Blue Flag applications which began in 1987 in Europe and in 1993 in Turkey, aim to establish high standards in beaches, marinas and yachts.

In the period from 1994-2017, the number of Blue Flag in Turkey increased steadily and reached to 454 beaches, 22 marinas and 13 yachts in 2017.

In our country, the scope of Blue Flag Programme carried out under the coordination of Turkey Environmental Education Foundation (TÜRÇEV), our country ranks third with 454 beaches, followed Spain (578) and Greece (486) in 2017. As for marinas, Turkey ranked 7th in the World.

GRAPH 126- THE NUMBER OF BLUE FLAG BEACHES, MARINAS AND YACHTS BY YEARS IN TURKEY



Source: Ministry of Culture and Tourism

16.1- Forest Fires

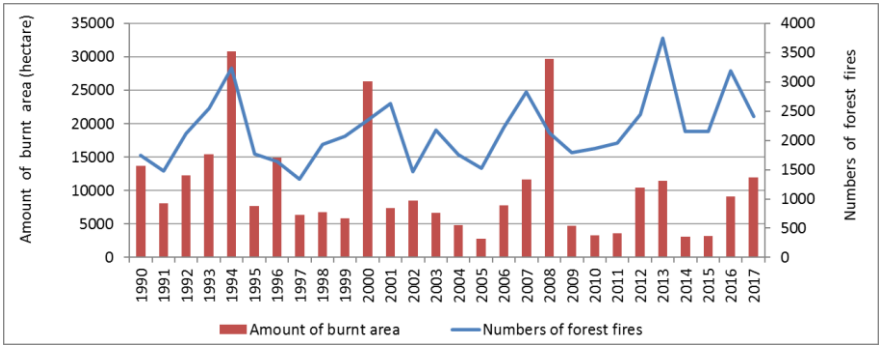
This indicator is an impact indicator. The majority of the forests located in Turkey, which is in the Mediterranean climate zone, are under the threat of forest fires.

In 2017, 2,411 forest fires occurred, in total 11,993 ha of forest area and per fire incident 5 hectar area in average were damaged. In 2017, the number of fires compared to the previous year decreased by 24.4%. Burnt forest area increased by 31% compared to the previous year.

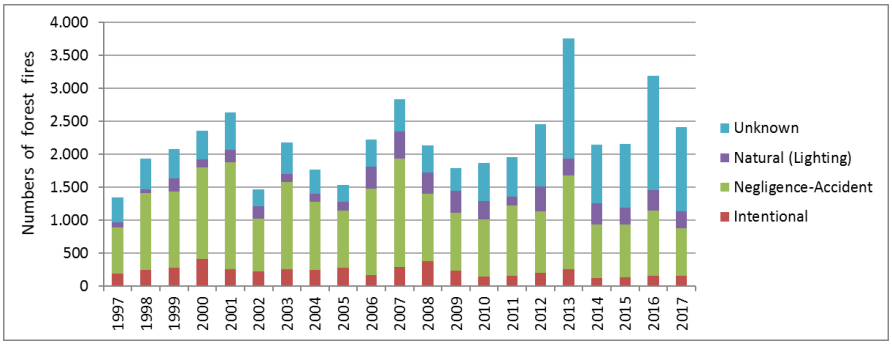
The majority of the forest fires are caused by people. Cause of the 53% of forest fires in 2017 could not be identified. 30% of fires were caused by negligence-accidents, 11% by natural causes and 6% by intention.

According to data provided by the European Forest Fire Information System (EFFIS), in the European countries in Mediterranean climatic zone, burnt areas per fire in average of 10 years (2007-2016) are as follows: Greece: 41.98 ha, Italy: 12.72 ha, Spain: 6.83 ha, Turkey: 3.73 ha and France: 2.65 ha [23].

GRAPH 127- FOREST FIRES (1990-2017)



GRAPH 128- CAUSES OF FOREST FIRES (1997-2017)



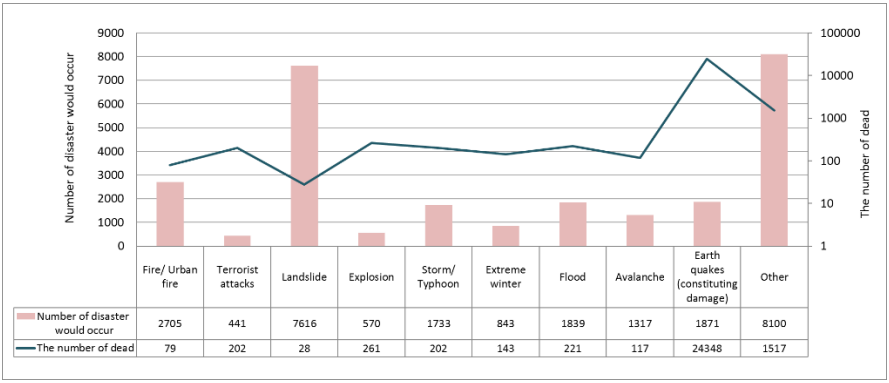
Source: Ministry of Forestry and Water Affairs, General Directorate of Forestry, https://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatistikler.aspx

16.2- Disasters by Types

Natural disasters are impact indicators and technological accidents are pressure indicators. According to Natural Disaster Archive Data Bank of Turkey (TABB), 27,035 disasters occurred between 1990 and 2017 (highway/vehicle accidents excluded). When disaster numbers have been evaluated between 1990 and 2017, it was seen that landslides took the first place by 7616 (28.2%). This was followed by 2705 (10%) urban fires and other fires, 1871 (6.9%) earthquakes (constituting damage).

27,118 people have lost their lives between 1990 and 2017 by disasters occurred in Turkey (highway/vehicle accidents not included). The highest death occurred by earthquakes (constituting damage) with a number of 24,348 (89.8%).

GRAPH 129- TYPE AND THE OCCURANCES OF DISASTERS AND THE NUMBER OF DEATH ACCORDING TO NATIONAL DISASTER ARCHIVE DATA BANK OF TURKEY (TABB) BETWEEN 1990-2017



	Fire/ Urban fire	Terrorist attacks	Landslide	Explosion	Storm/ Typhoon	Extreme winter	Flood	Avalanche	Earth quakes (constituting damage)	Other
Number of disaster would occur	2705	441	7616	570	1733	843	1839	1317	1871	8100
The number of dead	79	202	28	261	202	143	221	117	24348	1517

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

Note: highway/vehicle accidents excluded

16.3- Risk Assessment and Emergency Response Plans

Coastal Facilities which are executing activities leading pollution of seas have to prepare and submit "Risk Assessment and Emergency Response Plans" within the scope of The Law numbered 5312 "Pertaining to Principles of Emergency Response and Compensation for Damages in Pollution of Marine Environment by Oil and Other Harmful Substances" and "Implementation Regulation of related Law". In this context, Risk Assessment and Emergency Response Plans of 340 Coastal Facilities have been prepared and approved by the Ministry of Urbanisation and Environment. In 2017, this number constituted the 94% of all the coastal facilities in Turkey. The plan includes risk assessment of coastal facility, emergency response to marine pollution with necessary equipment & personnel, preventive measurements for the environment, damage identification and compensation systems and rehabilitation processes. One national and six regional emergency response plans entered into force on 08.02.2012 by the Ministry of Environment and Urbanisation and are reviewed annually.

TABLE 31- THE RATIO OF COASTAL FACILITIES FOR WHICH PLANS WERE CONFIRMED BY THE MINISTRY OF ENVIRONMENT AND URBANISATION

CITIES	YEARS								
	2009	2010	2011	2012	2013	2014	2015	2016	2017
ADANA	75%	75%	83%	83%	83%	91%	100%	92%	93%
ANTALYA	7%	36%	36%	43%	43%	75%	88%	88%	89%
ARTVİN	0%	50%	50%	50%	100%	100%	100%	100%	100%
AYDIN	0%	0%	0%	0%	0%	0%	50%	100%	100%
BALIKESİR	10%	20%	20%	30%	30%	43%	43%	57%	57%
BARTIN	0%	0%	0%	0%	0%	25%	40%	67%	67%
BURSA	20%	60%	60%	60%	60%	86%	86%	86%	100%
ÇANAKKALE	13%	25%	25%	38%	50%	67%	83%	75%	100%
DÜZCE	100%	100%	100%	100%	100%	100%	100%	100%	100%
EDİRNE	0%	0%	0%	0%	0%	0%	0%	0%	100%
GİRESUN	0%	40%	40%	40%	40%	100%	100%	100%	100%
HATAY	14%	81%	86%	86%	90%	90%	95%	95%	91%
İSTANBUL	4%	81%	82%	84%	84%	93%	94%	98%	99%
İZMİR	65%	79%	79%	79%	81%	95%	100%	91%	100%
KASTAMONU	0%	0%	0%	0%	0%	0%	33%	67%	67%
KIRKLARELİ	0%	0%	0%	0%	0%	0%	0%	0%	100%
KOCAELİ	25%	63%	78%	85%	85%	95%	100%	93%	93%
MERSİN	44%	68%	76%	80%	80%	91%	91%	88%	92%
MUĞLA	0%	4%	4%	12%	12%	57%	71%	83%	100%
ORDU	0%	14%	14%	14%	14%	60%	60%	60%	75%
RİZE	7%	7%	7%	7%	7%	100%	100%	100%	100%
SAKARYA	0%	0%	0%	0%	0%	0%	0%	0%	100%
SAMSUN	11%	67%	78%	89%	89%	90%	91%	100%	100%
SİNOP	0%	0%	0%	0%	0%	0%	0%	0%	0%
TEKİRDAĞ	25%	42%	50%	67%	75%	75%	92%	100%	91%
TRABZON	0%	8%	15%	23%	23%	60%	67%	100%	100%
YALOVA	7%	7%	7%	21%	21%	98%	98%	98%	95%
ZONGULDAK	40%	60%	80%	80%	100%	100%	71%	83%	98%
Total	**21%**	**52%**	**56%**	**60%**	**62%**	**85%**	**90%**	**92%**	**94%**

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

16.4- Liability Insurances Within the Scope of Environmental Legislation

D P S I R

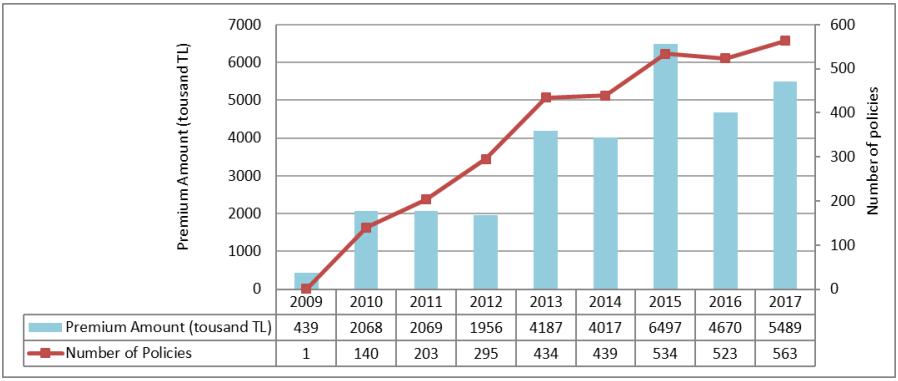
This is a response indicator. The concept of risk brings the concept of insurance as a requirement to assure the risk. In this context, environmental liability insurance is used as a tool of management of environmental risks nowadays.

Within scope of environmental legislation; General Conditions of Compulsory Marine Pollution Financial Liability Insurance for Coastal Facilities dated 01 July 2007; General Conditions of Compulsory Financial Liability Insurance for Hazardous Substances and Hazardous Wastes dated 11 March 2010 and General Conditions of Financial Liability Insurance for Environmental Pollution dated 01 September 2011 have entered into force.

Environment Pollution Third Party Liability Insurance provides coverage for the damages caused by the businesses polluting the land, the water or the air. Regarding to aforementioned insurance, 38 insurance contracts were signed and 112,883 TL premiums were written.

With Hazardous Materials and Hazardous Waste Compulsory Third Party Liability Insurance, material damages and bodily injuries caused by professional activities regarding hazardous materials are compensated. Regarding to this insurance, 67,096 insurance contracts were signed and 56,772,231 TL premiums were written [90].

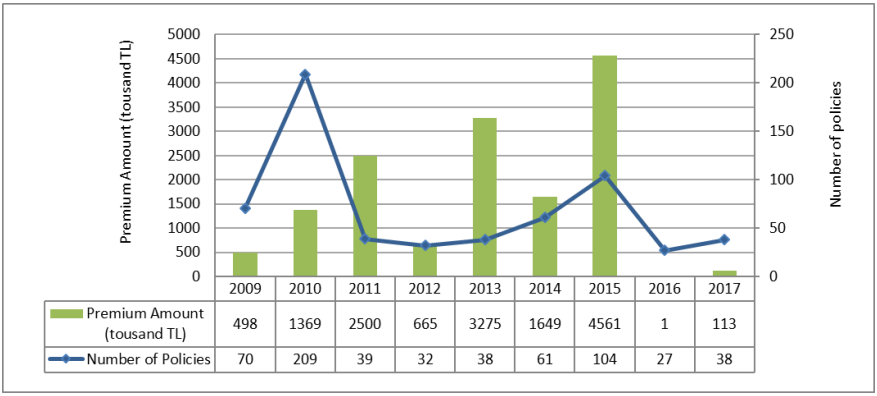
GRAPH 130- COASTAL FACILITIES SEA POLLUTION COMPULSORY THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017
Premium Amount (tousand TL)	439	2068	2069	1956	4187	4017	6497	4670	5489
Number of Policies	1	140	203	295	434	439	534	523	563

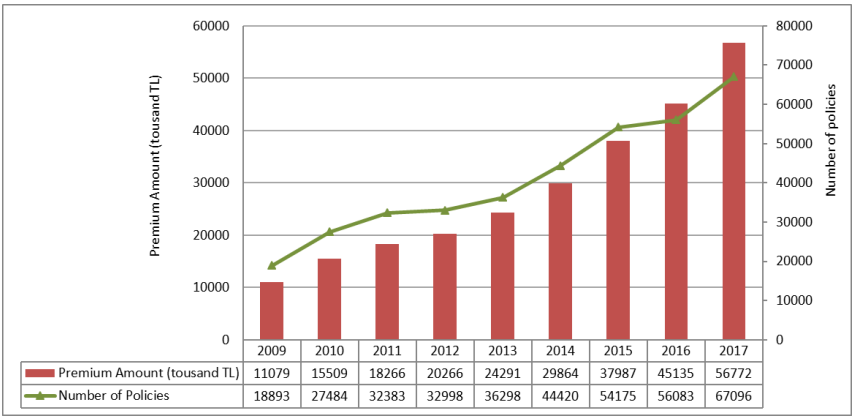
Source: Insurance Association of Turkey

GRAPH 131- ENVIRONMENT POLLUTION THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017
Premium Amount (tousand TL)	498	1369	2500	665	3275	1649	4561	1	113
Number of Policies	70	209	39	32	38	61	104	27	38

GRAPH 132- HAZARDOUS MATERIALS AND HAZARDOUS WASTE COMPULSORY THIRD PARTY LIABILITY INSURANCE



	2009	2010	2011	2012	2013	2014	2015	2016	2017
Premium Amount (tousand TL)	11079	15509	18266	20266	24291	29864	37987	45135	56772
Number of Policies	18893	27484	32383	32998	36298	44420	54175	56083	67096

Source: Insurance Association of Turkey

Amount of water abstracted by sectors (Billion m³/year

YEARS	2008		2010		2012		2014		2016	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Municipalities	4.55		4.78	9.6	4.94	8.8	5.23	10.3	5.83	9.7
Villages	1.22		1.01	2.0	1.04	1.9	0.43	0.8	0.38	0.6
Manufacturing Industry establishments	1.31		1.56	3.1	1.79	3.2	2.20	4.4	2.12	3.5
Thermal power plants	4.54		4.27	8.6	6.40	11.4	6.53	12.9	8.61	14.3
Organized Industrial zones	0.11		0.11	0.2	0.14	0.2	0.14	0.3	0.15	0.2
Mining establishments	...		0.05	0.1	0.11	0.2	0.21	0.4	0.23	0.4
Irrigation	33.77		38.15	76.4	41.55	74.2	35.85	70.9	43.06	71.3
Total			**49.95**	100.0	**55.96**	100.0	**50.59**	100.0	**60.38**	100.0

Note: Water transferred between sectors is not included.
... Data not available.
Sources: "Irrigation" figures; Source: Ministry of Forestry and Water Affairs General Directorate of State Hydraulic Works (DSİ), TURKSTAT

Amount of wastewater discharged to environment by sectors (Billion m³/year)

YILLAR	2008		2010		2012		2014		2016	
	Amount	%	Amount	%	Amount	%	Amount	%	Amount	%
Municipalities	3.26		3.58	38.1	4.07	32.7	4.11	32.4	4.25	28.6
Villages	0.20		0.19	2.0	0.19	1.5	0.11	0.9	0.12	0.8
Manufacturing Industry establishments	1.03		1.26	13.4	1.54	12.4	1.72	13.5	1.68	11.3
Thermal power plants	4.44		4.16	44.3	6.30	50.7	6.40	50.5	8.47	56.9
Organized Industrial zones	0.13		0.16	1.7	0.23	1.9	0.21	1.7	0.22	1.5
Mining establishments	...		0.04	0.4	0.10	0.8	0.14	1.1	0.14	1.0
Total			**9.39**	100.0	**12.44**	100.0	**12.68**	100.0	**14.88**	100.0

Source: TURKSTAT

Waste generation by sectors (1000 tonnes/year)

YEARS	2008		2010		2012		2014		2016	
	Total Waste Amount	Amount of Hazardous Waste İn Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste İn Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste İn Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste İn Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste İn Total Waste Amount
Municipalities	28,454	-	29,733	-	30,786	-	31,230	-	33,763	-
Manufacturing industry establishments	12,482	1,136	13,366	964	14,420	806	15,733	1,008	16,267	1,194
Thermal power plants	25,622	24	18,748	(*)	19,262	5	24,191	9	19,477	12
Organized industrial zones	255	34	313	(*)	421	62	533	32	474	...
Mining establishments	...	...	729,750	2,314	951,782	3,181	755,218	2,355	811,056	(*)
Health institutions	50	50	60	60	69	69	74	74	81	81
Total			**787,514**		**1,011,800**		**823,762**		**878,938**	

Source: TURKSTAT

(*) According to the Law no. 5429, data on units cannot be revealed when the number of units are three or less, or one or two units are dominating in the data.

... Data not available.

(1) Includes data on overburden and tailings waste from mining activities

(2) The health institutions listed in annex-1 of Medical Waste Control Regulation that are producing waste in large quantities (university hospitals and their clinics, general hospitals and their clinics, maternity hospitals and their clinics, and military hospitals and their clinics) are covered.

POPULATION

Population Growth Rate

Indicator shows the average annual increase of the population during a specific period or year. Growth rate is expressed as annual population increase for every 100 inhabitants.

Urban Population

Indicator shows the percentage of the population in provincial and district centres and within municipal boundaries over total population.

Migrant Population

Internal migration is defined as changes in usual residence addresses of population within one year in the specific areas inside the country.

ECONOMY

Resource Efficiency/Productivity

Resource efficiency/productivity is GDP divided by domestic material consumption (DMC). DMC measures the total amount of materials directly used by an economy. It is defined as the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports minus all physical exports. It is important to note that the term "consumption" as used in DMC denotes apparent consumption and not final consumption. DMC does not include upstream flows related to imports and exports of raw materials and products originating outside of the focal economy.

Domestic Material Consumption

The indicator Domestic Material Consumption (DMC) is defined as the total amount of material directly used in an economy. DMC equals Direct Material Input (DMI) minus exports. DMI measures the direct input of materials for the use in the economy. DMI equals Domestic Extraction (DE) plus imports.

Environmental Protection Expenditure

Environmental protection expenditure is the money spent on all purposeful activities directly aimed at the prevention, reduction and elimination of environmental pollution originating from production processes and consumption of goods and services. For the public sector administrative, monitoring, and enforcement expenditures are included. Environmental protection includes both abatement of and protection from pollution, and activities related to environmental degradation. Primary aim of the activities in this section is environmental protection. Actions which have a favorable impact on the environment but which serve primarily other goals do not come under environmental protection. In addition, activities performed for technical reasons, hygiene or security and provide environmental benefits are not included.

Sectoral Distribution of the Employment

It indicates the percentage of the active population of agriculture, industry, construction and service sectors in the total active population.

HEALTH

Piped water supply

Piped water supply system is defined as bringing pressurised water inside pipes from the municipal water supply network into the dwellings. Forcepumps, wells, spring supplies, cicterns, rainwater collection systems, fountains outside the houses are not considered as piped water supply systems. However, a piped water that serves in a courtyard for common use is accepted as piped water supply system.

Acute Gastroenteritis

Kinds of diarrhea and gastroenteritis not caused by specific factors or estimated to be caused by enfectious sources. It is considered as a state of defecation three or more times a day with faeces in liquid form, extending to 14 days (more than that duration implies chronic diarrhea). It may be accompanied by nausea, vomiting, fever and bowel pain.

CLIMATE CHANGE

Greenhouse Gas Emissions

These emissions comprise of direct greenhouse gasses, such as: carbon dioxide (CO_2), methane (CH_4) , nitrous oxide (N_2O) , hydro fluorocarbons (HFCs) and sulphur hexafluoride (SF6) and indirect greenhouse gases such as nitrogen oxides (NO_X) , non-methane volatile organic compounds (NMVOCs) and carbon monoxide (CO) emissions that are generated by energy, industrial processes and product use, agricultural activities and emissions from waste disposal. National Greenhouse Gas Emissions are calculated by using the guidelines of 2006 Intergovernmental Panel on Climate Change (IPCC).

Greenhouse Gas Emissions by Sectors

Indicator refers to the amount of the greenhouse gas emissions caused by different sectors and expressed as CO_2 equivalent.

Carbon Sink

Natural or human-made systems that absorb carbon dioxide from the atmosphere and store them. Forests are the most common form of sink, in addition to soils, peat, permafrost, ocean water and carbonate deposits in the deep ocean.

Carbon Sequestration

The process of capturing carbon dioxide in a manner that prevents it from being released into the atmosphere for a specified period. The process of removing carbon from the atmosphere and depositing it in a reservoir.

Precipitation

The expression describes the average precipitation per unit area.

Temperature

This indicates monitoring of the average surface temperature in time series.

Sea Water Temperature

This indicates the yearly change of the sea water surface temperature in time series.

AIR POLLUTION

Air Pollutant Emission

Emission of air pollutants is the expression for particular pollutants and is obtained by multiplying annual activity data with the emission factors and expressed as total mass (Kilotonnes, Gigagrams, etc.) per year.

Air Quality

This indicator; shows the mass concentrations of SO_2 and Particulate Matter (PM) in the ambient air. SO_2 is a suffocating, colourless and acidic gas which mostly arises from generation of sulphurous compounds that are naturally present in the fuel substances during combustion of fuels. Particulate Matter (PM) is a mixture of solid particles and liquid droplets suspended in the atmosphere. It comes in a variety of sizes and can be composed of many types of materials and chemicals. PM could also be formed by the agglomeration and the chemical conversion of the gaseous emissions. Particles between 5 to 10 micrometre diameter is defined as suspended particles. Overall, SO_2 involves heterogeneous mixtures and their characteristics vary considerably from one location to another. Particulate Matters are called PM_{10} if the aerodynamic diameter of the particles is less than 10 micrometres.

Limit value: A level fixed on the basis of scientific knowledge, with the aim of avoiding, preventing or reducing harmful effects on human health and/or the environment as a whole, to be attained within a given period and not to be exceeded once attained.

Large Combustion Plant: A combustion plant is a technical apparatus in which fuel is oxidised to use the heat generated. Large Combustion Plants (LCPs) have a total rated thermal input equal to or greater than 50 MW, irrespective of the type of fuel used.

WATER-WASTEWATER

Water Usage

This indicates the amount of total water which is drawn from the sources in a sectoral basis such as municipality, irrigation, drinking and utilization and industry.

Oxygen Consuming Substances in Rivers

The primary indicator of oxygenation state in water bodies, is expressed as biochemical oxygen demand (BOD)—which is the amount of dissolved oxygen required for the aerobic decomposition of organic matter present in water. This indicator also shows the present state and trends of ammonium (NH_4) concentrations and BOD in rivers.

Nutrients in Fresh Water Sources

Indicators can be used to show geography

ical variations in current nutrient concentrations - orthophosphate and nitrate concentrations in rivers, total phosphate and nitrate in lakes and nitrate in underground water formations - and temporal trends.

Classification based on trophic state (nutrient content); is done as oligotrophic (low nutrients), mesotrophic (normal/medium nutrient content) and eutrophic (high nutrient).

Oligotrophic

Nutrient income is limited to the surface water; organic matter generation and biomass concentration is very low.

Mesotrophic

Low organic matter and calcium at normal levels, biological productivity is higher compared to the oligotrophic water.

Eutrophic

Rich in basic plant nutrients and organic material. High levels of nitrogen, phosphorus and organic material. Also high levels of phytoplanctons and biological productivity.

Bathing Water Quality

This indicates bathing water quality in the coastal areas. According to By-law on Bathing Water Quality, following qualities represent Class A: Very Good/Excellent, Class B: Good Quality, Class C: Bad Quality and Class D: Very Bad Quality/Needs to be Banned.

Drinking and Potable Water Resources of Municipalities

This indicates the rate of the water drawn from dams, wells, natural springs, rivers, lakes and ponds by the municipalities for the consumption as drinking and potable water usage.

Municipalities Served by Wastewater Treatment Unit

This shows the number of the municipalities providing service with the wastewater treatment plant and the population that is benefitting from this service.

Wastewater Treatment is one or a combination of physical, chemical or biological processes in which the substances in wastewater are partially removed and partially changed by decomposition from complex highly putrescible organic solids to mineral or relatively stable organic solids. The extent of this change depends on the treatment processes involved. After all treatment processes are completed, it is still necessary to dispose off the liquid and the solids that are removed.

Wastewater Treatment Plants: Wastewater treatment plants are units in which water pollutants removed from wastewater by using different methods (biological, chemical, physical)

Treatment Methods

- Physical Treatment: Physical methods are the processes by which the undissolved pollutants are separated from the wastewater by filtration, sedimentation or floatation. The most common physical treatment units are; screens, sieves, sand traps, balancing and sedimentation and floatation ponds.

- Chemical Treatment: In chemical treatment by using chemicals like coagulants and polyelectrolytes, substances dissolved or suspended in the wastewater are separated.

- Biological Treatment: In this method microorganisms are used to eliminate dissolved organic substances in the wastewater which cannot be removed by physical or chemical methods. Some biological treatment methods can be mentioned as trickling filter, activated sludge, stabilization tank (oxidation tank).

- Advanced Treatment: It is the treatment method applied when physical and biological treatment methods are not capable to remove sufficiently or to remove at all, the pollutants such as nitrogen, phosphorous, heavy metals, toxic organic substances, etc.. Some of the advanced methods are; nitrification, denitrification, adsorption, ion exchange, etc.

- Natural Water Treatment System: Treatment by natural processes, such as: sedimentation of pollutants in artificial wetlands and treatment of wastewater by plants which can live in this kind of environment.

The Population Combined to at least Secondary (Biological) Wastewater Treatment Plant

It is the information of the percentage of the population whose wastewater is treated by at least secondary wastewater treatment.

Secondary Wastewater Treatment: When wastewater is treated by biological treatment or similar processes with secondary sedimentation. In this way, biochemical oxygen demand in wastewater (BOD) is reduced to at least 70%, and chemical oxygen demand (COD) to 75%.

WASTE

Municipal Waste and Disposal

This indicator shows the amount of the waste collected by the municipalities or on behalf of municipalities and the amount of the landfilled municipal waste. Waste generated in the houses are the most significant quantity of the municipal waste. It also includes the waste generated by the trade and commercial companies, office buildings, institutions and small workplaces.

Landfills

Landfills are the areas in which the waste are disposed off according to certain technical standards. This excludes the services in which the waste is stored in the interim storages less than 1 year for disposal, facilities in which the waste is stored in interim storage for less than 3 years for recovery or pre-treatment and the units in which the waste is stored in temporary waste storages for disposal or pre-treatment or recovery in the facility where the waste is generated. This indicator contains information about the number of landfills and the ratio of population the service is provided to.

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 which is used, 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, heat transfer, isolation and protection, isolation, transformer, molding, steam cylinder, pneumatic system protector, food and medicine industry, paper machine, bearing and other industrial oils and industrial greases, used thickeners, protective, cleaning and other similar preparations and oil products which are not appropriate for use.

Waste Vegetable oils

This indicates the total amount of collected vegetable oils, such as soap-stocks from refinery industry (residue formed during the removal of the fatty acids from raw oil using the base), tank bottom residues, oiled soils, used frying oil, oils from the oil separators of various facilities and expired vegetable oils.

Waste Batteries and Accumulators

It shows the collected amount and recovered amount of the used batteries and accumulators which are required to be collected, transported and disposed separately from household waste.

Packaging Waste

It contains the information about the wasted and recovered amounts of the sale, secondary and transportation packaging left to environment including the ones used for the presentation of the product during the process of transfer of goods to the consumer or the end user. This includes the expired reusable packaging waste formed after the product use but excludes waste from production.

Economic Facilities (for packaging waste)

It includes the packaging producers, merchandisers and suppliers.

End of Life Tires

This indicates the amount of tires that have reached the end of their useful life and that are used as additional fuel in recovery facilities or cement factories.

End of Life Vehicles

This indicates the number of the scrapped vehicles through the years.

Waste Electrical and Electronic Equipment

This indicates the amount of waste electrical and electronic equipment collected and the number of treatment facilities.

Mining Waste

This indicates the waste determined by the result of the questionnaire surveys made in the mining facilities such as coal and lignite, metal ore mining, mining and quarries and other sectors with supportive activities that employ 10 or more people.

Hazardous Waste

It includes information regarding the generation quantity and recovery processes of the waste which have properties of being explosive, flammable, self-combustible, exhaling flammable gases when in contact with water, oxidizing, containing organic peroxide, poisonous, corrosive, exhaling toxic gases when they are in contact with water or air and toxic and ecotoxic properties.

Ship Waste

Waste occured during the normal operation of the ships and covered by the International onvention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto MARPOL 73/78 Annex 1 (Oily wastes), Annex 2 (Noxious liquid substances in bulk), Annex 4 (sewage), Annex 5 (garbage).

Recovery

The transformation of waste into a similar material or a new raw material, product or energy by undergoing certain processes. (For instance, obtaining nylon fibers from plactic bottles, producing paper from waste paper, producing energy by combustion of wastes in incineration plants, etc.)

LAND USE

Distributions of General Land Cover

According to the CORINE project (Coordination of Information on the Environment) use types are divided into two.

1. Land Cover: It shows the state of the land covered with biological and physical elements such as, natural maquis, shrub lands, natural cliffs and natural pastures etc.

2. Land Use: It describes the land use appearing by human effect. This indicator shows a comparison between the land use changes and proportional indication of land use types determined according to Coordination of Information on the Environment-CORINE project.

Land use categories identified according to CORINE are:

1. Artificial Areas: Most of these areas are covered with buildings and transportation network.

2. Agricultural Areas: Both tamed agriculture lands and pasture areas are placed under this headline.

3. Forest and Semi-natural Areas: They are the areas consisting of forests, maquis, herbaceous plants and non-planted and less planted open areas.

4. Wetlands: These are areas which stay wet ecologically from the coastal line to the land side and all the water, marshes, reeds and peatland which do not exceed six meters during the tide movements of the seas, bitter or salted, stagnant or flowing, continuous or temporary, natural or artificial and which are important as the habitats of living things especially water birds.

5. Water Bodies: It includes the water bodies such as the continental waters (stream surfaces) and sea waters (lagoons, bays, sea and oceans).

Misuse of Agricultural Areas

It means giving permission to the lands that have the agricultural land property into use other than agricultural purposes according to certain laws or by-laws.

Zones Under Threat of Erosion

Erosion is the movement of soil from its natural environment by certain influences such as water flow, wind or gravity. Although it is a natural event, it becomes stronger with the influences such as water flow, wind and gravity with the result of deterioration of the natural structure of the land. In Turkey, several types of erosion are observed. Water erosion is the most common erosion type in Turkey. This indicator is shown together with the strength of erosion occurring in agricultural areas, forests and meadows.

BIOLOGICAL DIVERSITY

Biological Diversity

Biological diversity is the unity of genes, species, ecosystems and ecological events in a particular area. In other words, biological diversity contains the whole genes in a certain area, the species carrying these genes, the ecosystems home for these species and all the events (processes) which bind these together.

Protected Areas

These areas are the areas protected according to the description by International Union for Conservation of Nature (IUCN) updated in 2008. It is the area which is managed by legal and other effective methods, having geographical borders clearly described and dedicated for the purpose of protection of the nature and related ecosystem services and cultural values in the long term.

Forest Area

It is the size in hectare scale of the area covered by forest cover with a certain closure.

Normal Forest (Productive)

They are forests where the trees crown cover 11-100% of the hill tops.

Degraded Forest

They are forests where less than 10% of the tops of the trees crown cover the area.

Tree Growing Stock

The sum of the cyllindrical body volumes in terms of m^3 of the standing tree trunks with a chest diameter of 8 cm or more.

Definitions Related with Forestry Studies;

Functional Forestry

This indicator represents the areas which are reserved for the total timber production, nature conservation, erosion prevention, hydrological, aesthetic, ecotourism and recreation, climate protection, public health, national defence and scientific use in the total forested area.

Tree Growing Stock

It is the sum of the body volume of cylindrical body-shell trees (m^3) that have at least 8 cm or more chest diameter.

Range Rehabilitation

It involves activities like irrigation, fertilization, weed control, seeding, planting, tree planting and other biological techniques to increase the feed efficiency of the meadows and pastures in terms of quality and quantity; and the construction of plants facilitating grazing and the application of a variety of physical, technical and administrative measures in order to maintain soil.

Rehabilitation

This indicates the steps that include protection, fertilization, and pruning of existing species in degraded or unproductive forest areas and planting species that grow naturally in forests, including the plantation of grafted or non-grafted seedlings of these species.

Erosion Control

This includes the studies involving the precautions taken against erosion and removal of soil on the earth bedrock because of several factors.

Artificial Regeneration

This indicates soil processing, weed cleaning and wire embracing works by the help of machinery and manpower.

Private Afforestation

This indicates the afforestation projects permitted and approved by the Ministry of Forestry and Water Affairs, in the degraded forest areas, legal entities of the public domain and private land in the villages, municipalities, associations, foundations, chambers, the related entities that wood and harvesting belongs to commercial companies that are legal entity and natural entities.

INFRASTRUCTURE AND TRANSPORT

Highway Railway Network

This indicates development and the length of total roads (highways, state roads, province roads) and railroads

The Amount of Freight and Passengers Carried by Transport Types

This indicator shows distribution by percentage among transport types for the freight and passenger transport in the country.

Number of Road Motor Vehicles

It indicates the total number of road motor vehicles such as automobiles (including off-road vehicles), minibuses, autobuses, vans, trucks, and motorcycles, special purposed vehicles, road and non-road machinary and tractors.

ENERGY

Total Energy Consumption

It is the amount of energy sources that the enterprises consume ultimately, the conversion process and non-energy.

Total Energy Consumption by Sectors

This shows the total energy consumption of the residences, industries, transportation, agriculture, non-energy, conversion sectors with the petroleum equivalence.

Gross Inland Energy Consumption

Gross inland energy consumption represents the quantity of energy necessary to satisfy the inland consumption of the country, including energy consumed in the form of electricity, heating and transport.

Gross inland consumption is calculated as follows: primary production + recovered products + total imports + variations of stocks - total exports - bunkers. It corresponds to the addition of final consumption, distribution losses, transformation losses and statistical differences.

Primary Energy Consumption

By "Primary Energy Consumption" is meant the Gross Inland Consumption excluding all non-energy use of energy carriers (e.g. natural gas used not for combustion but for producing chemicals). This quantity is relevant for measuring the true energy consumption and for comparing it to the Europe 2020 targets.

Final Energy Consumption

The amount of final energy that enterprises use to produce goods and services, for space heating and transport purposes.

This indicator expresses the sum of the energy supplied to the final consumer's door for all energy uses. It is the sum of final energy consumption in industry, transport, households, services, agriculture, etc. Petro chemical feedstock quantities are part of transformation sector. Final energy consumption in industry covers the consumption in all industrial sectors with the exception of the 'Energy sector'. The fuel quantities transformed in the electrical power stations of industrial autoproducers and the quantities of coke transformed into blast-furnace gas are not part of the overall industrial consumption but of the transformation sector. Final energy consumption in transport covers the consumption in all types of transportation, i.e., rail, road, air transport and inland navigation. Consumption figures in household and services sector are aggregated.

Primary Energy Production

It explains the amount of energy supplied from solid fuels like coal and wood, petroleum, gas and renewable sources and the ratio of each resource to total energy production.

The Share of Renewable Energy Sources in Gross Final Energy Consumption

This indicator shows the rate of total energy consumption obtained from renewable energy sources (wood, animal and plant residues, hydraulic, geothermal, wind and solar). Renewable energy sources correspond to current external flow of energy or energy obtained from materials derived from them.

The Primary and Final Energy Intensity

The ratio of the primary energy consumption to the GDP is considered as primary energy intensity, the ratio of the the final energy consumption to the GDP is considered as final energy intensity.

Energy Consumption in Conversion Processes

It is the amount of energy that enterprises consume in electricity generation, heat production, and in coke oven / blast furnace.

Non-Energy Consumption

It is the amount of energy that enterprises consume an energy source not for energy purpose but as raw material etc.

INDUSRY AND MINING

Environmental Impact Assessment (EIA)

EIA contains the determination of the positive and negative impacts of the planned projects on the environment, preventing the potential negative impacts and in determining the technological alternatives to minimize the negative impacts together with the location choice. The process covers also the monitoring and inspection during the implementation stages of the projects.

EIA Positive

It is the decision of the Ministry stating that the adverse impacts of the project on environment, which is accepted to be on the desirable level according to scientific basis and due to the precautions taken; taking into consideration of the Commission for Scope Determination and Evaluation/Assessment about Environmental Impact Assessment Report

EIA Negative

The decision of the Ministry stating that it is inconvenient to implement the project due to its negative impacts on the environment; considering the decisions of the Commission for Scope Determination and Evaluation/Assessment.

AGRICULTURE

Agricultural Land Per Capita

This indicates the ratio of the total arable land to total population.

Consumption of Chemical Fertilizer

It refers to the amount of active ingredients (tonnes / year) Nitrogen, Phosphorus, or nitrogen - phosphorus – calcium mix within the fertilizer consumed in agriculture.

Use of Pesticides

It refers to the total annual use of pesticides.

Organic Agriculture

Organic agriculture is agricultural production type in which no chemical inputs are used in production, only with the usage of the input permitted by the By-Law and controlled and certified in every stage from production to consumption. This indicator represents the amount of agricultural products produced by organic agricultural methods and their fields.

Good Agricultural Practices

According to the By-Law published on the Official Gazette dated 7 December 2010 and with the issue number of 27778 ; good agricultural practices represent the processes to be applied to emphasize socially viable, economically profitable and efficient agricultural production which protects human health and environment and animal health and welfare.

FISHERIES

Fisheries Production

This indicates the amount of sea fish, shellfish, molluscs and aquatic food whether fished or cultivated from inland waters each year. The data related to production is the live weight of the resource when caught or cultured.

Fishing Fleet Capacity

This indicates the total engine power of the fishing fleet.

TOURISM

Number of Tourists

It indicates the number obtained by subtracting the number of the daily tourists from the number of foreign visitor coming to Turkey and the visits of the citizens residing abroad.

Blue Flag Implementations

Blue flag is an international environment award, which is awarded to the qualified beaches, marinas and yachts that have the required standards, and it is the total number of blue flags given to the beaches and marinas in Turkey since 1994. However, blue flag award is granted to yachts since 2008 in Turkey.

DISASTERS

Forest Fires

It indicates the total number of burned forest area within the whole forest areas in years.

Disasters by Types

It indicates the number of periodical occurrence of natural disasters such as hydraulic (flood, landslide), meteorological (storm, avalanche), geophysical (earthquake, volcanic activity) and climatic (heating, malformation, drought, fire) and industrial accidents, traffic accidents, pipeline transportation, and the deaths and property loss caused by these disasters.

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