REPUBLIC OF TURKEY MINISTRY OF ENVIRONMENT AND URBANISATION
GENERAL DIRECTORATE OF ENVIRONMENTAL IMPACT ASSESSMENT, PERMIT AND INSPECTION
Environmental Inventory and Information Management Department

ENVIRONMENTAL INDICATORS 2016

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REPUBLIC OF TURKEY MINISTRY OF ENVIRONMENT AND URBANISATION
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MINISTRY OF ENVIRONMENT
AND URBANISATION

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PRODUCTION

This booklet is generally based on 2016 data; however, data under some headings belong to year 2015, since these data are reported and compiled at the end of the following year. In particular, data on greenhouse gas emissions and emissions of air pollutants in this booklet belong to the year 2015.

While our country continues its development, protection and improvement of the environment are our main targets. At this point, it is important to closely monitor the change in the environment, to see the results of the legislation and practices in the field of environment, and to make new legislations when necessary.

It is important to use environmental indicators correctly in all studies in order to inherit a healthy environment to next generations by providing a summary and result-oriented perspective.

As the Ministry of Environment and Urbanisation, the reason for the preparation of the Environmental Indicators booklet is to reflect the relationship between the environment and all sectors, to keep track of changes in time and to produce understandable results.

I hope that "Environmental Indicators 2016" booklet which is prepared by the current data will inform the public, guide all institutions and organizations related to the environment, and also guide them in decision-making processes.

Mehmet ÖZHASEKİ
Minister of Environment and Urbanisation

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
Issue No 35	:	Environmental Inspection Report of Turkey in 2016	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;

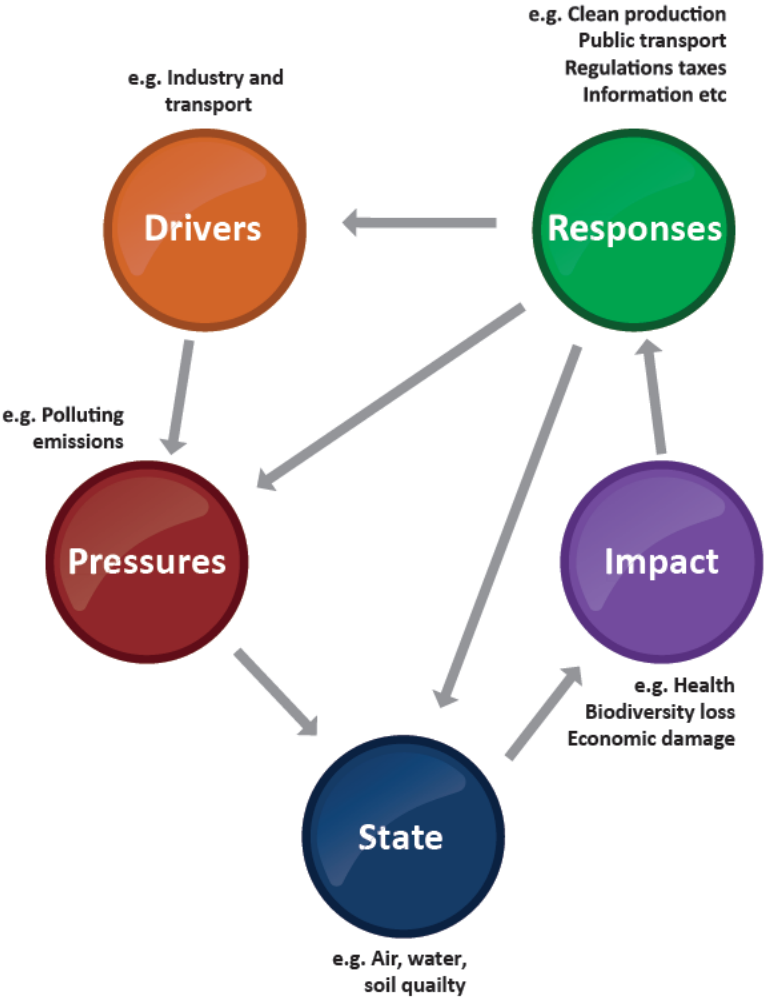
D Driving force indicators: These indicators are the factors behind various variables. If we need to express in general, all economic activities are classified in this group.

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 Rate • 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 • Average Age of Vehicles Registered to the Traffic • Final Energy Consumption by Mode of Transport • Fuel Consumption by Mode of Transport • Total Energy Consumption by Sectors • Primary Energy Consumption by Fuel Type • Final Energy Consumption by Sectors • Primary Energy Consumption per Capita • Primary Energy Production • Final Energy Intensity	• Greenhouse Gas Emissions • Total Greenhouse Gas Emissions by Sectors • Air Pollutants Emissions • 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 • Aquaculture 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 Expenditures • Environmental Employment • 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 • 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

TREND OVER THE PREVIOUS YEAR IN TERMS OF ENVIRONMENTAL IMPROVEMENTS

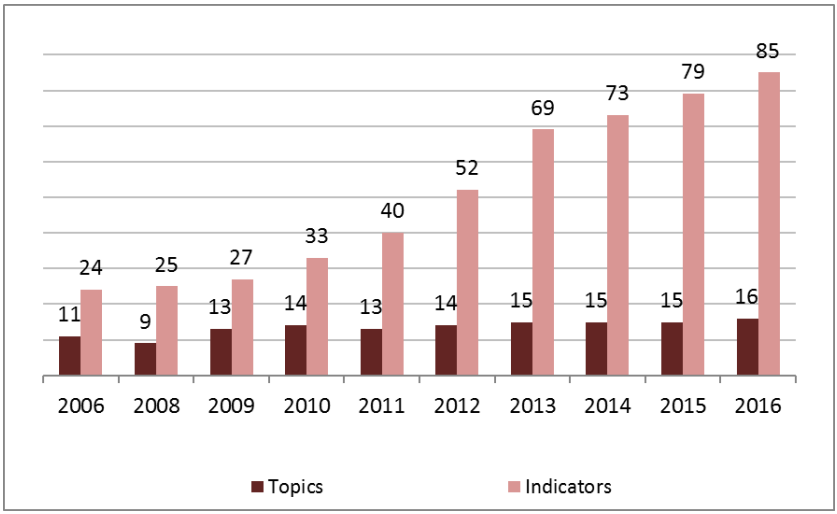
Keys

↑	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 Expenditures	↑
Share of Total Environmental Expenditures in GDP (%)	↓
Environmental Employment	↑
HEALTH	
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	
CO, NO_x, PM_{10} and NMVOC Emissions	↑
SO_2 and NH_3 Emissions	↓
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 Kucuk Menderes, North Aegean (Bakircay) and Sakarya Basins	↑
Oxygen Consuming Substances in the rivers in Ergene and Susurluk Basins	↓
Oxygen Consuming Substances in the rivers in Gediz Basin	→
Nitrate Nitrogen in Ergene, Kucuk Menderes, Gediz and Susurluk Basins	↓
Nitrate Nitrogen in North Aegean (Bakircay) and Sakarya 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	↑
Wildlife Protection Activities	↑
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	→
Energy Efficiency	→
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	↑
FISHERY	
Sea Fishery	↓
Aquaculture Products	↑
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 and Amount of Burnt Area	↑
Number of Coastal Facility Emergency Plans Approved	↑

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 2016" (present publication) contains 85 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 2016" booklet are laid down as follows:

Population

In 2016, population of Turkey was 79,814,871. While the population growth rate was 1.34% in 2015, it increased to 1.35% in 2016. Together with the growing population, average age is increasing in Turkey. Population is estimated to start decreasing from 2069 onwards [2].

Provinces that have the highest net migration (difference between immigration and emmigration) during 2015-2016 period are; Kocaeli (25,123 persons), Tekirdağ (24,246 persons) and İzmir (23,766 persons), and provinces with the lowest net migration are; İstanbul (-71,307 persons), Van (-20,133 persons), Ağrı (-17,384 persons)[7].

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, 2016 figure was 2.2 euros/kg [8].

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 9.8 tons in 2000 to 12.9 tons in 2015 with a 23.6% incerease. For the year 2013, Turkey's domestic material consumption per capita was 11.9 tons while average value of the EU-28 countries was less than 13.3 tons and the world average was around 11.8 tonnes[9].

Sectorial distribution of GDP and employment are indicators of the national economy. In Turkey, services sector receives the highest share of employees with 53.7%; 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.

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 in 2016, life expectancy at birth was 78 years while this number was 80.6 years in EU-28 according to 2015 data. 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 2015 by 122% compared to 1990, 4.3% compared to 2014. 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 135,986 thousand TOE (Tonnes of Oil Equivalent) in 2016. Increase in 2016 was 159.3% compared to 1990,. Despite the increase, per capita primary energy consumption (1.71 TOE in 2016) in Turkey is still lower than average of European Union Countries (3.21 TOE in 2015).

In Turkey, parallel to the energy consumption, CO_2 equivalent emissions were calculated as 3.88 tonnes per capita in 1990's but in 2015, this value went up to

6.07 tonnes per capita[18]. CO_2 equivalent EU-28 emissions per capita were calculated as 8.75 tonnes in 2015 [20]. 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 2015, 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 55.6%, and it was followed by fuel combustion for transport with 16%, industrial processes and product use with 12.8%, agricultural activities with 12.1% and waste sector with 3.5% [18].

Energy

Energy production is an important driving force that puts pressure on the environment, not only as pollution source, but also by contribution to the climate change as well. Shift to cleaner energy resources like use of renewable energy sources help mitigate climate change because of their lower carbon intensity (lower CO_2 emissions per unit energy). In Turkey, while contribution of renewables to total energy consumption was 19.4% in 1990, in parallel with increasing energy demand, this figure decreased to almost 13.1% in 2016. However, this figure is close to the 13.4% rate in the EU-28 countries with 2014 data[67].

Another important issue regarding the environment in energy consumption is energy efficiency.

As compared with the year 2000, there is an improvement of 23.1% in the primary energy intensity index and 21% in the final energy intensity index in 2015. Compared to 2000, energy efficiency index improvement of 2.1% has been achieved in general[59].

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 obtained in the Register of Industrial installations maintained by the Ministry of Science, Industry and Technology, total sales of the installations that operate within organized industrial zones are 19% of the total sales of all the installations in the register for year 2015 and 24% for the year 2016.

Air Quality

Based on the 123 stations with a value exceeding every three years in the period between 2014 and 2016, exceedances for PM_{10} increased by 22.4% and exceedances for SO_2 decreased by 22.5% in 2016 compared to 2015. In the same period, PM_{10} and SO_2 limit values decreased by 11%.

Particularly in winter months pollutants rising from domestic heating cause significant air pollution problems. Besides present studies, it's thought that additional efforts are required in order to improve air quality.

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.

Compared to 2015, in 2016 biochemical oxygen demand (BOD) decreased in Susurluk and Ergene Basin, however increased in North Aegean and Kucuk Menderes Basins. In the nitrate nitrogen parameter, a slight increase was observed in the North Aegean (Bakırcay) and Sakarya Basins and a decrease was observed in the other Basins.

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% [29].

Discharges of nitrogen and phosphorus from land based sources like urban, industry or agricultural sources cause eutrophication. In the 2014-2016 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 2014-2016 monitoring period.

Total phosphorus (TP) concentrations were high especially in inner bays having riverine and household discharges in Mediterranean Sea. TP summer concentrations were higher than winter concentrations. The lowest concentration was observed in 2016 winter season. In Aegean Sea, winter TP concentrations values were higher than the summer values because of high river load entrance to the sea due to high precipitation. In Black Sea, high concentrations of TP along the coast implies the land based pressures. It is known that the Sea of Marmara is an inner sea, which is more influenced from the outer pressure than our other seas.

Rate of Class A (very good) bathing waters decreased from 78.6% in 2015 to 75% in 2016.

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 [34]. 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 [35].

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, 71% of the population (in total municipal population) was served by waste disposal and recovery facilities is in 2016.

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 2016, 60,233 plants in total provided data to HWDS. The total amount of the hazardous waste generated in 2016 was calculated as 1,363,227 tonnes, excluding the waste generated by the mining industry. 79.94% of the mentioned total was directed to recycling; 16.3% was disposed of; 3% stored and 0.75% was exported.

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.

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. There are various erosion types observed all over the country; while water erosion is the most widespread one. 61.2% of the territory of the country faces high level (severe and very severe) water erosion problem.

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 endemism rate is about 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 2016. 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 [43].

As for 2016, ratio of total protected areas (including areas protected by Ministry of Forestry and Water Affairs and by the Directorate General for Preservation of Natural Heritage under the Ministry of Environment and Urbanisation) to the total surface area of the country was 9.1%, This is below the World average which was 12.8% in 2014 [47].

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 majority of the forest fires are caused by people. Cause of the 54% of forest fires in 2016 could not be identified. 31% of fires were caused by negligence-accidents, 10% by natural causes and 5% 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 2016, 89.2% of the domestic passenger transportation and 86.5% 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 2016 was 55%. In 2013 the ratio was 75% and in 2016 57%.

Agriculture

In Turkey plant nutrient (N, P_2O_5, K_2O) usage was 2,807,280 tons in 2016 with 27.4% increase compared to 2015. Fertilizer aplication rate in Turkey is 116 kg/hectare (2016 data) while in more developed countries this rate is 200 kg/hectares in average. Overuse of fertilizers does not occur on dry agricultural land but generally on some irrigated land [75]. According to TURKSTAT data, pesticide consumption in Turkey has increased to 50,054 tons in 2016 with a 28.2 % increase rate compared to consumption in 2015.

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[78]. Based on the TURKSTAT data, in 2016, aquaculture production decreased by 12.4% in 2016 with respect to the previous year and occured as 588,715 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. The number of tourists coming to Turkey for the year 2015 showed an increase as. The number of tourists in 2016 compared to 2015 decreased by 23.28%. 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 2016, 381 of 3,641 (10.5%) tourism accommodation facilities have been issued “Environment-Friendly Accommodation Facility” certificate (Green star badge). Moreover, with 444 beaches that possess Blue Flag, Turkey is ranked second place following Spain; with 21 marinas ranked 7th place in the World. This situation necessitates more measures in enviroınmental 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 1.34% in 2015, it increased to 1.35% in 2016. In 2016, the population of Turkey became 79,814,871 persons. The population density which is the number of persons per square kilometre increased by 2 persons/km^2 compared to 2015 and reached to 104 in 2016. The median age of the population in Turkey increased from 31 in 2015 to 31.4 in 2016 [2].

The world population in 2015 was more than 7 billion according to the population projections calculated by United Nations. Constituting 1.1% of the world population, Turkey was the world's 18th most populous country.

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

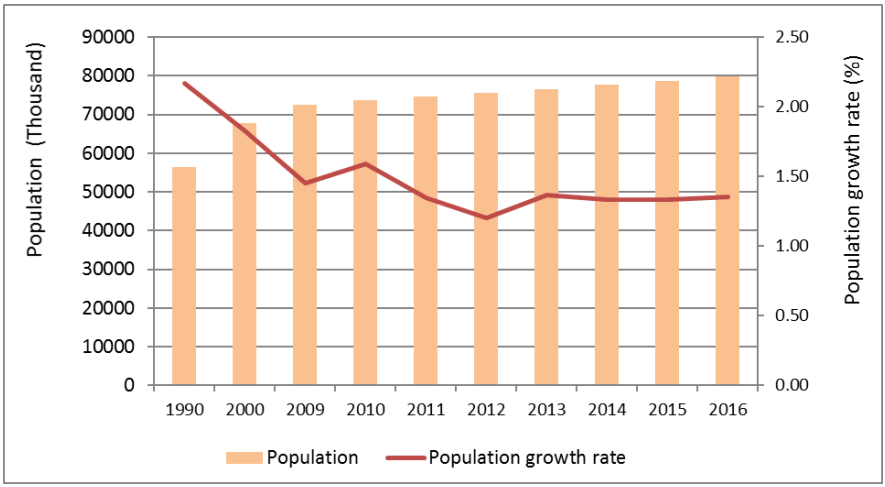


TABLE 1- POPULATION AND POPULATION GROWTH RATE CHANGES OVER THE YEARS

YEARS	1990	2000	2010	2011	2012	2013	2014	2015	2016
Population (1000 persons)	56,473	67,804	73,723	74,724	75,627	76,668	77,696	78,741	79,815
Population Growth Rate (%)	2.17	1.83	1.59	1.35	1.20	1.37	1.33	1.34	1.35
Population density (persons/km^2)	73	88	96	97	98	100	101	102	104

Source: TURKSTAT Population Censuses, 1990-2000 and Address Based Population Registration System (ABPRS), 2009-2016
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 32 n 2023, 38.5 in 2040, 42.3 in 2060 and 45 in 2080 [3].

GRAPH 2- POPULATION PROJECTIONS BY YEARS, 2016-2075

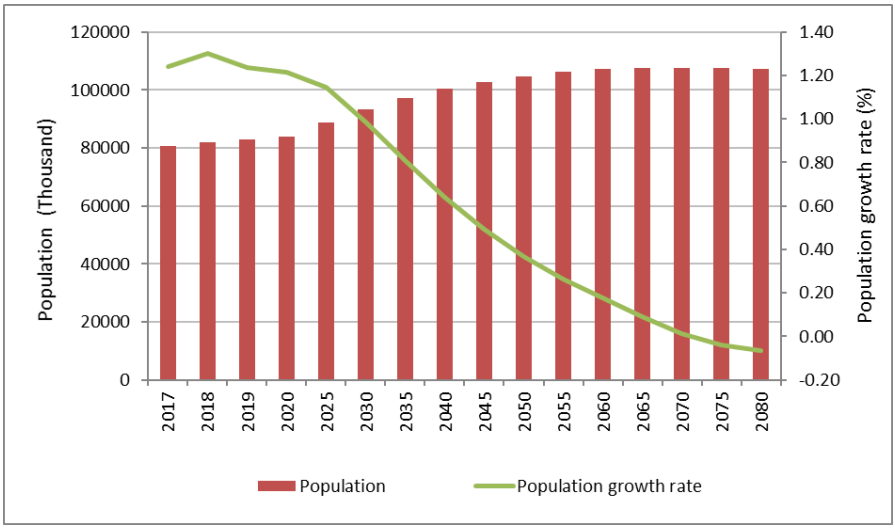


TABLE 2- POPULATION PROJECTIONS BY YEARS, 2016-2075

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	1,15	0,98	0,81	0,64
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 (%)	0,49	0,37	0,27	0,18	0,09	0,01	-0,04	-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.

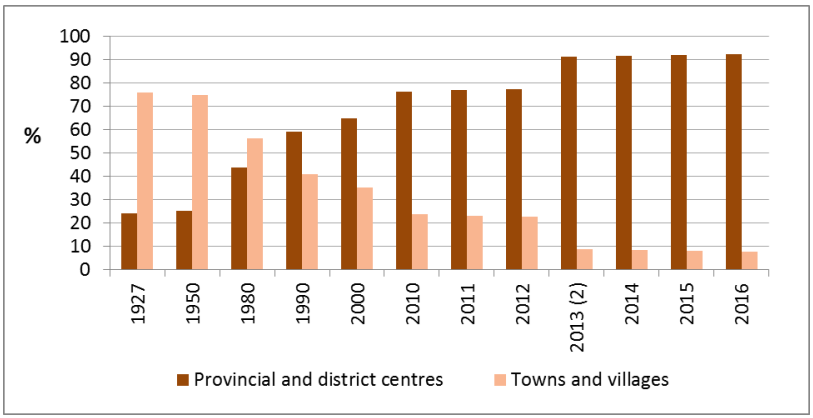
According to the first census conducted in 1927 In Turkey, population was 13,648,270, and 75.8% of the people lived in towns and villages and 24.2% in cities; however, after 1950 population started to agglomerate in urban areas.

Ratio of the total urban population was 77.3 in 2012. However, in 2013, with the ammendment of the Law on Metropolitan Municipalities, new metropolitan municipalities were established in 14 provinces. Towns and villages were affiliated to these municipalities as districts in 30 provinces with metropolitan status. This had a significant influence on the increase of urbanisation rate to 91.3 % in 2013 and to 92.3% in 2016. Proportion of population living in small towns and villages was 7.7% in 2016

According to the results of Address Based Population Registration System in 2016, population residing in province and district centres was 73,671,748 persons and population residing in towns and villages was 6,143,123 persons[2].

About half of the global population lives in urban areas, and this share is projected to increase to two thirds by 2050. Nearly 73% of the European population lives in cities [4], [5], [6].

GRAPH 3- URBAN AND RURAL POPULATION RATES THROUGH THE YEARS



Source: TURKSTAT

Notes: (1) The results of population cencuses were used for the years between 1927 and 2000 while the results of address based population registration system were used for the years between 2010 and 2016.

(2) In 2013, main reason of the sudden change in the urban and rural populations is the restructuring of administrative divisions by the Law No. 6360.

1.3- Migrant Population

Internal migration is defined as changes in permanent residence of population within one year inside a country. Conditions stipulated by economic development are regarded to cause demographic movements such as rapid population growth and migration from rural to urban areas.

According to the figures from the Address Based Population Registration System, 2,192,826 persons migrated within the country during 2015-2016 period while this figüre was 1,903,234 during 2007-2008 period. In these figures, foreign population is not included.

Provinces that have the highest net migration (difference between immigration and emmigration) during 2015-2016 period are; Kocaeli (25,123 persons), Tekirdağ (24,246 persons) and İzmir (23,766 persons), and provinces with the lowest net migration are; İstanbul (-71,307 persons), Van (-20,133 persons), Ağrı (-17,384 persons) [7].

GRAPH 4- MIGRANT POPULATION, 2008-2016

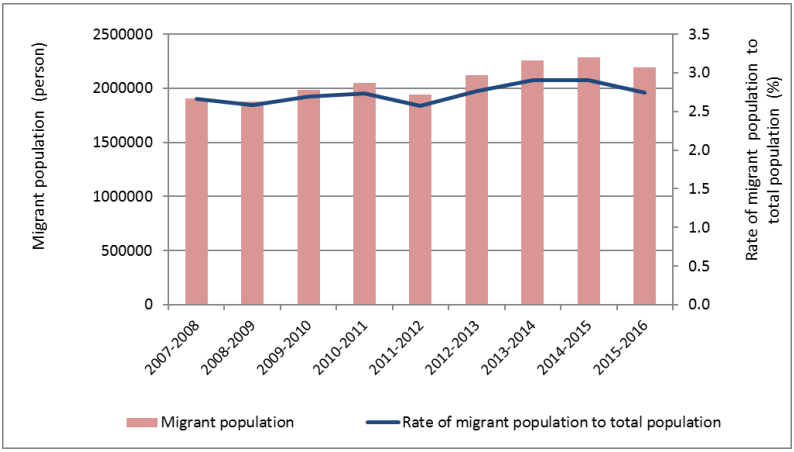


TABLE 3- MIGRANT POPULATION, 2008-2016

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)	1,903	1,877	1,986	2,046	1,943
Rate of Migrant Population to Total Population (%)	2.7	2.6	2.7	2.7	2.6

Period	2012-2013	2013-2014	2014-2015	2014-2016
Total Population (1000 persons)	76,668	77,696	78,741	79,815
Migrant Population (1000 persons)	2,122	2,255	2,288	2,193
Rate of Migrant Population to Total Population (%)	2.8	2.9	2.9	2.7

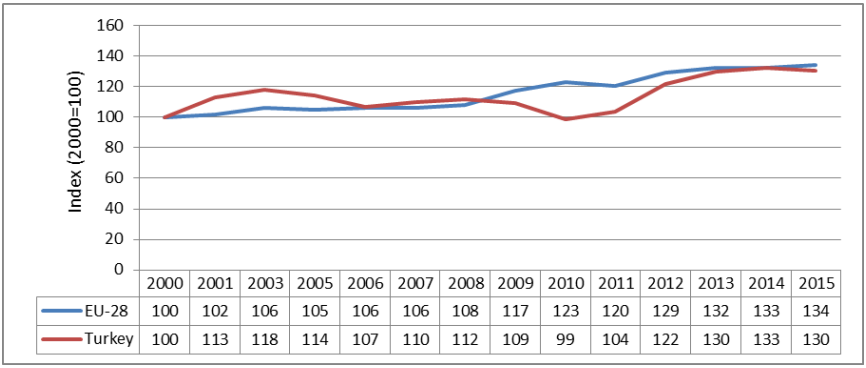
Source: TURKSTAT, The results of Address Based Population Registration System (ABPRS), 2008-2016
Note: Foreign population is not included.

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 34% between 2015 and 2000, while in Turkey has increased by 30% [8].

GRAPH 5- RESOURCE EFFICIENCY



	2000	2001	2003	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
EU-28	100	102	106	105	106	106	108	117	123	120	129	132	133	134
Turkey	100	113	118	114	107	110	112	109	99	104	122	130	133	130

Source: EUROSTAT, http://ec.europa.eu/eurostat/tgm/refreshTableAction.do?tab=table&plugin=1&pcode=tsdpc100&language=en

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 2016 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 9.8 tons in 2000 to 12.9 tons in 2015 with a 23.6% 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 11.8 tonnes per capita in 2013, having increased steadily from 8.5 tonnes per capita in 2000, according to estimates by SERI (Sustainable Europe Research Institute) and the Vienna University of Economics and Business (WU Vienna)[9].

As seen on the graph, per capita DMC of Turkey was below the EU-28 average, but close to the World average in 2013.

GRAPH 6- DOMESTIC MATERIAL CONSUMPTION PER CAPITA BY YEARS

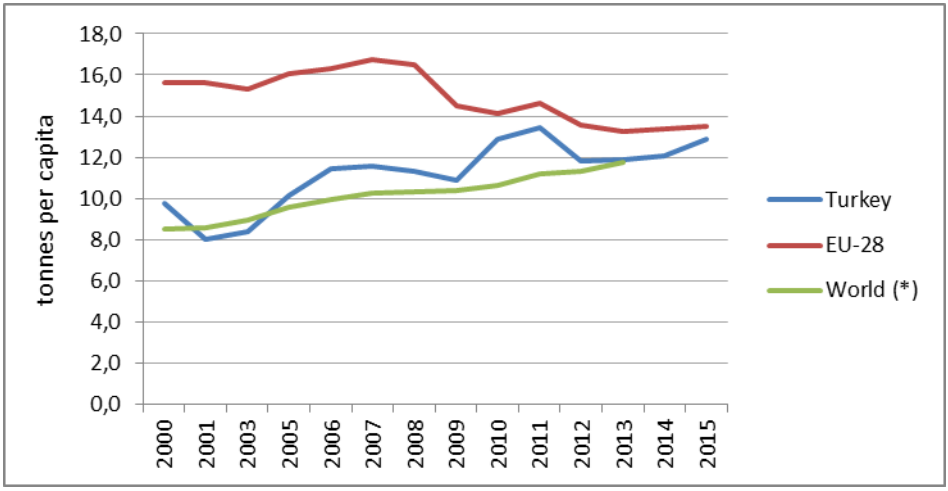


TABLE 4- YEARLY TREND OF DOMESTIC MATERIAL CONSUMPTION PER CAPITA (tonnes)

YEARS	2000	2001	2003	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Turkey	9.8	8.0	8.4	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	15.3	16.1	16.3	16.7	16.5	14.5	14.1	14.7	13.6	13.3	13.4	13.5
World (*)	8.5	8.6	8.9	9.6	9.9	10.3	10.3	10.4	10.6	11.2	11.3	11.8	*	*

(*) Global average values for2014 and 2015 are not available.
Sources:
1) 2000-2009 Turkey datas Sustainable Development Indicators of TURKSTAT, 2010-2014 Turkey datas were calculated using Material Flow Account of TURKSTAT.
2) EUROSTAT, http://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_and_resource_productivity

2.2- Sectoral Distribution of Employment

This indicator is a status 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 2016, while the rate of employment in the service sector was 73.4% in EU 19 average, in Turkey this rate was 53.7%.

In 2016, sectoral distribution of employment in EU-19 countries were 3.2% in agriculture, 6.4% in construction, 17.0% in industry, 73.4% in services. These figures in OECD countries are 4.6% in agriculture, 6.4% in construction, 15.7% in industry, 73.3% in services [10].

GRAPH 7- SECTORAL DISTRIBUTION OF EMPLOYMENT

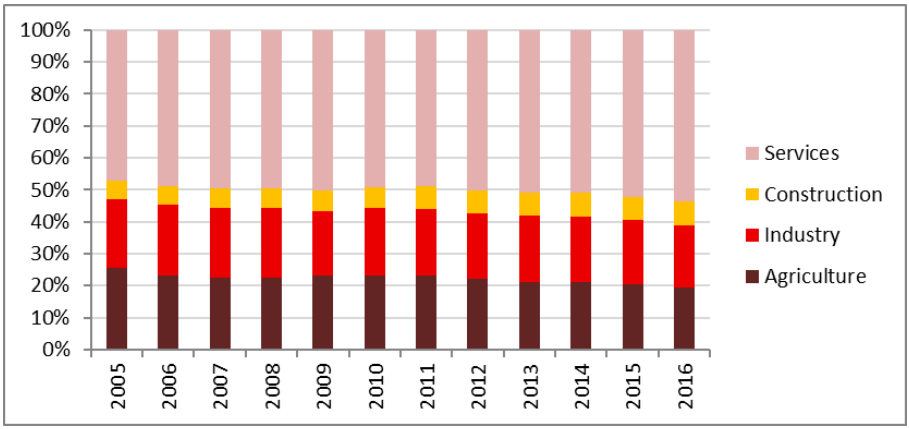


TABLE 5- SECTORAL DISTRIBUTION OF EMPLOYMENT

(+15 age)

YEARS	2005		2010		2015		2016	
	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**
Agriculture	5,015	25.5	5,084	23.3	5,483	20.6	5,305	19.5
Industry	4,241	21.6	4,615	21.1	5,332	20.0	5,296	19.5
Construction	1,097	5.6	1,434	6.6	1,914	7.2	1,987	7.3
Services	9,281	47.3	10,725	49.1	13,891	52.2	14,617	53.7

Source: TURKSTAT, Household Labour Force Survey
Note: The results of 2005-2013 are estimated by the econometric model.

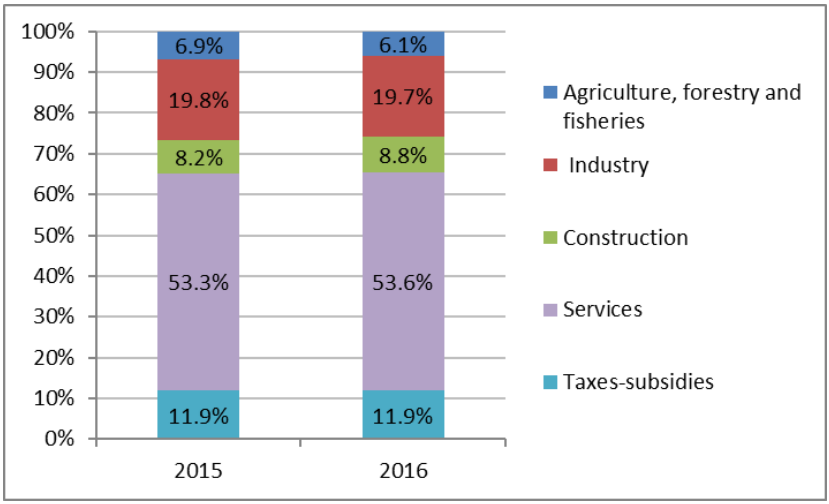
2.3- Sectoral Distribution of Gross Domestic Product

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 10.8% compared to the previous year in 2016 to 2 trillion 590 billion 517 million TL. When the activities that constitute the gross domestic product at the current prices according to the production method are examined, In 2016, share of agriculture, forestry and fishery sector was 6.1%, share of industrial sector was 19.7%, share of construction sector was 8.8% and share of services sector was 53.6%.

GRAPH 8- IN 2015-2016, GROSS DOMESTIC PRODUCT AT CURRENT PRICES BY KIND OF ECONOMIC ACTIVITY (A10) (%)



Source: TURKSTAT, Quarterly Gross Domestic Product, IV. Quarter: October-December, 2016
Note: Figures may not sum up to 100 due to rounding.
NACE Rev. 2 used for classification of Economic Activities.

2.4- Environmental Expenditures

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.

In 2016, total environmental expenditure was 31.8 billion TL, of which 66.8% was current expenditure and 32.2% was investment expenditure. Share of total environmental expenditures in gross domestic product was 1.2% in 2016.

In total environmental expenditure, waste management services accounted for 40.4%, water services accounted for 32.6%, wastewater management services accounted for 17.6% and others accounted for 9.4% in 2016 [11].

GRAPH 9- ENVIRONMENTAL EXPENDITURES BY SECTOR

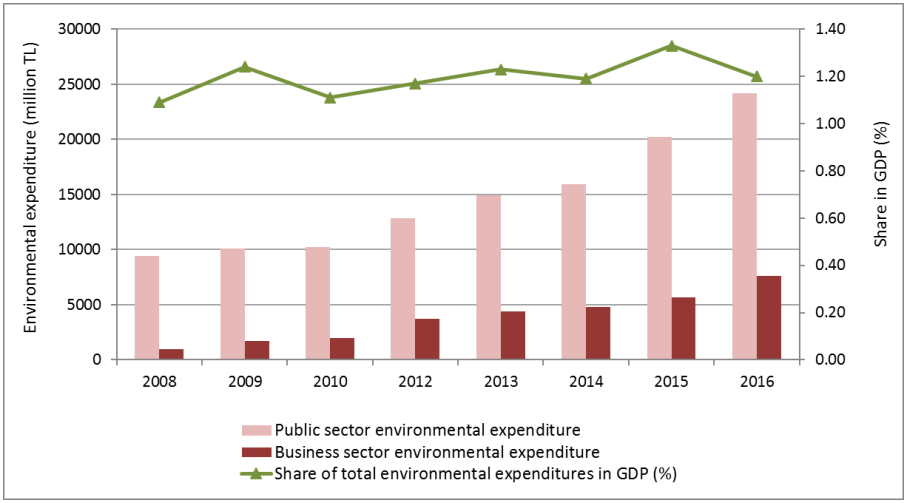


TABLE 6- ENVIRONMENTAL EXPENDITURES BY SECTOR

YEARS	2008	2009	2010	2012	2013	2014	2015	2016
Total (million TL)	**10,356**	**11,803**	**12,206**	**16,582**	**19,275**	**20,732**	**25,935**	**31,805**
Public Sector Environmental Expenditures (million TL)	**9,416**	**10,078**	**10,241**	**12,848**	**14,914**	**15,935**	**20,249**	24,200
Governmental organisations and private provincial administrations	1,280	1,335	1,479	2,190	2,426	2,197	2,419	2,901
Municipalities	7,763	8,377	8,377	10,237	11,929	13,431	17,428	20,887
Local administration unions	374	366	385	421	559	307	402	412
Business Sector Environmental Expenditures (million TL)	**940**	**1,725**	**1,965**	**3,734**	**4,361**	**4,797**	**5,686**	**7,605**
Enterprises	872	1,498	1,834	3,527	4,067	4,431	5,310	7,123
Organized industrial zones	68	227	131	207	294	366	377	482
Share of Total Environmental Expenditures in GDP (%)	**1.09**	**1.24**	**1.11**	**1.17**	**1.23**	**1.19**	**1.33**	**1.2**

Source: TURKSTAT

2.5- Environmental Employment

Environmental employment is the number of personnel working in public institutions and private sectors related to environmental operations. The number of personnel working related to environmental operations should be sufficient in order to carry out environmental protection, pollution prevention and inspection duties.

Environmental employment was 89,265 employees in 2016. 8.5% of this number is employed in public sector, and 91.5% is employed in private sector. Among the number of people in private sector, 98.6% was employed in enterprises, and 1.4% in organized industrial zone management. 60% of the employment in enterprises was related with water supply, sewerage, waste management and remediation acitivites [11].

GRAPH 10- ENVIRONMENTAL EMPLOYMENT BY SECTOR

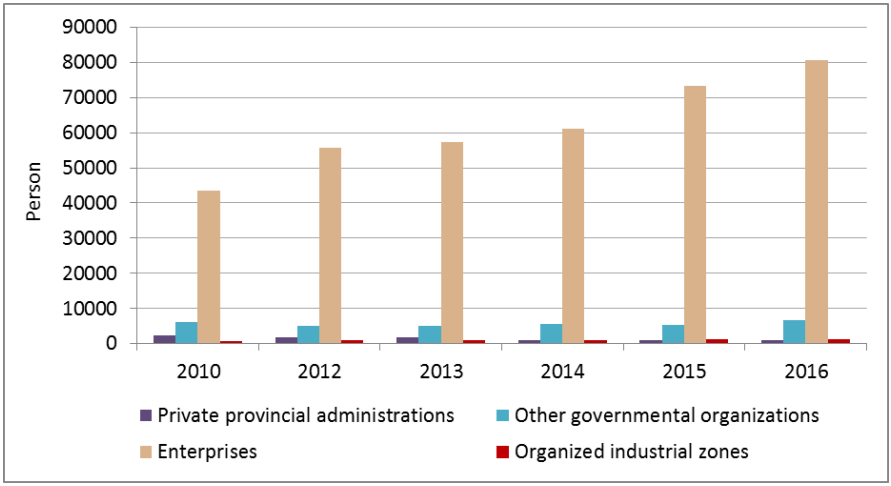


TABLE 7- ENVIRONMENTAL EMPLOYMENT BY SECTOR

YEARS	2010	2012	2013	2014	2015	2016
Total	**52,457**	**63,331**	**65,124**	**68,486**	**80,827**	**89,265**
Public Sector (1)	**8,298**	**6,921**	**6,799**	**6,447**	**6,445**	**7,567**
Private Provincial Administrations	2,305	1,855	1,847	1,003	1,073	1,045
Other Governmental Organizations (2)	5,993	5,066	4,952	5,444	5,372	6,522
Business Sector	**44,159**	**56,410**	**58,325**	**62,039**	**74,382**	**81,698**
Enterprises	43,583	55,564	57,393	61,068	73,257	80,592
Organized Industrial Zones	576	846	932	971	1,125	1,106

Source: TURKSTAT

(1) Excluding environmental employment in municipalities and local administration unions.

(2) It covers ministries and affiliated institutions.

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 80.7 years for women. In general, women appeared to live longer than men and the difference in life expectancy at birth was 5.4 years.

According to EUROSTAT (Statistics Office of the European Union) data, in 2015, life expectancy at birth was 80.6 years in general, 77.9 years for men and 83.3 years for women in the EU-28 countries[13].

TABLE 8- LIFE EXPECTANCY BY SEX AND AGE, 2014-2016

Age	Total	Male	Female
0	**78.0**	**75.3**	**80.7**
15	64.2	61.5	66.8
30	49.6	47.1	52.1
50	30.5	28.2	32.7
65	17.8	16.1	19.3

Source: TURKSTAT

3.2- Waterborne Diseases

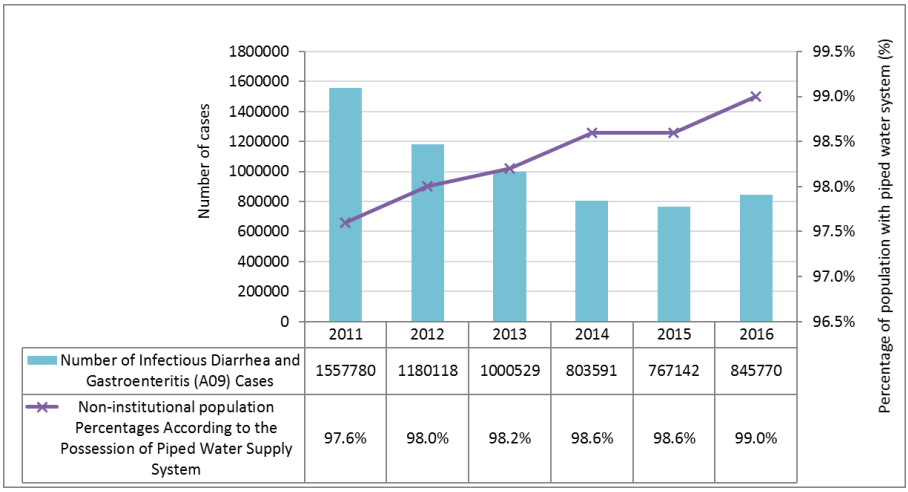
Every year all over the world 2 million people are estimated to have acute gastroenteritis. Diseases with diarrhea cause 1.5 million child deaths and are the second largest cause of death among kids below 5 years of age.

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 [14].

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 [15].

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%

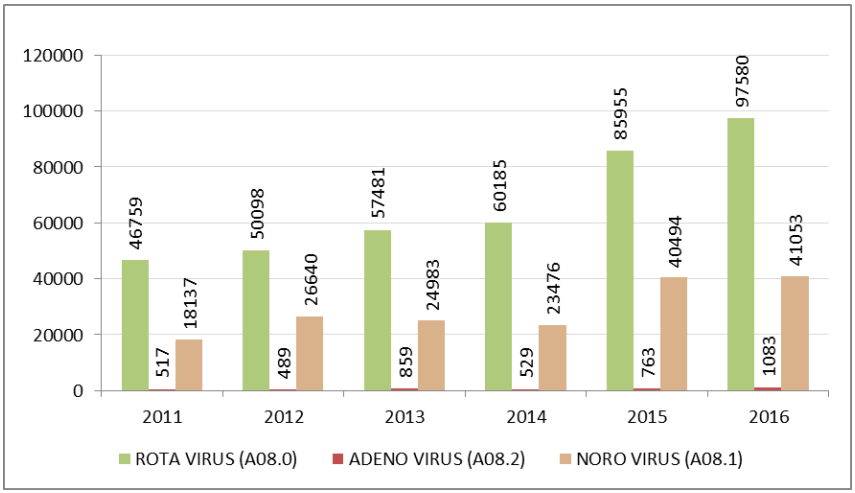
Sources:
For case numbers; Ministry Of Health, Public Health Institution of Turkey, 2016, http://yeni.thsk.gov.tr/depo/thsk/strateji-db/birimler/stratejik-yoneti-planlama/idari-faaliyet-raporu/2016_faaliyet_raporu-13.03.2017.pdf

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 [14].

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[16].

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 99% of the non-institutional population benefited piped water supply system in 2016 (non-institutional population: all population living in dwellings within the country). 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 [17].

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 2015 by 122% compared to 1990, 4.3% compared to 2014 [18]. In 2015, greenhouse gas emissions in the EU-28 were down by 22% compared to 1990 levels [19].

In Turkey, CO_2 equivalent emissions were calculated as 3.88 tonnes per capita in 1990's but in 2015, this value went up to 6.07 tonnes per capita[18]. CO_2 equivalent EU-28 emissions per capita were calculated as 8.75 tonnes in 2015 [20].

GRAPH 13- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS

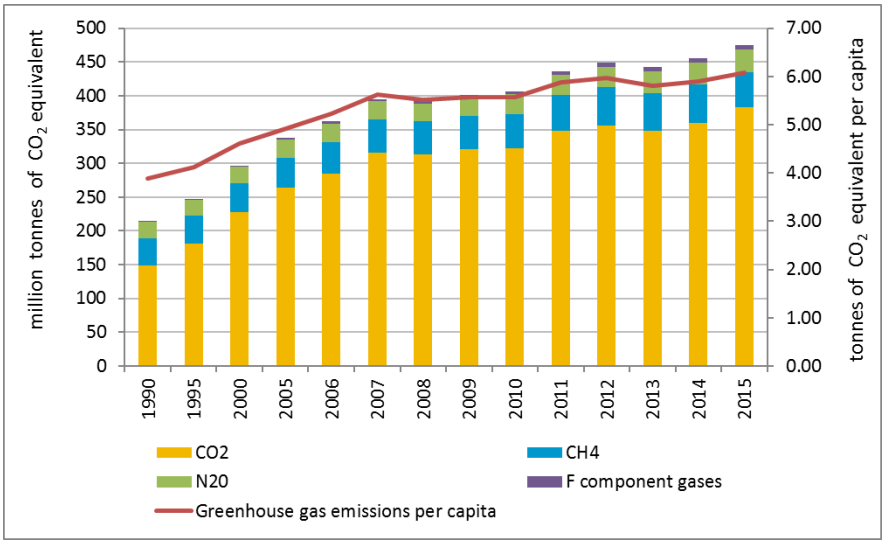


TABLE 9- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS (million tonnes of CO_2 equivalent)

YEAR	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015
CO_2	148.2	181.4	227.7	263.9	322.1	348.0	355.5	347.7	359.2	383.4
CH_4	41.2	41.2	42.3	44.4	51.2	53.4	56.8	55.6	56.8	51.4
N_20	23.8	23.3	25.1	26.3	28.8	29.7	30.7	32.8	32.7	33.3
F Component Gases	0.7	0.6	1.4	2.6	4.7	5.2	5.9	6.1	6.8	6.9
TOTAL	**214.0**	**246.6**	**296.5**	**337.2**	**406.8**	**436.4**	**448.9**	**442.2**	**455.6**	**475.1**

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990-2015
Notes: (1) Data for 1990-2014 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 134.4 million tonnes CO_2 equivalent in 1990, this figure increased to 340 million tonnes CO_2 equivalent in 2015. In 2015, when greenhouse gas emissions were consideredas CO_2 equivalent, fuel combustion and fugitive emissions from fuels (without transport) had the largest portion with 55.6%, and it was followed by fuel combustion for transport with 16%, industrial processes and product use with 12.8%, agricultural activities with 12.1% and waste sector with 3.5% [18].

'Fuel combustion and fugitive emissions from fuels (without transport)' is responsible for 55% of EU-28 greenhouse gas emissions in 2015. Fuel combustion for transport (including international aviation) is the second most important source sector with 23% in 2015. 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% [19].

GRAPH 14- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS

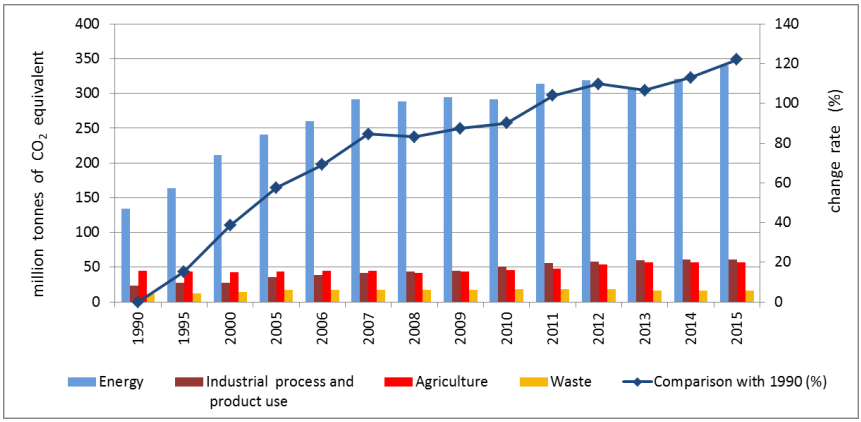


TABLE 10- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS (million tonnes of CO_2 equivalent)

YEARS	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015
Energy	134.4	163.5	211.7	241.0	291.8	313.9	319.3	308.3	321.2	340.0
Industrial Process and Product Use	23.7	27.3	27.8	35.9	51.0	55.8	57.7	60.2	60.8	60.7
Agriculture	44.8	43.4	42.5	43.3	45.8	48.1	53.8	57.2	57.2	57.4
Waste	11.1	12.4	14.5	16.9	18.2	18.5	18.1	16.5	16.4	16.9
Comparison with 1990(%)	-	15.2	38.6	57.6	90.1	103.9	109.8	106.6	112.9	122.0

Source: TURKSTAT, Greenhouse Gas Emissions Statistics,1990 - 2015
Notes: (1) Data in table was revised for the period of 1990-2014
(2) The emissions and sinks from forestry and other land use 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 [21].

Carbon captured in forests and processed forest products has been increased by 98% between 1990 and 2015 in Turkey.

GRAPH 15- CARBON SINKS IN TURKEY AND ANNUAL CAPTURE (1990-2015) (Gg CO_2 equivalent)

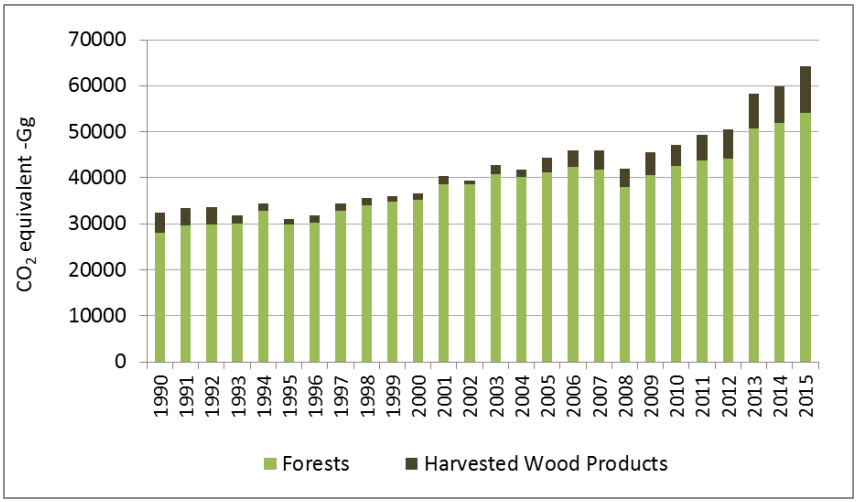


TABLE 11- CARBON SINKS IN TURKEY AND ANNUAL CAPTURE (Gg CO_2 equivalent)

YEARS	1990	1995	2000	2005	2010	2014	2015
Annual Carbon Capture by Foresty	28,118	29,747	35,266	41,112	42,567	51,982	54,077
Annual Greenhouse Gas Capture by Harvested Wood Products	4,368	1,306	1,257	3,164	4,585	7,809	10,227
TOTAL	**32,486**	**31,053**	**36,523**	**44,276**	**47,152**	**59,791**	**64,305**

Source: Ministry of Forestry and Water Affairs, General Directorate of Forestry, NIR 2017

4.4- Consumption of Ozone Depleting Substances (ODS)

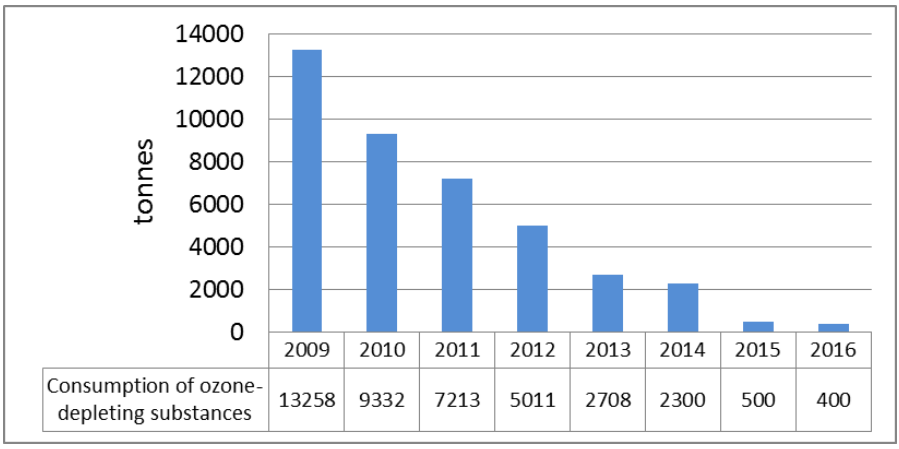
This indicator is a driving force indicator. The release of ozone depleting substances to the atmosphere leads to the depletion of the Earth's ozone layer. The stratospheric ozone layer protects people and environment from harmful ultra-violet (UV) radiation emitted by the sun [23].

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 2009-2016 has decreased by 97%.

Globally, consumption of ODS's controlled under the Montreal Protocol has declined by some 98.34% worldwide in the period 1986-2015 [23].

GRAPH 16- CONSUMPTION OF OZONE DEPLETING SUBSTANCES (ODS)



	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

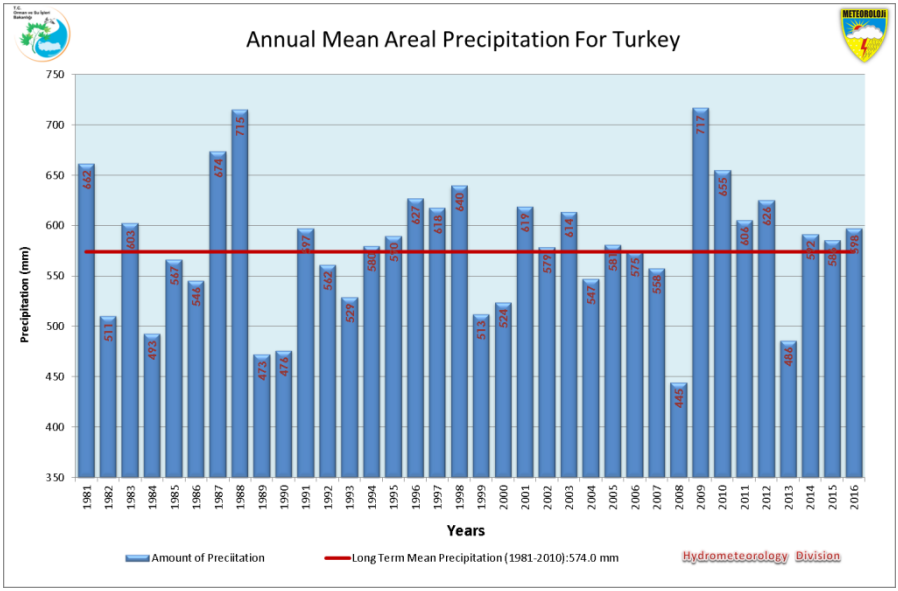
4.5- Precipitation

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. 597.6 mm average rainfall was recorded in 2016 (January 1 to December 31). According to the rainfall distribution data over the years, 2008 was recorded as a dry year, after which a rainy period started. Although drought was observed again in 2013, rainfall occurred above the long term annual average during the last two years in Turkey.

It was observed that mean areal precipitation in 2016 was 4% higher than the long term annual average, and 2% higher than the average in 2015. Regionally, while there is increase in Central Anatolia, Black Sea and Eastern Anatolia, decrease has been seen in other regions. The highest increase was in Black Sea region with 26% and the highest decrease was in Mediterranean region with 16%[24].

GRAPH 17- ANNUAL MEAN AREAL PRECIPITATION FOR TURKEY



Source: Ministry of Forestry and Water Affairs, Turkish State Meteorological Service

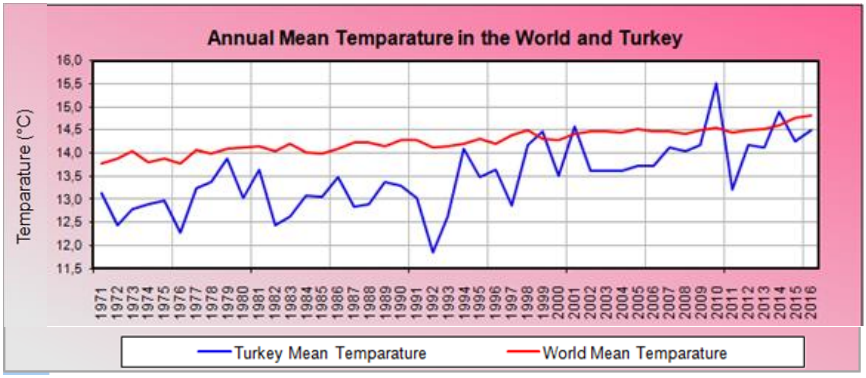
4.6- Temperature

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 2016 was 14.8°C, which was 0.9 °C above the 20th Century average (13.9°C). Annual mean temperature for Turkey in 2016 is 14.5°C, which is 1.0°C above the 1981-2010 average (13.5°C). Lowest temperature in 2016 was in January as -35.8°C in Ağrı while highest temperature was observed in August as 47.2°C in Cizre.

From 1971 to 2016, 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) (Source: DG Meteorlogy).

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 Forestry and Water Affairs, Turkish State Meteorological Service

4.7- Sea Surface Temperature

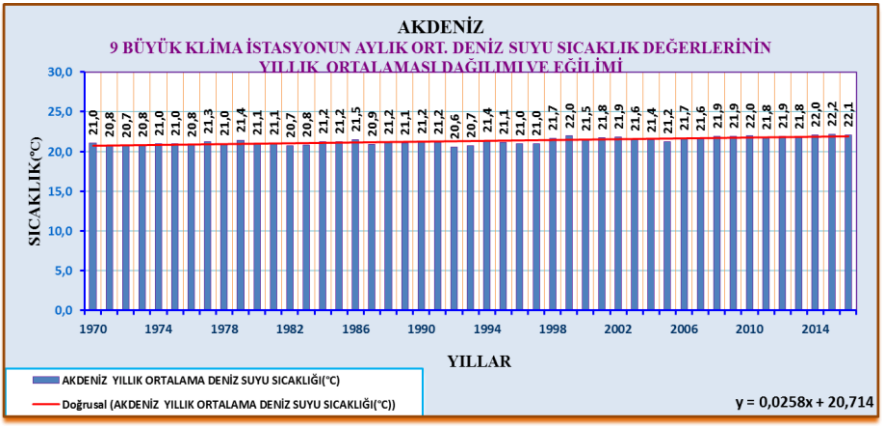
This impact indicator represents the annual change in sea surface temperature. Main sources of atmospheric weather events and air masses are oceans and seas. Warming and cooling trends in sea surface are the most accurate indicators of climate change, and changes in sea surface temperature affect many 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; 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 wind directions.

The long-term annual mean sea temperature data recorded by Turkish State Meteorological Service (TSMS) indicate a slight increase, however, this cannot be concluded as a warming at global scale. To monitor the whole process, sea surface temperatures are monitored by TSMS in all seas to represent all over the coasts of Turkey. . That will help establish a higher resolution marine dataset in future.

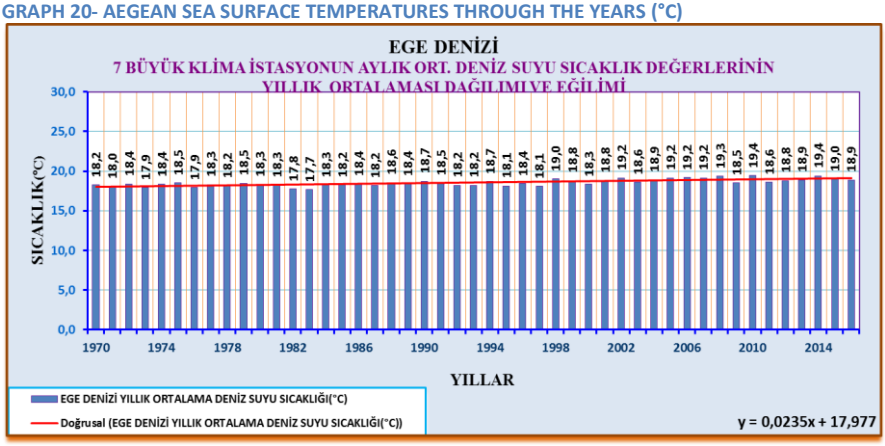
The mean sea temperature values in 2016 are 22.1 °C in the Mediterranean Sea, 18.9 °C in the Aegean Sea, 17.2 °C in the Marmara Sea, and 16.4 °C in the Black Sea. The annual mean sea surface temperatures (in °C) recorded in years between 1970-2016 are given in the following figure [24].

GRAPH 19- MEDITERRANEAN SEA SURFACE TEMPERATURES THROUGH THE YEARS (°C)

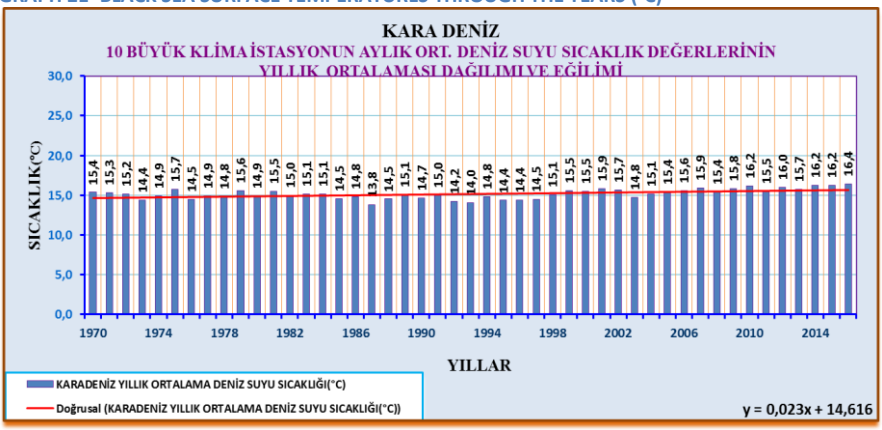


Source: Ministry of Forestry and Water Affairs, Turkish State Meteorological Service

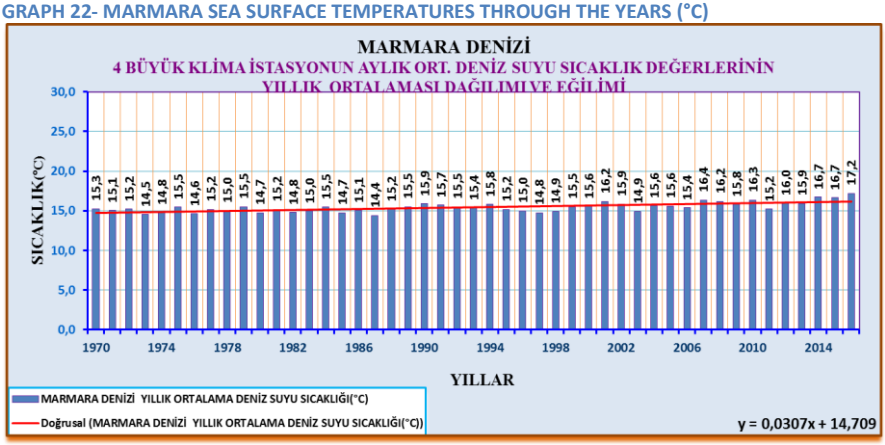
GRAPH 20- AEGEAN SEA SURFACE TEMPERATURES THROUGH THE YEARS (°C)



GRAPH 21- BLACK SEA SURFACE TEMPERATURES THROUGH THE YEARS (°C)



GRAPH 22- MARMARA SEA SURFACE TEMPERATURES THROUGH THE YEARS (°C)



Source: Ministry of Forestry and Water Affairs, 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. In this book, latest available data belongs to 2015.

General increase was observed in the trend of emissions between 1990 and 2015, despite a small decrease of combustion emissions within recent years.

Compared to the 1990 emissions data, NO_X emissions showed a high increase with a percentage of 57%, followed by NMVOC and other emissions respectively.

Compared to the emissions in 2014, SO_2 and NH_3 emissions decreased by 9.7% and 2.7%, respectively. Other emissions appear to be increasing. Table 12 shows the emission changes compared to 1990 and the previous year.

In 2015, for SO_2 61.8 % of the emissions were caused by energy production-power plants, 14.3 % by residential heating. 27.3 % of NO_X emissions were caused by heavy-duty vehicles and 30.5 % by energy production-power plants. Residential heating caused 15.5% and animal waste 17.9 % of the total NMVOC emissions. Main reasons of the NH_3 emissions were synthetic fertilizer use and livestock farming.

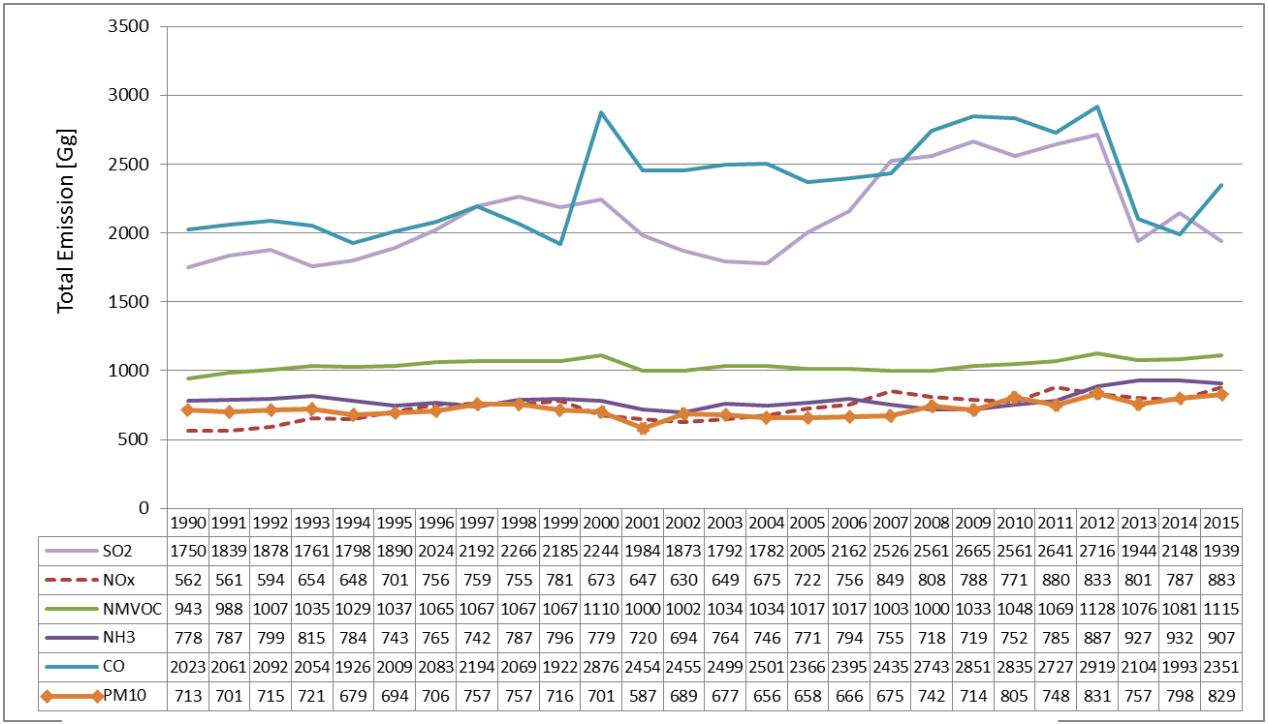
TABLE 12- PERCENT CHANGE OF AIR POLLUTANT EMISSIONS (SO_2, NO_X, NMVOC, NH_3, CO VE PM_{10}) IN TURKEY IN 2015 COMPARED TO 1990 AND 2014

Trend (%)	SO_2	NO_X	NMVOC	NH_3	CO	PM_{10}
1990-2015	11%	57%	18%	16%	16%	16%
2014-2015	-9.7%	12.2%	3.2%	-2.7%	17.9%	3.9%

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 2015; NO_X emissions decreased by 56%, SO_X emissions by 89%, NMVOC emissions by 61%, NH_3 emissions by 23% and $PM_{2.5}$ emissions by 26% [25].

GRAPH 23- 1990-2015 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
SO2	1750	1839	1878	1761	1798	1890	2024	2192	2266	2185	2244	1984	1873	1792	1782	2005	2162	2526	2561	2665	2561	2641	2716	1944	2148	1939
NOx	562	561	594	654	648	701	756	759	755	781	673	647	630	649	675	722	756	849	808	788	771	880	833	801	787	883
NMVOC	943	988	1007	1035	1029	1037	1065	1067	1067	1067	1110	1000	1002	1034	1034	1017	1017	1003	1000	1033	1048	1069	1128	1076	1081	1115
NH3	778	787	799	815	784	743	765	742	787	796	779	720	694	764	746	771	794	755	718	719	752	785	887	927	932	907
CO	2023	2061	2092	2054	1926	2009	2083	2194	2069	1922	2876	2454	2455	2499	2501	2366	2395	2435	2743	2851	2835	2727	2919	2104	1993	2351
PM10	713	701	715	721	679	694	706	757	757	716	701	587	689	677	656	658	666	675	742	714	805	748	831	757	798	829

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

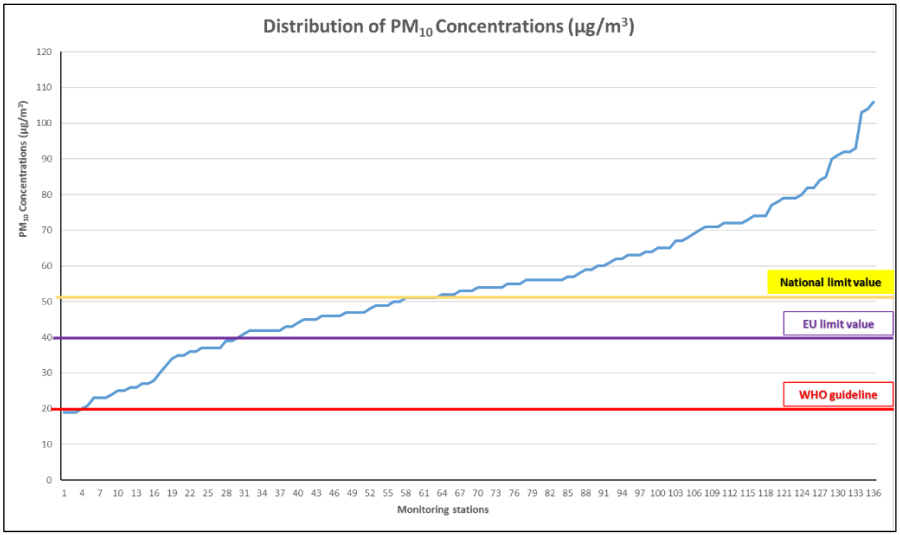
5.2- Average Concentrations of PM_{10} and SO_2 in Ambient Air

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 provided by the National Air Quality Monitoring Network, the stations with highest 10 validated annual average PM_{10} and SO_2 measurements are presented in Table 13. Edirne (Keşan) has had the highest annual SO_2 average for the last 3 years. In terms of annual average PM_{10} value, the station in Iğdır has been within the top 3 stations during the last 3 years.

Regarding the top 10 stations with the highest annual average PM_{10} during the last 5 years between 2012-2016, Siirt station has been among top 10 for 5 times, while Kayseri (Hürriyet) and Düzce stations 4 times, Iğdır, Bursa and Manisa stations 3 times. For SO_2, Yozgat and Tekirdag stations have been among the 10 stations with the highest annual SO_2 averages in the last five years for 4 times, Canakkale (Can), Edirne (Kesan), Afyonkarahisar and Karabuk stations have been for 3 times in the top10 list.

GRAPH 24—DISTRIBUTION OF THE ANNUAL AVERAGE PM_{10} CONCENTRATIONS



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

2016 yearly average PM_{10} concentrations are laid down in the graph 24 above. For 51% of the air quality monitoring stations (for which the values were provided and incorporated), average values exceeded the national limit value for 2016,

which is 52 µg/m³. 78% of the stations experienced values higher than the European Union limit value, while in 97% of the stations, World Health Organization air quality guideline was exceeded.

Within the scope of "Clean Air Action Plans" in order to improve air quality in the provinces; it is necessary to increase the effectiveness of mitigation measures such as: application of best available techniques and best environmental practices in the industrial installations, control of fuel types used for domestic heating, improve combustion systems, thermal insulation of the buildings, stoker training and measures to abate pollution from motor vehicles.

TABLE 13-- AIR QUALITY MONITORING STATIONS WITH THE HIGHEST PM_{10} AND SO_2 AVERAGES IN 2016

STATIONS	PM_{10} (µg/m³)*
IGDIR	106
TEKIRDAG (Center MCAC)	104
KAYSERI (HurrIyet)	103
BURSA	93
DUZCE	92
MANISA (SOMA)	92
SIIRT	91
DENIZLI (Bayramyeri)	90
AMASYA (Sehzade)	85
ERZINCAN	84

STATIONS	SO_2 (µg/m³)*
EDIRNE (Kesan MCAC)	265
AMASYA (Suluova)	73
CANAKKALE (Çan MCAC)	53
ORDU (FATSA)	50
TEKIRDAG (Center MCAC)	39
YOZGAT	35
TOKAT (Turhal)	32
ÇORUM (MImar SInan)	28
SINOP (Boyabat)	27
TEKIRDAG	27

** 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.

5.3- Number of Exceedences of Air Quality Limit Values

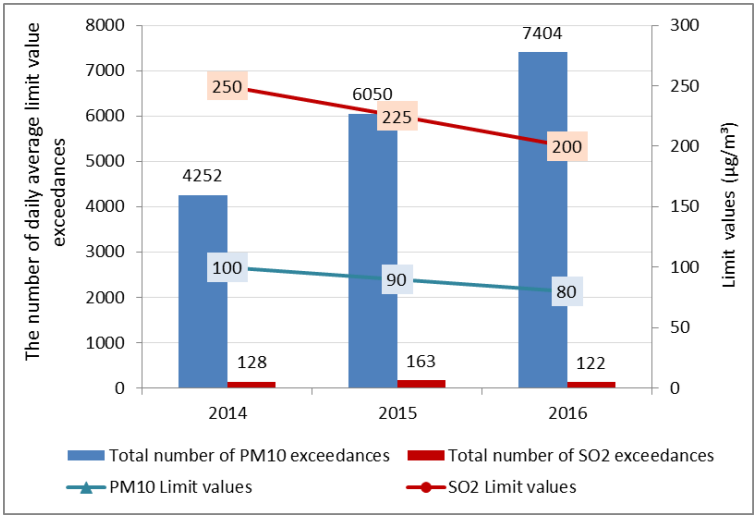
This state indicator shows how often the air pollution exceeds the (daily) limits. Increasing number of exceedences shows a decline in air quality.

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 2016, daily limit value are: 80 µg/m^3 for PM_{10} and 200 µg/m^3 for SO_2. Total exceedences in 2016 rise to 8581 for PM_{10} and 139 for SO_2 [26].

Graph 25 is based on 123 stations with a value exceeding every three years in the period between 2014-2016. According to Graph 25, although both limit values were reduced by 11% in 2016 compared to 2015, there was a 22.4% increase in the number of overruns for the PM_{10} parameter and a 25.2% decrease in the overrun for the SO_2 parameter.

GRAPH 25— AIR QUALITY LIMITS AND NUMBER OF EXCEEDANCES OVER THE YEARS



Source http://www.havaizleme.gov.tr/Default.ltr.aspx.

NOTES:

1. Exceedances are assessed by daily (24 hourly) average values of the measurement results.

2. The data for 123 stations, which are overvalued every three years between 2014 and 2016, are taken as basis.

3. Limit values were determined as: For PM_{10}, 100 µg/m³ (2014), 90 µg/m³ (2015) and 80 µg/m³ (2016) For SO_2; 250 µg/m³ (2014), 225 µg/m³ (2015) and 200 µg/m³ (2016).

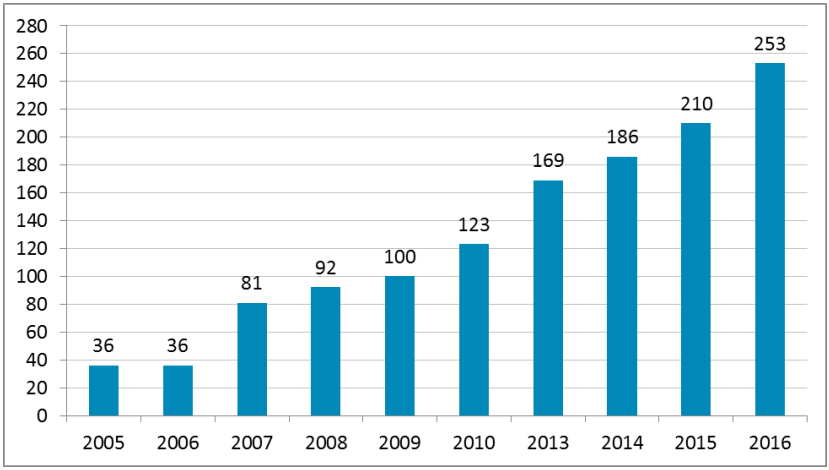
5.4- Number of Air Quality Monitoring Stations

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

In Turkey there are 253 air quality monitoring stations most of which are located in urban areas representing domestic heating sources. A limited number of stations also represent traffic and industrial sources. However, according to European Union criteria, such stations should be established in respect to the area they represent; urban, suburban and rural; and with respect to source types as traffic, heating or industry. To determine the locations of the station to be founded accordingly, preliminary assessment studies have been being carried out since 2011.

Among the existing 253 stations in operation, 245 stations measure PM_{10}, 57 stations $PM_{2.5}$, 230 measure SO_2, 145 stations measure NOx, 92 O_3 and 74 stations measure CO. 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. The Ministry foresees to meet this target by the end of 2018.

GRAPH 26- 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.

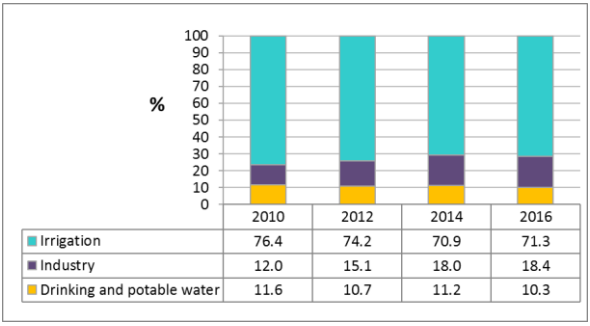
Based on the 2006 data presented by United Nations Food and Agriculture Organization (FAO) and published in 2012, 69% of the water source is used for irrigation, 19% for industry and 12% for domestic use in the World. However, water resources in European countries which are member to European Environment Agency (EEA) excluding Turkey, 51.4% is used for agriculture, forestry and fishing, 23.7% for urban water supply, 9.1% for services, 13.1% for electricity, gas, steam and air conditioning supply and 2.6% for mining and quarrying, manufacturing and construction according to EEA data [27].

TABLE 14- 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 27- 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 [28].

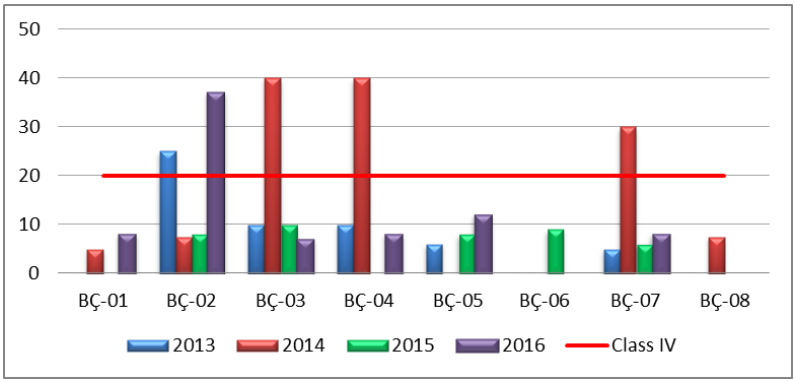
WEI of Turkey is 21.3% in 2010, 23.9% in 2012, 21.6% for 2014 and %25.8 in 2016. Index being above 20 % shows water scarcity for Turkey. Index above 40 % means severe water scarcity [29]. Data on this indicator concludes that Turkey needs to take measures for sustainable water resources management.

6.2- Oxygen Consuming Substances in Rivers

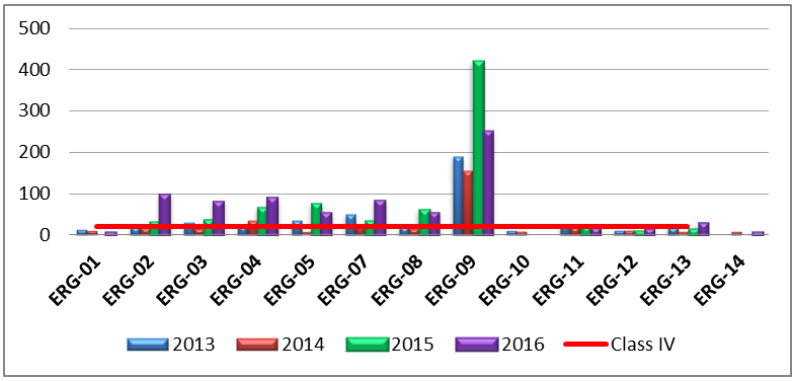
The primary indicator of the oxygenation state in water bodies is biochemical oxygen demand (BOD) which expresses the demand of oxygen by the living creatures consuming oxidizable organic materials in a body of water. This indicator is a state indicator which shows the present situation and the tendency related with ammonium concentrations (NH_4) 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 and 2016. 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 28- NORTH AEGEAN (BAKIRCAY) BASIN BOD (mg/L)

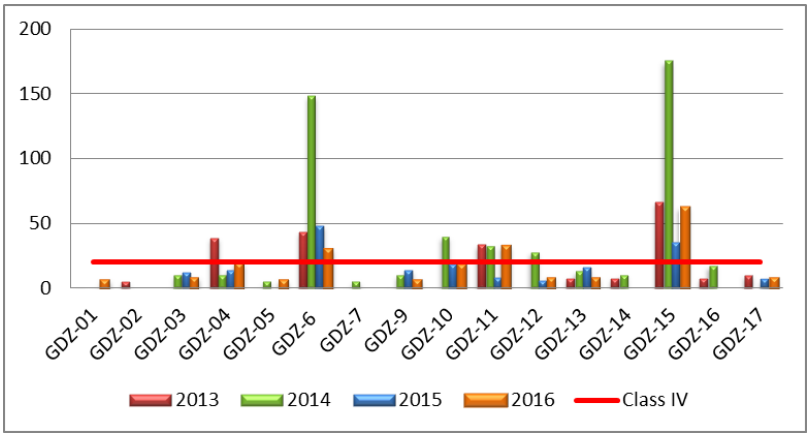


GRAPH 29- ERGENE BASIN BOD (mg/L)

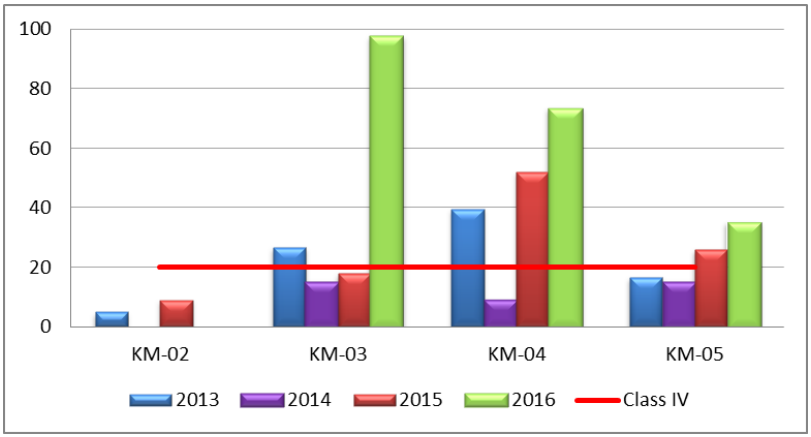


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2016)

GRAPH 30- GEDIZ BASIN BOD (mg/L)

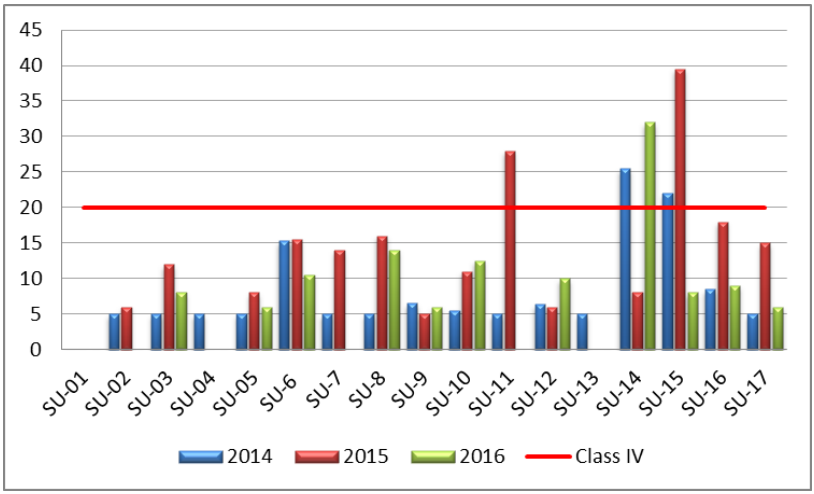


GRAPH 31- KUCUK MENDERES BASIN BOD (mg/L)

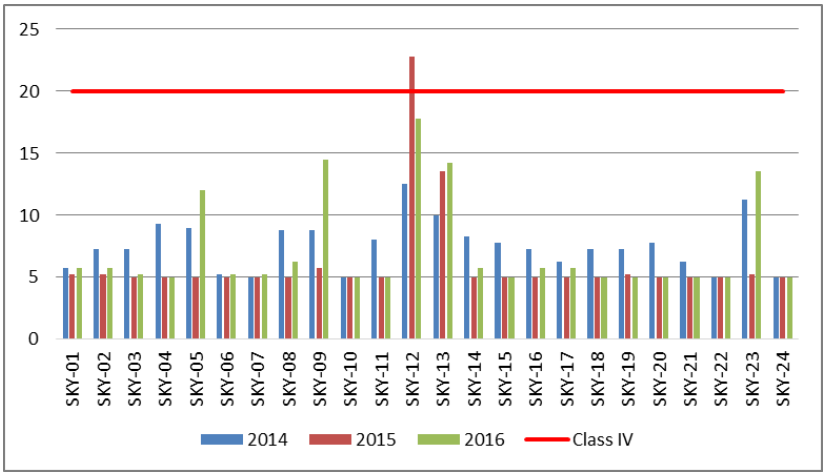


Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2016)

GRAPH 32- SUSURLUK BASIN BOD (mg/L)



GRAPH 33- SAKARYA BASIN BOD (mg/L)



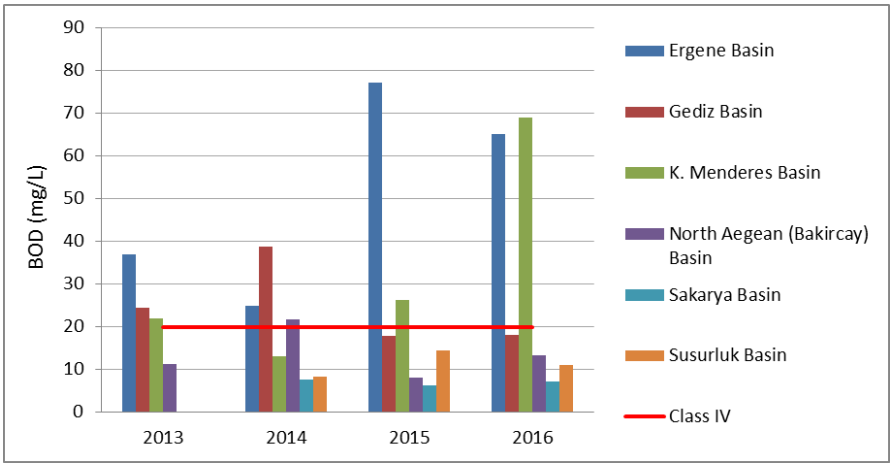
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2016)

Compared to 2015, in 2016 BOD decreased in Susurluk and Ergene basin, however increased in North Aegean (Bakırçay), Kucuk Menderes and Sakarya basins.

Looking at the yearly trends of the averages of all monitoring stations within the basins, a significant increase in the BOD values in the Kucuk Menderes basin is observed while there are improvements in Ergene and Susurluk basins.

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 m^3/day or higher. The system starts sampling automatically when triggered, measures are taken depending on the results of the analysis by authorised laboratories.

GRAPH 34- 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.

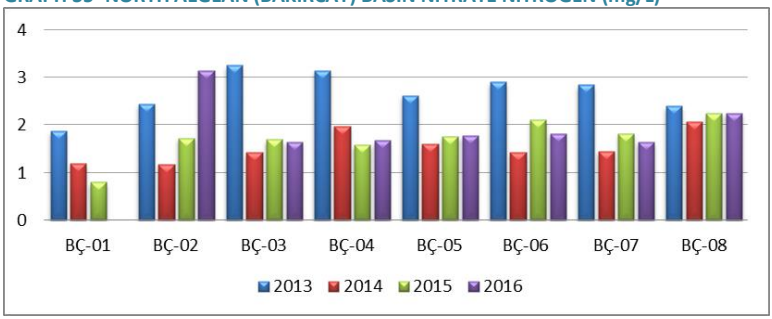
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports(2016)

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.

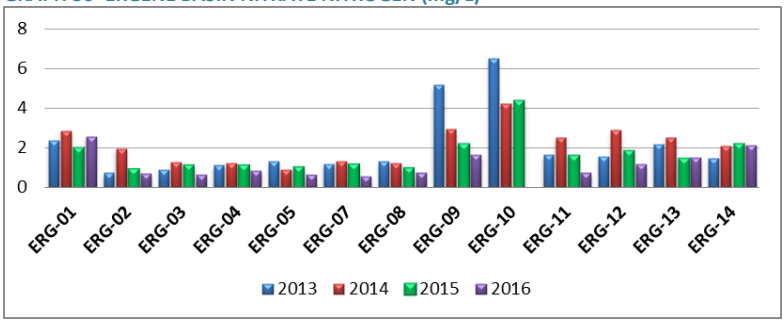
Laboratory, Measuring and Monitoring Department of the Ministry of Environment and Urbanisation carried out Domestic and Industrial Pollution Monitoring Programmes in 2012, 2013, 2014, 2015 and 2016. Seasonal monitoring studies have been done in the basins: Ergene, Küçük Menderes, Gediz, North Aegean, 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 35- NORTH AEGEAN (BAKIRCAY) BASIN NITRATE NITROGEN (mg/L)



In North Aegean Basin from 2013 to 2016, Ammonium Nitrogen, nitrite and nitrate has decreased.

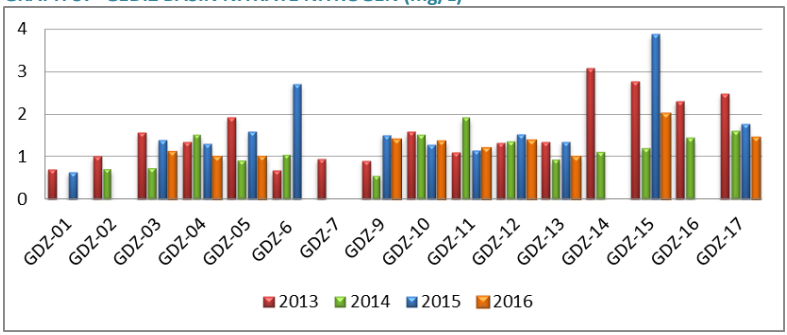
GRAPH 36- ERGENE BASIN NITRATE NITROGEN (mg/L)



In Ergene basin from 2013 to 2016, Ammonium Nitrogen has increased however nitrite and nitrate has decreased.

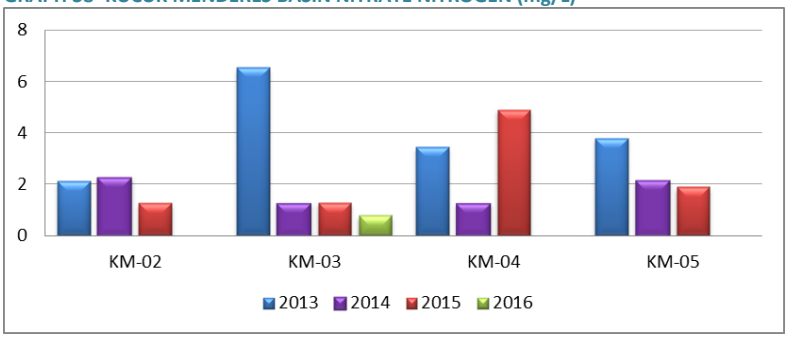
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports(2016).

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



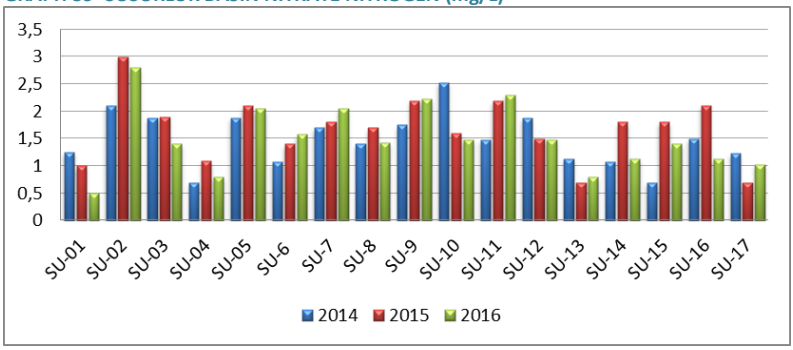
In Gediz Basin from 2013 to 2016, nitrate has decreased in 2016.

GRAPH 38- KUCUK MENDERES BASIN NITRATE NITROGEN (mg/L)



In K. Menderes basin from 2013 to 2016, nitrate has decreased in 2016.

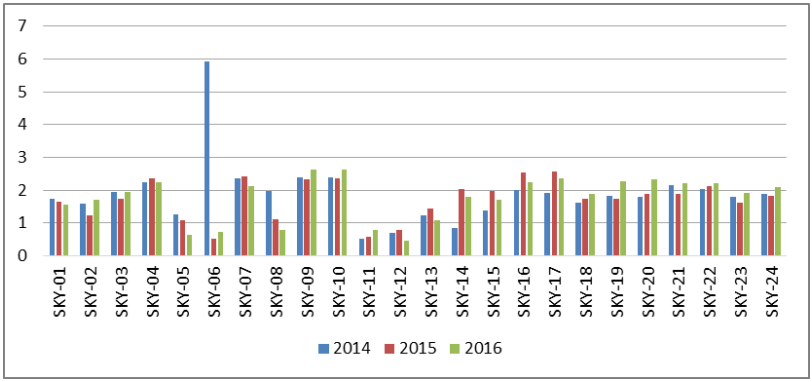
GRAPH 39- SUSURLUK BASIN NITRATE NITROGEN (mg/L)



In Susurluk basin from 2014 to 2016, nitrate has decreased in 2016.

Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports(2016).

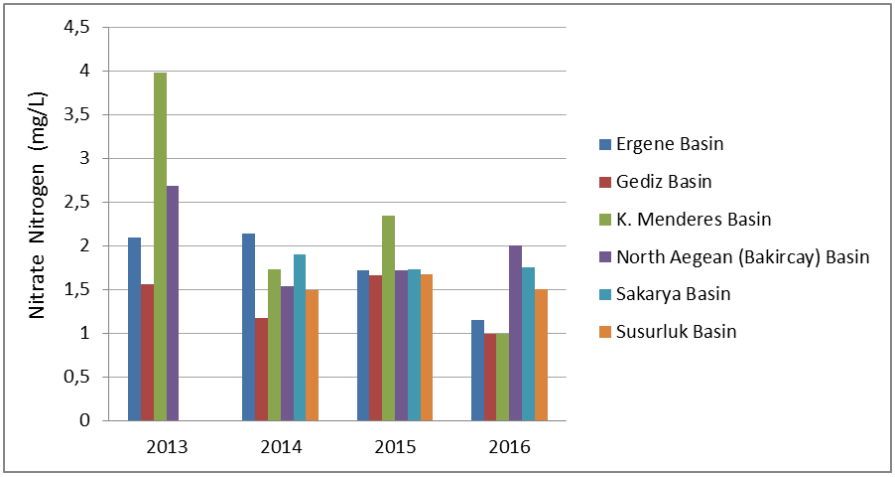
GRAPH 40- SAKARYA BASIN NITRATE NITROGEN (mg/L)



In Sakarya Basin nitrate has decreased in 2016.

Comparing yearly trends of the averages of the stations within the basins, generally a decrease is observed in 2016 in the Nitrate Nitrogen meeasured, apart from the North Aegean (Bakırçay) basin, which has a slight increase in 2016.

GRAPH 41- 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 (2016).

6.4- Chlorophyll Concentration in Coastal and Marine Waters

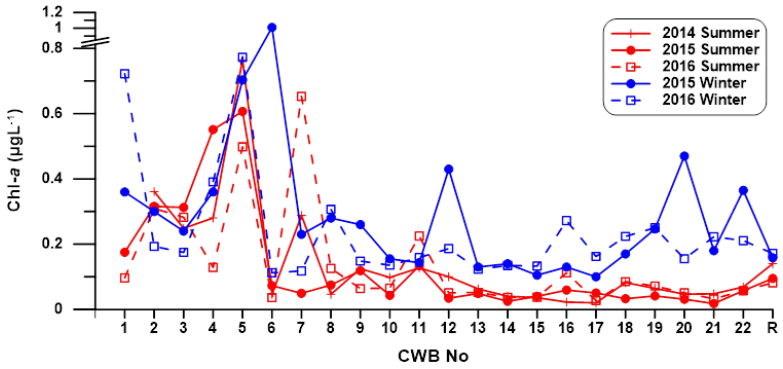
D P S I R

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

Laboratory, Measuring and Monitoring Department of the Ministry of Environment and Urbanization implemented "Integrated Marine Pollution Monitoring Programme" with TUBITAK-Marmara Resarch Center. In the programme, ecological and chemical monitoring was done twice a year in all seas of Turkey: Mediterranean Sea, Aegean Sea, Black Sea and Marmara Sea.

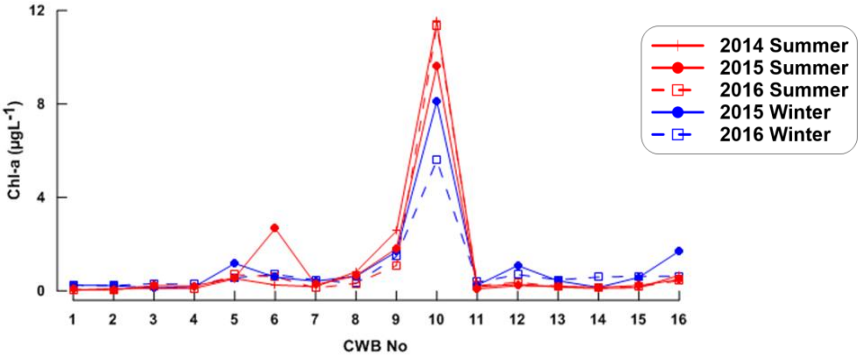
2014-2016 Chl-a assessments showed that all marine waters of Turkey have sufficient solarination. Peak values of Chl-a concentrations occur due to primary production in winter seasons when land based nutrient loads increase. Besides this, no significant difference is observed among years during 2014-2016 monitoring period.

GRAPH 42- MEDITERRANEAN SEA SURFACE WATER (0-10M) Chl-a AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES (CWB)

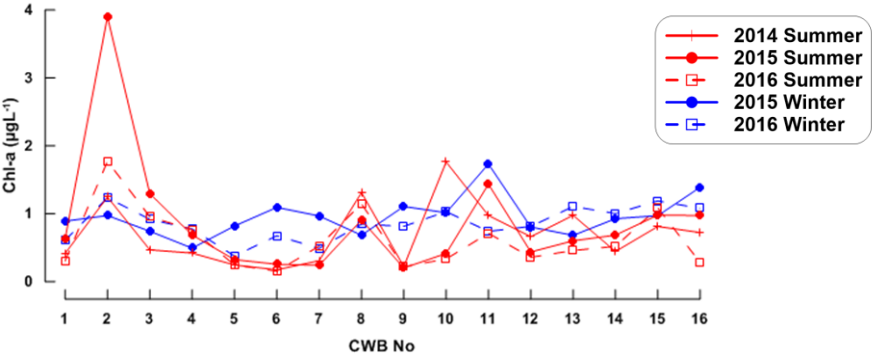


Source: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

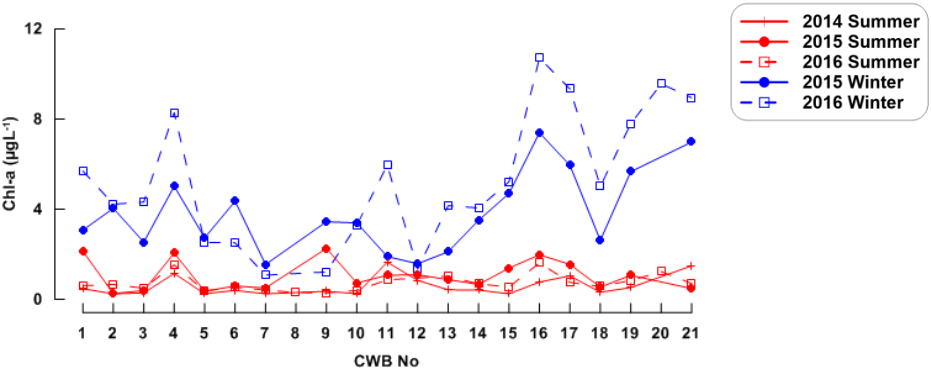
GRAPH 43- AEGEAN SEA SURFACE WATER (0-10M) Chl-a AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES



GRAPH 44- BLACK SEA SURFACE WATER (0-10m) Chl-a AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES (CWB).



GRAPH 45- MARMARA SEA SURFACE WATER (0-10m) Chl-a AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES (CWB).



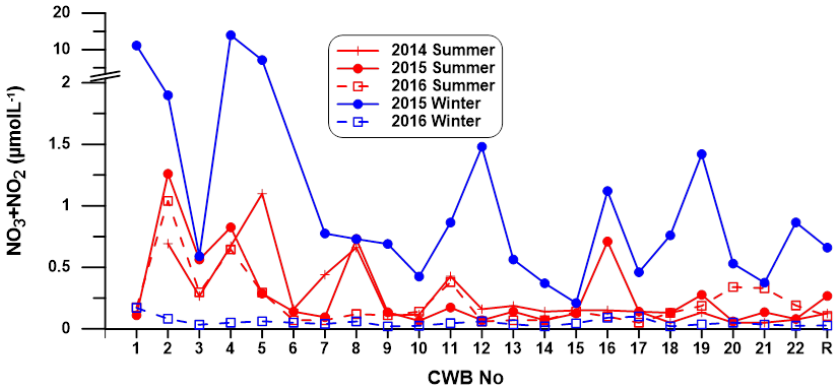
Sources: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

6.5- Nutrients in Coastal and Marine Waters

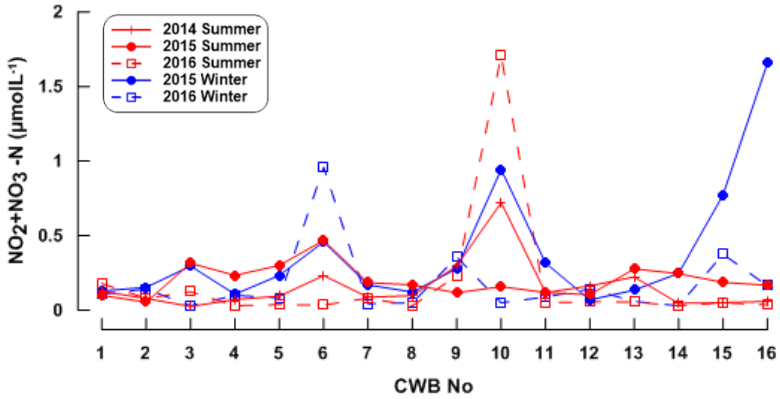
This state indicator shows current nutrient concentrations in geographical changes and temporal trends. Discharges of nitrogen and phosphorus from land based sources like urban, industry or agricultural sources cause eutrophication.

Within the context of "Integrated Marine Pollution Monitoring Programme" of Turkey water quality was assessed in all seas of Turkey for the period 2014-2016.

GRAPH 46- MEDITERRANEAN SURFACE WATER NO_2+NO_3-N (NO_X) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES (CWB).

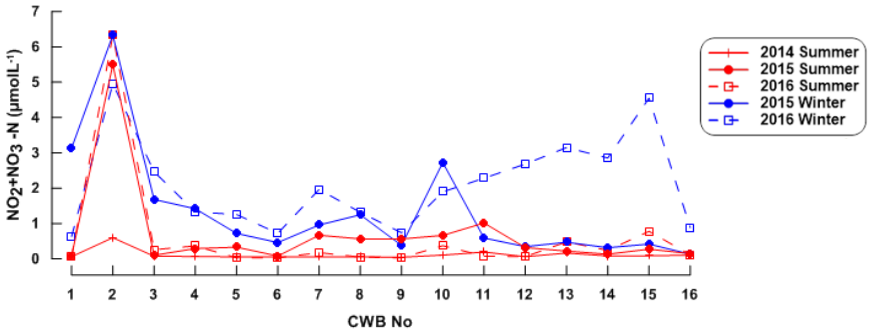


GRAPH 47- AEGEAN SEA SURFACE WATER NO_2+NO_3-N (NO_X) CONCENTRATION AVERAGES IN COASTAL WATER BODIES (CWB).

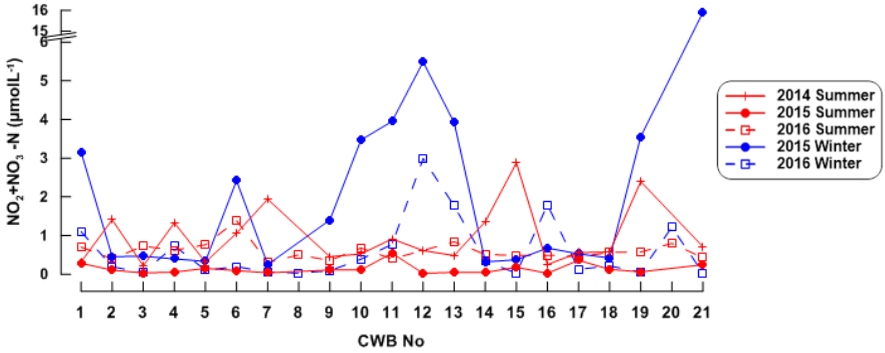


Sources: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

GRAPH 48- BLACK SEA SURFACE WATER NO_2+NO_3-N (NO_X) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES (CWB). red line)



GRAPH 49- MARMARA SEA SURFACE WATER NO_2+NO_3-N (NO_X) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES: winter (blue line), summer (red line)



Sources: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

In Mediterranean Sea, high NO_X (NO_2+NO_3-N) concentrations were observed in 2015 winter season due to high precipitations in winter and high riverine discharges. However, for 2016 winter having less precipitation average, NOx values were as low as in summer seasons. Main reason of these annual changes is that nitrate ion-rich rainfall and riverine water entrance were in low levels in 2016 February and surface water NOx was consumed by photosynthesis.

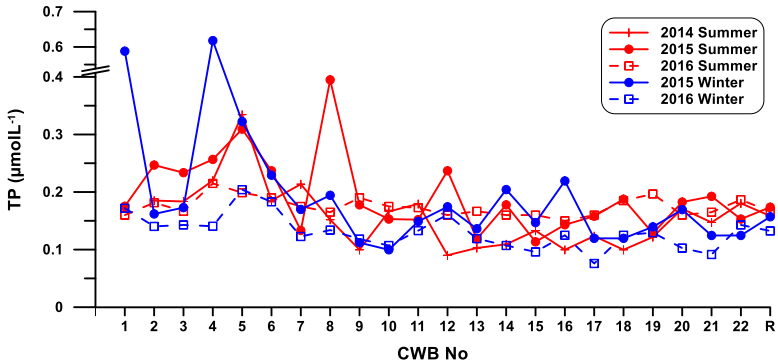
Aegean Sea surface NO_X (NO_2+NO_3-N) concentrations did not show significant differences among seasons. However, in 2016 high concentrations were observed in both summer and winter.

NOx concentrations in Black Sea coasts and at open sea stations showed significant differences among seasons. Winter NO_X concentrations were approximately four times of summer values, because of loss by photosynthesis until summer. Especially in winter times, both the high concentrations of NO_X and these concentration distributions implies the land based pressures in water

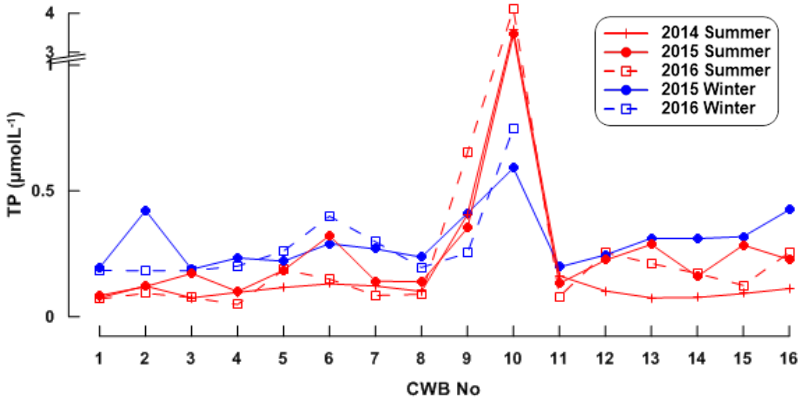
bodies. In 2016 Eastern Black Sea showed apparently high concentrations of NO_X due to the high levels of precipitation above the average values.

Surface NO_X concentrations in Marmara Sea was higher in winter than in summer. However there were also differences among years. Being an inland sea Marmara is exposed to more pressures compared to other seas. Winter season concentration differences could be resulted by precipitation causing increased loads of rivers and meteorological conditions like wind direction and speed.

GRAPH 50- MEDITERRANEAN SEA SURFACE WATER TOTAL PHOSPHORUS (TP) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES: winter (blue line), summer (red line)

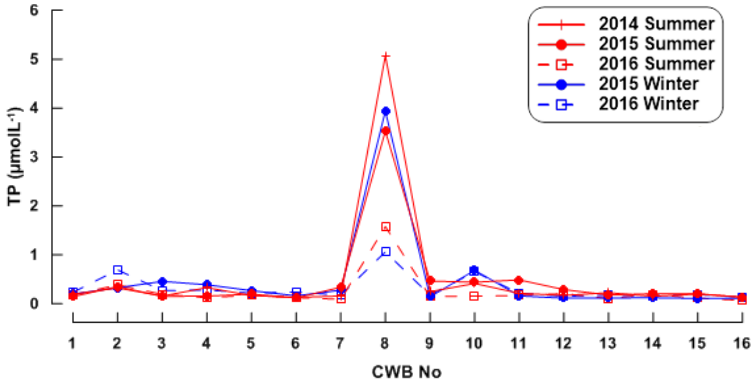


GRAPH 51- AEGEAN SEA SURFACE WATER TOTAL PHOSPHORUS (TP) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES: winter (blue line), summer (red line)

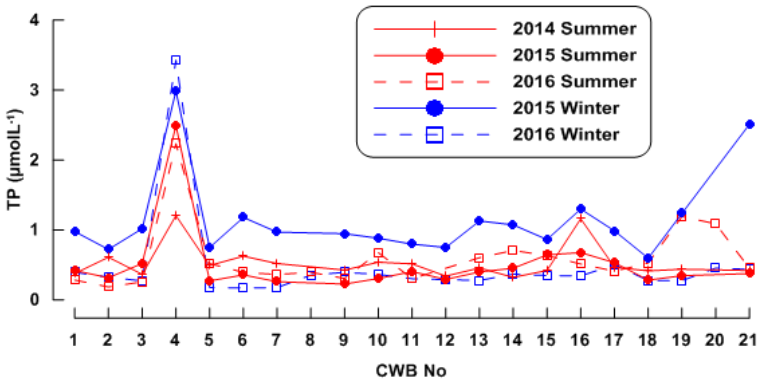


Sources: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

GRAPH 52- BLACK SEA SURFACE WATER TOTAL PHOSPHORUS (TP) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES: winter (blue line), summer (red line)



GRAPH 53- MARMARA SEA SURFACE WATER TOTAL PHOSPHORUS (TP) AVERAGE CONCENTRATIONS IN COASTAL WATER BODIES: winter (blue line), summer (red line)



Sources: "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017).

Total phosphorus (TP) concentrations were high especially in inner bays having riverine and household discharges in Mediterranean Sea between 2014-2016. TP summer concentrations were higher than winter concentrations. The lowest concentration was observed in 2016 winter season. In Aegean Sea, winter TP concentrations values were higher than the summer values because of high river load entrance to the sea due to high precipitation. Black Sea TP concentrations in water bodies in 2014-2016 period were between 0.07-5.07 µM/l, and did not show significant changes among seasons. High concentrations of TP along the coast implies the land based pressures. In 2015, TP concentrations were higher than the other monitoring periods.

6.6- Bathing Water Quality

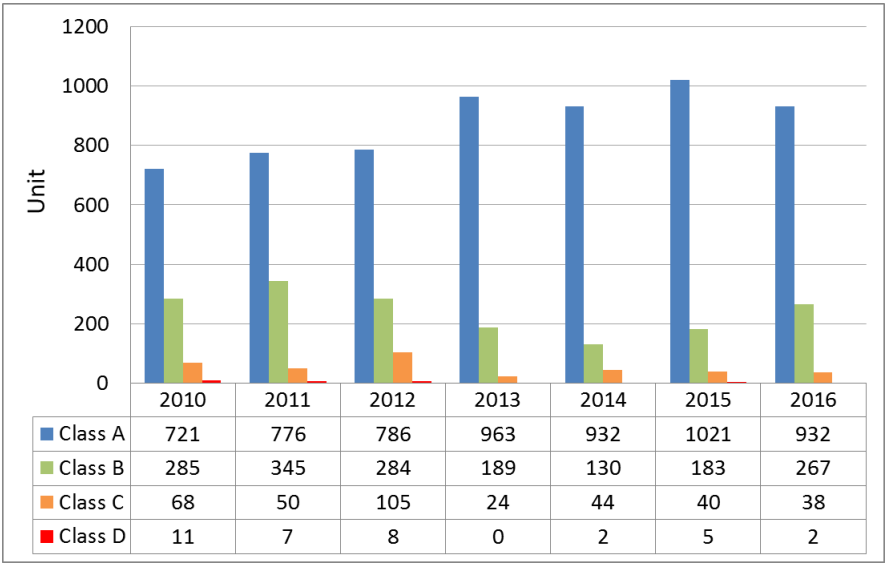
Indicator is a state indicator related with the impacts of household wastewaters on the marine and coastal waters.

Every year in swimming season, bacteriologic monitoring activities are performed in sea and lake water in 34 cities with a coast to sea or lake by the Ministry of Health, Public Health Institution of Turkey in order to protect individual and public health.

The number of swimming areas monitored was 1085 in 2010, while water quality monitoring activities were carried out in a total of 1239 swimming areas in 2016.

According to the results of the monitoring in 2016, among the 1239 swimming zones, 932 zones (75%) were identified as Class A, 267 zones (22%) as Class B, 38 zones (3%) as Class C and only 2 zones (0.002%) were identified as Class D [32].

GRAPH 54- COMPARING SWIMMING AREAS WITH REGARDS TO QUALITY CLASSES (2010-2016)



	2010	2011	2012	2013	2014	2015	2016
Class A	721	776	786	963	932	1021	932
Class B	285	345	284	189	130	183	267
Class C	68	50	105	24	44	40	38
Class D	11	7	8	0	2	5	2

Source: 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

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.

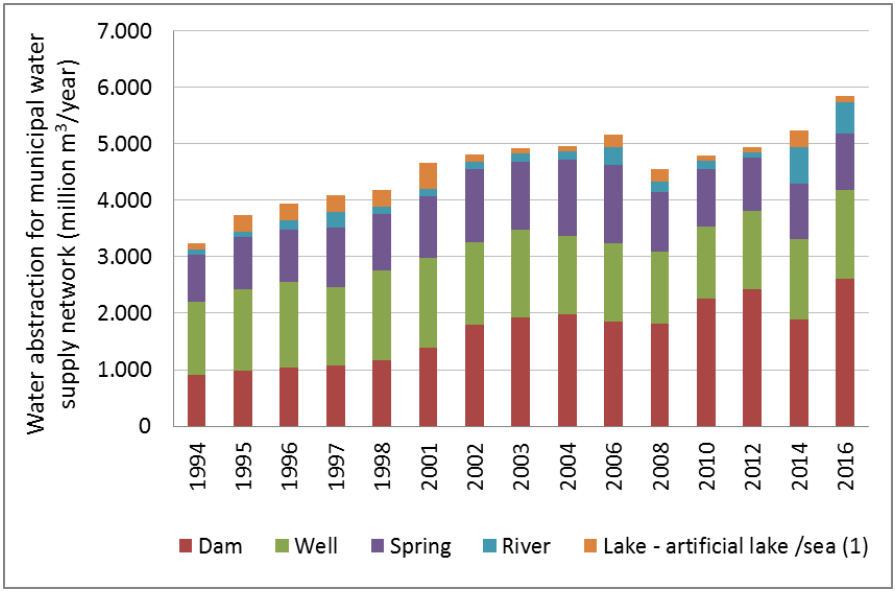
In 2016, population served by water supply networks formed 92.2% of Turkey's population and 98.2% of total municipal population.

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

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

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[33].

GRAPH 55- WATER ABSTRACTION FOR MUNICIPAL WATER SUPPLY NETWORKS BY SOURCES



(1) Water abstracted from sea is included from 2010.
Source: TURKSTAT

6.8- Municipalities Served by Wastewater Treatment Unit

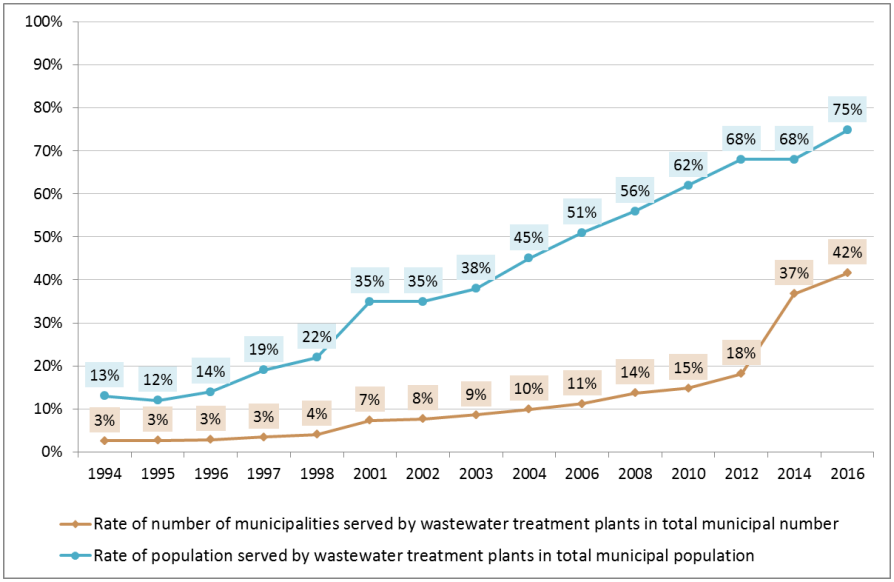
This indicator is a response indicator and an important tool for monitoring the success of the policies implemented for the control of pollution arising from domestic wastewater.

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 [34].

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) [35].

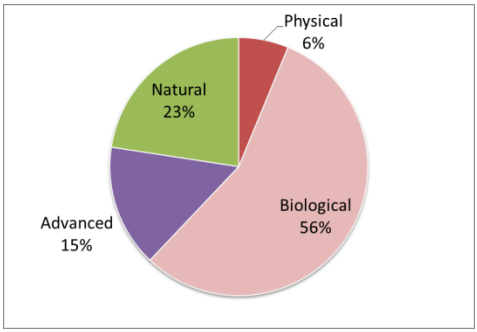
GRAPH 56- NUMBER OF MUNICIPALITIES AND POPULATION RATIOS SERVED BY WASTEWATER TREATMENT PLANTS (%)



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 57- 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 [34].

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 [35].

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. During the period from the date of entry into force of the By-Law until the end of 2015, Reimbursement Certificates of Energy Incentive were issued to 529 plants meeting the conditions under the By-Law. In this context, in 2011, 23 million TL to 172 plants, in 2012, 27 million TL to 212 plants, in 2013 30.2 million TL to 207 plants and in 2014 30.4 million TL to 225 plants, in 2015 46.4 million TL to 294 plants, in 2016 59.4 million TL to 375 plants were paid as energy incentives.

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[35].

GRAPH 58- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

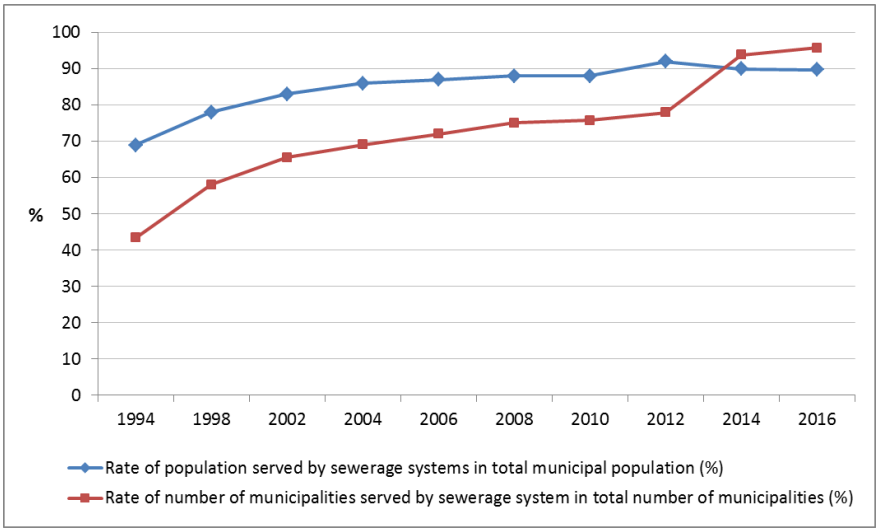


TABLE 15- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS (%)

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

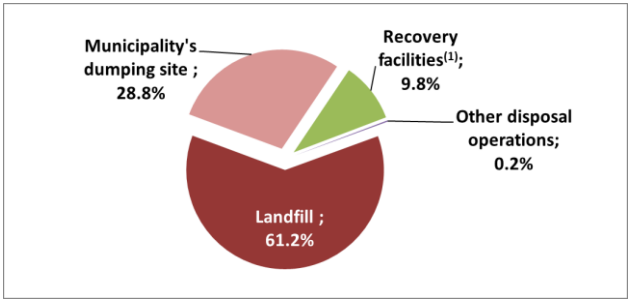
7.1- Municipal Waste Generation and Disposal

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. Waste generation amounts are pressure, while collection, disposal and recycle/recovery amounts of these wastes are response type indicators.

According to EUROSTAT 2016 data, annual average amount of municipal waste generated per capita in the EU-27 countries is 483 kg, whereas for Turkey this figure is 426 kg [36].

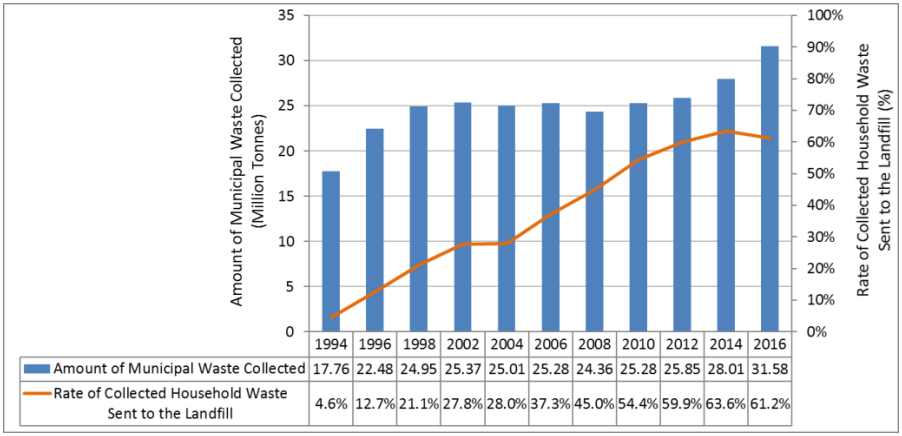
By 2013, average rate of recycling and composting of municipal wastes in the EU-28 countries had reached to 41.8 [37]. As of 2016, this figure is 9.8% in Turkey.

GRAPH 59- AMOUNT OF MUNICIPAL WASTE BY DISPOSAL METHODS 2016 (%)



(1) Data refers to waste collected separately by municipalities and sent to licensed recovery facilities that recover glass, metal, paper, plastic, etc. as well as biogas and composting facilities.

GRAPH 60- 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

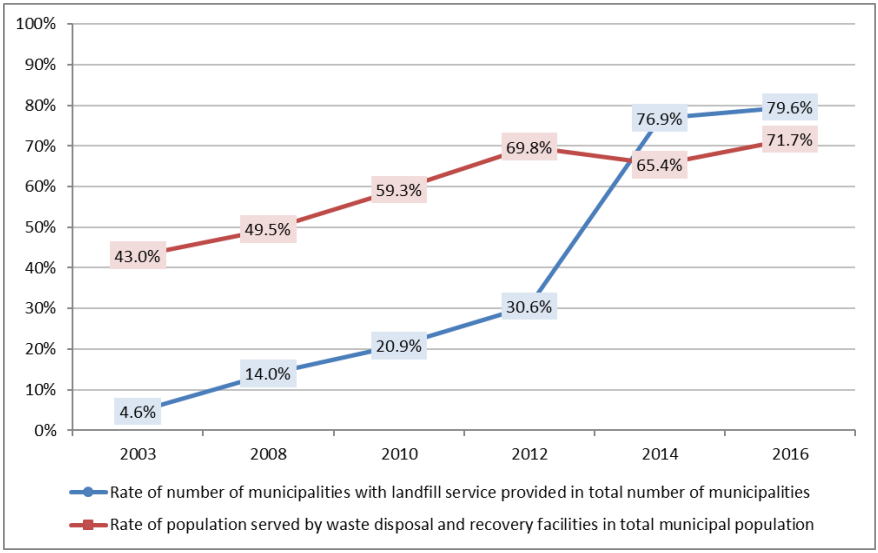
7.2- Number of Landfills – Municipalities - Population Covered by Landfills

Number of urban waste management facilities in Turkey increased from 15 landfill sites in 2003, to 38 in 2008, 46 in 2010, 79 in 2014, 81 in 2015 and 84 in 2016, by also contribution of the European Union harmonization studies.

According to Ministry of Environment and Urbanisation data, 71% of the population (in total municipal population) was served by waste disposal and recovery facilities is in 2016.

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

GRAPH 61- THE RATE OF POPULATION SERVED BY WASTE DISPOSAL AND RECOVERY FACILITIES IN TOTAL MUNICIPAL POPULATION (%) AND RATIO OF MUNICIPALITIES SERVED BY LANDFILLS THROUGH YEARS



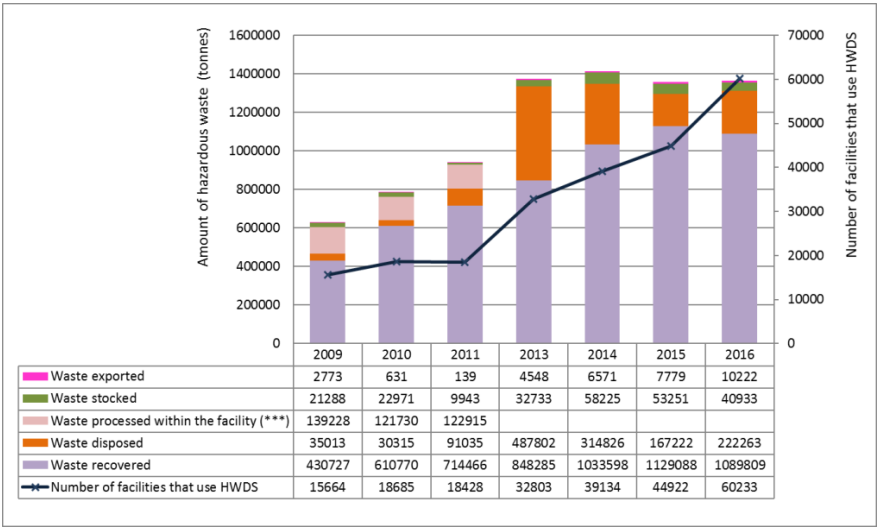
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

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 2016, 60,233 plants in total provided data to HWDS. The total amount of the hazardous waste generated in 2016 was calculated as 1,363,227 tonnes, excluding the waste generated by the mining industry. 79.94% of the mentioned total was directed to recycling; 16.3% was disposed of; 3% stored and 0.75% was exported.

GRAPH 62- DATA FROM THE HAZARDOUS WASTE DECLARATION SYSTEM (2009-2016)



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

TABLE 16- DATA OF HAZARDOUS WASTE DECLARATION SYSTEM FOR (2009-2016) (**)

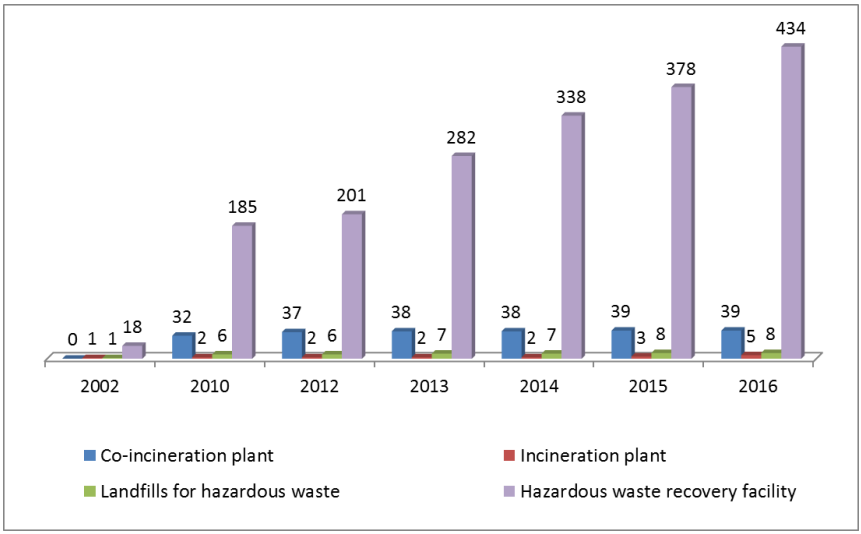
YEARS	2009	2010	2011	2013	2014	2015	2016
The number of firms that use HWDS	15,664	18,685	18,428	32,803(*)	39,134	44,922	60,233
The amount of total hazardous waste (tonnes)	629,933	786,418	938,498	1,373,368	1,413,220	1,357,340	1,363,227

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, 2014,2015 and 2016 amount processed within the facility was reported under either disposal or recoveryg accordingly.

Number of hazardous waste recovery facilities increased from 185 in 2010 to 434 in 2016. Number of landfills for hazardous waste was 8 in 2016, while 6 in 2010.

There are 44 facilities for energy recovery from waste, 5 of these are incineration plants and 39 of them are co-incineration plants. At these facilities, 590 thousand tons of waste have been co-incinerated as auxiliary fuel and 780 thousand tons of waste have been consumed as alternative raw material.

GRAPH 63- NUMBER OF LICENSED WASTE RECOVERY/DISPOSAL FACILITIES



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

7.4- Medical Waste

Hazardous Waste Declaration System (HWDS) is also used for the declaration of medical waste by the medical facilities. Within 2016, 13,430 facilities reported a total amount of 98,376 tonnes of medical waste, which comprises 7.2% of the total hazardous waste (excluding mining waste).

In Turkey, sterilization of medical aste is carried out by sterilization facilities since 2008. As of the end of 2016, in total 56 medical waste sterilization and 2 incineration facilities have been serving all over the country.

TABLE 17- MEDICAL WASTE DATA BY THE HAZARDOUS WASTE DECLARATION SYSTEM (2013- 2016)

YEARS	2013	2014	2015	2016
Number of reporting facilities	4949	7059	7602	13,430
Total amount of medical waste (tonnes)	71,173	83,190	113,857	98,376

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

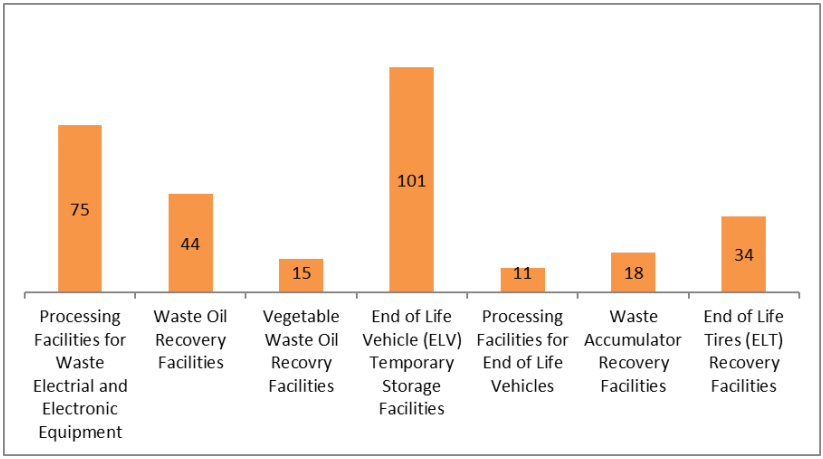
Waste oil, vegetable waste oils, waste accumulators, waste batteries, end of life tires, end of life vehicles and waste electrical and electronic equipment quantities in the years 2013, 2014, 2015 and 2016 are given in Table 18.

TABLE 18- WASTE OILS, VEGETABLE WASTE OILS, WASTE BATTERIES AND ACCUMULATORS, WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE), END OF LIFE TIRES, END OF LIFE VEHICLES (2013-2016)

YEARS	2013	2014	2015	2016
Waste Oils (tonnes)	39,645	47,460	57,800	82,681
Vegetable Waste Oils (tonnes)	14,350	15,200	21,040	27,565
Waste Batteries (tonnes)	526	555	630	718
Waste Accumulators (tonnes)	69,000	61,300	71,444	66,400
Waste Electrical and Electronic Equipment (tonnes)	9,500	22,000	28,000	55,000
End of Life Tires (tonnes)	118,600	120,425	134,680	144,000
End of Life Vehicles (Unit)	10,619	11,962	14,736	15,541

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

GRAPH 64- NUMBER OF LICENSES AND TEMPORARY OPERATION CERTIFICATES IN 2016



Source: 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.

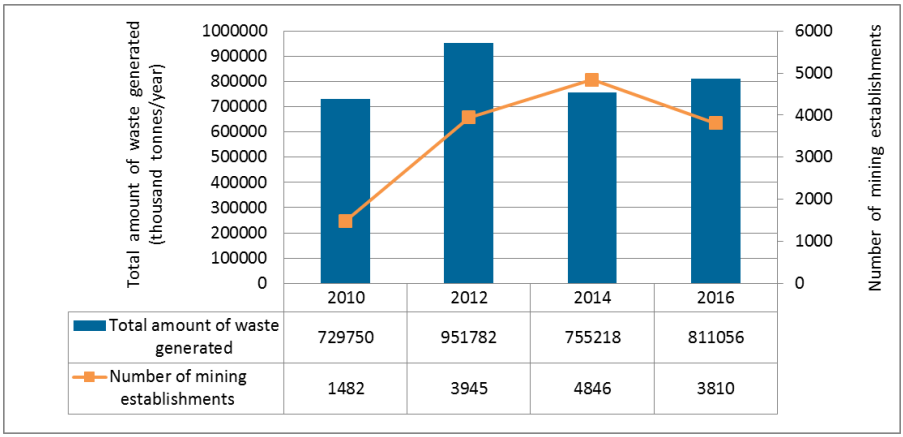
When looking at the distribution of total mining waste by recovery and disposal methods in 2016; 70.4% was disposed of in heaps for overburden or controlled landfill sites, 15.9% was used for backfilling, 13% was used for reclamation purposes in mining sites and 0.7% was recovered or disposed of by other methods[38].

TABLE 19- 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 65- 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.

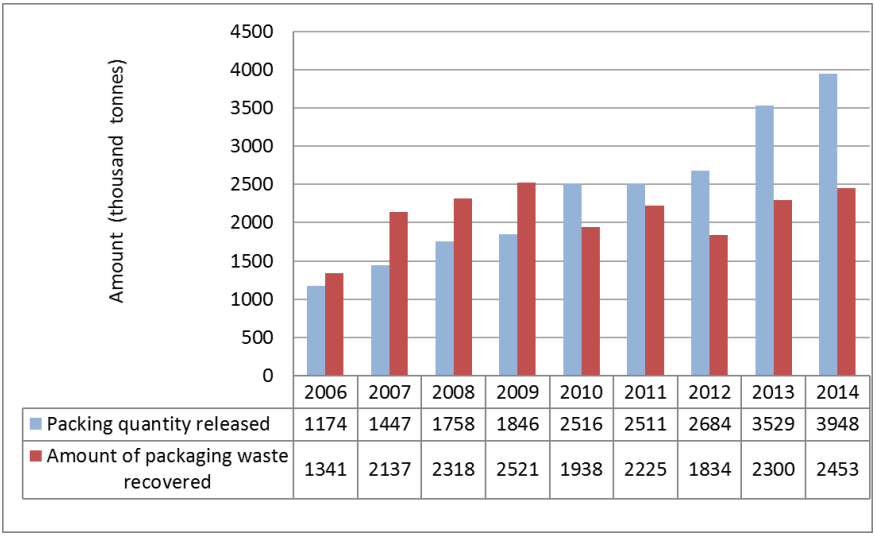
(4) The scope of Mining Establishments Water, Wastewater and Waste Statistics Survey was mining establishments, which submitted production data for 2015 to General Directorate of Mining Affairs or had a new licence for 2016. Establishments dealing only with enrichment processes was out of scope.

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



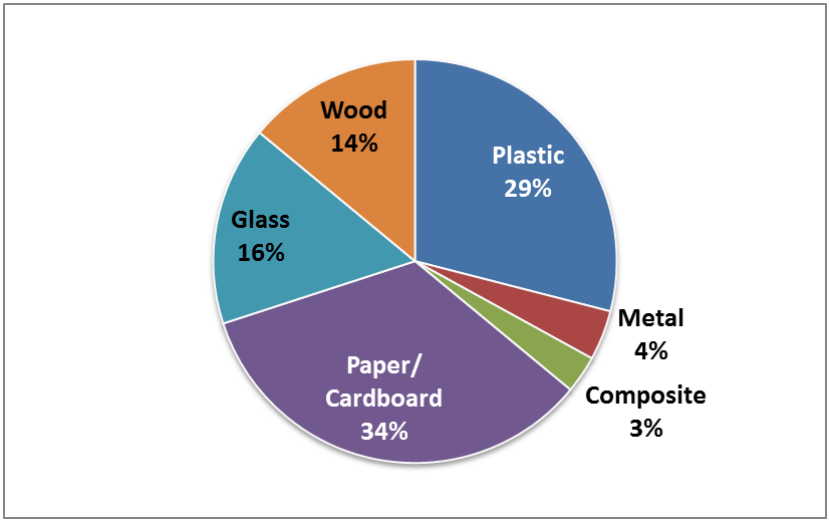
	2006	2007	2008	2009	2010	2011	2012	2013	2014
Packing quantity released	1174	1447	1758	1846	2516	2511	2684	3529	3948
Amount of packaging waste recovered	1341	2137	2318	2521	1938	2225	1834	2300	2453

TABLE 20- PACKAGING WASTE STATISTICS IN 2014

Waste Code	Type of Packaging	Produced Packaging Amount (tonnes)	Packaging Quantity Released (tonnes)	Recovered Amount (tonnes)	Achieved Recovery Rate (%)
15.01.02	PLASTIC	3,513,086	1,144,285	506,717	44
15.01.04	METAL	373,809	160,975	80,747	50
15.01.05	COMPOSITE	140,497	107,721	76,216	70
15.01.01	PAPER/CARDBOARD	1,953,208	1,335,603	1,523,253	114
15.01.07	GLASS	878,262	637,045	154,841	24
15.01.03	WOOD	427,322	562,678	80,747	14
	TOTAL	**7,286,184**	**3,948,307**	**2,422,521**	**61**

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

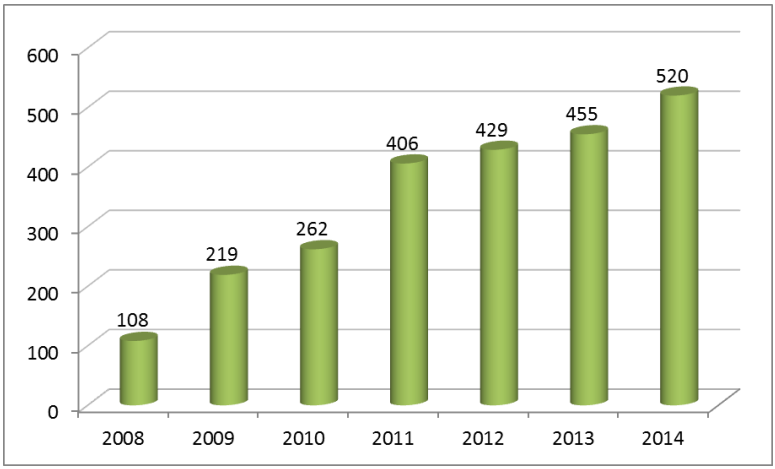
GRAPH 67- PACKAGING QUANTITY RELEASED ACCORDING TO TYPE AND INTENDED USE IN 2014



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 68- NUMBER OF MUNICIPALITIES WHO HAVE APPROPRIATE PACKAGING WASTE MANAGEMENT PLANS



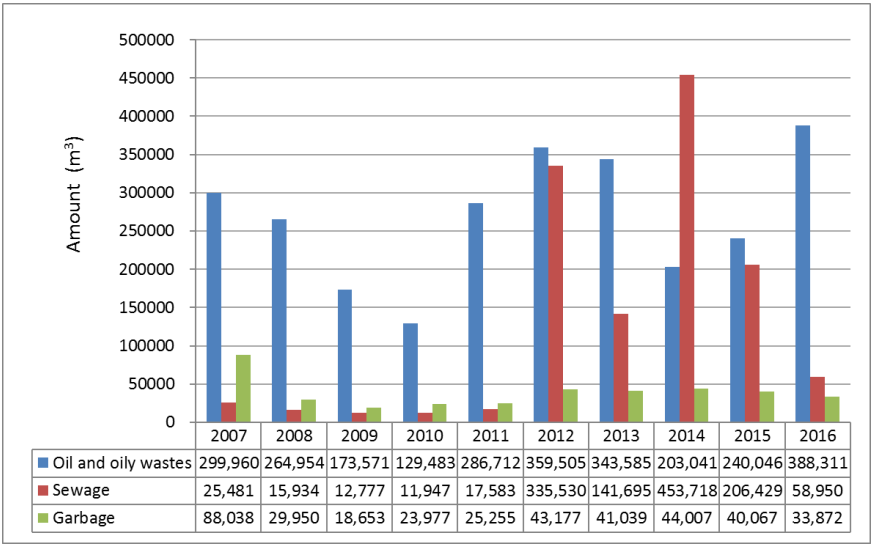
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

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 2016, number of coastal facilities which give waste reception service to the ships was 269.

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



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

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.

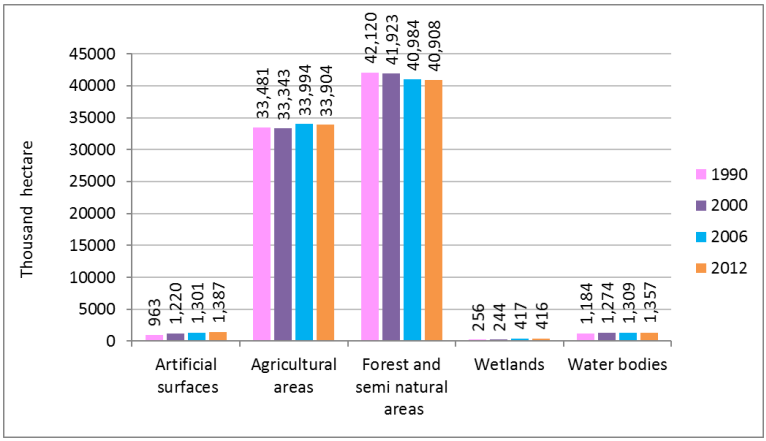
Under the European Union's CORINE (Coordination of Information on the Environment) Land Cover Program, projects were done in years 1990, 2000, 2006 and 2012 in Turkey.

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 (37.7%) 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%) [40].

GRAPH 70- LAND USE BY YEARS (1990-2012)



Source: 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.

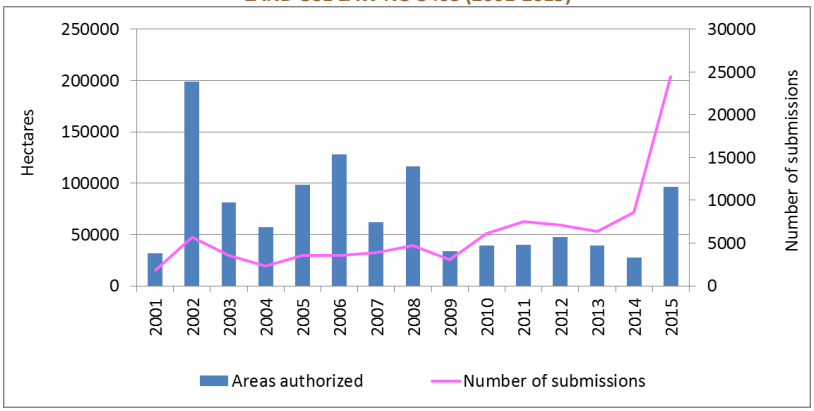
In the 1989-2015 period, a total of 2,553,316 hectares of agricultural land was allowed for non-agricultural activity in Turkey.

629,285 hectares of agricultural land was allowed for non-agricultural use in 2006-2015 period. 65.4% of this land was dry marginal agricultural land and 22.9% was absolute agricultural land [41].

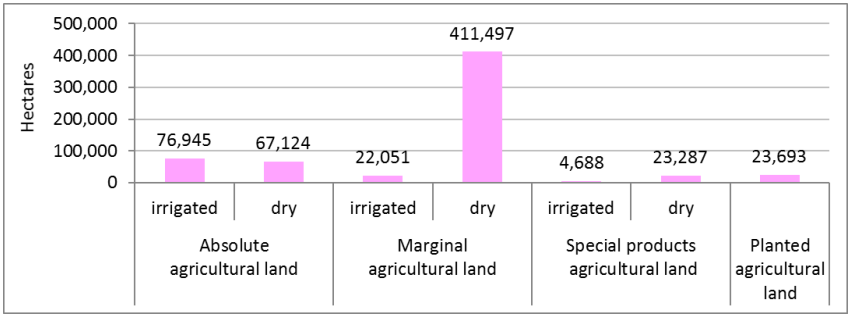
In 2015, 24,421 applications for non-agricultural use have been made and in total 96,255 ha of agriculture land was permitted to be used as non-agricultural area.

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 71- MISUSE OF AGRICULTURAL AREAS WITHIN THE SCOPE OF SOIL CONSERVATION AND LAND USE LAW NO 5403 (2001-2015)



GRAPH 72- DISTRIBUTION OF THE LAND ALLOWED FOR MISUSE ACCORDING TO THEIR CLASSES IN THE 2006-2015 PERIOD



Source: http://www.tarim.gov.tr/sgb/Belgeler/SagMenuVeriler/TRGM.pdf

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'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. There are various erosion types observed all over the country; while water erosion is the most widespread one. 61.2% of the country territory faces severe and very severe water erosion problem.

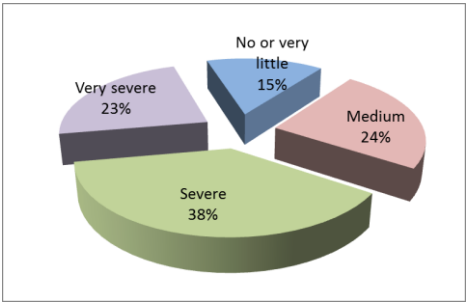
Given below is the erosion information from the Digital Soil Maps (scale 1/25,000) that have been prepared using GIS systems and classified according to the American Taxonomy, relying on field surveys of Repealed General Directorate of Rural Services (soil survey and mapping data 1982-1984).

TABLE 21- AREAS THAT WIND AND WATER EROSION OCCUR AND THEIR DEGREES

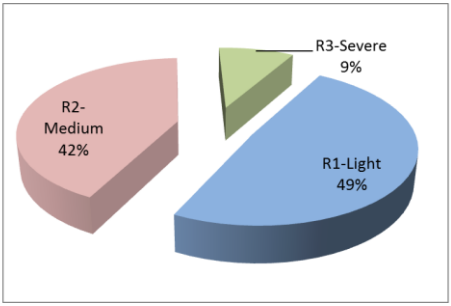
	MAGNITUDE OF EROSION	AREA (hectares)
Water Erosion	1-None or very little	10,930,800
	2-Intermediate (medium)	17,754,275
	3-Severe	28,410,874
	4-Splitting (Very severe)	16,856,271
Wind Erosion	R1-Light	233,730
	R2-Medium	198,720
	R3-Severe	42,020

Source: Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform

GRAPH 73- WATER EROSION



GRAPH 74- WIND EROSION



Source: Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform

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 [43].

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 22- 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 23- 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 24- NUMBER OF BIO-SMUGGLING CASES RECORDED (2007-2016)

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

Source: Protected Area Statistics 2016 (http://www.milliparklar.gov.tr/Anasayfa/istatistik.aspx?sflang=tr)

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 2016.

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 2016 [43].

9.3- Protected Areas

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

As of 2016, total areas (terrestrial and marine) protected by Ministry of Forestry and Water Affairs and Ministry of Environment and Urbanisation General Directorate for Preservation of Natural Heritage summed up to 9.1% 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. There is a drop in the percentage of protected areas from 10.1% in 2013, to 8.5% in 2014, to 8.9% in 2015, mainly because a registry procedure was introduced for the wetlands by the the amendment in 2014 in By-Law on Wetlands. Finally, rate of protected areas has become 9.1% in 2016.

Referring to the situation in the world, according to 2014 World Bank data, ratio of terrestrial and marine protected areas as percent of total terrestrial area was about 12.8% globally [47].

TABLE 25- STATUS AND AREAL DISTRIBUTION OF AREAS UNDER PROTECTION IN TURKEY

YEARS	2013		2016	
The Ministry of Forestry and Water Affairs, Protected Areas	**Number (Quantity)**	**Area (ha)**	**Number (Quantity)**	**Area (ha)**
National Park	40	848,119	42	845,814
Nature Park	189	89,832	209	99,378
Nature Monument	112	6,678	111	7,142
Nature Conservation Area	31	63,694	30	47,244
Wildlife Conservation Area	80	1,191,340	81	1,189,293
Locally important wetlands (1)			6	1,602
Nationally Important Wetlands (1)	121	1,735,495	38	469,830
Ramsar Areas	14	184,487	14	184,487
Protection Forests	55	251,409	55	251,548
Gene Conservation Forests (in-situ)	258	37,098	295	39,732
Seed Stands (in-situ)	347	46,106	330	43,858
Seed Orchard (ex-situ)	179	1,313	187	1,442
City Forests	126	11,867	145	10,550
SUBTOTAL	**1,552**	**4,467,438**	**1,543**	**3,191,920**
Ministry of Environment and Urbanisation, Protected Areas	**Number (Quantity)**	**Area (ha)**	**Number (Quantity)**	**Area (ha)**
Special Environmental Protection Areas	16	2,459,116	16	2,458,749
Natural Sites	1,273	1,322,749	2,430	1,773,856
SUBTOTAL	**1,289**	**3,781,865**	**2,446**	**4,232,605**
OVERALL TOTAL	**2,841**	**8,249,303**	**3,989**	**7,424,525**
Ratio of protected areas in the Country's total surface area (%) (3)		**%10.1**		**%9.1**

Sources: For areas protected by Ministry of Forestry and Water Affairs; http://www.milliparklar.gov.tr/Anasayfa/istatistik.aspx?sflang=tr
special protection areas and natural sites: General Directorate for Preservation of Natural Heritage
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 land and marine.
(3)Percentages used in calculations are calculated as the rate of the summation of land and marine protected areas to the total terrestrial surface area of Turkey. Surface area for Turkey refers to topographic surface area, which is 814,578 km^2.

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 1865 km (22%) of it is under protection, as of 2016 [45].

TABLE 26- LENGTH OF PROTECTED COASTAL ZONES IN TURKEY

YEARS	2002	2012	2013	2014	2015	2016
Length of Protected Coastal Zones in Turkey (km)	1775	1853	1855,3	1855,3	1860	1865
Rate of Length of Protected Coastal Zones to Total Length of Coastal Zones (%)	20	22	22	22	22	22

Source: Status Report on Nature Conservation (2015-2016), Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Parks, http://www.milliparklar.gov.tr/kitap/175/?sflang=tr

9.5- Wildlife Protection Activities

This response indicator represents the activities for the protection of biological diversity. 629 species including 121 mammals, 378 birds and 130 reptiles, are taken under protection by The Ministry of Forestry and Water Affairs 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 [39].

TABLE 27- WILDLIFE PROTECTION ACTIVITIES

YEARS	2012	2013	2014	2015	2016
The Number of Wild Mammals, Placed in the Nature	62	84	148	114	36
Winged Wild Animal Placement Numbers (Partridge – Pheasant)	64.895	79.200	91.050	97.200	103.100
Number of Trout Stocked in Waters within Forest Zones,	2.042.000	3.172.000	1.291.000	1.510.000	3.016.000
Total Number of Wildlife Production Facilities (Partridge, Pheasant, Mammals, Bald Ibis, Trout, Mountain Gazelle)	20	21	21	23	24
The Number of Wild Animals Rehabilitated and Released back to Nature	921	1.643	2.109	2.561	2.465

Source: http://www.milliparklar.gov.tr/kitap/175/?sflang=tr

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

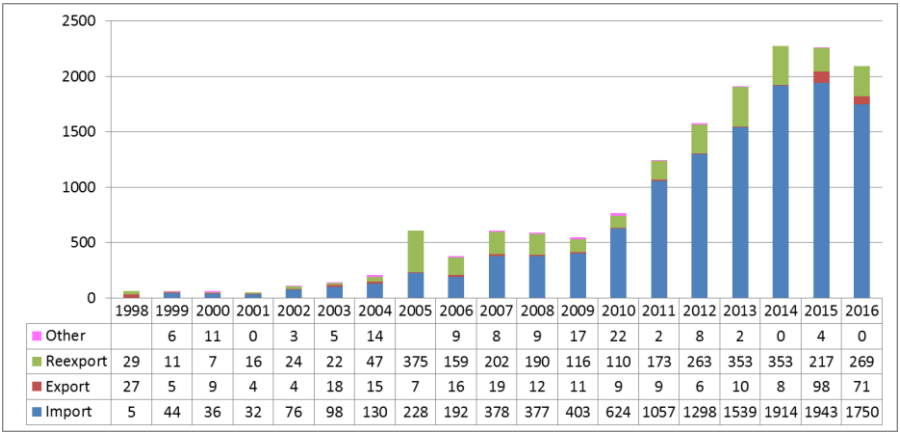
D P S I R

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 2016, totally 2090 certification documents were issued.

GRAPH 75- NUMBER OF CITES CONSENT CERTIFICATES BY THE DOCUMENT TYPE, (1998-2016)



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

Source: http://www.milliparklar.gov.tr/Anasayfa/istatistik.aspx?sflang=tr

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 [48].

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.

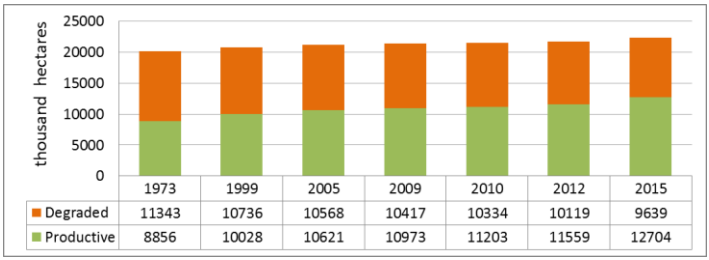
According to the World Bank, the ratio of world's forest cover to the total land area was 31.3% in 2000 and 30.8% in 2015 [50].

TABLE 28- FOREST AREA THROUGH YEARS

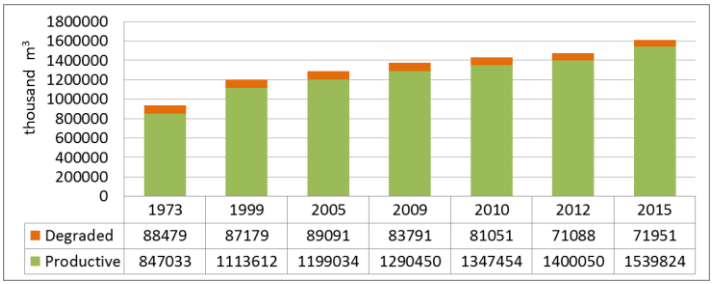
YEARS	1973	1999	2005	2009	2010	2012	2015
Forest Area (hectare)	20,199,296	20,763,248	21,188,747	21,389,783	21,537,091	21,678,134	22,342,935

Source: The Ministry of Forestry and Water Affairs, 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

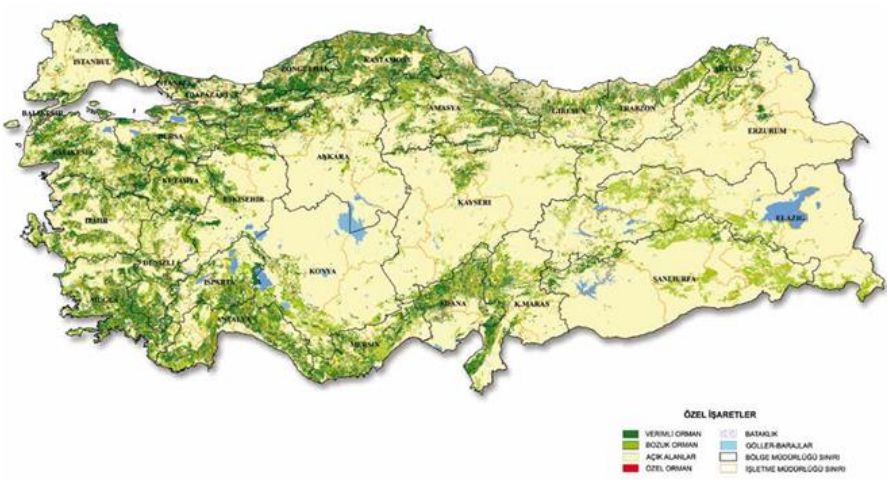


GRAPH 77- DISTRIBUTION OF GROWING STOCK BY FOREST FORM



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

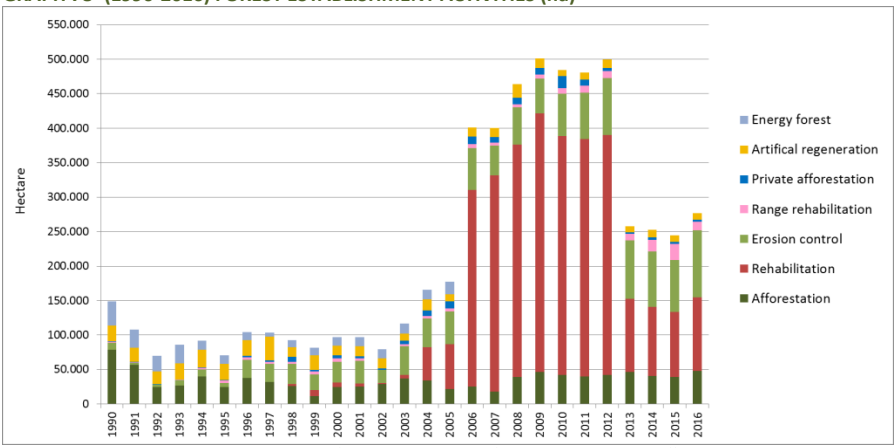
TURKEY FOREST AREAS (2015)



Source: The Ministry of Forestry and Water Affairs, 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 2016, 48,230 ha area was afforested, 106,267 ha area was rehabilitated, in 97,056 ha area erosion was controlled, in 12,778 ha area range rehabilitation has been done, in 3,245 ha area private afforestation were done and in 8,885 ha area artificial regeneration was done as forest establishment activities. A total of 276,461 hectares of forest establishment activities were conducted in 2016.

GRAPH 78- (1990-2016) FOREST ESTABLISHMENT ACTIVITIES (ha)



Note: Forest based works are the Works performed by Ministry of Forestry and Water Affairs and the other institutions.
Source: Ministry of Forestry and Water Affairs, 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 29- 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 Forestry and Water Affairs, 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 30- 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 Forestry and Water Affairs, 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 2016, there were 55 airports open to commercial air traffic with a total airway flight line length of 66,930 km; 120 ports and 89 installations handling oil and chemicals in Turkey. The length of highways (state roads, provincial roads, highways) summed up to 67,161 km, the railway network(including both the conventional and high speed lines) to 12,532 km in length.

TABLE 31- HIGHWAY AND RAILWAY NETWORKS BY YEARS (km)

YEARS	2002	2005	2010	2011	2012	2013	2014	2015	2016
Highway Network Length (km)	63,082	63,606	64,865	65,166	65,491	65,740	65,909	66,437	67,161
Railway Network Length (km)	10,925	10,973	11,940	12,000	12,008	12,097	12,485	12,532	12,532

Source: Ministry of Transport, Maritime Affairs and Communications.

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 2015 data, there were 80 km highways and the 13 km railways (length of mainline) per population of 100,000. In the EU-28 countries, these figures are respectively, 410 km and 43 km in average. Considering the surface area, there were 84 km highways and 13 km railways per 1000 km^2 in Turkey. In the EU-28 countries, these figures were 474 km and 50 km respectively [51].

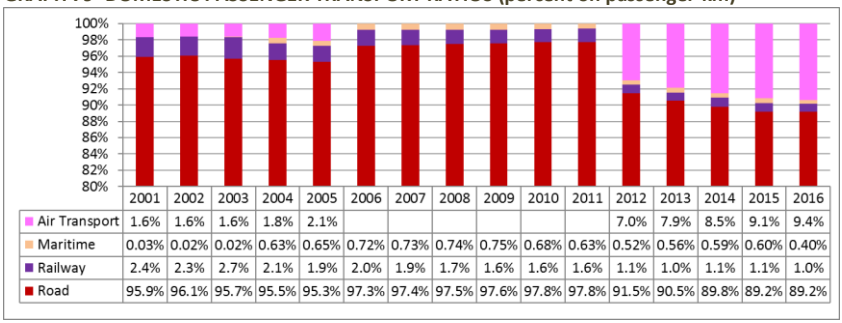
It is estimated that highway network will have reached to 70,000 km and railway network to 25,000 km in length by 2023 [52]. Then the highway network intensity will have reached to 86 km and railway network to 32 km per 1000 km^2.

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 9.4% in 2016 from 1.8% in 2000; in the same period, share of highway transport reduced from 95.9% to 89.2% and railway transport from 2.2% to 1%. The share of maritime passenger transport was 0.4% in 2016. It is targeted to reduce the share of domestic passenger transport by road (as a passenger /km) to 76% by the end of 2023 [52].

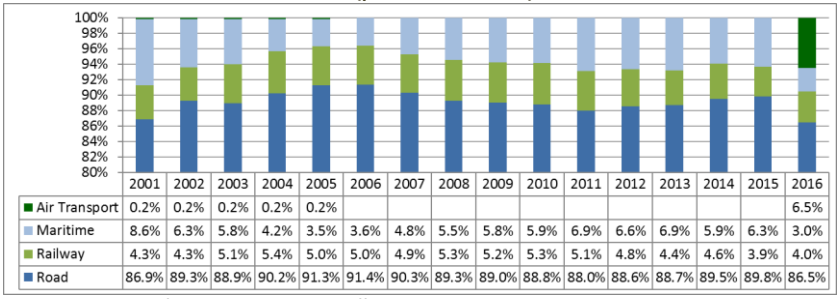
In 2016, considering the domestic freight transport, it seems that the highways (86.5%) take the major share. In 2016, it is observed that the share of air freight in domestic freight transport increased compared to 2000, while the shares of maritime, railway and highway freight decreased.

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



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Air Transport	1.6%	1.6%	1.6%	1.8%	2.1%							7.0%	7.9%	8.5%	9.1%	9.4%
Maritime	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%	0.60%	0.40%
Railway	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%
Road	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%	89.2%

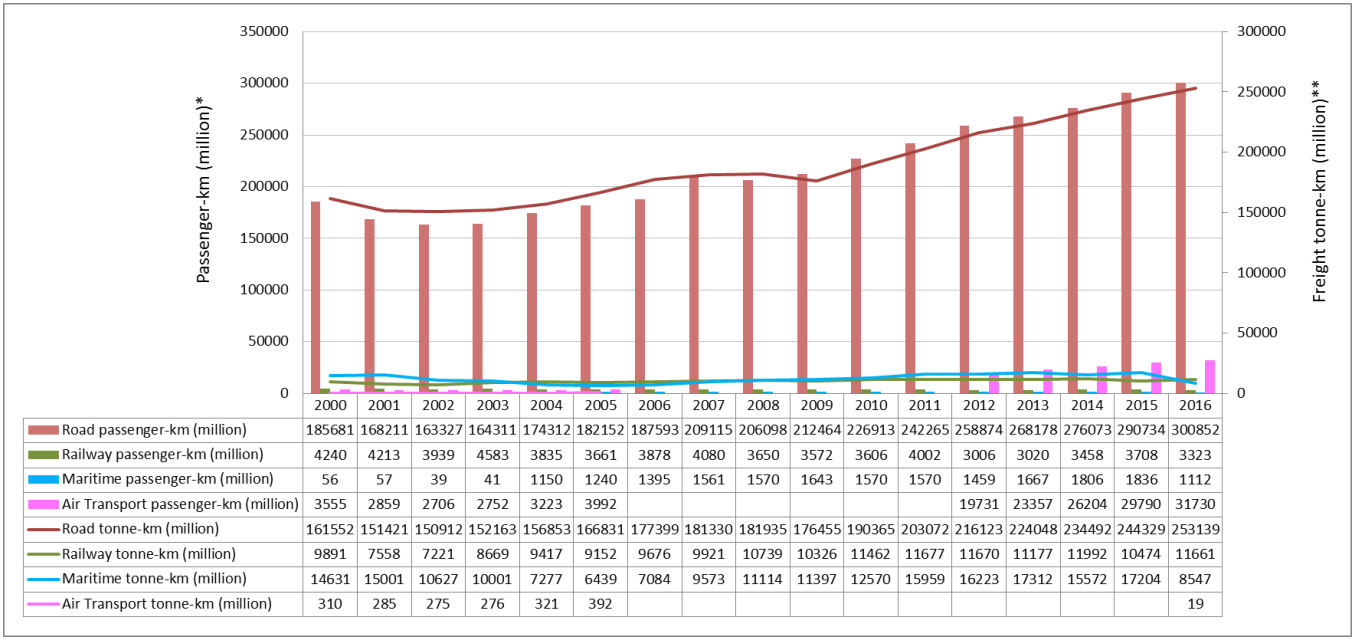
GRAPH 80- DOMESTIC FREIGHT RATIOS (percent on ton-km)**



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Air Transport	0.2%	0.2%	0.2%	0.2%	0.2%											6.5%
Maritime	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%	3.0%
Railway	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%	4.0%
Road	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%	86.5%

Sources: Ministry of Transport, Maritime Affairs and Communications, Turkish 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

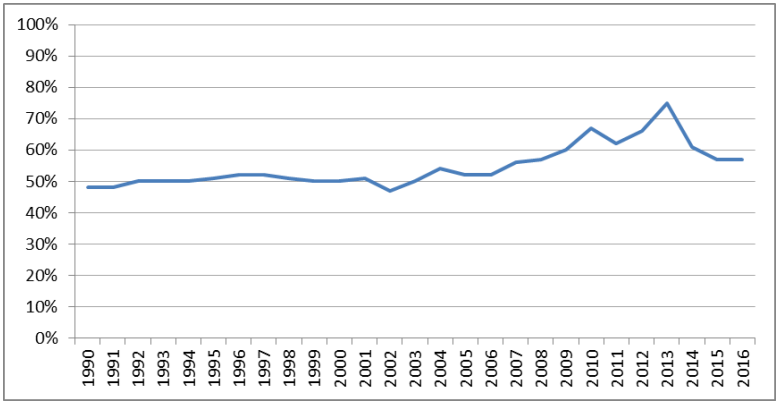


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Road passenger-km (million)	185681	168211	163327	164311	174312	182152	187593	209115	206098	212464	226913	242265	258874	268178	276073	290734	300852
Railway passenger-km (million)	4240	4213	3939	4583	3835	3661	3878	4080	3650	3572	3606	4002	3006	3020	3458	3708	3323
Maritime passenger-km (million)	56	57	39	41	1150	1240	1395	1561	1570	1643	1570	1570	1459	1667	1806	1836	1112
Air Transport passenger-km (million)	3555	2859	2706	2752	3223	3992							19731	23357	26204	29790	31730
Road tonne-km (million)	161552	151421	150912	152163	156853	166831	177399	181330	181935	176455	190365	203072	216123	224048	234492	244329	253139
Railway tonne-km (million)	9891	7558	7221	8669	9417	9152	9676	9921	10739	10326	11462	11677	11670	11177	11992	10474	11661
Maritime tonne-km (million)	14631	15001	10627	10001	7277	6439	7084	9573	11114	11397	12570	15959	16223	17312	15572	17204	8547
Air Transport tonne-km (million)	310	285	275	276	321	392											19

Sources: Ministry of Transport, Maritime Affairs and Communications, Turkish 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 2016 was 55%. In 2013 the ratio was 75% and in 2016 57%.

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



Sources: Ministry of Transport, Maritime Affairs and Communications, Turkish 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 2015 greenhouse gas emission inventory data, Turkey's total greenhouse gas emissions were 475.1 million tonnes CO_2 equivalent, in 2015. Out of this, 75,789 kilotonnes of CO_2 equivalent are transport related emissions. The share of transport related emissions in total greenhouse gas emissions was about 12.6% in 1990 and 16% in 2015.

91.4% of transport related CO_2 emission was originated from road transport, 5.5% from domestic aviation, 1.5% from domestic navigation, 0.6% from railways and 0.9% from other transport modes.

In the EU-28, the transport sector contributed 21 % of total greenhouse gas emissions (international aviation and maritime emissions excluded) [53].

GRAPH 83- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT

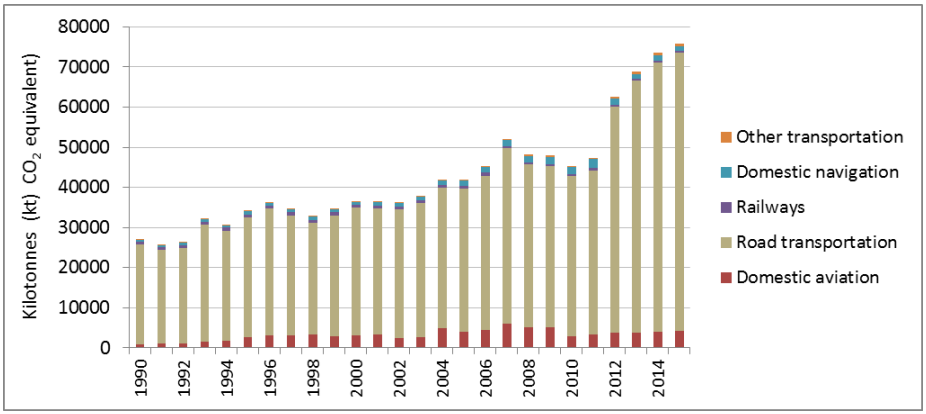


TABLE 32- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT (kilotonnes CO_2 equivalent)

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

Source: TURKSTAT

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. Graph 83 shows the national total emissions rising from land transport. Regarding the emissions between 1990 and 2015, it can be observed that there is significant decrease in SO_2 emissions due to a legislation banning the sulphur content of the fuels. However, increasing trend in CO emissions reflects the result of increasing number of road vehicles and the financial profile of the fuel market.

GRAPH 84- TOTAL EMISSIONS ARISING FROM ROAD TRANSPORT (1990-2015)

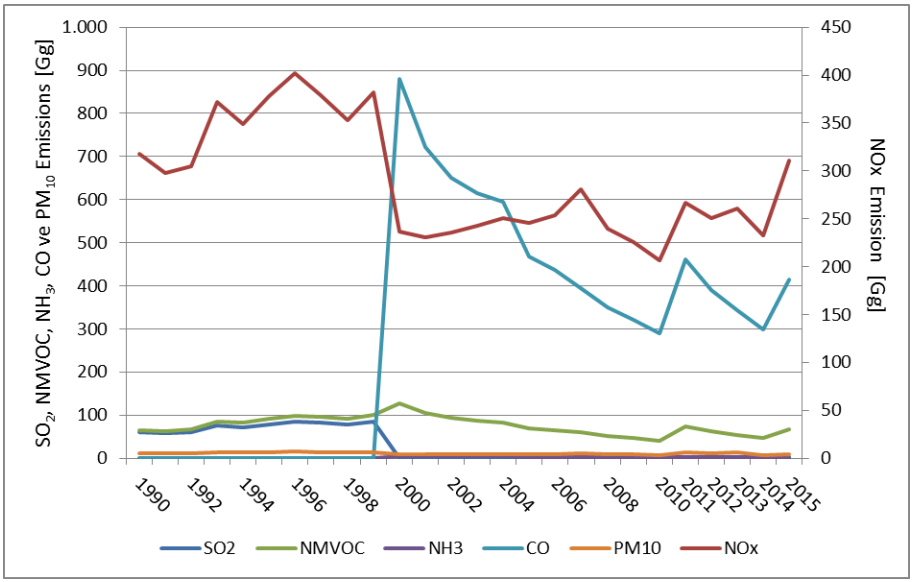


TABLE 33- TOTAL EMISSIONS ARISING FROM ROAD TRANSPORTATION (Gg)

Years	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2015
SO_2	61	61	72	85	78	0.17	0.18	0.21	0.36	0.42	0.45	0.47	0.50	0.8
NMVOC	65	67	82	98	91	128	94	82	65	52	40	63	47	67
NH_3	0.1	0.1	0.2	0.2	0.2	4.6	3.9	3.5	2.9	2.7	2.4	1.7	1.7	2.7
CO	0	0	0	0	0	880	651	594	436	349	289	390	299	415
PM_{10}	12	12	13	15	13	10	10	10	10	9	8	12	8	9.7
NO_X	317	305	349	402	353	237	236	251	254	239	206	251	233	311

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

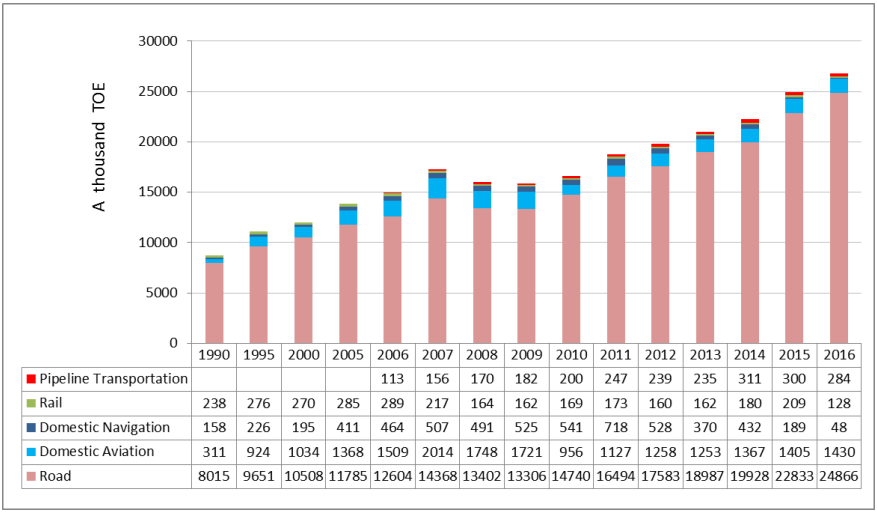
10.5- Final Energy Consumption by Mode of Transport

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) [54].

Total energy consumption by the transport sector as a whole was 26,756 thousand TOE (Tonnes of Oil Equivalent) in 2016, with a 206.7% increase compared to 1990. Excluding the 284 thousand TOE consumed by pipeline transport, 93.9% of the total transport consumption of 26,472 thousand TOE was consumed by road transport. 5.4% of the consumption was by aviation, 0.2% by domestic navigation and 0.5% consumed by railroad transport.

Energy consumption by aviation increased by 359% from 1990 to 2016. This was followed by road transport with an increase of 210%. The amount of energy consumed for maritime transport decreased by 70% compared to 1990 and the amount of energy consumed for railway transport has decreased by 46%.
According to 2015 EU-28 data, 94.7% of the final energy consumption by transportation was by road transport, 1.8% by domestic aviation, 1.5% by domestic navigation and 2% by railroad transport [55].

GRAPH 85- FINAL ENERGY CONSUMPTION BY MODE OF TRANSPORT



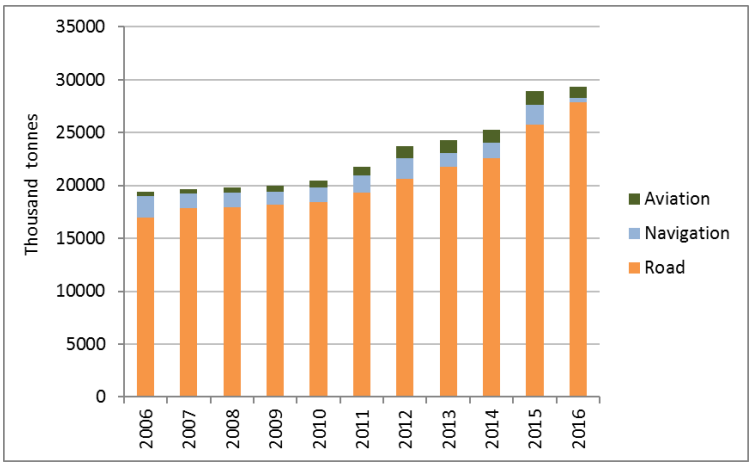
	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Pipeline Transportation					113	156	170	182	200	247	239	235	311	300	284
Rail	238	276	270	285	289	217	164	162	169	173	160	162	180	209	128
Domestic Navigation	158	226	195	411	464	507	491	525	541	718	528	370	432	189	48
Domestic Aviation	311	924	1034	1368	1509	2014	1748	1721	956	1127	1258	1253	1367	1405	1430
Road	8015	9651	10508	11785	12604	14368	13402	13306	14740	16494	17583	18987	19928	22833	24866

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

Fuel consumption according to transport mode:

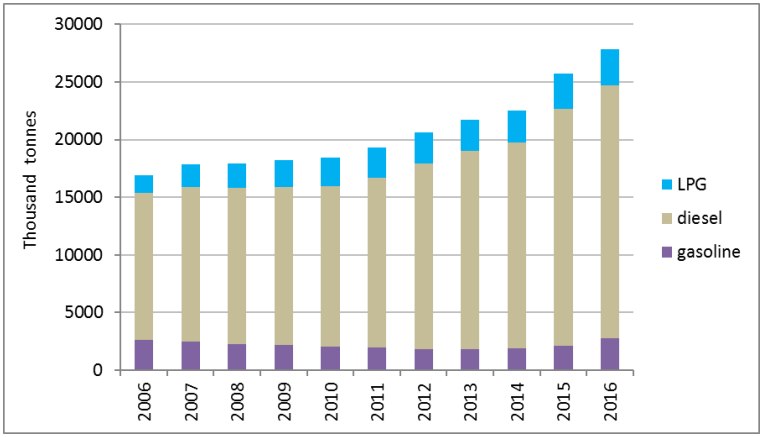
In 2016, fuel consumption was 27,848,652 tons in road transport, 396,816 tons in maritime transport and 1,123,702 tons in aviation. Out of the 27,848,652 tons consumed in road transport, 78.9% (21,970,270 tons) was diesel fuel, 11.3% (3,141,901 tons) were LPG and 9.8% (2,736,482 tons) was gasoline.

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

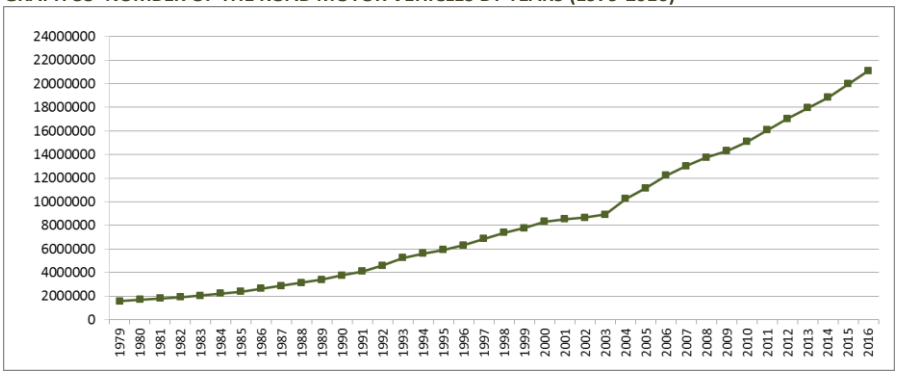
10.6- Number of the Road Motor Vehicles in Use

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.

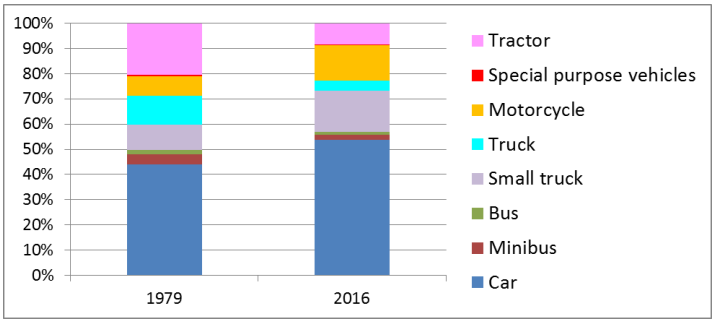
The number of total road motor vehicles, which was 1,566,405 in 1979, increased especially after 2004 and reached to 21,090,424 in 2016. When types of road motor vehicles share between 1979 and 2016 are compared, the increase in the rates of automobiles, small trucks and motorcycles are remarkable. Automobiles constitute 53.7% of the total road motor vehicles in 2016, small trucks 16.3%, motorcycles 14.2%, tractors 8.4%, trucks 3.9%, minibuses 2.2%, buses 1% and special purposed vehicles 0.2%.

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 2015 figures, average number of cars per thousand people in the EU-28 is 498, nearly four-fold of Turkey with average possesion value of 134 cars per thousand people [57].

GRAPH 88- NUMBER OF THE ROAD MOTOR VEHICLES BY YEARS (1979-2016)



GRAPH 89- DISTRIBUTION OF ROAD MOTOR VEHICLES IN TERMS OF THEIR TYPES (1979-2016) (%)



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

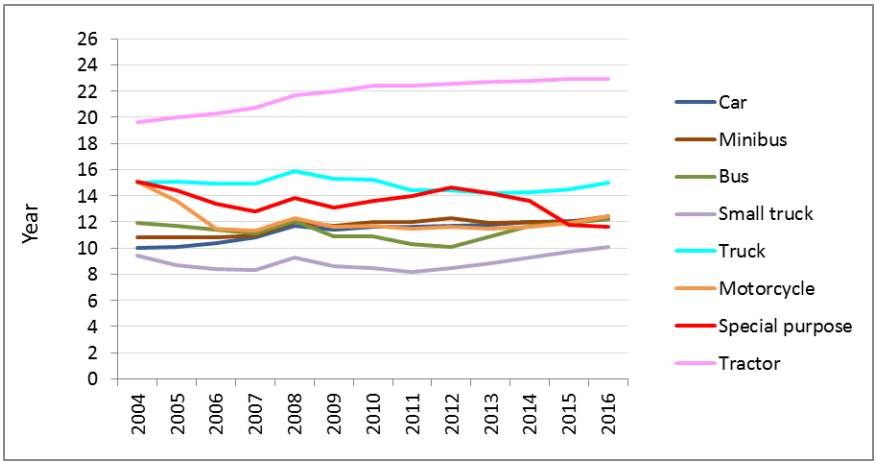
10.7- Average Age of Vehicles Registered to the Traffic

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 12.9 in 2016. During the same period, average age of passenger cars has increased from 10 to 12.2 by 22%. Average ages for various vehicle types in 2016 are as follows: 12.4 for minibuses, 12.2 for buses, 10.1 for small trucks, 15 for trucks, 12.4 for motorcycles, 11.6 for special purpose vehicles, 22.9 for tractors.

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[58].

GRAPH 90- AVERAGE AGE OF REGISTERED VEHICLES ACCORDING TO THE TYPES



Source: TURKSTAT

As of 2016 in Turkey, age group distribution of vehicles registered: 34% of the vehicles are at 0-5 years age range, 19.3% at 6-10 years, 12.4% at 11-15 years, 12.1% at 16-20 years range and 22.3% of the vehicles are older than 20 years.

11.1- Total Energy Consumption by Sectors

The indicator is a driving force indicator that identifies energy consumption. Turkey's total primary energy consumption was 135,986 thousand TOE (Tonnes of Oil Equivalent) in 2016. Increase in 2016 was 159.3% compared to 1990, 53.9% compared to 2005 and 5.6% compared to 2015.

In 2015, gross inland consumption in the EU-28 countries decreased by 2.5% compared to 1990, by 11.1% compared to 2005. In 2015, gross inland consumption in the EU-28 countries increased by 1.2% compared to 2014 [61].

In Turkey, distribution of primary energy consumption in 2016 shows that the highest consumption takes place in the housing-trade-services sector with 24.5% and by industry with 24.5%. These are followed by energy and conversion sector with 23.3%, transport with 19.7%, non-energy with 5.1% and agriculture and livestock sector with 3%.

GRAPH 91- TOTAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)

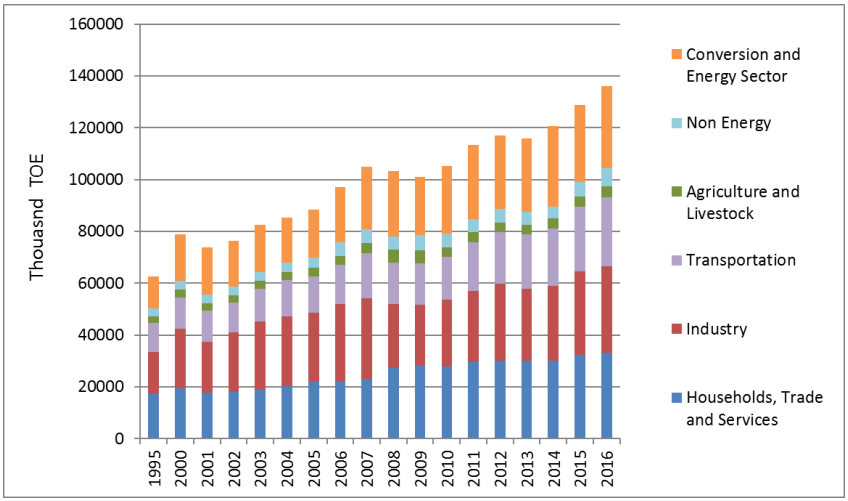


TABLE 34- TOTAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)

YEARS	1990	1995	2000	2005	2010	2015	2016
Total (Thousand TOE)	**52,447**	**62,662**	**78,801**	**88,338**	**105,251**	**128,741**	**135,986**
Household, Trade and Services	15,356	17,514	19,556	22,284	27,760	32,329	33,274
Industry	13,641	15,986	22,876	26,410	25,873	32,348	33,264
Transport	8,723	11,077	12,007	13,849	16,607	24,936	26,755
Agriculture and Livestock	1,956	2,556	3,073	3,359	3,736	3,932	4,051
Not Energy	2,543	3,087	3,455	4,089	5,314	5,652	6,989
Conversion and Energy Sector	10,228	12,442	17,834	18,347	25,961	29,544	31,653

Source: Ministry of Energy and Natural Resources, http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari

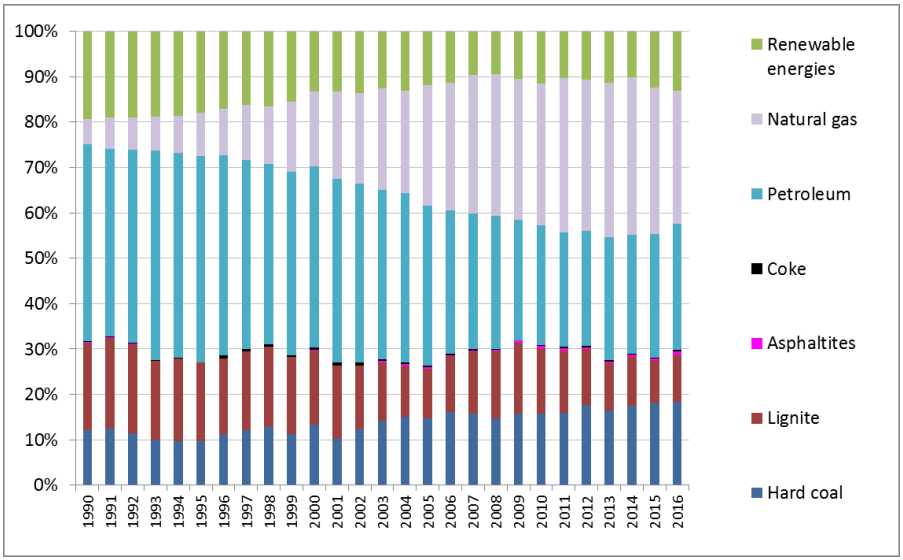
11.2- Primary Energy Consumption by Fuel Type

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 49,904 thousand TOE in 1990 to 128,997 thousand TOE in 2016. In 1990, the shares in primary energy consumption of Turkey in terms of coal and its derivatives was 31.8% (hard coal 12.1%, lignite 19.2%, asphaltite 0.3% and coke 0.1%). While the share of petroleum products was 43.4%, natural gas was 5.6% and share of renewable energy sources was 19.4%. As of 2016, 29.8% of Turkey's primary energy consumption was met by coal and its derivatives (hard coal 18.3%, lignite 10.5%, asphaltite 0.6% and coke 0.4%). While the share of petroleum products has decreased to 27.7%, the share of natural gas has increased to 29.2%. Portion of renewable energy sources decreased to 13.1%.

As of 2014, 17.7% of the primary energy consumption in the EU-28 countries was made up of coal and lignite, 31.1% from petroleum and petroleum products, 21.9% from natural gas, 15% from nuclear power, 13.4% from renewable energy [62].

GRAPH 92- PRIMARY ENERGY CONSUMPTION BY FUEL TYPE (%)



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

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 (transport, industry, services and households).

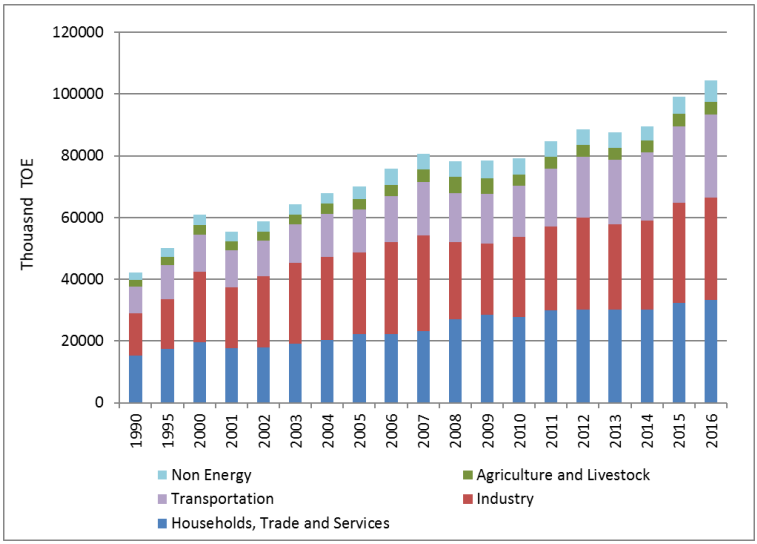
The total final energy consumption in Turkey was 104,333 thousand TOE in 2016, with an increase of 147% compared to 1990, 48.36% compared to 2005 and 4.76% compared to 2014 (Table 34).

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, final energy consumption decreased by 1.8% between 1990 and 2014 and by 11% between 2005 and 2014, owing to improvements in energy efficency[63].

In 2016 in Turkey, the highest share of final energy consumption occured in household-trade and services sector (%31.89) and industrial sector (31.88%), followed by transport (25.64%) and agriculture-livestock sectors (3.88%).

For comparison with the EU countries, in 2014 highest share in energy consumption was by household consumption and services with 38.1% (households 24.8%, services 13.3%); followed by transport (33.2%), industry (25.9%) and agriculture-fisheries-forestry and others (totally 2.8%) in the EU-28 member states [64].

GRAPH 93- FINAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)



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

11.4- Energy Consumption per Capita

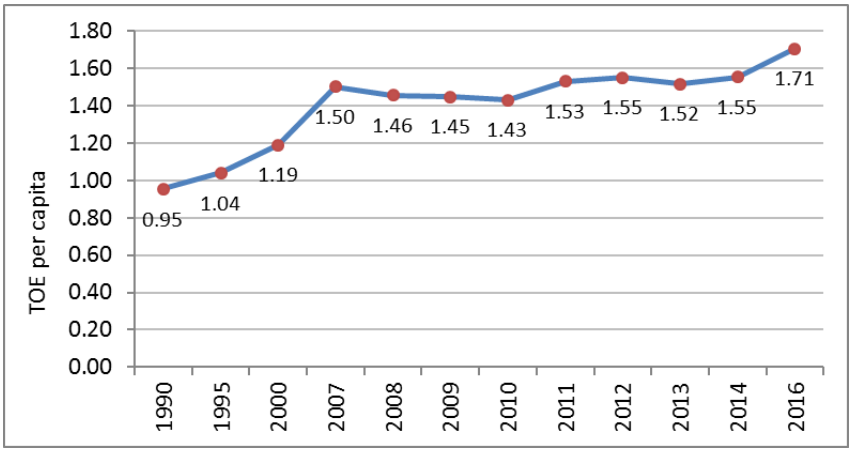
This driving force indicator shows energy consumption levels and is one of the indicators used for comparison among countries, regions, etc.

Primary energy consumption in Turkey was 0.95 TOE per capita in 1990 and 1.71 TOE in 2016.

In European Union countries, per-capita primary energy consumption was 3.44 TOE in 1990 and 3.21 TOE in 2015 [65].

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 [66].

GRAPH 94- PRIMARY ENERGY CONSUMPTION PER CAPITA THROUGH THE YEARS (TOE/PERSON)

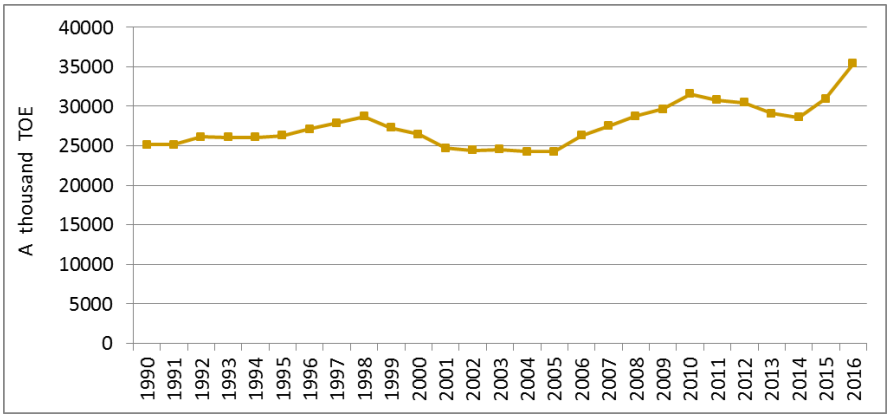


Source: Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/en-US/Balance-Sheets

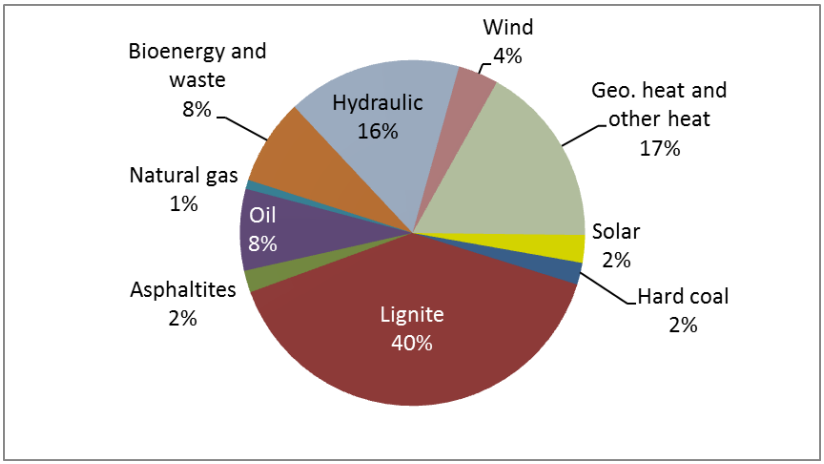
11.5- Primary Energy Production

This indicator is a driving force indicator. While total primary energy produced in Turkey in 1990 was 25,138 thousand TOE, this figure increased to 35,374 thousand TOE in 2016. From 1990 to 2016, the primary energy has grown by 40.7%.

GRAPH 95- - PRIMARY ENERGY PRODUCTION BY THE YEARS (Thousand TOE)



GRAPH 96- DISTRIBUTION OF PRIMARY ENERGY PRODUCTION BY RESOURCES (%) IN 2016



Source: Ministry of Energy and Natural Resources, http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari

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

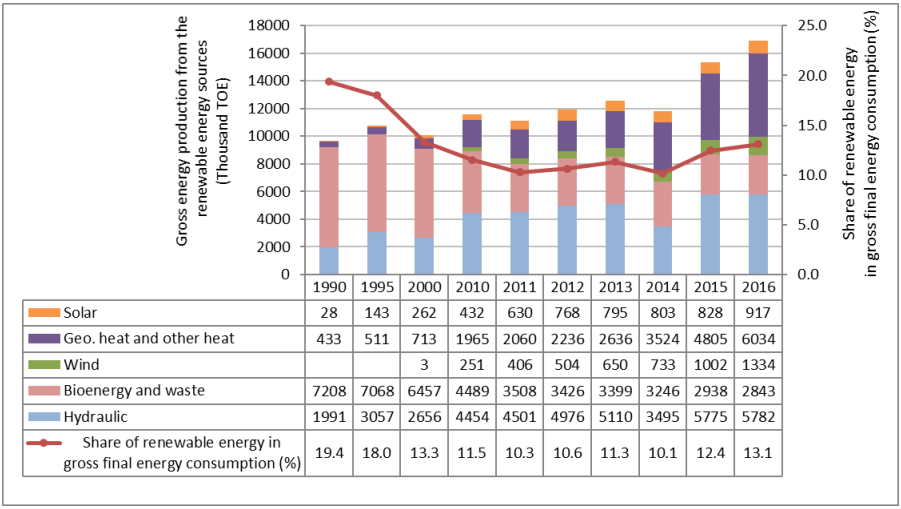
This response indicator displays the ratio of the energy produced by the renewable sources. Renewable energy sources are environment-friendly and have much lower CO_2 emission values per power unit generated.

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 136,229 thousands TOE, domestic gross energy production has reached to 35,374 thousands TOE at the end of 2016. Renewable resources provide 47.8%, equal to 16,910 thousands TOE, within the domestic gross energy production.

In Turkey, while contribution of renewables to total energy consumption was 19.4% in 1990, in parallel with increasing energy demand, this figure decreased to almost 13.1% in 2016.

The share of renewable energy in EU-28 primary energy consumption increased from around 4.5% in 1990 to 13.4% in 2014 [67].

GRAPH 97- GROSS ENERGY PRODUCTION FROM THE RENEWABLE ENERGY SOURCES IN TURKEY and SHARE OF RENEWABLE ENERGY IN GROSS FINAL ENERGY CONSUMPTION



	1990	1995	2000	2010	2011	2012	2013	2014	2015	2016
Solar	28	143	262	432	630	768	795	803	828	917
Geo. heat and other heat	433	511	713	1965	2060	2236	2636	3524	4805	6034
Wind			3	251	406	504	650	733	1002	1334
Bioenergy and waste	7208	7068	6457	4489	3508	3426	3399	3246	2938	2843
Hydraulic	1991	3057	2656	4454	4501	4976	5110	3495	5775	5782
Share of renewable energy in gross final energy consumption (%)	19.4	18.0	13.3	11.5	10.3	10.6	11.3	10.1	12.4	13.1

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

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 2016, Turkey's gross electricity consumption was 279,286.3 GWh. Electricity produced from renewable sources (90,981.3 GWh) was 32.6% of gross electricity consumption.

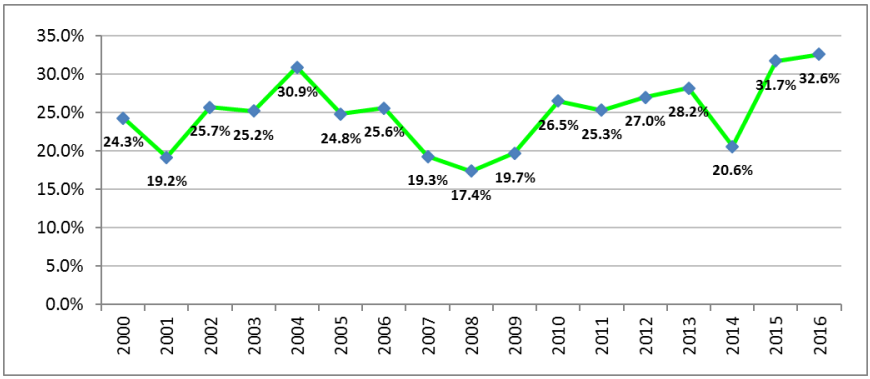
According to European Statistical Office (EUROSTAT), In 2015, the share of renewable electricity in gross electricity consumption was 28.8% in the EU-28[68].

TABLE 35- GROSS ELECTRICITY PRODUCTION FROM RENEWABLE ENERGY SOURCES IN 2016 (GWh)

	GWh	%
Waste+ waste heat	2,371.6	2.61
Wind	15,517.1	17.06
Solar	1,043.1	1.15
Dams	48,962.1	53.82
Lakes and rivers	18,268.8	20.08
Geothermal	4,818.5	5.30
TOTAL	**90,981.3**	**100.00**

Source: Turkish Electricity Transmission Company (TEIAS),
https://www.teias.gov.tr/tr/iii-elektrik-enerjisi-uretimi-tuketimi-kayiplar

GRAPH 98- SHARE OF RENEWABLE ELECTRICITY IN GROSS ELECTRICITY CONSUMPTION (%)



Sources:
1) For 2000-2012 years data TURKSTAT "Sustainable Development Indicators", http://www.tuik.gov.tr/PreTablo.do?alt_id=1097,
2) For 2013- 2016 data are calculated from data Turkish Electricity Transmission Company.
https://www.teias.gov.tr/tr/iii-elektrik-enerjisi-uretimi-tuketimi-kayiplar

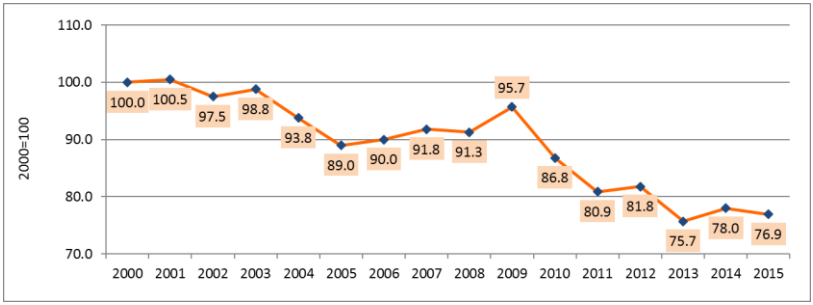
11.8- Primary and Final Energy Intensity

Primary energy intensity is a response; final energy intensity is a driving force indicator. 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.

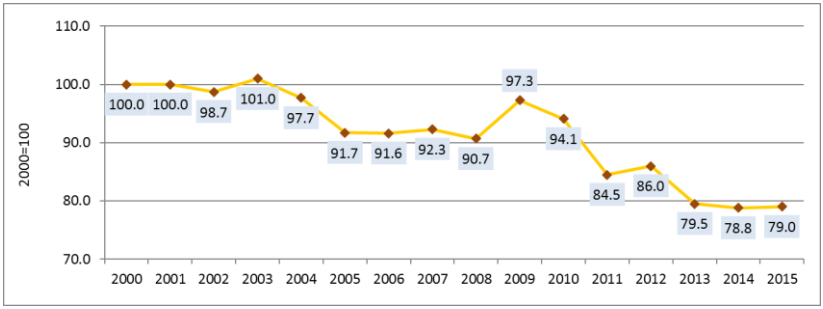
In Turkey, in the years 2000-2015, primary energy intensity index have decreased by 1.7% and final energy intensity index by 1.5% annualy. As compared with the year 2000, there is an improvement of 23.1% in the primary energy intensity index and 21% in the final energy intensity index in 2015 [59].

Comparing figures for 2015, EU-28 countries consumed 120 kg (Petroleum equivalent) for each 1000 Euros of GDP produced (2010 prices); while in Turkey, 160.9 kg's were consumed for the same amount of GDP [69].

GRAPH 99- PRIMARY ENERGY INTENSITY THROUGH THE YEARS (with climatic correction)



GRAPH 100- FINAL ENERGY INTENSITY THROUGH THE YEARS (with climatic correction)



Source: Ministry of Energy and Natural Resources, General Directorate of Renewable Energy.

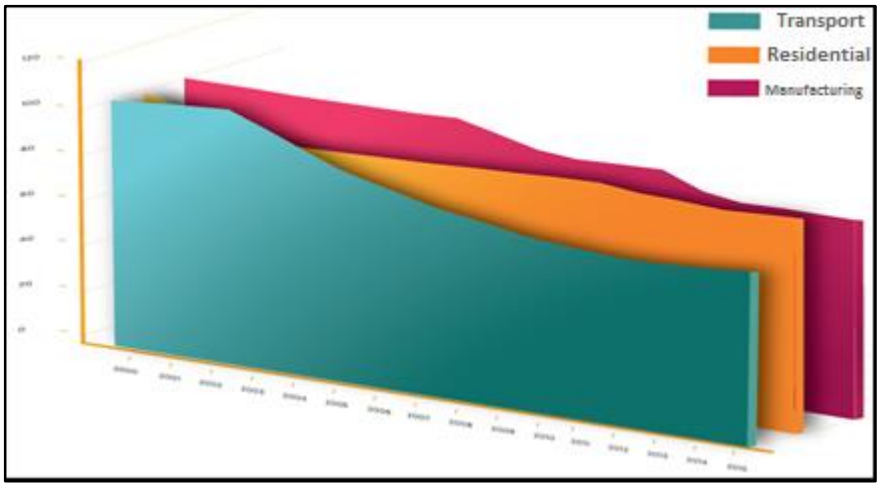
Note: Primary and final energy intensities were calculated taking into account the GDP data based on 2009 GDP series as published by TURKSTAT on 12.12.2016.

11.9- Energy Efficiency

This is a response indicator. Energy efficiency figures provide data for energy efficiency index, which in turn indicates amount of energy saved by manufacturing, residences and transport sectors in terms of primary and final energy consumption. This also indicates the level of contribution made to the country's economy by improwing the energy efficiency.

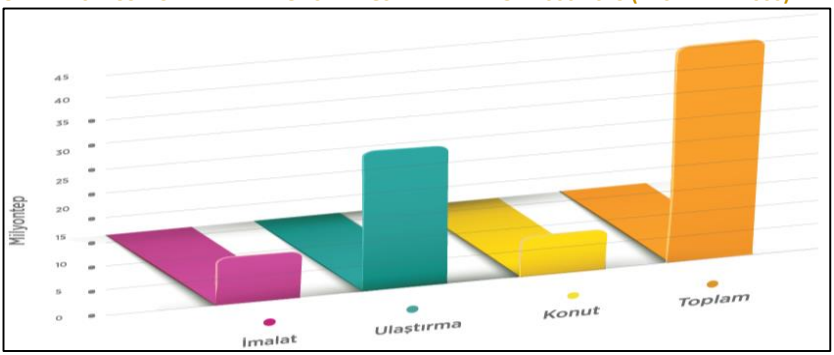
An average yearly improvement has been made in the "Energy Efficiency Index", 1.8% in manufacturing, 1.9% in residences and 2.7% in transport sector. An overall yearly improvement of 2.1% has been achieved in general.

GRAPH 101- ADVANCES IN ENERGY EFFICIENCY INDEX BY SECTORS IN YEARS (2000=100)



In 2000-2015 period, an improvement in efficiency of 9.7 million TOE in manufacturing, 7.1 million TOE in residences and 24.6 million TOE in transport has been achieved cumulatively, with an overall improvement of 41.5 million TOE.

GRAPH 102- CUMULATIVE ENERGY SAVINGS IN THE PERIOD 2000-2015 (BASE YEAR:2000)



Source: Ministry of Energy and Natural Resources, General Directorate of Renewable Energy.

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. As of the end of 2016, a total of 480,000 Energy Identity Certificates, 444,000 for new and 36,000 for present buildings have been already issued.

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. Within the context of sharing the expenses of heat for central heating systems, as of the end of 2016, 85 companies have been authorized. Target is to reduce the fuel consumption by average of 30% without hampering the comfort conditions in these buildings.

According to the statement by the General Directorate for Vocational Services, 2.57% of the energy used by the buildings in Turkey was estimated to be from renewable energy sources [70].

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 Science, 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, total sales of the installations that operate within organized industrial zones are 19% of the total sales of all the installations in the register for year 2015 and 24% for the year 2016.

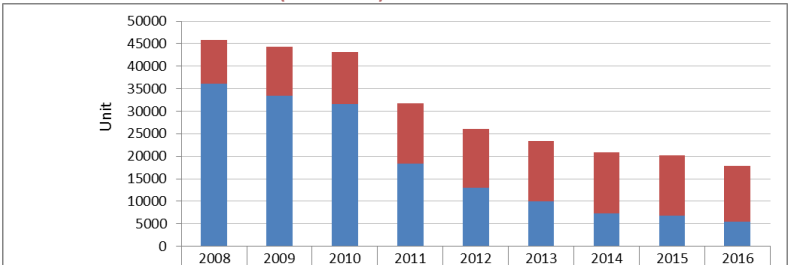
12.2- Number of Mining Facilities According to Their Groups

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 2016, a total of 17,800 mining licenses were granted by the General Directorate of Mining Affairs. Of these licenses, 5,445 have been granted as exploration license and 12,355 have been granted as running license. Total number of licenses decreased in 2008-2016 period.

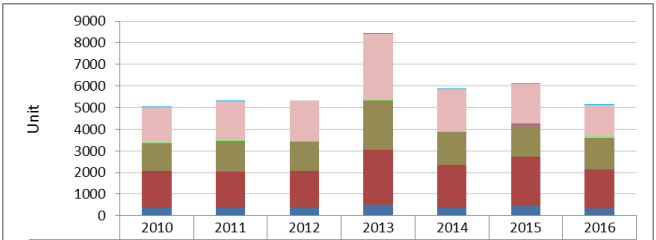
As of 2016, 5109 licensed mining sites were in operation. Out of these, 35.4 % were in Group II(a), 28.5 % in group IV and 28.35% were in group II(b)

GRAPH 103- MINING LICENCES (2008-2016)



	2008	2009	2010	2011	2012	2013	2014	2015	2016
Operation Licences	9802	10935	11604	13323	13068	13382	13464	13331	12355
Exploration Licences	36098	33407	31562	18417	12945	9984	7341	6864	5445

GRAPH 104- NUMBER OF MINING LICENSES ACCORDING TO MINING GROUPS (2010-2016)



	2010	2011	2012	2013	2014	2015	2016
V. Group	3	2		3	1	1	2
IV. Group	1637	1798	1869	3056	1944	1783	1455
III. Group	26	33	35	47	44	61	57
II(c) Group						11	6
II(b) Group	1301	1450	1360	2279	1536	1521	1444
II(a) Group	1686	1642	1707	2507	1957	2264	1808
I(b) Group	377	380	357	526	380	449	337

Source: Ministry of Energy and Natural Resources, General Dectorate of Mining Affairs (MİGEM)

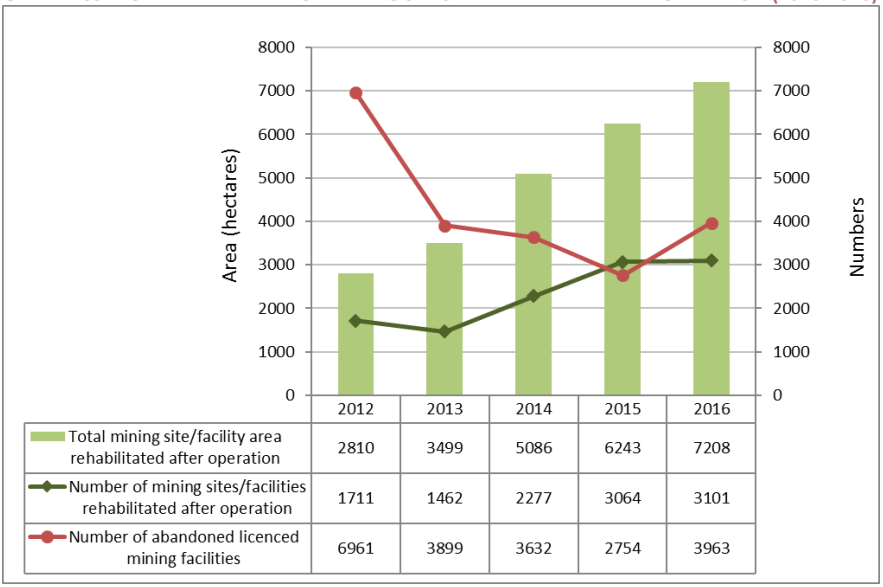
12.3- Number and Area of Abandoned Licenced Mining Facilities

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 105- 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.

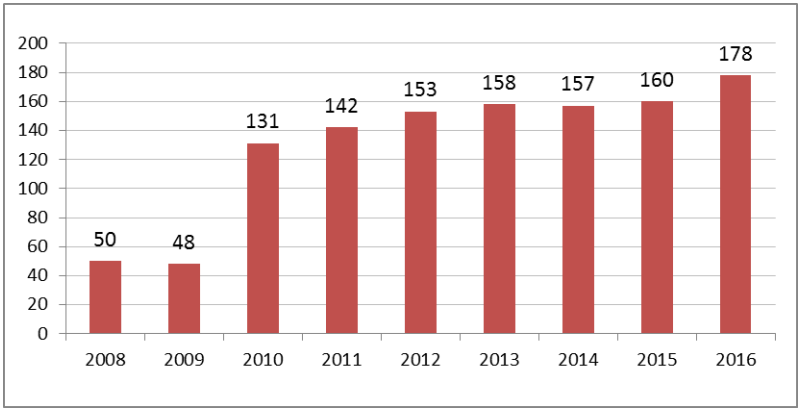
12.4- Laboratories Operating within Environmental Legislation

The indicator is a response indicator. In 2016, in Turkey there were 178 laboratories operating within the scope of environmental legislation. The qualifications and the provinces of these laboratories can be inquired at the following location:

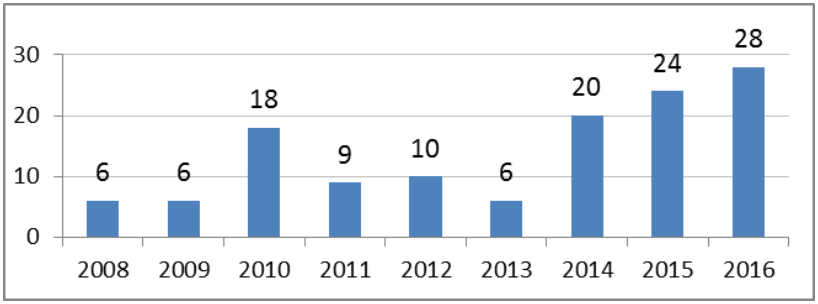
http://www.csb.gov.tr/projeler/lab/index.php?Sayfa=sayfaicerik&IcId=1893.

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 28 in 2016.

GRAPH 106- NUMBER of LABORATORIES OPERATING WITHIN ENVIRONMENTAL LEGISLATION BY YEARS



GRAPH 107- NUMBER OF PARAMETERS USED IN PROFICIENCY TESTS THROUGHOUT YEARS



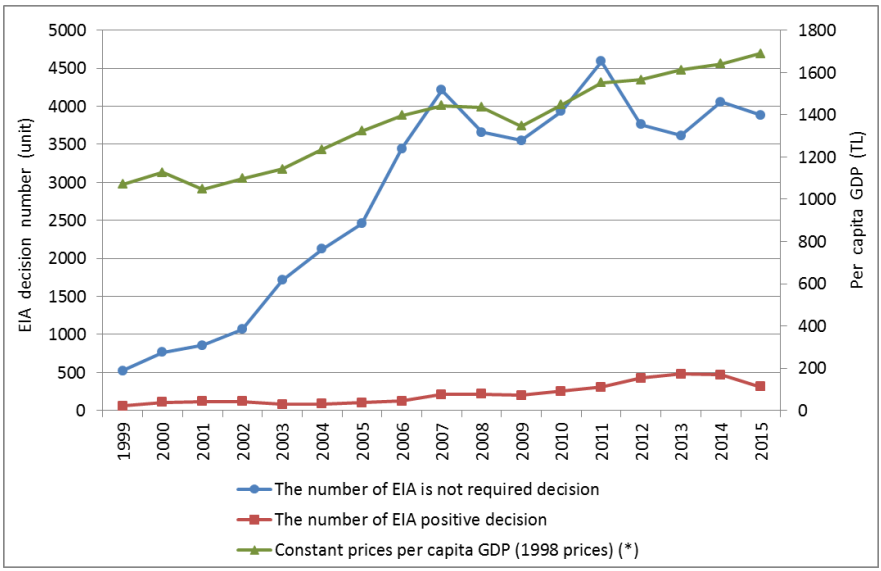
Source: Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring

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 108- THE NUMBER OF EIA POSITIVE AND EIA NOT NECESSARY DECISIONS BETWEEN 1993 WHEN THE FIRST EIA LEGISLATION WAS PUBLISHED AND 2016 AND GDP PER CAPITA



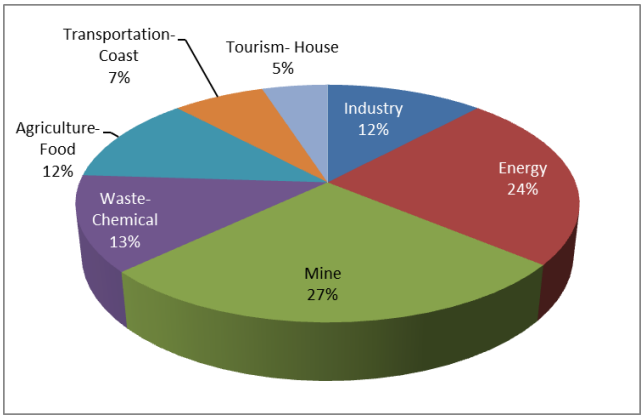
Sources: EIA data of the Ministry of Environment and Urbanisation, General Directorate of EIA, Permit and Inspection, the TURKSTAT data for GDP per capita, https://biruni.tuik.gov.tr/gosterge/?locale=tr

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.

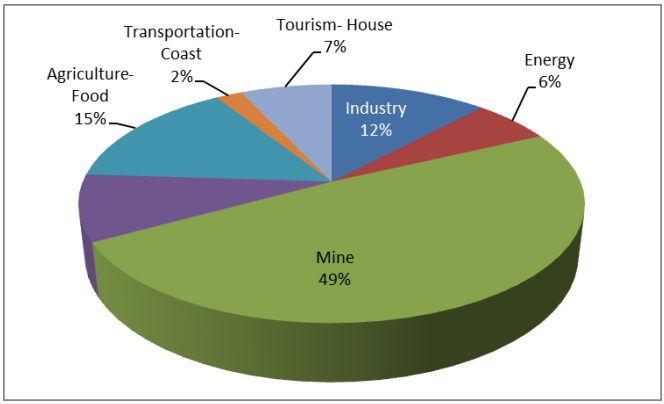
In Turkey, the first EIA Regulation was published in 1993 and by the end of 2016, a total of 4632 "EIA positive" decisions were given. When these decisions are investigated according to the distribution by sector we can see that oil and mining investments ranked the first with 27%, followed by energy investments with 24% and waste and chemical industry investments with 13%.

From 1993 up to the end of 2016 a total of 54,238 "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 109- DISTRIBUTION OF EIA POSITIVE DECISIONS BY SECTOR BETWEEN 1993-2016



GRAPH 110- DISTRIBUTION OF EIA IS NOT REQUIRED DECISIONS BY SECTOR BETWEEN 1993-2016



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

13.1- Agricultural Land Per Person

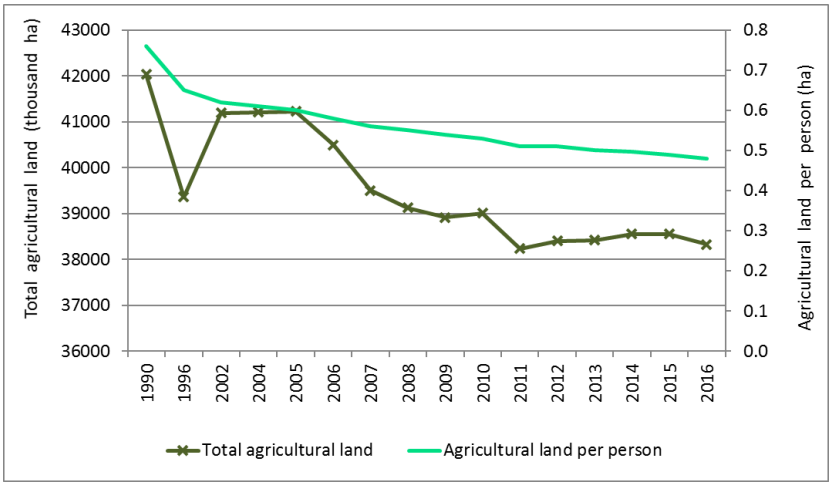
This indicator is a state indicator. While the agricultural land is essential for herbal production, pastures, winter quarters and summer pasture are necessary for the improvement of animal husbandry and protection of the nature.

According to the data from TURKSTAT, in 2016, total utilized agricultural land was approximately 38,328 thousand hectares (including permanent meadows and pastures). Of the total agricultural land, 53.2% was arable areas, 8.7% was permanent crops areas (perennial fruits), and 38.1% 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 2016, Turkish population rose by 41.33% while agricultural land per capita decreased by 36.8%.

In 1990, agricultural land per capita was 0.76 hectares, this number decreased to 0.48 hectares by 2016. As of 2016, when total arable land and land under permanent crops are considered (23,711 thousand hectares), area per person was 0.3. Arable land available per person for the world is 0.2 hectares and 0.21 hectares in European Union in 2014 [73].

GRAPH 111- AGRICULTURAL LAND (TOTAL AND PER CAPITA) THROUGH THE YEARS



Sources: Ministry of Food, Agriculture and Livestock, 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

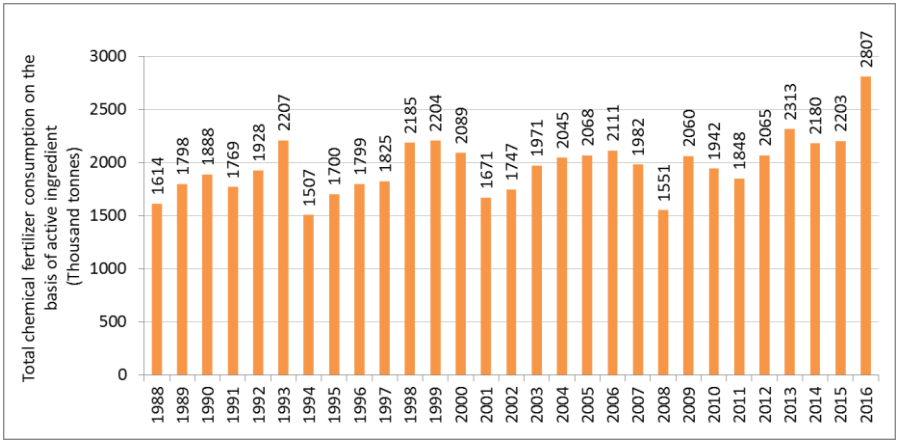
This indicator is a pressure indicator in demonstrating the factors causing eutrophication. In agricultural sector, the part of fertilizer not absorbed by plants and leaking to surface waters is an important cause of eutrophication.

In Turkey plant nutrient (N, P_2O_5, K_2O) usage was 2,807,280 tons in 2016 with 27.4% increase compared to 2015. Fertilizers were applied on a total of 24,000,000 hectares of agricultural land. Fertilizer aplication rate in Turkey is 116 kg/hectare (2016 data) while in more developed countries this rate is 200 kg/hectares in average. Overuse of fertilizers does not occur on dry agricultural land but generally on some irrigated land [74].

Regarding fertilizer consumption, the goal for sustainable agriculture is to apply fertilizers in a timely manner, in proper amount, by proper means and considering the soil analysis, refrain from applications that may cause water pollution, and deteriorate soil conditions and reduce fertility and promote organic agriculture practices. In this respect, Ministry of Food, Agriculture and Livestock provides financial incentives for soil analysis, inspect fertilizer producers and dealers and conducts education and publications targeting farmers [74].

The most fertilizer consuming province in 2016 in Turkey was Konya with 8.9% of the total consumption (in plant nutrient basis). The next most consumers were Şanlıurfa (6.9%), Adana (6.1%), Diyarbakır (3.8%), Ankara (3.6%), Tekirdağ (3%), Edirne (2.9%) and Hatay (2.6%).

GRAPH 112- CONSUMPTION OF CHEMICAL FERTILIZER ON THE BASIS OF NUTRIENT OVER THE YEARS



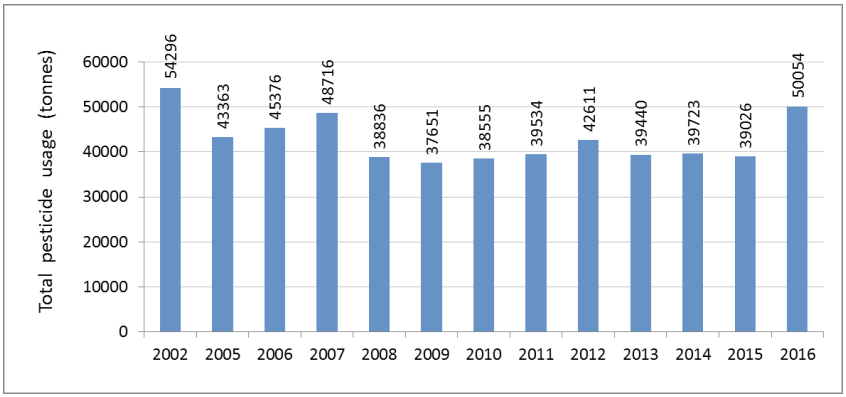
Source: Ministry of Food, Agriculture and Livestock

13.3- Pesticide Use

This indicator is a pressure indicator. Pesticide consumption in Turkey has increased to 50,054 tons in 2016 with a 28.2 % increase rate compared to consumptİon in 2015. 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. 2016 total pesticide use composition was as follows: 40.9% fungicides, 20.8% insecticides, 20% herbicides, 4% acaricides, 0.5% rodenticides and 13.7% others (nematocides, mollucides, and mineral oils).

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 42% of the total cultivated land and the target is to increase this rate to 50% in 2022 [75].

GRAPH 113- TOTAL PESTICIDE USE OVER THE YEARS



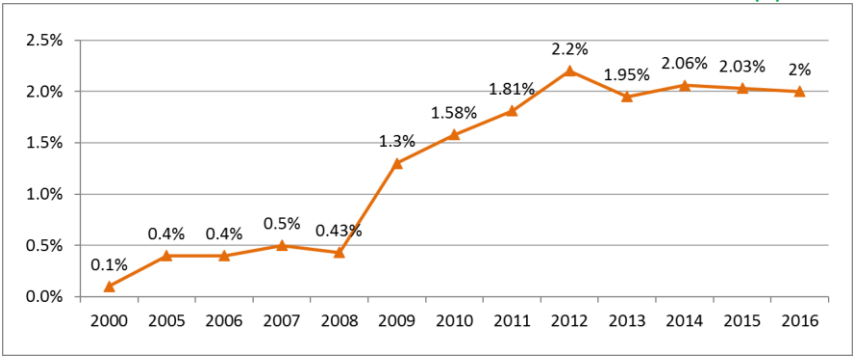
Sources: For 2002-2005 data, Ministry of Food, Agriculture and Livestock, for 2006-2016 data: TURKSTAT

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 2016 this amount reached to 2,473,600 tonnes in 238 product types and 67,878 farmers who planted on 523,777 hectares. Within the 523,777 hectares including wild harvesting areas, 489,671-hectare land is used for cultural farming. In 2016, total land used for organic farming (including wild harvesting areas) has grown by 1.7% and amount of production by 35.2% compared to those in 2015.

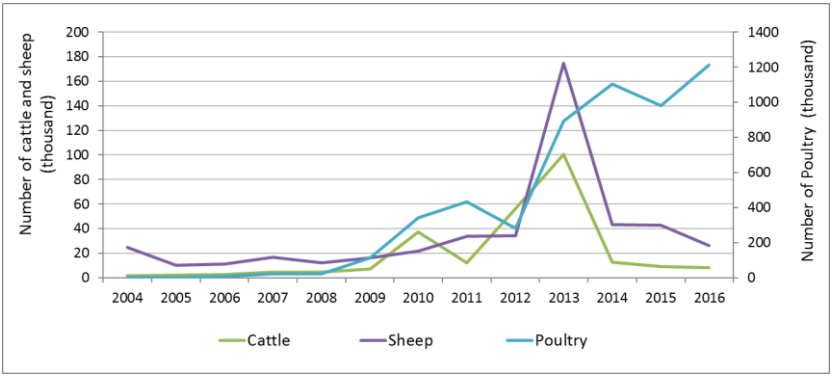
For 2016, the share of land used for organic farming in total agricultural land is 2%. According to 2015 data, World average is 1.1% and the EU average is 6.2% [76].

GRAPH 114- THE SHARE OF ORGANIC FARMING LAND IN TOTAL AGRICULTURE LAND (%)



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

GRAPH 115- DATA ON ORGANIC LIVESTOCK



Source: Ministry of Food, Agriculture and Livestock

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.

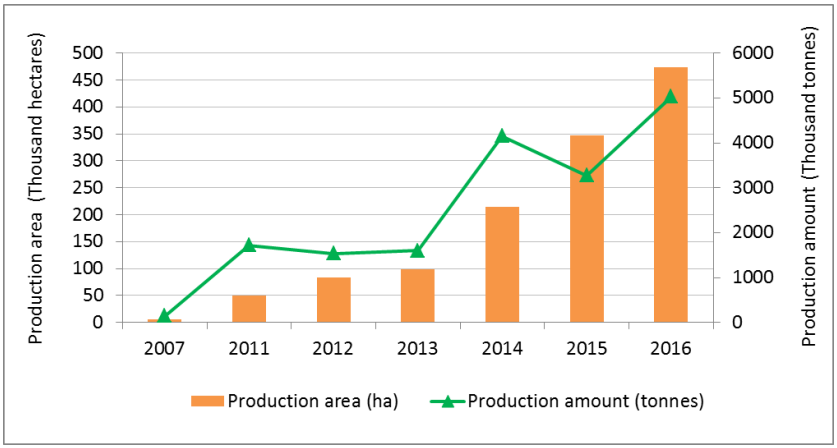
In Turkey, Good Agricultural Practices Certificate started to be given in 2007. In 2007, GAP certification has been extended to 149,693 tons of production amount on 5,361 hectares of land while this figure increased to 5,027,892 tons of production on 474,108 hectares in 2016. Compared to 2015, good agriculture practices application area increased by 36.8% and the production amount by 53.7% in 2016.

Turkey aims to increase the rate of good agriculture practices production areas over total agricultural land (excluding fallows) upto 10% by 2023 [74].

TABLE 36- GOOD AGRICULTURAL PRACTICES BETWEEN 2007 AND 2016

	Number of Provinces	Number of Producers	Production Area (ha)	Production amount (tonnes)
2007	18	651	5361	149,693
2016	64	55,609	474,108	5,027,892
% Changes (2007-2016)	-	**8442**	**8744**	**3259**

GRAPH 116- GOOD AGRICULTURAL PRACTICES PRODUCTION AREAS AND PRODUCER NUMBER BY THE YEARS



Source: Ministry of Food, Agriculture and Livestock

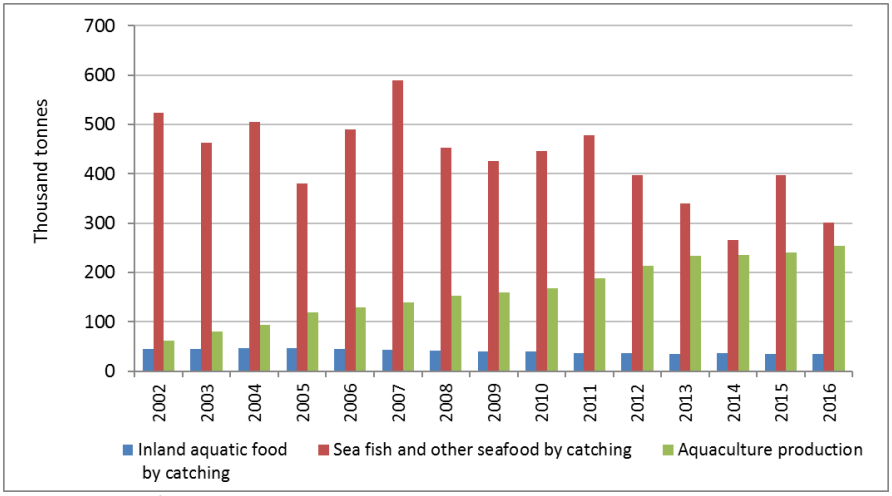
14.1- Aquaculture Production

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 2016, aquaculture production decreased by 12.4% in 2016 with respect to the previous year and occured as 588,715 tonnes. The total production composed of marine fish by 44.8%, other seafood by 6.4%, inland fish and aquatic food by 5.8% and aquacultural production by 43%.

In 2016, capture of fishery products decreased by 22.4% and aquaculture increased by 5.4% compared to the previous year. While the production made by capture was 335,320 tonnes, aquaculture production occurred as 253,395 tonnes. Seafood capture decreased by 24.2%, capture of inland aquatic food decreased by 0.9% with respect to the previous year. 40.1% of the amount of aquaculture production took place in inland waters and 59.9% in seas. Within all the production of seafood by capture, East Black Sea Region lead with 40.7% of the total production It's followed by West Black Sea Region with 33.3%, Aegean Region with 11.5%, Marmara with 10.6% and Mediterranean with 3.9% [76].

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[77]. 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 117- AQUACULTURE PRODUCTION DATA BY THE YEARS



Source: Ministry of Food, Agriculture and Livestock, 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 14,501 in 2016.

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 [77].

GRAPH 118- NUMBER OF FISHING VESSELS

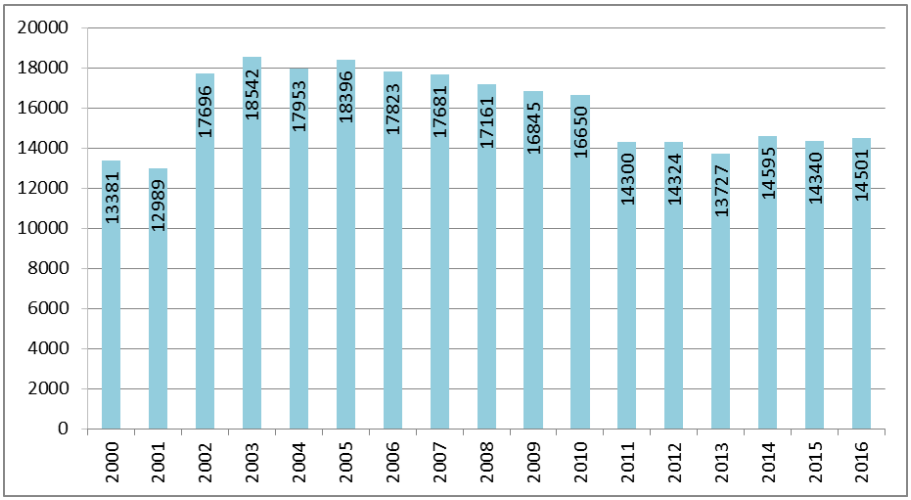


TABLE 37- NUMBER OF FISHING VESSEL RETURNED BY YEARS

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

Source: Ministry of Food, Agriculture and Livestock, General Directorate of Fisheries and Aquaculture

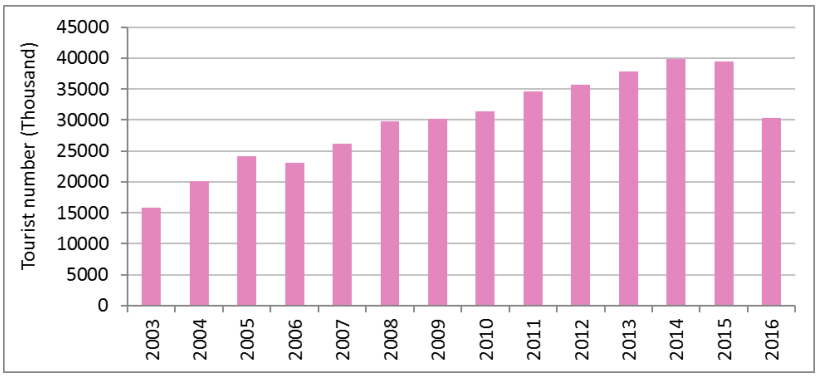
15.1- Number of Tourists

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 30,288,789 in 2016. The number of tourists in 2016 compared to 2015 decreased by 23.28%.

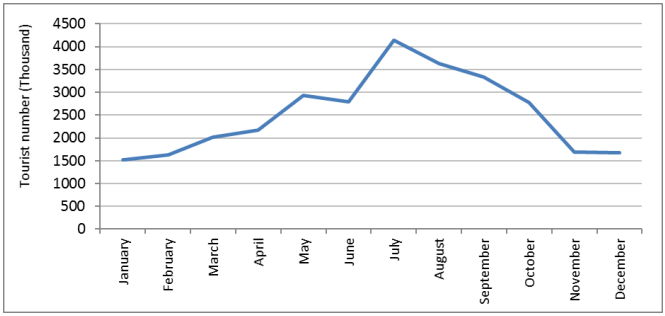
GRAPH 119- 2003-2016 PERIOD NUMBER OF TOURISTS



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 120- MONTHLY DISTRIBUTION OF TOURISTS VISITING TURKEY IN 2016



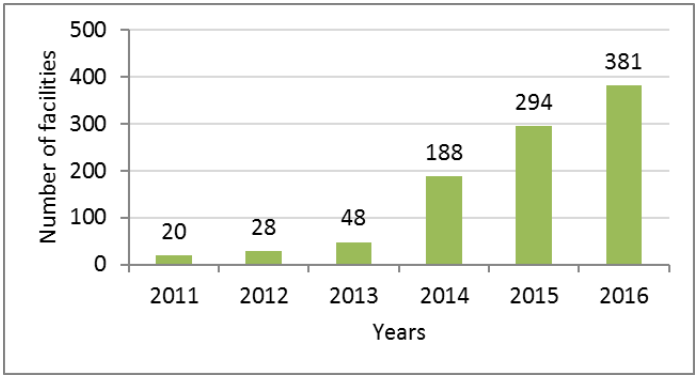
Source: Ministry of Culture and Tourism

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. Ministry of Culture and Tourism provides a partial subsidy of the electricity expenses of the certificate owners.

As of the end of 2016, number of the facilities with the "Tourism Facility Certificate" was 3,641 with a capacity of 899,881 bed places in total. 381 of these (10.5%) possess "Environment-Friendly Accommodation Facility" certificate (Green star badge).

GRAPH 121- 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

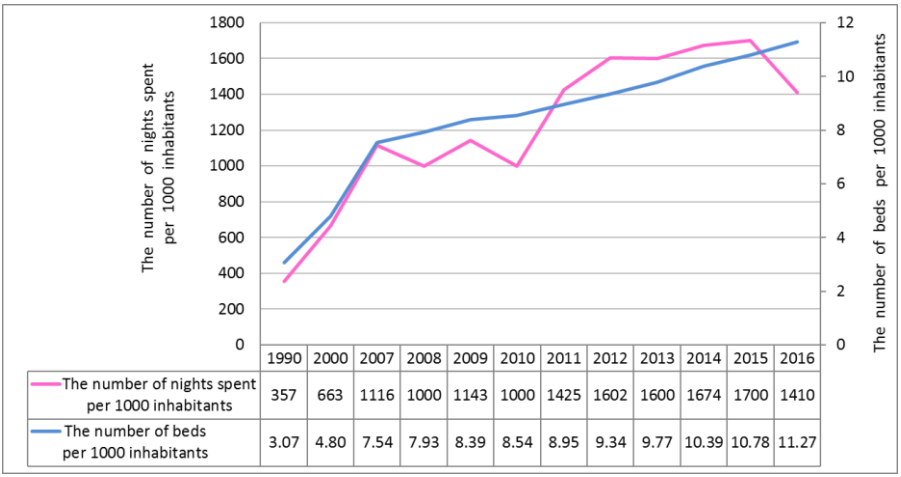
This pressure indicator is obtained by dividing the total overnight stays in the tourism facilities and the total bed places capacity of the certificated tourism facilities by total population; expressed as per 1000 people.

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.

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 [79].

GRAPH 122 – TOURIST OVERNIGHTS AND BED PLACES PER 1000 INHABITANTS



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

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.

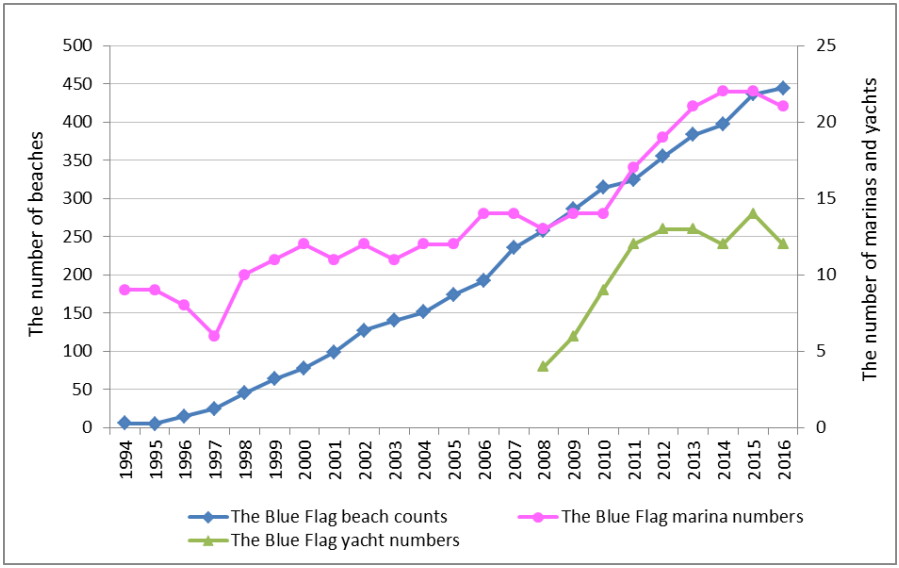
15.4- Blue Flag Implementations

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 1994-2016, the number of Blue Flag in Turkey increased steadily and reached to 444 beaches, 21 marinas and 12 yachts in 2016.

In our country, the scope of Blue Flag Programme carried out under the coordination of Turkey Environmental Education Foundation (TÜRÇEV), our country ranks second with 444 beaches, followed Spain (588) in 2016. As for marinas, Turkey ranked 7th in the World.

GRAPH 123- THE NUMBER OF BLUE FLAG BEACHES, MARINAS AND YACHTS BY YEARS IN TURKEY



Source: Turkey Environment Education Foundation

16.1- Forest Fires

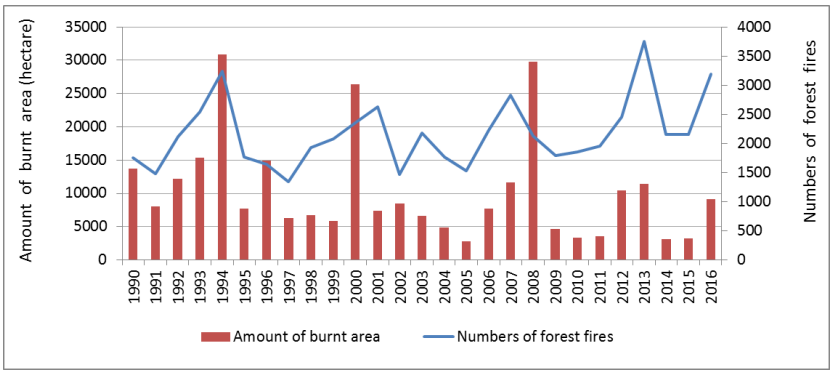
This indicator is an impact indicator. The majority of the forests located in Turkey, which is in the Mediterranean climate zone, are under the threat of forest fires.

In 2016, 3,188 forest fires occurred, in total 9,156 ha of forest area and per fire incident 2.9 hectar area in average were damaged. In 2016, the number of fires compared to the previous year increased by 48%. Burnt forest area was almost the same as the previous year.

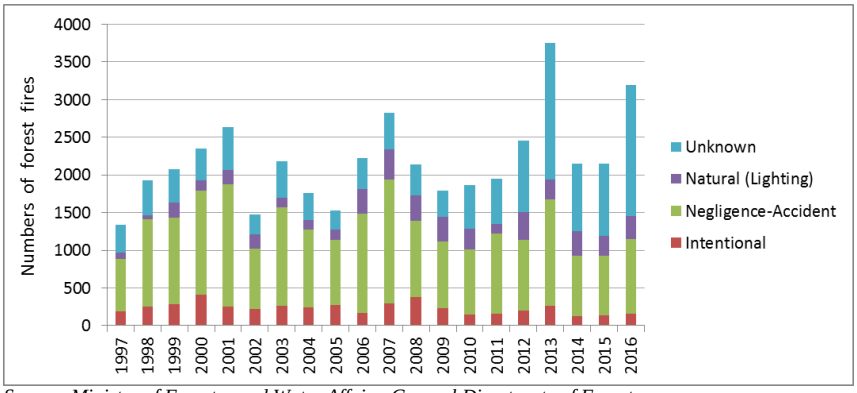
The majority of the forest fires are caused by people. Cause of the 54% of forest fires in 2016 could not be identified. 31% of fires were caused by negligence-accidents, 10% by natural causes and 5% by intention.

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 [22].

GRAPH 124- FOREST FIRES (1990-2016)



GRAPH 125- CAUSES OF FOREST FIRES (1997-2016)



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), 26,993 disasters occurred between 1990 and 2016 (highway/vehicle accidents excluded). When disaster numbers have been evaluated between 1990 and 2016, it was seen that landslides took the first place by 7614 (28.2%). This was followed by 2700 (10%) urban fires and other fires, 1871 (6.9%) earthquakes (constituting damage).

27,112 people have lost their lives between 1990 and 2016 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 126- TYPE AND THE OCCURANCES OF DISASTERS AND THE NUMBER OF DEATH ACCORDING TO NATIONAL DISASTER ARCHIVE DATA BANK OF TURKEY (TABB) BETWEEN 1990-2016

	Fire/ Urban fire	Terrorist attacks	Landslide	Explosion	Storm/ Typhoon	Extreme winter	Flood	Avalanche	Earth quakes (constituting damage)	Other
Number of disaster would occur	2700	441	7614	569	1731	839	1840	1314	1871	8074
The number of dead	79	202	28	261	202	143	221	117	24348	1511

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

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 322 Coastal Facilities have been prepared and approved by the Ministry of Urbanisation and Environment. In 2016, this number constituted the 92% 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 38- THE RATIO OF COASTAL FACILITIES FOR WHICH PLANS WERE CONFIRMED BY THE MINISTRY OF ENVIRONMENT AND URBANISATION

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

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

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	24,361	-	25,277	-	25,845	-	28,011	-	31,584	-
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.

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 geographical 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.

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.

FISHERY

Aquaculture 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.

[1] Turkish Statistical Institute (TURKSTAT)
[2] Turkish Statistical Institute, "The Results of Address Based Population Registration System, 2016" News Bulletin, 31/01/2017, No: 24638, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24638
[3] Turkish Statistical Institute, "Population Projections, 2018-2080" News Bulletin, 21/02/2018, No: 30567, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=30567
[4] "The European Environment State and Outlook 2015- Synthesis Report", European Environment Agency (EEA), Copenhagen, 2015, http://www.eea.europa.eu/soer-2015/synthesis/report#tab-data-visualisations
[5] UN, 2011, Population distribution, urbanization, internal migration and development: an international perspective, United Nations Department of Economic and Social Affairs
[6] UN, 2012, World Urbanization Prospects – The 2011 Revision – Highlights, New York.
[7] Turkish Statistical Institute, The results of Address Based Population Registration System (ABPRS), 2008-2016 Internal Migration Statistics, http://www.turkstat.gov.tr/VeriBilgi.do?alt_id=1067
[8] http://ec.europa.eu/eurostat/statistics-explained/index.php/Resource_productivity_statistics
[9] http://ec.europa.eu/eurostat/statistics-explained/index.php/Material_flow_accounts_and_resource_productivity
[10] https://data.oecd.org/emp/employment-by-activity.htm
[11] Turkish Statistical Institute, "Environmental Employment, Revenue and Expenditure Statistics, 2016" News Bulletin, 30/11/2017, No: 24587, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24587
[12] Turkish Statistical Institute, "Life Tables, 2014-2016" News Bulletin, 27/09/2017, No: 24640, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24640
[13] http://www.tuik.gov.tr/PreTablo.do?alt_id=1100
[14] http://mikrobiyoloji.thsk.saglik.gov.tr/ums/a/Akut-gastroenterit.pdf Bulaşıcı Hastalıkların Laboratuvar Tanısı için Saha Rehberi, AKUT GASTROENTERİT
[15] http://mikrobiyoloji.thsk.saglik.gov.tr/Dosya/tani-rehberi/sendromik-tani-yaklasimi/UMS-SY-01-Akut-gastroenterit-sendromu.pdf
[16] http://yeni.thsk.gov.tr/depo/thsk/strateji-db/birimler/stratejik-yoneti-planlama/idari-faaliyet-raporu/2016_faaliyet_raporu-13.03.2017.pdf
[17] http://ec.europa.eu/eurostat/documents/3217494/7735275/KS-06-16-212-EN-N.pdf/8a304ba5-588a-4cf6-8549-8d000aafc342
[18] Turkish Statistical Institute, "Greenhouse Gas Emissions Statistics, 1990-2015" News Bulletin; 17/04/2017, No: 24588, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24588
[19] http://ec.europa.eu/eurostat/statistics-explained/index.php/Greenhouse_gas_emission_statistics
[20] http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=t2020_rd300&language=en
[21] http://unfccc.int/land_use_and_climate_change/lulucf/items/1084.php
[22] The Ministry of Forestry and Water Affairs, General Directorate of Forestry
[23] https://www.eea.europa.eu/data-and-maps/indicators/production-and-consumption-of-ozone-2/assessment-2
[24] The Ministry of Forestry and Water Affairs, General Directorate of Meteorology
[25] https://www.eea.europa.eu/data-and-maps/indicators/main-anthropogenic-air-pollutant-emissions/assessment-5
[26] Çevre ve Şehircilik Bakanlığı, ÇED, İzin ve Denetim Genel Müdürlüğü, Laboratuvar Ölçüm ve İzleme Dairesi
[27] https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-2/assessment-2
[28] http://www.dsi.gov.tr/toprak-ve-su-kaynaklari
[29] http://ec.europa.eu/eurostat/tgm/web/table/description.jsp
[30] The Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring, "Domestic and Industrial Pollution Monitoring Programme (2016)", Ankara 2017.
[31] "Integrated Marine Pollution 2014-2016 Programme" Summary Reports (2017)
[32] The 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
[33] Turkish Statistical Institute, "Municipal Water Statistics, 2016" News Bulletin, 21/11/2017, No: 24874, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24874
[34] Turkish Statistical Institute, "Municipal Wastewater Statistics, 2016" News Bulletin, 22/11/2017, No: 24875, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24875
[35] http://ec.europa.eu/eurostat/statistics-explained/index.php/Water_statistics
[36] http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1&pcode=cei_pc031&language=en
[37] http://ec.europa.eu/eurostat/statistics-explained/index.php/Sustainable_development_-_consumption_and_production#Recycled_and_composted_municipal_waste
[38] Turkish Statistical Institute, "Mining Establishments Water, Wastewater and Waste Statistics, 2016" News Bulletin, 28/12/2017, No: 24879, http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=24879
[39] The Ministry of Forestry and Water Affairs, General Directorate of Information and Technology
[40] http://ec.europa.eu/eurostat/statistics-explained/index.php/Land_cover_and_land_use
[41] The Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform
[42] http://www.tarim.gov.tr/sgb/Belgeler/SagMenuVeriler/TRGM.pdf
[43] The Ministry of Forestry and Water Affairs, General Directorate of Nature Conversation and National Parks

[44] Former Ministry of Environment and Forestry, General Directorate of Nature Conservation and National Parks, Department of Environment Protect, "Biological Diversity Strategy and Action Plan" 2007, Ankara.
[45] The Ministry of Forestry and Water Affairs, General Directorate of Nature Conversation and National Parks, "Tabiatı Koruma Durum Raporu (2015-2016)", Ankara.
http://www.milliparklar.gov.tr/Anasayfa/istatistik.aspx?sflang=tr
[46] The Ministry of Environment and Urbanisation, General Directorate for Preservation of Natural Heritage
[47] http://data.worldbank.org/indicator/ER.PTD.TOTL.ZS
[48] The Ministry of Forestry and Water Affairs, General Directorate of Forestry, Forest Management and Planning Department, Existence of Forest in Turkey -2015,
http://www.ogm.gov.tr/ekutuphane/Yayinlar/T%C3%BCrkiye%20Orman%20Varl%C4%B1%C4%9F%C4%B1-2015.pdf
[49] The Ministry of Forestry and Water Affairs, General Directorate of Forestry
http://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatistikler.aspx
[50] http://wdi.worldbank.org/table/3.1#
[51] http://www.tcdd.gov.tr/files/istatistik//20122016yillik.pdf
[52] http://www.udhb.gov.tr/images/hizlierisim/1e75e889e5409c4.pdf
[53] https://www.eea.europa.eu/data-and-maps/indicators/transport-emissions-of-greenhouse-gases/transport-emissions-of-greenhouse-gases-10
[54] http://www.eea.europa.eu/data-and-maps/indicators/transport-final-energy-consumption-by-mode/assessment-5
[55] http://ec.europa.eu/eurostat/documents/3217494/8113778/KS-EN-17-001-EN-N.pdf/99cc20f1-cb11-4886-80f9-43ce0ab7823c
[56] Republic of Turkey Energy Market Regulatory
[57] https://ec.europa.eu/transport/facts-fundings/statistics/pocketbook-2017_en
[58] http://www.eea.europa.eu/data-and-maps/indicators/average-age-of-the-vehicle-fleet/average-age-of-the-vehicle-8
[59] The Ministry of Energy and Natural Resources, Directorate for Strategy Development.
[60] The Ministry of Energy and Natural Resources, http://www.eigm.gov.tr/tr-TR/Denge-Tablolari/Denge-Tablolari
[61] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_100a&lang=en
[62] https://www.eea.europa.eu/data-and-maps/indicators/primary-energy-consumption-by-fuel-6/assessment-1
[63] https://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-by-sector-9/assessment-1
[64] https://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-by-sector-9/assessment-1
[65] https://data.worldbank.org/indicator/EG.USE.PCAP.KG.OE?locations=EU
[66] https://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-by-sector-9/assessment-1
[67] https://www.eea.europa.eu/data-and-maps/indicators/primary-energy-consumption-by-fuel-6/assessment-1.
[68] http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc330&plugin=1
[69] http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec360&plugin=1
[70] The Ministry of Environment and Urbanisation, General Directorate of Professional Services
[71] The Ministry of Science, İndustry and Technology, Directorate for Strategy Development
[72] The Ministry of Energy and Natural Resources, General Dectorate of Mining Affairs
[73] https://data.worldbank.org/indicator/AG.LND.ARBL.HA.PC
[74] The Ministry of Food, Agriculture and Livestock, General Directorate of Plant Production
[75] http://www.tarim.gov.tr/SGB/Belgeler/2013-2017/GTHB%202018-2022%20STRATEJI%CC%87K%20PLAN.PDF
[76] Turkish Statistical Institute, "Su Ürünleri, 2016" News Bulletin, 23/06/2017, No: 24657 ,
http://www.tuik.gov.tr/PreHaberBultenleri.do?id=24657
[77] The Ministry of Food, Agriculture and Livestock, General Directorate of Fisheries and Aquaculture
[78] The Ministry of Culture and Tourism
[79] http://ec.europa.eu/eurostat/documents/3217494/7053328/KS-GR-15-001-EN-N.pdf/08db83d1-966c-4b4d-869a-4a5dc2a9538d
[80] Republic of Turkey Prime Ministry, Disaster and Emergency Management Presidency