

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 2014

RELEASE NO: 27-1

FOR YOUR INFORMATION REQUESTS AND QUESTIONS ABOUT RELEASE CONTENT

Environmental Inventory and Information Management Department

Data Evaluation Division

Tel: +90 (312) 410 17 00

Fax: +90 (312) 419 21 92

e-mail: cebyd@csb.gov.tr

Special thanks to all public institutions and organizations for their contribution.

WEBSITE

<http://www.csb.gov.tr/gm/ced/>

ISBN 978-605-5294-46-5

T.R. MINISTRY OF ENVIRONMENT AND URBANISATION

GENERAL DIRECTORATE OF ENVIRONMENTAL IMPACT ASSESSMENT, PERMIT, AND INSPECTION

Mustafa Kemal Mahallesi Eskişehir Devlet Yolu (Dumlupınar Bulvarı)

9. km. (Tepe Prime Yanı) No: 278 Çankaya / Ankara.

PRODUCTION

Alpar Matbaa ve Reklam Hizmetleri

Küçük Ayasofya Mahallesi Küçükayasofya Caddesi No: 66/13 Kat: 1 Sultanahmet - İstanbul - TURKEY

Phone / Fax: (0212) 516 27 92

PRINT

Ümit Matbaacılık & Reklamcılık Sanayi ve Ticaret Ltd. Şti.

Gümüşsuyu Cad. Litros Yolu 2. Mat. Sit. Zemin Kat A Blok No:6 (ZA/6) Topkapı - İstanbul - TURKEY

Sertifika No: 018084

All rights of this publication are reserved to Republic of Turkey Ministry of Environment and Urbanisation due to the Law of Intellectual and Artistic Works number 5846. It shall not be reproduced or distributed without authorization by real or legal entity.



We must sustain our environmental policies and consciousness and combat against climate change; while keeping economic development. In recent years, parallel to socio-economic dynamics and accelerated development of our country, legislation and implementation of environment, which is a major component of sustainable development, has gained speed.

As the Ministry of Environment and Urbanization, we have increased our efforts on the smart management of our natural resources and to leave a healthy environment for the future generations.

In this regard, we deem great importance to rational use of Environmental indicators in all of the efforts for preparing, developing and progress-monitoring of environmental policies, in order to sustain a healthy environment for the future generations.

Our objective in preparing the Environmental Indicators booklet is to reflect the relation between environment and other sectors, to enable monitoring of the trends in time and to produce comprehensible results.

I wish that the Environmental Indicators booklet, which has been prepared with up to date data, will provide public with information in environmental matters, guide all the institutions related with environment, will be pioneer in taking the environmental decisions.

Fatma Güldemet SARI

Minister of Environment and Urbanisation

OTHER PUBLICATIONS

- 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 Handbook 2008, 2009
- Issue No. 8 : Environmental Indicators Handbook 2009, 2010
- Issue No. 9 : Inventory of Environmental Problems Priorities Assessment Report of Turkey 2007-2008, 2010
- Issue No. 10 : Environmental Indicators Handbook 2010, 2011
- Issue No. 11 : Environmental Status Report of Turkey, 2011
- Issue No. 12 : Environmental Indicators Handbook 2011, 2012
- Issue No. 13 : Environmental Inspection Report of Turkey 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
- Issue No 16 : Environmental Inspection Report 2012, 2013
- Issue No 17 : Environmental Indicators 2012, 2013
- Issue No 18 : Environmental Impact Assessment Impacts-precautions, 2013
- Issue No 19 : Environmental Permits and Licenses, 2013
- Issue No 20 : Fundamentals of Environmental Inspection & Environmental Inspection in Turkey, 2013
- Issue No 21 : International Congress of EIA Proceedings 8-10 November 2013
- Issue No 22 : Environmental Inspection Report 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 2014, 2015
- Issue No 26 : Environmental Status Report - 2013 Annual Summary – Provinces

CLASSIFICATION OF INDICATORS	5	5.5- Chlorophyll in Transitional, Coastal and Marine Waters	41
INDICATORS SUMMARY CHART	8	5.6- Quality of Swimming Water.....	42
EXECUTIVE SUMMARY	11	5.7- Drinking and Potable Water Resources of Municipalities.....	43
1- POPULATION		5.8- Municipalities Served by Wastewater Treatment Unit	44
1.1- Population Growth Rate	16	5.9- Municipalities Served by Sewerage Systems.....	46
1.2- Urban- Rural Population Ratio	17	6- WASTE	
2- ECONOMY		6.1- Amount of Municipal Wastes and Disposal	47
2.1- Environmental Expenditures.....	18	6.2- Number of Landfills - Population Covered by Landfills	48
2.2- Sectorial Distribution of Employment	19	6.3- Hazardous Wastes.....	49
2.3- Sectoral Distribution of Gross Domestic Product.....	20	6.4- Mining Wastes	51
3- CLIMATE CHANGE		6.5- Packing Quantity Released and Amount of Packaging Waste Recycled	52
3.1- Greenhouse Gas Emissions.....	21	6.6- End of Life Vehicles.....	54
3.2- Total Greenhouse Gas Emissions by Sectors	23	6.7- Management of Ship Wastes	55
3.3- Precipitation.....	24	7- LAND USE	
3.4- Temperature	25	7.1- General Distribution of Land Cover.....	56
3.5- Sea Water Temperature.....	26	7.2- Misuse of Agricultural Areas.....	57
4- AIR POLLUTION		7.3- Zones Under Threat of Erosion	58
4.1- Air Pollutant Emissions	28	8- BIODIVERSITY	
4.2- Average values of PM ₁₀ and SO ₂ in Ambient Air.	30	8.1- Total Number of Species, Endangered Species, Endemism Rate (%)	59
4.3- Exceedances of Air Quality Limit Values.....	31	8.2- Number of Non-indigenous Species.....	61
4.4- The Number of Air Quality Monitoring Stations.....	33	8.3- Designated Protected Areas.....	62
5- WATER- WASTEWATER		8.4- Protected Coastal Length	63
5.1- Use of freshwater resources.....	34	8.5- Wildlife Protection Activities	64
5.2- Oxygen Consuming Substances in Rivers.....	35	8.6- Regulation and Control of the trade of Wild Animals according to the International Conventions	65
5.3- Nutrients in Freshwater.....	37		
5.4- Nutrients in Transitional, Coastal and Marine Waters.....	40		

TABLE OF CONTENTS

8.7- The Distribution of the Forest Areas.....	66
8.8- Distribution of Forests by Tree Species	69
8.9- Functional Forestry	69
9- INFRASTRUCTURE AND TRANSPORTATION	
9.1- Highway - Railway Network.....	70
9.2- Amount of Passengers and Freight Carried by Transportation Types.....	71
9.3- Transport Emissions of Greenhouse Gases.....	73
9.4- Transport Emissions	74
9.5- Number of the Road Motor Vehicles in Use.....	75
10- ENERGY	
10.1- Primary Energy Consumption by Fuel Type	76
10.2- Primary Energy Consumption per Capita	78
10.3- Primary Energy Consumption by Sectors	79
10.4- Final Energy Consumption by Sectors.....	80
10.5- Primary Energy Production.....	81
10.6- Share of Renewable Energy Sources in Gross Final Energy Consumption	82
10.7- Share of Renewable Electricity in Gross Electricity Consumption..	83
10.8- Primary and Final Energy Intensity	84
10.9- Energy Efficiency in Buildings.....	85
11- AGRICULTURE	
11.1- Agricultural Land Per Capita.....	86
11.2- Chemical Fertilizer Consumption	87
11.3- Pesticide Use.....	88
11.4- Area Under Organic Farming.....	89
11.5- Good Agricultural Practices.....	90

12- FISHERY

12.1- Aquaculture Production.....	91
12.2- Fishing Fleet Capacity.....	92

13- TOURISM

13.1- The Number of Tourists.....	93
13.2- Environment-Friendly Accommodation Facilities	94
13.3- Tourist overnights and bed capacity per 100 Residents.....	95
13.4- Blue Flag Implementations	96

14- DISASTERS

14.1- Forest Fires	97
14.2- Disasters by Types.....	98
14.3- Liability Insurance.....	99
14.4- Risk Assessment and Emergency Response.....	101

15- OTHER

15.1- The Number of Laboratories Operating within Environmental Legislation	102
15.2- Environmental Impact Assessment Decisions	103

COMPARISON OF WATER, WASTEWATER AND WASTE DATA OF 2008, 2010 AND 2012 BY SECTORS.....

DEFINITIONS.....

REFERENCES.....

CLASSIFICATION OF INDICATORS

In the World, various approaches are used 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 PSR framework 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 final 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.

CLASSIFICATION OF INDICATORS

Indicators of the booklet are classified as follows;

Driving Force Indicators	Pressure Indicators	State Indicators
<ul style="list-style-type: none"> • Population Growth Rate • Urban Population • Amount of Passengers and Freight by Transportation Types • Primary Energy Consumption With Regard to Fuel Type • Lignite Consumption by Sectors • Primary Energy Consumption Per Capita • Primary Energy Consumption by Sectors • Final Energy Consumption by Sectors • Primary Energy Production • Final Energy Density 	<ul style="list-style-type: none"> • 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 • Non-indigenous Species • Highway - Railway Network • Transport Emissions of Greenhouse Gases • Transport Emissions • Number of the Road Motor Vehicles in Use • Chemical Fertilizer Consumption • Pesticide Use • Aquaculture Production • Fishing Fleet Capacity • The Number of Tourists • Tourist overnights and bed capacity per 100 Residents • Technological Accidents 	<ul style="list-style-type: none"> • Sectoral Distribution of Employment • Sectoral Distribution of Gross Domestic Product • Temperature • Average values of PM₁₀ and SO₂ in Ambient Air • Number of Exceedance of Air Quality Limit Value • Oxygen Consuming Substances in Rivers • Nutrients in Freshwater • Nutrients in Transitional, Coastal and Marine Waters • Chlorophyll in Transitional, Coastal and Marine Waters • Quality of Swimming Water • 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 • Forest Fires

Impact Indicators	Response Indicators
<ul style="list-style-type: none"> • Precipitation • Sea Water Temperature • The Number of Endangered Species (Bio-diversity) • Natural Disasters 	<ul style="list-style-type: none"> • Environmental Expenditures • 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 • 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 Consumption • Primary Energy Intensity • Energy Efficiency in Buildings • Area Under Organic Farming • Good Agricultural Practices • Municipal Wastes and Disposal • Waste Disposal and Recycling • The Number of Environment-Friendly Accommodation Facilities • Liability Insurance • Risk Assessment and Emergency Response • The Number of Laboratories Operating within Environmental Legislation • Environmental Impact Assessment Decisions

INDICATORS SUMMARY TABLE

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 Population	↑
ECONOMY	
Total Environmental Expenditures of Public Sector	↑
Total Environmental Expenditures in the Public Sector Share in GDP	↓
Share of agriculture in employment	→
CLIMATE CHANGE	
Greenhouse Gas Emissions	↓
Total Greenhouse Gas Emissions by Sector	↓
Precipitation	↑
Temperature	↑
Sea Water Temperature	↑

AIR POLLUTION	
SO ₂ , NO _x , NMVOC, CO, PM ₁₀ Emissions	↓
NH ₃ Emissions	↑
Turkey Overall average of PM ₁₀ and SO ₂ Parameters	↓
Number of Exceedance of Air Quality Limit Value	↓
The Number of Air Quality Monitoring Stations	↑
WATER – WASTEWATER	
Use of freshwater resources	↑
Oxygen Depleting Substances in Ergene Basin	↓
Oxygen Depleting Substances in Gediz, Bakırçay, Küçük Menderes Basins	↑
Nutrients in Freshwater	↑
Nutrients in Transitional, Coastal and Marine Waters	X
Chlorophyll in Transitional, Coastal and Marine Waters	X
Quality of Swimming Water	↓

Abstraction for Municipal Water Supply Networks in Water Sources	↑
Rate of Population Served By Wastewater Treatment Plants in Total Municipal Population	↑
Repayment of Energy Incentives for Wastewater Treatment Plant	↑
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	↑
Amount of Waste Packaging Recycling	↓
Percentage of the number of End of Life Vehicles to Total number of Motor Vehicles in Traffic	↓
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	↓
Misuse of Agricultural Areas	X
Zones Under Threat of Erosion	X

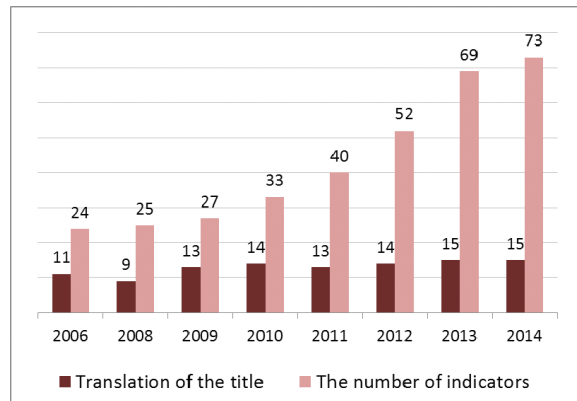
BIODIVERSITY	
Total Number of Species, Endangered Species, Endemism Rate	X
Number of Non-indigenous Species	↑
Designated Protected Areas	↓
Protected Coastal Zones	→
Wildlife Protection Activities	↑
Regulation and Control of the trade of Wild Animals according to the International Conventions	↑
Forested Areas	↑
Forest Establishment Activities	↓
Diversity (Distribution) of tree species in forest lands	X
Functional Forestry	X
INFRASTRUCTURE AND TRANSPORTATION	
Highway Network	↑
Railway Network	↑
Transportation of Passenger on Road	↓
Transportation of Freight on Road	↑
Transportation of Passenger on Railway	↑
Transportation of Freight on Railway	↑
Transport Emissions of Greenhouse Gases	↑
Transport Emissions	↓

INDICATORS SUMMARY TABLE

Number Of Motor Vehicles	↑
ENERGY	
Primary Energy Consumption by Fuel Type	↓
Lignite Consumption	↓
Primary Energy Consumption per person	↓
Total Primary Energy Consumption by Sector	↑
Total Final Energy Consumption by Sector	↑
Primary Energy Production	→
Share of Renewable Energy Sources in Gross Final Energy Consumption	↑
Share of Renewable Electricity in Gross Electricity Consumption	↓
Primary and Final Energy Density	↓
Energy Efficiency in Buildings	↑
AGRICULTURE	
Agricultural Land Per Capita	→
Chemical Fertilizer Consumption	↑
Pesticide Use	→
The Ratio of The Organic Agricultural Areas to the Total Agricultural Areas	↑
Areas to the Total Good Agricultural Practices	↑

FISHERY	
Sea Fishery	↓
Aquaculture Products	→
Number of Fishing Vessel Licenses	↓
TOURISM	
The Number of Tourists	↑
The Number of Environment-Friendly Accommodation Facilities	↑
Tourist overnights and bed capacity per 100 Residents	↑
Blue Flag Implementations	↑
DISASTERS	
Forest Fires	↓
Compulsory financial liability insurance for marine and environmental pollution by coastal facilities	↓
Compulsory financial liability insurance for dangerous substances and hazardous wastes	↑
Risk Assessment and Emergency Response Plans	↑
OTHER	
The Number of Laboratories Operating within Environmental Legislation	↓
Environmental Impact Assessment Decisions	↑

The main purpose of the Environmental Indicators Booklet is to represent the relationship between the environment and the sectors and to monitor the activities that have environmental impacts in a sequence and to monitor the results of the applied environmental policies. Moreover, it also aims to provide assist in determining plans, programs and policies, preparing legislations and provide information. Booklets have been developed and become more detailed since the very first booklet “Environmental Indicators 2006” consisting of 11 headings and 24 Indications was published. “Environmental Indicators 2014” is prepared to contain 15 headings and 73 indications.



According to the booklet “Environmental Indicators 2014”;

Population

The total population of Turkey was 77,695,904 in 2014. The population growth rate of Turkey, which was 1.37% in 2013, decreased to 1.33% in 2014. Population in Turkey is increasing while average age is getting older. Rate of people living in towns were 91.8% in 2014; a vast majority living in urban areas with a rapid urbanization causing increasing pressure on the environment.

Economy

In Turkey, services sector receives the highest share of employees with 51%; in more developed countries employment share of services sector is about 70-80%^[6].

Climate Change

Total greenhouse gas emissions (Equivalent to CO₂) increased in 2013 by 110.4% compared to 1990, and decreased by 1.1% compared to 2012, in Turkey. The biggest cause of the emission increase since 1990 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 is 120,290 thousand TOE's in 2013 with an increase of 127% compared to 1990. Despite the increase, per capita energy consumption (1.57 TOE in 2013) in Turkey is still lower than average of European Environment Agency Member Countries (2.1 TOE in 2012).

Parallel to the energy consumption, per capita CO₂ equivalent greenhouse gas emissions are estimated as 3.96 ton/ca. in 1990, 6.17 ton/ca. In 2012 and 6.04 ton/ca. in 2013 ^[8]. Although EU per capita CO₂ equivalent emissions have decreased from 11.8 tonnes to 9.0 tonnes, Turkey's per capita CO₂ equivalent emissions are still lower than the average of the EU Member States. Furthermore, historical contribution of Turkey to the greenhouse gas emissions accumulated in the atmosphere is only 4 per mille (0.4%) and ranks as the 31st among the countries in the World ^[9]. Looking at the sectoral distribution of greenhouse gas emissions, In 2013, when greenhouse gas emissions was taken into consideration as CO₂ equivalent, energy-based emissions constitutes the biggest share with (67.8%), and it was followed by industrial processes and product use (15.7%), agricultural activities (10.8%) respectively and waste (5.7%) ^[10].

Energy

Use of renewable energy sources is important because of their lower carbon intensity (lower CO₂ emissions per unit energy). In Turkey, while contribution of renewables to total energy consumption was approximately 18% in 1990, in parallel with increasing energy demand, this figure decreased to almost 11% in 2013.

Another important issue regarding the environment in energy consumption is energy efficiency. Compared to year 2000, there was 18.2% improvement in 2013 in the intensity of primary energy index and 18.8% in the intensity of final energy index ^[55].

Air Quality

An improvement of 7.9% in PM₁₀ and 6.3% in SO₂ was observed throughout the country in 2014 compared to the previous year ^[14]. For the stations that were in operation both in 2013 and 2014, exceedances for PM₁₀ and SO₂ occurred respectively 17.9% and 21% less in 2014 than in 2013. Despite these improvements, number of exceedances especially for PM₁₀ is keeping to be an important problem. 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, Küçük Menderes, Gediz, Kuzey Ege, 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.

Monitoring results in 2014 indicate that, according to the classification system parameters identified in By-law on Surface water Quality Management", the majority of the lakes within Konya Closed Basin, Antalya, Marmara and Küçük Menderes basins are eutrophic or hypertrophic.

Inorganic nitrogen monitoring has been done in coastal and marine waters in Gediz, Sakarya and Susurluk basins in 2013

and in Ergene, Antalya, Marmara and Küçük Menderes basins in 2014. The studies reveal that Gediz, Sakarya, Marmara and Antalya basin coastal and marine waters are hypertrophic.

Rate of Class A (very good) bathing waters reduced from 82% in 2013 to 77% in 2014.

As a result of studies for environmental protection and financial and technical assistance given by the Ministry of Environment and Urbanization, the number of municipalities and population serviced by sewerage system and waste water treatment facility increased significantly in recent years. The ratio of population serviced by wastewater treatment plants to the total municipality population reached to 77 % by year 2014.

Waste

Regarding the waste management principles; the wastes should be reduced at source, then recovery, energy recovery and finally disposal methods should be applied. By year 2014, the ratio of the population covered by landfill to municipality population is 70%.

Depending on the Hazardous Waste Declaration System (TABS) data, amount of processed hazardous waste in Turkey in 2014 is calculated to be 1,413,220 tonnes (excluding waste from the mining sector). Of the processed total, 73.1% was diverted to recovery, 22.3% was disposed off, 4.1% stored and 0.5% was exported.

Land use

In Turkey between 1990 and 2012, while forests and semi-natural areas decreased by 1,216,871 hectares, all other areas have increased, such as agricultural areas by 425,943 hectares, artificial regions by 425,757 hectares, water bodies by 173,361 hectares and wetlands by 160,494 hectares. Increasing population, urbanization 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.

Number of marine (invasive) alien species has risen from 263 in 2005 to nearly 470 in 2015. In inland water bodies 25 invasive alien species have been identified. ^[40] While most of the invasive species in the Mediterranean come through the Suez Canal, most of those in Black Sea are transported to the Black Sea via the ballast waters of vessels ^[39].

As for 2014, 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 8.6%, This is below the World average which was 13% in 2010 ^[41].

In 2012, total size of forests in Turkey was 21,678,134 hectares which constitutes 27.6% of the country's total surface area. However, about half of this area constitutes of degraded and either lightly covered or not covered areas.

The majority of the forest fires are caused by people. The reasons of the 42% of forest fires in 2014 could not be specified. 37% were caused by negligence-accidents, 15% by natural causes (lightning), it was concluded that 6% of the fires were started intentionally.

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. Almost 90% of domestic passenger and freight transport is done by roads.

Agriculture

Fertilizer consumption was about 91.2 kg per hectare active substance (plant nutrient basis) in 2014. This value is close to that of EU15 member states average for the year 2009.

In 2014 39,721,883 kg/lt pesticides were used in Turkey. This amount is targeted to be limited at about 40 thousand tonnes.

Fisheries

Despite the high fisheries capacity, the fishery production has not increased and therefore it is considered that the values about fishery production are on the upper limit ^[60]. In order to protect fisheries resources and provide sustainable fishing, the fishing fleet has been limited by the way of not licensing further vessels.

Tourism

Turkey is one of the leading countries in tourism, regarding the number of visiting tourists and tourism income. Total number of tourists visiting Turkey is increasing in time, with a 5.33 % increase

in 2014 compared to 2013. 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 2014, 188 of 3131 tourism accommodation facility have been issued “Environment friendly accommodation facility” certificate (Green Star). Moreover, with 397 beaches that possess Blue Flag, Turkey is ranked third place following Spain and Greece; with 22 marinas ranked 7th place in the World.

Result

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-POPULATION

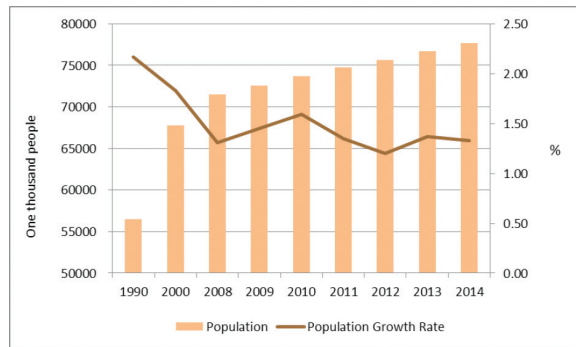
1.1- Population Growth Rate D P S I R

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 1.37% in 2013, it decreased to 1.33% in 2014. In 2014, the population of Turkey became 77 million 695 thousand 904 people. The population density which is the number of persons per square kilometre increased by 1 person compared to 2013 and reached to 101 in 2014. The median age of the population in Turkey increased from 30.4 in 2013 to 30.7 in 2014 ^[1].

The world population in 2014 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



Source: TURKSTAT Population Censuses, 1985-2000 and Address Based Population Registration System (ABPRS), 2007-2014

Note: In the calculation of growth rate of population, previous census year's population was taken into consideration.

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

YEARS	1990	2000	2008	2009	2010	2011	2012	2013	2014
Population (1000 people)	56,473	67,804	71,517	72,561	73,723	74,724	75,627	76,668	77,696
Population Growth Rate (%)	2.17	1.83	1.31	1.45	1.59	1.35	1.20	1.37	1.33

1.2- Urban- Rural Population Ratio D P S I R

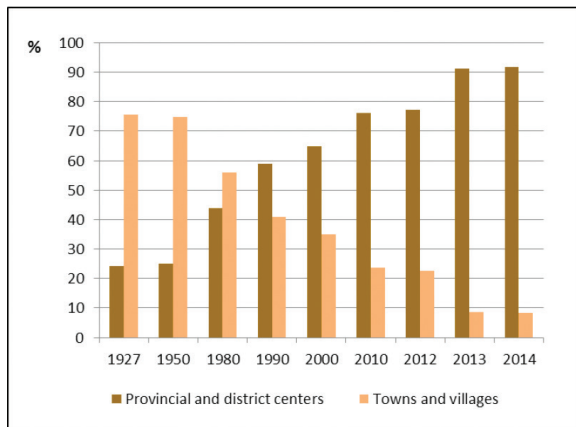
Urban population appears to be a driving force leading to pressure on environmental assets.

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

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

According to the results of Address Based Population Registration System in 2014, population residing in province and district centres was 71,286,182 people and population residing in towns and villages was 6,409,722 people. In 2013, 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 urbanization rate to 91.8% in 2014. Proportion of population living in small towns and villages was 8.2%^[1]

GRAPH 2- URBAN AND RURAL POPULATION RATES THROUGH THE YEARS



Source: TURKSTAT

Note: The results of Population Censuses 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 2014.

Today, 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 ^{[2],[3], [4]}.

2- ECONOMY

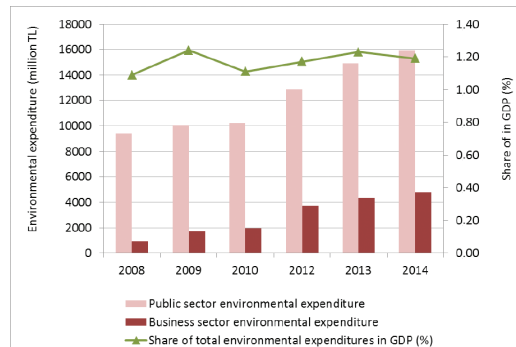
2.1- Environmental Expenditures D P S I R

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

Total environmental expenditure was 20.7 billion TL, of which 69.6% was current expenditure and 30.4% was investment expenditure. Share of total environmental expenditures in gross domestic product was 1.2% in 2014.

In total environmental expenditure, waste management services accounted for 41%, water services accounted for 29.6%, wastewater management services accounted for 20.2% and others accounted for 9.2% ^[5].

GRAPH 3- ENVIRONMENTAL EXPENDITURE



Source: TURKSTAT

TABLE 2- ENVIRONMENTAL EXPENDITURE BY SECTOR

YEARS	2008	2009	2010	2012	2013	2014
Total (million TL)	10,356	11,803	12,206	16,582	19,275	20,732
Public sector environmental expenditure (million TL)	9,416	10,078	10,241	12,848	14,914	15,935
Governmental organisations and private provincial administrations (million TL)	1,280	1,335	1,479	2,190	2,426	2,197
Municipalities (million TL)	7,763	8,377	8,377	10,237	11,929	13,431
Local administration unions (million TL)	374	366	385	421	559	307
Business sector environmental expenditure (million TL)	940	1,725	1,965	3,734	4,361	4,797
Enterprises (million TL)	872	1,498	1,834	3,527	4,067	4,431
Organized industrial zones (million TL)	68	227	131	207	294	366
Share of total environmental expenditures in GDP (%)	1.09	1.24	1.11	1.17	1.23	1.19

Source: TURKSTAT

2.2- Sectoral Distribution of Employment



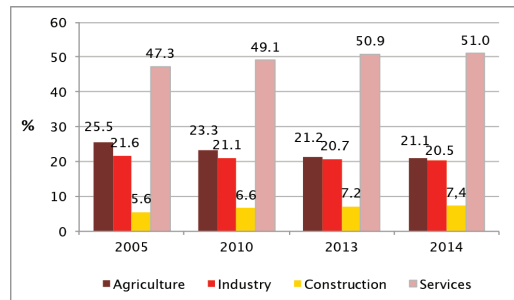
This indicator is a status indicator. Distribution of the working population of a country among sectors has an enormous effect on the quality and size of the pressure of the population on the environment.

Due to the inevitable result of development, there is a decrease in employment in agriculture, where as an increase in industry and mostly in service sectors.

The proportion of agricultural sector is still high currently, compared to developed countries. The share of employment in industry and service sectors is increasing. However, while the rate of employment in the service sector is 70-80% in developed economies, which in our country this rate is still around 51%^[6].

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.

GRAPH 4- SECTORAL DISTRIBUTION OF EMPLOYMENT



Source: TURKSTAT, Labour Force Statistics. (<http://www.tuik.gov.tr/UstMenu.do?metod=temelist>)

Note: Total figures may not be exact due to the rounding of the numbers.

The results of 2005-January 2014 period were estimated by using econometric model.

Classification of Economic Activities NACE Rev-2 was used.

TABLE 3- SECTORAL DISTRIBUTION OF EMPLOYMENT

YEARS	2005		2010		2013		2014	
	Thousand person (+15 age)	%	Thousand person (+15 age)	%	Thousand person (+15 age)	%	Thousand person (+15 age)	%
TOTAL	19,633	100.0	21,858	100.0	24,601	100.0	25,933	100.0
Agriculture	5,014	25.5	5,084	23.3	5,204	21.2	5,470	21.1
Industry	4,241	21.6	4,615	21.1	5,101	20.7	5,316	20.5
Construction	1,097	5.6	1,434	6.6	1,768	7.2	1,912	7.4
Services	9,281	47.3	10,725	49.1	12,528	50.9	13,235	51.0

2- ECONOMY

2.3- Sectoral Distribution of Gross Domestic Product D P S I R

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

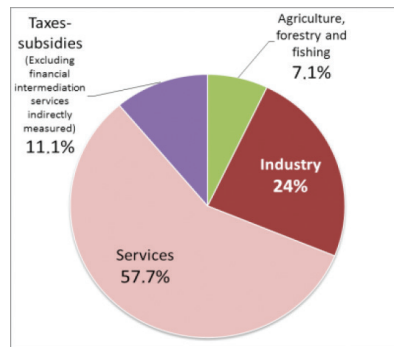
The indicator represents as percentage, shares of economic activity branches in the GDP (consumer price index with current prices).

The services sector provided the highest share of gross domestic revenue at current prices in 2014 with 57.7%, followed by the industrial sector with 24.1%.

Within the 57.7% rate of the services sector; 12% was by wholesale and retail, 12% by transport and storage, 9.8% by real estate activities and 23.9% was the sum of the other service sector activities.

Among 24.1% rate of the industrial sector; 15.8% was by manufacturing industry, 4.6%, by construction activities, 1.6% electricity, gas, steam and air conditioning supply, 1.5% mining and quarrying, 0.7% water supply, sewerage, waste management and remediation activities.

GRAPH 5- SECTORIAL BREAKDOWN OF GROSS DOMESTIC PRODUCT IN CURRENT PRICES IN 2014 (%)



Source: TURKSTAT

TABLE 4- GROSS DOMESTIC PRODUCT IN CURRENT PRICES - BY KIND OF ECONOMIC ACTIVITY (%)

YEARS	2006	2007	2008	2009	2010	2011	2012	2013	2014
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Agriculture, forestry and fishing	8.3	7.6	7.6	8.3	8.4	8	7.9	7.4	7.1
Industry	24.9	24.8	24.5	23.0	23.6	24.4	23.8	23.6	24.1
Services	55.0	57.0	57.8	59.5	57.2	56.3	57.5	57.6	57.7
Taxes-subsidies (Excluding Financial intermediation services indirectly measured)	11.9	10.5	10.1	9.2	10.8	11.3	10.9	11.4	11.1

Source: TURKSTAT, Gross Domestic Product Press Releases, <http://www.tuik.gov.tr/OncekiHBArama.do>

Note: Figures may not sum up to 100 due to rounding.

NACE Rev1.1 used for classification of Economic Activities. Since the end of 2011, classification system has been changed to NACE Rev. 2 and the present series have been updated accordingly.

3.1- Greenhouse Gas Emissions D P S I R

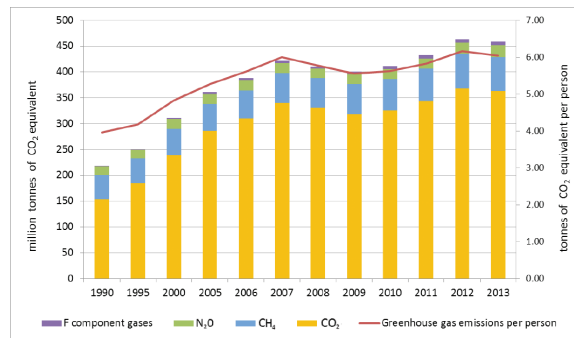
This indicator is a pressure indicator. Greenhouse gas emissions are important with regard to Turkey's contribution to climate change with respect to the source sector distribution and also for monitoring and controlling activities.

Total greenhouse gas emissions (CO₂-equivalent) increased in 2013 by 110.4% compared to 1990, but decreased by 1.1% compared to 2012.

In Europe in 2012 greenhouse gas emissions were 19.2 % below 1990 levels (excluding land use, changes in land use, emissions caused by forestation and sinks (LULUCF) and international aviation). Greenhouse gas emissions in 2012 amounted to 4522 million tonnes of CO₂ equivalent in the EU-28 ^[7].

CO₂ equivalent emission was calculated as 3.96 tonnes per person in 1990's but in 2013, this value went up to 6.04 tonnes per person ^[8]. EU per capita emissions declined from 11.8 tonnes of CO₂ equivalent in 1990 to 9.0 tonnes in 2012 ^[2].

GRAPH 6- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS



Source: TURKSTAT

Notes: Land usage, land usage changes and forestry sources emissions and sinks are not included.

1990-2013 year due to changes in methodology, data have been revised.

TABLE 5- GREENHOUSE GAS EMISSIONS TREND OVER THE YEARS

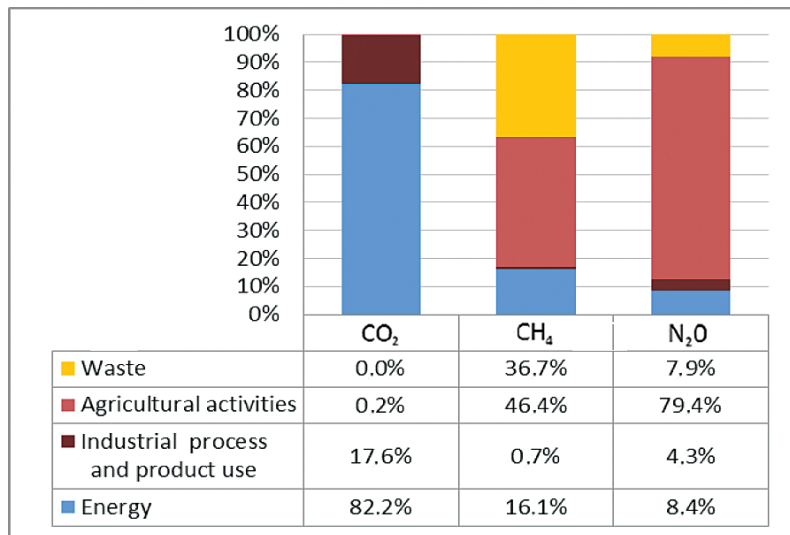
CO₂ equivalent (million ton)

YEARS	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
CO ₂	153.8	184.3	239.0	285.9	309.8	340.6	330.1	318.5	326.1	343.7	368.3	363.4
CH ₄	46.8	48.5	51.0	52.2	54.2	57.0	58.3	58.3	60.4	63.2	67.6	65.8
N ₂ O	17.0	16.2	19.0	19.7	20.3	19.7	17.9	19.7	19.5	19.5	21.0	23.2
F Component Gases	0.6	0.5	1.7	3.9	4.3	4.5	4.0	4.2	5.7	6.1	7.2	6.7
TOTAL	218.2	249.5	310.7	361.7	388.6	421.8	410.3	400.7	411.7	432.5	464.1	459.1

3- CLIMATE CHANGE

In the second and third sections of the Second National Communication on Climate Change, it is stated that, with regard to greenhouse gas emission per capita, historical responsibility and primary energy consumption per capita, Turkey has the lowest values when compared to the countries in the Annex-1 list of UNFCCC (United Nations Framework Convention on Climate Change) and OECD (Organization for Economic Cooperation and Development). Additionally, with respect to development and industrialization level, Turkey is not as advanced as many other OECD countries and the countries in the Annex-1 list of UNFCCC and some of the countries not stated in the list. Similarly, the amount of emission created by one unit GDP is far below the OECD and world average. On the other hand, the historical contribution (between the years 1850-2000) of Turkey to the cumulative greenhouse gas released to the atmosphere since the industrial revolution has been only 0.04% [9].

GRAPH 7- SECTORAL BREAKDOWN OF EMISSIONS OF CO₂, CH₄ and N₂O (%)



Source: TURKSTAT

3.2- Total Greenhouse Gas Emissions by Sectors

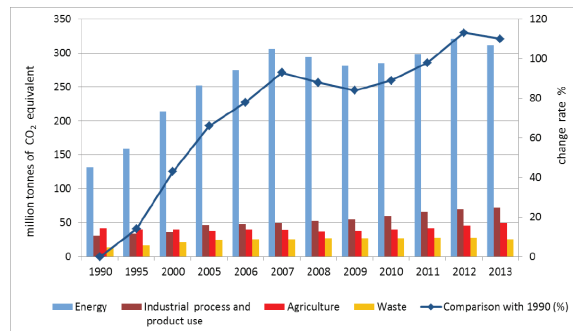


Looking at the sectoral distribution of greenhouse gas emissions, it is observed that the increase in total emissions is mainly due to energy production and consumption. It is followed by emissions resulted from industrial processes and product use.

While greenhouse gas emissions generated by energy sector were 132 million tonnes CO₂ equivalent in 1990, it increased to 321 million tonnes CO₂ equivalent in 2012. In 2013, these emissions have decreased by 3.1% to 311 million tonnes CO₂ equivalent.

In 2013, when greenhouse gas emissions was taken into consideration as CO₂ amount, energy-based emissions constitutes the biggest share with (67.8%), and it was followed by industrial processes and product use (15.7%), agricultural activities (10.8%) and waste (5.7%)^[10].

GRAPH 8- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS



Source: TURKSTAT

Note: 1990-2013 year due to changes in methodology, data have been revised.

TABLE 6- TOTAL GREENHOUSE GAS EMISSIONS BY SECTORS

YEARS	1990	1995	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013
Energy	132	159	214	252	275	306	294	281	285	298	321	311
Industrial Process and product use	31	34	36	47	48	50	53	55	60	66	70	72
Agriculture	42	40	40	38	40	39	37	38	40	42	46	50
Waste	14	17	21	25	26	26	27	27	27	28	28	26
Comparison with 1990 (%)	-	14	43	66	78	93	88	84	89	98	113	110

CO₂ equivalent (million ton)

3- CLIMATE CHANGE

3.3- Precipitation



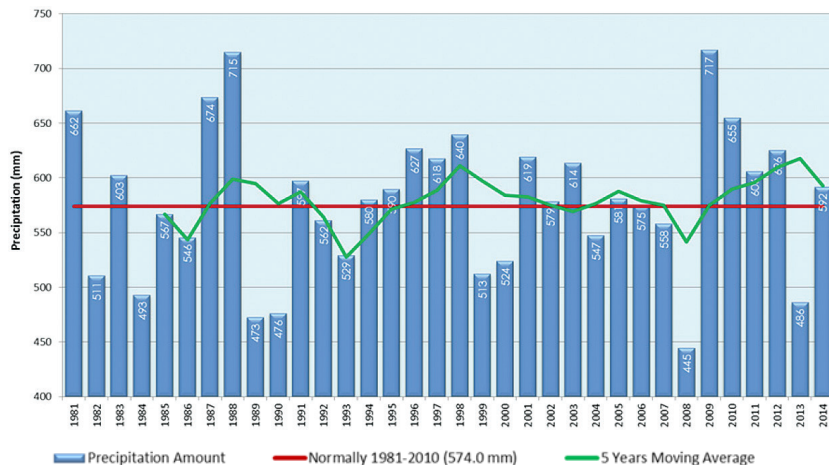
This impact indicator represents amount of average precipitation on unit area in time series.

The long term annual mean precipitation is about 574 mm in our country. 591.8 mm average rainfall was recorded in 2014 (January 1 to December 31).

When the rainfall distribution over the years is studied, a rainy period started after the very dry year occurred in 2008. Although the drought was observed again in 2013, a little rainier period was observed in 2014. It has been observed that 2014 mean areal precipitation was 3% higher than the long term annual mean and 22% higher than 2013 average.

Regionally, the decrease of 12% and 7% in mean areal precipitation was observed in Eastern Anatolia and South-eastern Anatolia respectively while Black Sea and Mediterranean regions received precipitation near normal in 2014. The highest increase of 28% (about 183 mm) occurred in the Marmara region. When global rainfall has been assessed, global average rainfall in 2014 occurred 0.52 mm less than the average of 1961 to 1990 period with 1033 mm ^[11].

GRAPH 9- ANNUAL AREAL PRECIPITATION IN TURKEY



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

Note: The retrospective data were revised due to a change in methodology.

3.4- Temperature



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

In the year 2014, average global surface temperature for the ocean and average was 14.55°C and this was over the 20th century average (13.86°C) ^[12].

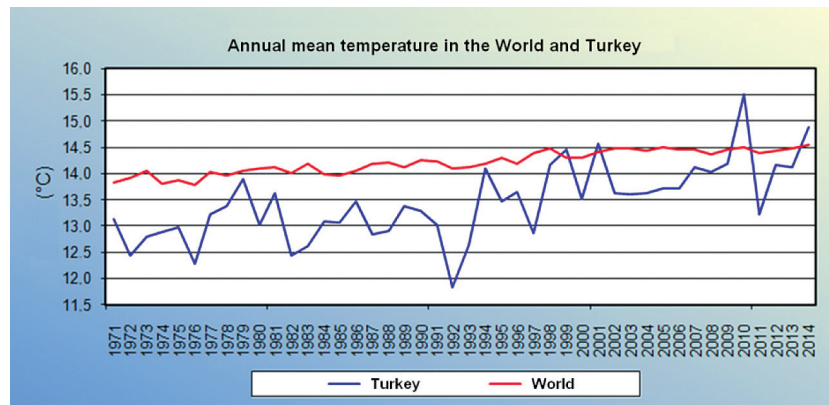
Turkey annual mean temperature in 2014 has been 14.9°C. This value is 1.4°C above from 1981-2010 normal (13.5°C). Lowest temperature in 2014 was in February with -32.8°C in Ardahan while highest temperature was in July with 46.1°C in Cizre.

When we look at the 1971-2014 period, the highest annual average temperature in Turkey was 15.5° in 2010 and the lowest annual average temperature was 11.8°C in 1992.

There are positive temperature anomalies in Turkey since 1994 except 1997 and 2011 ^[11].

In 2014, the global average temperature of the ocean and the land surface has been the warmest recorded since 1880 ^[12]. In Turkey 2014 was the second warmest year after 2010 since 1961 ^[11].

GRAPH 10-ANNUAL MEAN TEMPERATURE IN THE WORLD AND TURKEY



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

3- CLIMATE CHANGE

3.5- Sea Water Temperature

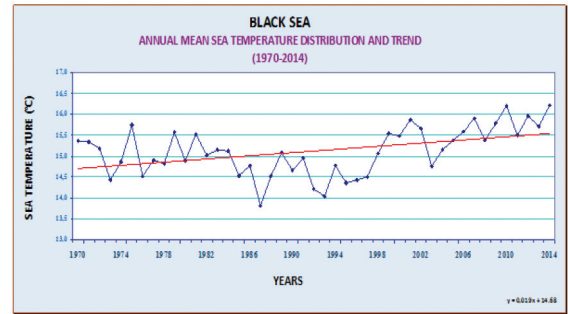
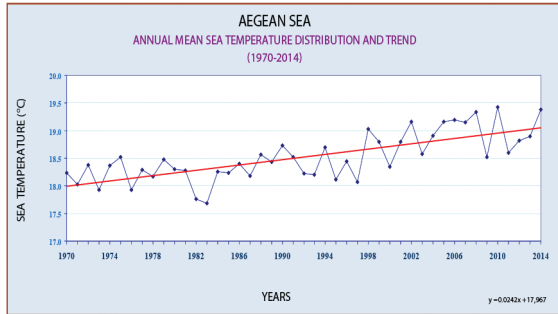
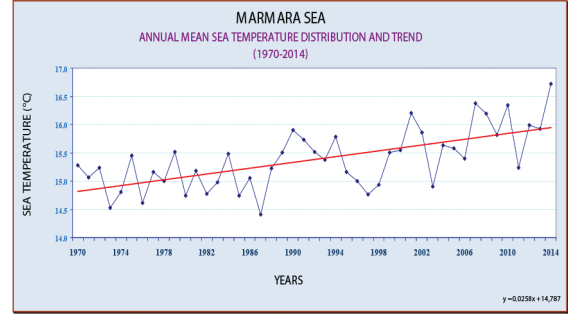
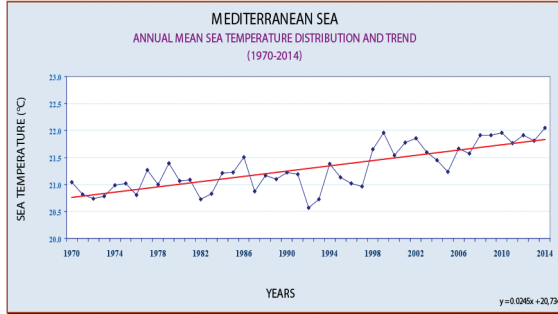
This impact indicator represents sea surface water temperature changes over the years.

The real cause of atmospheric events and air masses are oceans and seas. The best indicator of climate change is the warming and cooling of the sea water. These temperature changes in sea water affect not only many species by altering their ecological environments, but also the lives of a large proportion of the population that benefit from the seas economically.

According to the data obtained by Turkish Meteorological General Directorate, although there has been a slight increase in average sea water temperature, it is not true to mention about a global increase in sea water temperature at this stage. Turkish State Meteorological Service is carrying on their studies to measure sea water temperatures representing all our coasts. As a result a high resolution data source can be obtained about our seas.

In 2014, average sea water temperature was 22.0°C in the Mediterranean sea, 19.4°C in the Aegean sea, 16.7°C in Marmara sea and 16.2°C in the Black sea. The graph below shows the average sea water temperatures measured in (°C) between 1970 and 2014 ^[11].

GRAPH 11- SEA WATER TEMPERATURES THROUGH THE YEARS 1970-2013 (°C)



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

4- AIR POLLUTION

4.1- Air Pollutant Emissions

Air pollutant emissions is an important pressure indicator and shows the amount of national emissions of major air pollutants by years and source sectors.

Data comes from the national air emissions inventory for, NO_x (nitrogen oxides), SO₂ (sulphur dioxide), NMVOC (non-methane volatile organic compounds), NH₃ (ammonia), PM₁₀ (particulate matter) and CO (carbon monoxide) prepared annually for the reporting requirements of the UNECE CLRTAP (United Nations Economic Commission for Europe, Convention on Long-Range Transboundary Air Pollution (CLRTAP)).

In 2013, SO₂ emissions were caused by the following sectors respectively; 59% energy production-power plants, 16% residential heating and 11% industrial processes. Heavy-duty vehicles and energy production-power plants were the main sources of NO_x with a ratio of 35% and 24% respectively. Residential heating caused 17% of the total NMVOC emissions. Main reasons of the NH₃ emissions were synthetic fertilizer use and livestock farming.

General decrease was recognized within the trend of emissions between 1990 and 2013. The reasons of this situation could be explained by the decrease on the fuel consumption in the energy production sector and the updated emission factors due to new emission reduction technologies.

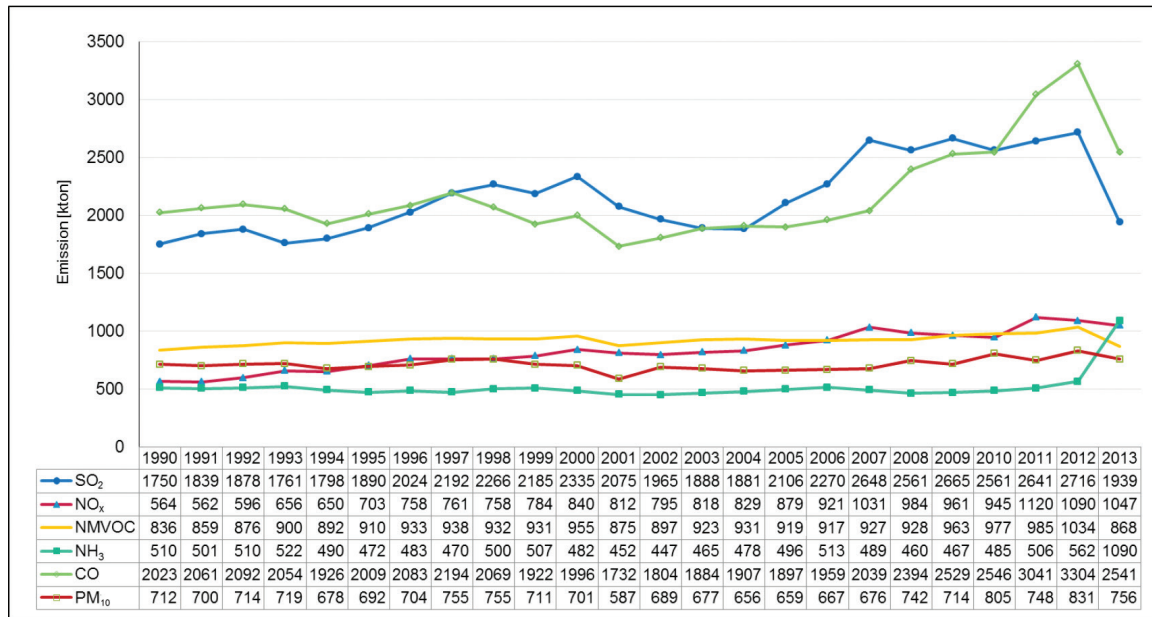
Compared to the 1990 data on emissions, NH₃ emissions showed a high increase with a percentage of 114%. Respectively the highest emissions were NO_x (86%), CO (26%), SO₂ (11%), PM₁₀ (6%) and NMVOC (4%). When compared to the emissions in 2012, air pollutant emissions except for NH₃ all were decreased. The increase in NH₃ emissions could be explained by the data of agricultural fertilizers which was published under agricultural statistics showing an increase.

Anthropogenic emissions of the main air pollutants decreased significantly in EU-28 countries between 1990 and 2012; NO_x emissions decreased by 51%, SO_x emissions decreased by 84%, NMVOC emissions decreased by 60%, NH₃ emissions decreased by 28% and PM_{2.5} emissions decreased by 35% [13].

TABLE 7- PERCENT CHANGE OF AIR POLLUTANT EMISSIONS IN TURKEY IN 2013 COMPARED TO 1990

Trend (%)	SO ₂	NO _x	NMVOC	NH ₃	CO	PM ₁₀
1990-2013	11	86	4	114	26	6
2012-2013	-29	-4	-16	94	-23	-9

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

GRAPH 12- 1990-2013 TOTAL EMISSIONS OF SO₂, NO_x, NMVOC, NH₃, CO AND PM₁₀

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

4- AIR POLLUTION

4.2- Average values of PM₁₀ and SO₂ in Ambient Air



The state indicator of air pollution represents annual average concentrations of PM₁₀ and SO₂ measured at the 10 air quality monitoring stations that report the highest pollution levels.

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 open to public online at: www.havaizleme.gov.tr.

In Turkey, a 7.9% improvement has been achieved for PM₁₀ and 6.3% for SO₂ in 2014 compared to the previous year.

It's believed that the observed improvements in 2014 for PM₁₀ and SO₂ were achieved due to the measures taken under scope of the “Clean Air Action Plans”, such as control of fuel types used for domestic heating, thermal isolation of the buildings, stoker training and measures to abate pollution from motor vehicles.

When the 2014 data is analysed, an increase in 24-hourly average PM₁₀ and SO₂ is observed especially during winter period. One can conclude that pollutants from domestic heating have significant contribution to winter time air pollution. ^[14].

TABLE 8- AIR QUALITY MONITORING STATIONS WITH THE HIGHEST PM₁₀ AND SO₂ AVERAGES IN 2014

STATIONS	PM ₁₀ (µg/m ³)*	STATIONS	SO ₂ (µg/m ³)*
SIİRT	113	EDİRNE (KEŞAN)	308
DÜZCE	107	ÇANAKKALE (ÇAN)	139
İĞDIR	106	MUĞLA 2 (YATAĞAN)	59
BURSA	97	TEKİRDAĞ	44
BURSA (İNEGÖL)	93	BURSA (KESTEL)	34
İSTANBUL (ESENİYURT)	92	YOZGAT	33
MANİSA	92	BİTLİS	32
KAYSERİ (HÜRRİYET)	86	KIRKLARELİ (LÜLEBURGAZ)	32
EDİRNE (KEŞAN)	86	KAHRAMANMARAŞ (ELBİSTAN)	27
SAKARYA	83	KARABÜK	27

* Assessment done with the validated hourly average values where data availability is above 90%.

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

4.3- Number of Exceedances of Air Quality Limit Values



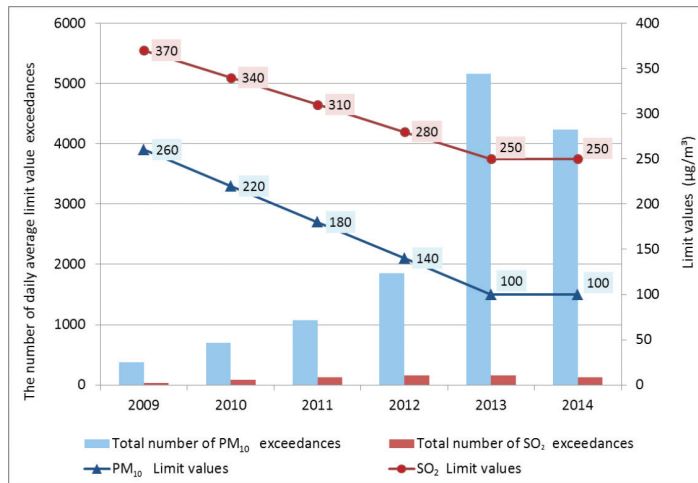
This state indicator shows how often the air pollution exceeds the limits.

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).

However, in case of 2013 and 2014 period, limit values remained unchanged, $100\mu\text{g}/\text{m}^3$ for PM_{10} and $250\mu\text{g}/\text{m}^3$ for SO_2 . This provides an opportunity to view the improvement over the last year.

For the 120 stations that were in operation both in 2013 and 2014, exceedances for PM_{10} and SO_2 reduced respectively by 17.9% and 21% in 2014 than in 2013.

GRAPH 13- AIR QUALITY LIMITS AND NUMBER OF EXCEEDANCES OVER THE YEARS



Source: Ministry of Environment and the Urbanization, Air Quality Newsletters (2009-2014).

NOTES:

1. Exceedances are assessed by daily (24 hourly) average values of the measurement results.
2. For 2014, data from 120 stations was considered for consistency with previous years.
3. Limit values were determined as: For PM_{10} , $260\mu\text{g}/\text{m}^3$ (2009), $220\mu\text{g}/\text{m}^3$ (2010), $180\mu\text{g}/\text{m}^3$ (2011), $140\mu\text{g}/\text{m}^3$ (2012), and $100\mu\text{g}/\text{m}^3$ (2013 and 2014). For SO_2 , $370\mu\text{g}/\text{m}^3$ (2009), $340\mu\text{g}/\text{m}^3$ (2010), $310\mu\text{g}/\text{m}^3$ (2011), $280\mu\text{g}/\text{m}^3$ (2012) and $250\mu\text{g}/\text{m}^3$ (2013 and 2014).

4- AIR POLLUTION

Maximum number of exceedances allowed within a year is 35 for PM_{10} and 3 for SO_2 .

In 61 (41%) of the 148 monitoring stations operated in 2014, maximum number of exceedances for PM_{10} within one year, which is 35, was exceeded. For SO_2 , in 7 stations (4%) out of 152 stations maximum exceedance number (3) was exceeded.

TABLE 9- 10 AIR QUALITY MONITORING STATIONS WITH THE HIGHEST NUMBER OF EXCEEDANCES OF DAILY LIMIT VALUES FOR PM_{10} AND SO_2 IN 2014.

Stations	Number of PM_{10} exceedances [*]
SIİRT	203
MUŞ	122
İÇDIR	121
DÜZCE	121
BURSA	121
BATMAN	109
İSTANBUL-ESENYURT	104
KAYSERİ-HÜRRİYET	96
SAKARYA	93
MUĞLA-YATAĞAN	85

Stations	Number of SO_2 exceedances ²
EDİRNE-KEŞAN	114
ŞIRNAK	81
ÇANAKKALE-ÇAN	57
MUĞLA-YATAĞAN	19
MANİSA-SOMA	13
TRABZON	5
TEKİRDAĞ	4
AFYON	3
HAKKARİ	2
BOLU	1

*: Exceedances are assessed by daily (24 hourly) average values of the measurement results considering the limit values in BAQAM ($100 \mu g/m^3$ for PM_{10} and $250 \mu g/m^3$ for SO_2).

BAQAM: By-Law on Air Quality Assessment and Management issued in Official Journal No. 26898 on 06.06.2008.

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

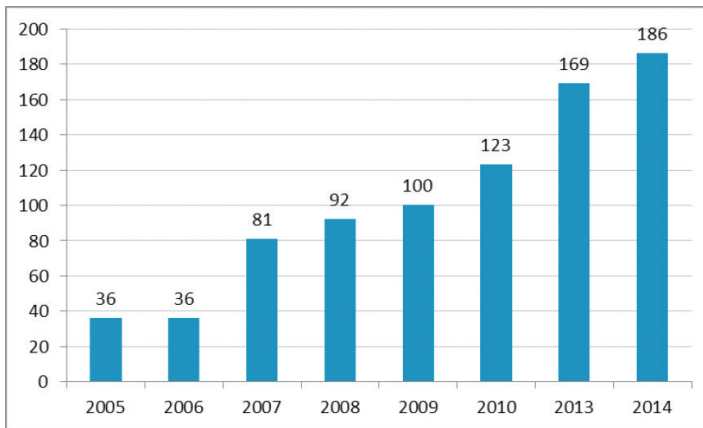
4.4- The Number of Air Quality Monitoring Stations



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 186 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 norms, 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. Population data is regarded as basis for the number of stations required. According to the assessment studies, at least 330 monitoring stations are required. The Ministry foresees to meet this target by the end of 2017.

GRAPH 14- 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

5- WATER- WASTEWATER

5.1- Use of Freshwater Resources



This indicator is a pressure indicator. Total water consumption indicates the use of water sources (surface and underground) 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, 70.4% of the water drawn was used for agricultural irrigation, 17.2% for industry, and 12.4% for domestic use.

The total area which can be economically irrigated is 8.5 million hectares and 5.9 million ha (69%) of this area can be irrigated by the end of 2013 ^[15].

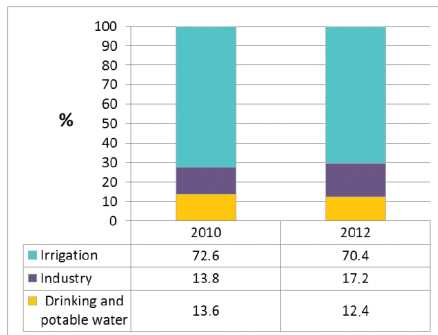
Based on the 2006 data presented by United Nations Food and Agriculture Organization (FAO) and published in 2012, 69% of the water source is used for irrigation, 19% for industry and 12% for domestic use in the world. However, In Europe, 22% is used for irrigation, 57% for industry and %22 for municipal use ^[16].

TABLE 10-AMOUNT OF WATER DRAWN FROM WATER BODIES WITH REGARD TO USAGE

	(Billion m ³ /year)		
	2008	2010	2012
Municipalities	4.55	4.79	4.94
Villages	1.22	1.01	1.04
Manufacturing Industry Activities	1.20	1.42	1.67
Thermal Power Plants	4.54	4.29	6.41
Organized Industrial Zones	0.11	0.13	0.14
Mining Facilities	... (*)	0.05	0.11
Irrigation	27.00	30.95	34.00
Total		42.64	48.30

(*) No Information.

GRAPH 15- WATER USAGE BY SECTORS



Source For 'Irrigation' Values: Ministry of Forestry and Water Affairs General Directorate of State Hydraulic Works, <http://www.dsi.gov.tr/dsi-resmi-istatistikler>
Source for Values other than 'Irrigation': TURKSTAT

Note: Water transfer between sectors is not included

Since 2008, data collection has been made once in 2 years.

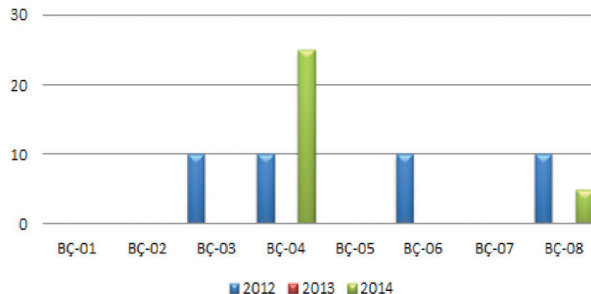
5.2- Oxygen Consuming Substances in Rivers



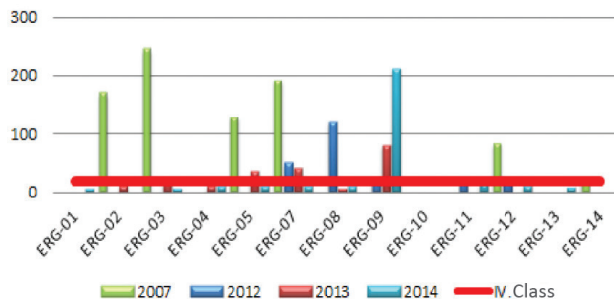
The primary indicator of the oxygenation state in water bodies is biochemical oxygen demand (BOD) which expresses the demand of oxygen by the living creatures consuming oxidizable organic materials in a body of water. This indicator is a state indicator which shows the present situation and the tendency 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 and 2014. Seasonal monitoring studies have been done in the basins: Ergene, K    k 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.^[17, 18, 19, 20, 21]

GRAPH 16- NORTH AEGEAN (BAKIRCAY) BASIN BOD (mg/L)

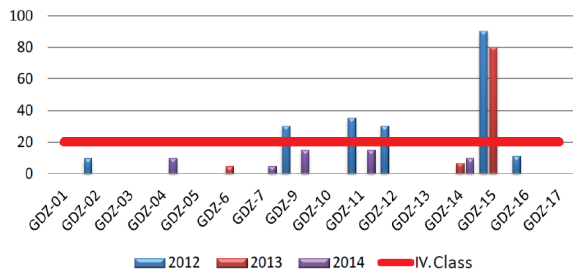


GRAPH 17- ERGENE BASIN BOD (mg/L)

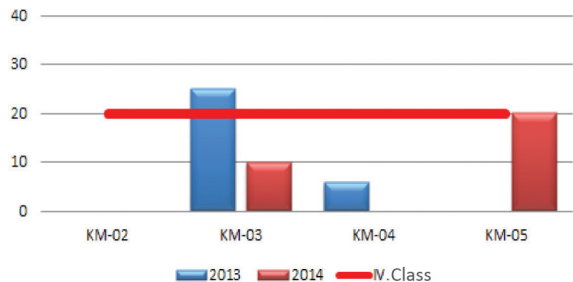


5- WATER- WASTEWATER

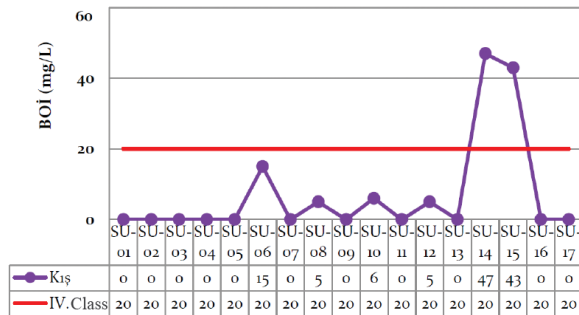
GRAPH 18- GEDİZ BASIN BOD (mg/L)



GRAPH 19- KUCUK MENDERES BASIN BOD (mg/L)



GRAPH-20-SUSURLUK BASIN BOD (mg/L) (2014 WINTER PERIOD)



Compared to 2013, in 2014 BOD decreased in Ergene basin, however increased in Gediz, Bakırçay, K. Menderes basins.

In order to determine the pollution real-time and take rapid mitigation measures, the Ministry has started monitoring the pollutant emissions by installing online continuous monitoring stations at the discharge points of wastewater treatment units of installations with a flowrate of 10,000 m³/day or higher.

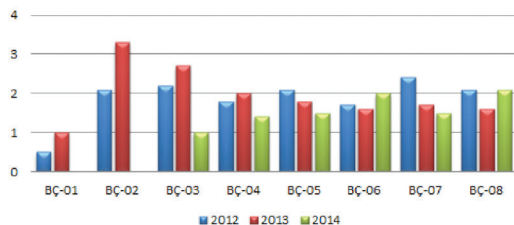
Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports (2014)
<http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcld=691&detld=946&ustld=691>

5.3- Nutrients in Freshwater D P S I R

The state indicator is used to show the current nutrient intensity and the time-wise trends in geographic variations.

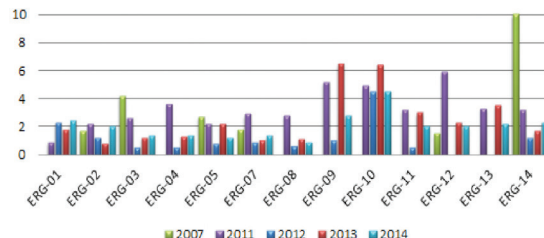
Widespread nitrogen and phosphorus entry from the urban areas, the industrial and agricultural areas to the water sources can cause eutrophication. Laboratory, Measuring and Monitoring Department of the Ministry of Environment and Urbanisation carried out Domestic and Industrial Pollution Monitoring Programmes in 2012, 2013 and 2014. 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. ^[17, 18, 19, 20, 21].

GRAPH 21- NORTH AEGEAN (BAKIRCAY) BASIN
nitrate nitrogen (mg/L)



In the North Aegean basin from 2012 to 2014, Ammonium-Nitrogen, total phosphorous, total dissolved solids, cadmium, manganese, boron, aluminium and colour has increased while nitrate, total chromium, fluorine, free chlorine, sulphur and iron has decreased.

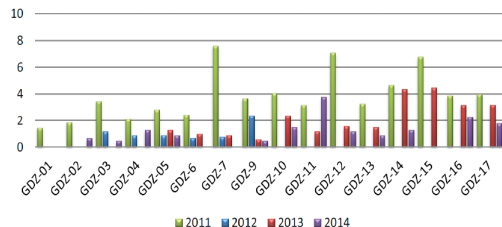
GRAPH 22- ERGENE BASIN nitrate nitrogen (mg/L)



In Ergene basin, pollutant amounts has generally decreased in Spring 2014 compared to Spring 2007. Ammonium and nitrite has increased while total nitrogen and nitrite has decreased.

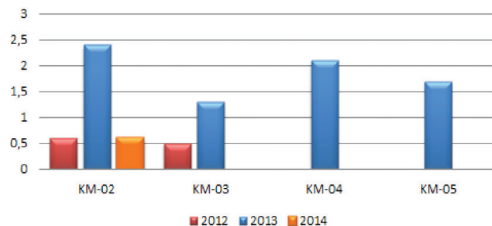
5- WATER- WASTEWATER

GRAPH 23- GEDIZ BASIN nitrate nitrogen (mg/L)



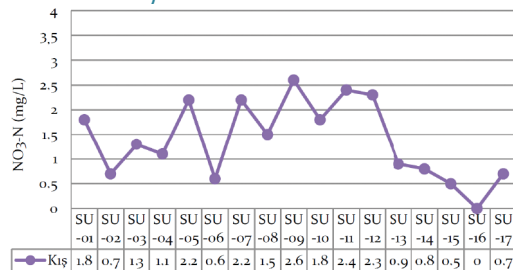
In Gediz basin during Spring period from 2011 to 2014, an increase is observed at all parameters and in all sampling points.

GRAPH 24- KUCUK MENDERES BASIN nitrate nitrogen (mg/L)



In Küçük Menderes basin from 2012 to 2014, total dissolved solids, nitrate, sulphate, dissolved oxygen and nitrite has decreased while the other parameters have shown an increase.

GRAPH 25- SUSURLUK BASIN nitrate nitrogen (mg/L) (2014 WINTER PERIOD)



Susurluk basin 2014 winter season measurement results for dissolved oxygen, pH, Nitrite Nitrogen, Ammonium nitrogen, total phosphorus, COD, BOD, Total Kjeldahl Nitrogen parameters reveal that the river is at Class IV (highly polluted water) quality according to the By-Law on Surface Water Quality Management

Sources: Domestic and Industrial Pollution Monitoring Programme Monitoring Reports
<http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lclId=691&detId=946&ustId=691>

In 2014, analyses have been done by the Ministry of Forestry and Water Affairs in lakes in Konya Closed Basin, Antalya, Marmara and Küçük Menderes basins within the scope of the project "Basin monitoring and identification of reference points".

According to the total phosphorus analysis results, most of the lakes in abovementioned basins were found out to be eutrophic and hypertrophic (highly deteriorated), considering the trophic levels defined in the By-Law on Surface Water Quality Management. The highest values are obtained in Akkaya and İbrala Reservoirs (in Konya closed basin), Küçükçekmece and Büyükçekmece lakes (in Marmara basin) and Beydağı Reservoir (in Küçük Menderes basin) [22].

TABLE 11- TOTAL PHOSPHORUS LEVELS AND EUTROPHIC CLASSIFICATION IN LAKES IN 2014

Basin	Lake	Average total phosphorus (TP) (µg/L)	Trophic Classification
KONYA CLOSED BASIN	Akkaya Dam Lake (Niğde)	1625.0	Hypertrophic
	İbrala Dam Lake (Karaman)	526.4	Hypertrophic
	Mamasın Dam Lake (Aksaray)	82.6	Eutrophic
	Gödet Dam Lake (Karaman)	71.3	Eutrophic
	Suğla Storage (Konya)	46.1	Eutrophic
	Altınapa Dam Lake (Konya)	17.4	Mesotrophic
	Beyşehir Lake (Konya) 1	15.6	Mesotrophic
	Beyşehir Lake (Konya) 2	7.2	Oligotrophic
	İvriz Dam Lake (Konya)	5.0	Oligotrophic
ANTALYA BASIN	Kovada Lake	61.6	Eutrophic
	Karacaören 1 Dam	34.5	Eutrophic
	Manavgat Dam	34.0	Eutrophic
	Eğirdir Lake	33.0	Eutrophic
	Karacaören 2 Dam	29.6	Mesotrophic
	Dim Dam	21.0	Mesotrophic
MARMARA BASIN	Küçükçekmece Lake	935.0	Hypertrophic
	Büyükçekmece Lake	105.0	Hypertrophic
	Ömerli Dam	83.0	Eutrophic
	Terkos Lake	82.5	Eutrophic
	İznik Lake	57.0	Eutrophic
KUCUK MENDERES BASIN	Beydağı Dam Lake (İzmir)*	39.4	Hypertrophic
	Alaçatı Dam (İzmir)	73.5	Eutrophic
	Tahtalı Dam Lake (İzmir)	26.6	Mesotrophic

* İzmir Beydağı Dam light transmittance value (0.19 m) due to hypertrophy.

Note: Surface Water Quality Management of the lake, Trophic Classification System Limits in the lake reservoirs and dams; Oligotrophic: $TP \leq 10$, Mesotrophic: $10 > TP \geq 30$, Eutrophic: $30 > TP \geq 100$, Hypertrophic $TP > 100$

Source: Ministry of Forestry and Water Works, General Directorate for Water Management

5- WATER- WASTEWATER

5.4- Nutrients in Transitional, Coastal and Marine Waters D P S I R

The water quality in transitional, coastal and marine regions could be adversely affected by anthropogenic activities, such as the application of agricultural fertilisers and manure, the discharge of wastewater and airborne emissions from shipping and combustion processes. These activities may result in elevated nutrient (nitrogen and phosphorus) concentrations leading to eutrophication and causing a chain of undesirable effects [23]. This indicator is a state indicator.

Marine and coastal water analyses have been carried out in the Gediz, Sakarya and Susurluk basins in 2013 and Ergene, Antalya, Marmara and Küçük Menderes basins in 2014 by the Ministry of Forestry and Water Affairs in the project "Basin monitoring and identification of reference points". Assessments were done according to the criteria of the trophic classification system in the By-Law on Surface Water Quality Management. Dissolved inorganic nitrogen data dictate that the marine and coastal waters in Gediz, Sakarya, Marmara and Antalya basins are hypertrophic (highly deteriorated) [22].

TABLE 12- AVERAGE DISSOLVED INORGANIC NITROGEN DATA IN COASTAL AND MARINE WATERS (2013, 2014)

Basin	Occurrences of coastal water	The average dissolved inorganic nitrogen ($\mu\text{g/L}$)	Trophic Classification
ERGENE BASIN	ERG20 Enez/EDİRNE	0.5	Oligotrophic
	ERG21 Enez/EDİRNE	0.5	Oligotrophic
	ERG22 Enez/EDİRNE	0.5	Oligotrophic
GEDİZ BASIN	GDZ19 Aegean Coast Water	444.0	Hypertrophic
	GDZ20 Aegean Coast Water	239.0	Hypertrophic
	GDZ21 Aegean Coast Water	234.0	Hypertrophic
SAKARYA BASIN	SKGS02 Black Sea Coast Water	535.0	Hypertrophic
	SKGS03 Black Sea Coast Water	439.0	Hypertrophic
	SKGS04 Black Sea Coast Water	250.0	Hypertrophic
SUSURLUK BASIN	SD2P Marmara Coast Water	211.0	Hypertrophic
	MD19P Marmara Coast Water	36.1	Mesotrophic
	MD20P Marmara Coast Water	26.5	Mesotrophic
ANTALYA BASIN	Aksu Stream Outlet Coast (Aksu-ANTALYA)	493.4	Hypertrophic
	Muratpaşa Coast (Muratpaşa-ANTALYA)	491.5	Hypertrophic
	Manavgat Coast (Manavgat-ANTALYA)	430.3	Hypertrophic
MARMARA BASIN	Alanya Coast (Alanya-ANTALYA)	412.1	Hypertrophic
	Saroz Bay (Koruköy-Gelibolu-CANAKKALE)	464.0	Hypertrophic
	Riva Creek Output (Beykoz-İSTANBUL)	391.0	Hypertrophic
	Kocaeli –Dilovası Coast Water	390.0	Hypertrophic
	Bursa –Gemlik Coast Water	354.0	Hypertrophic
	Kadıköy Kurbagalidere Output (Kalamış-Kadıköy-İST.)	344.0	Hypertrophic
	Izmit Central Coast Water	339.0	Hypertrophic
	Bayramoğlu Location (Bayramoğlu-Darıca-KO-CAELİ)	303.0	Hypertrophic
	Büyükdere Location (Büyükdere, Sarıyer, İST.)	282.0	Hypertrophic
	Çamlık Stream / Güzelbahçe, İZMİR	100.0	Mesotrophic
KÜÇÜK MENDERES BASIN	Pamucak Creek area involving sea, Selçuk/İZMİR	100.0	Mesotrophic
	Kuşadası Güzelcamlı Location /AYDIN	100.0	Mesotrophic
	Çeşme central sea deficits /İZMİR	100.0	Mesotrophic

Note: Surface Water Quality Management of the Aegean and Mediterranean coastal and transitional waters Eutrophication Criteria; Oligotrophic: <20, Mesotrophic: 20-100, Eutrophic: 100-200, Hypertrophic: >200 The Black Sea and Marmara coastal and transitional waters Eutrophication Criteria; Oligotrophic: <20, Mesotrophic: 20-140, Eutrophic: 141-250, Hypertrophic: >250

Source: Ministry of Forestry and Water Works, General Directorate for Water Management

5.5- Chlorophyll in Transitional, Coastal and Marine Waters



This state indicator represents chlorophyll-a measurements, one of the data used in eutrophication monitoring.

Marine and coastal water analyses have been carried out in the Gediz, Sakarya and Susurluk basins in 2013 and Ergene, Antalya, Marmara and Küçük Menderes basins in 2014 by the Ministry of Forestry and Water Affairs in the project "Basin monitoring and identification of reference points".

Assessments were done according to the criteria of the trophic classification system in the By-Law on Surface Water Quality Management. Chlorophyll-a results show that the marine and coastal waters in Gediz, Sakarya, Marmara and Antalya basins are hypertrophic (highly deteriorated) [22].

TABLE 13- AVERAGE CHLOROPHYLL -A DATAS IN COASTAL AND MARINE WATERS (2013, 2014)

Basin	Occurrences of coastal water	Average Chlorophyll-a ($\mu\text{g/L}$)	Trophic Classification
ERGE NE HAVZASI	ERG21 Enez/EDİRNE	<0.1	Oligotrophic
	ERG22 Enez/EDİRNE	<0.1	Oligotrophic
	ERG20 Enez/EDİRNE	0.05	Oligotrophic
GEDİZ HAVZASI	GDZ19 Aegean Coast Water	2.33	Eutrophic
	GDZ21 Aegean Coast Water	0.78	Mesotrophic
	GDZ20 Aegean Coast Water	0.5	Mesotrophic
SAKARYA HAVZASI	SKGS04 Black Sea Coast Water	2.7	Eutrophic
	SKGS02 Black Sea Coast Water	0.5	Oligotrophic
	SKGS03 Black Sea Coast Water	0.5	Oligotrophic
SUSURLUK HAVZASI	SD2P Marmara Coast Water	4.1	Hypertrophic
	MD20P Marmara Coast Water	1.4	Mesotrophic
	MD19P Marmara Coast Water	1.2	Mesotrophic
ANTALYA HAVZASI	Aksu Stream Outlet Coast (Aksu-ANTALYA))	<0.1	Oligotrophic
	Muratpaşa Coast (Muratpaşa-ANTALYA)	<0.1	Oligotrophic
	Manavgat Coast (Manavgat-ANTALYA)	<0.1	Oligotrophic
	Alanya Coast (Alanya-ANTALYA)	<0.1	Oligotrophic
MARMARA HAVZASI	İzmit Central Coast Water	<0.1	Oligotrophic
	Kocaeli –Dilovası Coast Water	<0.1	Oligotrophic
	Bursa –Gemlik Coast Water	<0.1	Oligotrophic
	Riva Creek Output (Beykoz-İSTANBUL)	<0.1	Oligotrophic
	Bayramoğlu Location (Bayramoğlu-Danca-KOCAELİ)	<0.1	Oligotrophic
	Kadıköy Kurbağalıdere Output (Kalamış-Kadıköy-İST.)	<0.1	Oligotrophic
	Büyükdere Location (Büyükdere-Sarıyer-İSTANBUL)	<0.1	Oligotrophic
	Saroz Bay (Koruköy-Gelibolu-ÇANAKKALE)	<0.1	Oligotrophic
KÜÇÜK MENDERES HAVZASI	Çamlık Stream / Güzel Bahçe, İZMİR	0.5	Mesotrophic
	Pamucak Creek area involving sea, Selçuk/İZMİR	0.5	Mesotrophic
	Çeşme central sea deficits /İZMİR	0.5	Mesotrophic
	Kuşadası Güzelçamlı Location /AYDIN	0.5	Oligotrophic

Note: Surface Water Quality Management of the Aegean and Mediterranean coastal and transitional waters Eutrophication Criteria; Oligotrophic: <0.4, Mesotrophic: 0.4-2, Eutrophic: 2- 4, Hypertrophic: > 4

Black Sea and Marmara coastal and transitional waters Eutrophication Criteria; Oligotrophic : <0.7, Mesotrophic: 0.7- 3, Eutrophic: 3.1- 5, Hypertrophic: > 5

Source: Ministry of Forestry and Water Works, General Directorate for Water Management

5- WATER- WASTEWATER

5.6- Quality of Swimming Water D P S I R

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 Ministry of Health Public Health Institution of Turkey to protect individual and public health.

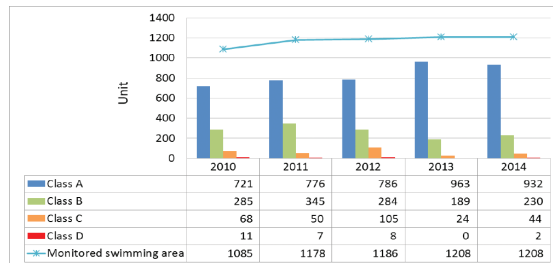
Considering the last five years it can be seen that the number of monitored swimming areas has been increasing. The number of swimming areas monitored was 1085 in 2010, while water quality monitoring activities were carried out in a total of 1208 swimming areas in 34 provinces in 2014.

Class A and Class B swimming areas are considered as the areas that meet the mandatory requirements and are suitable for swimming. Class C and Class D swimming areas are the ones which do not meet the necessary requirements.

In 2014, 77.2% of the 1208 of swimming areas are categorized as Class A, 19% Class B, 3.6% Class C and 0.2% Class D ^[24].

Comparing the results it can be seen that: Ratio of Class A (very good) swimming areas fell from 82% in 2013 to 77% in 2014; however, class A and B (good) areas (suitable for swimming) in total have increased from 1152 in 2013 to 1162 in 2014. While in 2013 82% of monitored swimming areas were of Class A, this ratio fell to 77% in 2014. Number of other classes increased.

GRAPH 26- COMPARING SWIMMING AREAS WITH REGARDS TO QUALITY CLASSES 2010-2014



Source: Ministry Of Health, Public Health Institution of Turkey.

Note: According to By-law on Swimming Water Quality following qualities represents Class A Very Good/Excellent, Class B good Quality, Class C Bad Quality and Class D Very Bad Quality/ Needs to be Banned.

TABLE 14- 2014 QUALITY ANALYSIS RESULTS OF SWIMMING WATER

YEAR	THE NUMBER OF MONITORED PROVINCES	TOTAL NUMBER OF SWIMMING AREAS	MONITORED PARAMETERS AND TOTAL ANALYSIS VALUES			SWIMMING AREAS THAT MEETS THE MANDATORY REQUIREMENTS		SWIMMING AREAS THAT DOES NOT MEET THE MANDATORY REQUIREMENTS	
			TOTAL COLIFORM	FECAL COLIFORM	FECAL STREPTOCOCCUS	CLASS A	CLASS B	CLASS C	CLASS D
2014	34	1208	12734	12734	12734	932	230	44	2

5.7- Municipal Water Supply D P S I R

Indicator represents the pressure on water resources. Reservoirs are the most important and widely used water supply for the municipalities. In years of less precipitation, water exploited from the reservoirs may decrease while exploitation from rivers, lakes or ponds increases.

In 2014, population served by water supply networks forms 91% of Turkey's population and 97% of total municipal population.

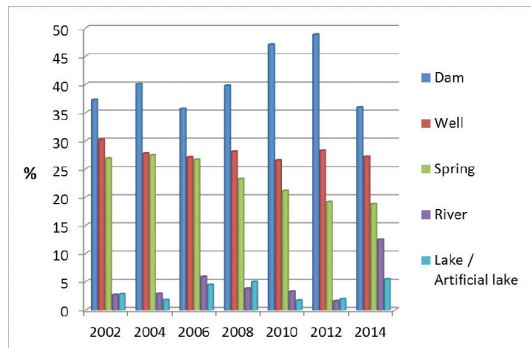
While 4.94 billion m³ of water was drawn for municipal potable water in order to be distributed in 2012, this number was increased to 5.24 billion m³ in 2014.

According to 2014 data, the ratio of the population of the municipalities served by drinking water treatment plants was calculated as 54% in the population of Turkey and 58% in the population of municipalities. Out of 5.2 billion m³ of water abstracted to water supply network, 3 billion m³ (57.2%) was treated in drinking water treatment plants. 95.5% of this amount was treated by conventional methods, 2.9% was treated by advanced methods, and 1.6% was treated by physical methods. In 2014, through the drinkable and potable water networks 3.39 billion m³ potable water was distributed to 25.7 million subscribers ^[25].

TABLE 15- WATER ABSTRACTION FOR MUNICIPAL WATER SUPPLY NETWORKS BY SOURCES (%)

Years	Dam	Well	Spring	River	Lake/ Artificial lake
2002	37.3	30.2	26.9	2.7	2.8
2004	40.1	27.8	27.5	2.9	1.8
2006	35.7	27.1	26.7	5.9	4.5
2008	39.8	28.1	23.3	3.8	5.0
2010	47.1	26.6	21.2	3.3	1.7 ^(*)
2012	48.9	28.3	19.2	1.6	2.0 ^(*)
2014	36.0	27.2	18.8	12.5	5.5 ^(*)

GRAPH 27- WATER ABSTRACTION FOR MUNICIPAL WATER SUPPLY NETWORKS BY SOURCES (%)



Source: TURKSTAT

Note: Since 2004 data has been collected once in two years.

(*) 2010, 2012 and 2014 Sea Water is included in the value of "Lake-Pond".

5- WATER- WASTEWATER

5.8- Municipalities Served by Wastewater Treatment

Unit D P S I R

This indicator is a response indicator. Indicator is 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, the total number of the municipalities served with wastewater treatment plants was 71, in 2014 this number reached to 478. The number of municipalities decreased with the entry into force of Metropolitan Municipality Law No. 6360 in 2014. The ratio of municipality population serviced by wastewater treatment facilities to the total population of city councils has reached to 77% and is planned to reach at least 85% by the end of 2017. By the year 2023, the 100th anniversary of the Republic, all the municipalities are planned to be serviced by wastewater treatment facilities.

The Cities with a population of more than 100.000 is given priority for building wastewater treatment plants. By the end of 2014, 82% of the 228 municipalities, with a population of more than 100.000, benefit from the wastewater treatment plant services.

GRAPH 28- NUMBER OF MUNICIPALITIES AND POPULATION RATIO SERVED BY WASTEWATER TREATMENT PLANTS

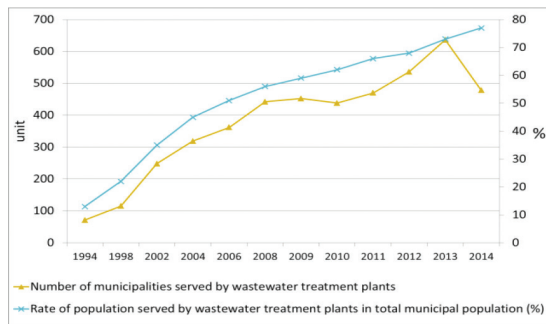


TABLE 16- NUMBER OF MUNICIPALITIES AND POPULATION RATIO SERVED BY WASTEWATER TREATMENT PLANTS

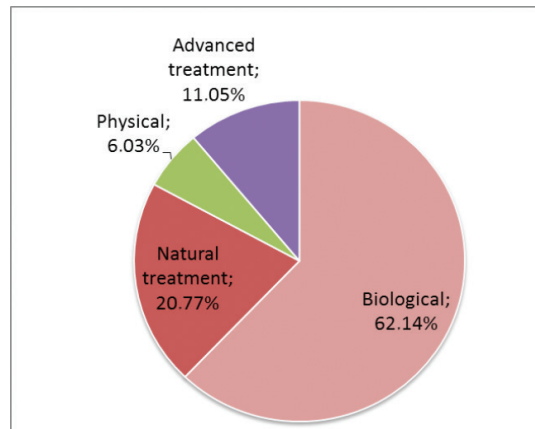
YEARS	1994	1998	2002	2004	2006	2008	2009	2010	2011	2012	2013	2014
Number of municipalities served by wastewater treatment plants	71	115	248	319	362	442	452	438 ⁽¹⁾	470	536	636	478 ⁽²⁾
Rate of population served by wastewater treatment plants in total municipal population (%)	13	22	35	45	51	56	59	62	66	68	73	77

Source: 2009, 2011, 2012 data, General Directorate for Environmental Management, data about other years TURKSTAT.

Note: 1) In 2010, due to administrative district changes, the number of municipalities served with wastewater Treatment plants decreased. 2) A decline in the number of municipalities was experienced with the entry into force of Metropolitan Municipality Law No. 6360 in 2014. 3) Regarding the data of DG environmental Management, in the calculation of "the ratio of municipality population serviced by wastewater treatment facilities to the total municipal population", it was assumed that the treatment plant of a particular municipality serves whole population of the municipality.

The number of the wastewater treatment plants which was 145 in 2002, reached to 597 in 2014. Looking at the distribution of these facilities, 11.05 % of the wastewater treatment plants is advanced treatment plant, 62.14 % is biological treatment plant, 6.03 % is the physical treatment and 20.77% is natural treatment plant.

GRAPH 29- THE NUMBER OF WASTEWATER TREATMENT PLANTS, BY THE END OF 2014



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

Considering the situation in Europe; in accordance with the 2009 data, approximately 80% of the North and South European population were connected to wastewater treatment plants. In the central European countries, this amount was much higher and exceeded 90% ^[26].

According to TURKSTAT data, The rate of advanced treatment was 41.6%, while the rate of biological treatment was 33.2%, the rate of physical treatment was 25.0% and the rate of natural treatment was 0.2% in 2014 ^[27].

With reference to the data presented by TURKSTAT, the population rate connected to the least secondary (biological) wastewater treatment facility was 37.58% in 2010 ^[28]. With regard to the sustainable development data of EUROSTAT, this rate was 99.5% in Great Britain, 99.4% in Netherlands, 97.3% in Switzerland, 95.3% in Germany, 93% in Spain, 83% in Finland and 64.5% in Poland in 2010 ^[29].

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 waste water treatment facilities. 50% of the electricity costs of the treatment facilities that were certified by the Ministry is subsidized in this regard.. During the period from the date of entry into force of the Regulation until the end of 2014, Reimbursement Certificates of Energy Incentive were given 359 of facilities provided the conditions under the Regulation by the Ministry. In this context, in 2011 23 million TL to 172 facilities, in 2012, 27 million to 212 facilities, in 2013 30.2 Million to 207 facilities and in 2014 30.4 million to 225 facilities were paid as energy incentives.

5- WATER- WASTEWATER

5.9- 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 2014, population that is served by sewerage systems has a share of 84% in Turkey's population and a share of 90% in total municipal population.

As of year 2014 the total number of municipalities is 1396, of which 1309 (94% of the municipalities) are served by the sewerage system.

Average daily per capita amount of wastewater discharged from municipal sewerage systems in 1994 was 126 litres, while it has increased to 181 litres in 2014^[27].

GRAPH 30- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS

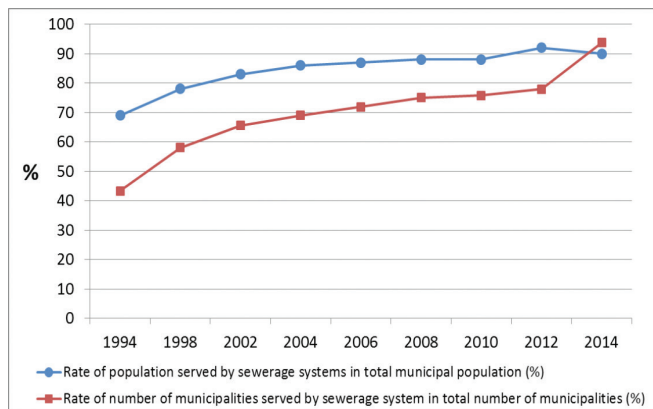


TABLE 17- RATE OF POPULATION AND MUNICIPALITIES SERVED BY SEWERAGE SYSTEMS

YEARS	1994	1998	2002	2004	2006	2008	2010	2012	2014
Rate of population served by sewerage systems in total municipal population (%)	69	78	83	86	87	88	88	92	90
Rate of number of municipalities served by sewerage system in total number of municipalities (%)	43	58	66	69	72	75	76	78	94
Average amount of wastewater discharged per capita per day (litres/capita-day)	126	154	154	174	181	173	182	190	181

Source: TURKSTAT

6.1- Amount of Municipal Wastes and Disposal

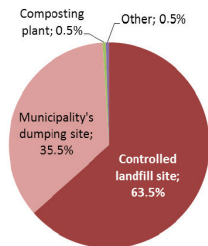


Regarding the waste management principles; the wastes should be primarily minimized at source, then recovery, energy recovery and finally disposal methods should be applied. Waste generation amounts are pressure, while collection, disposal and recycle/recovery amounts of these wastes are response type indicators.

According to TURKSAT survey results average amount of municipal waste per capita per day was calculated as 1.08 kg in 2014.

According to EUROSTAT 2012 data, the average annual urban waste produced per capita by EU-27 countries was 492 kg while that produced in Turkey was 407 kg based on TURKSTAT data.

GRAPH 31- AMOUNT OF MUNICIPAL WASTE BY DISPOSAL METHODS (%), 2012

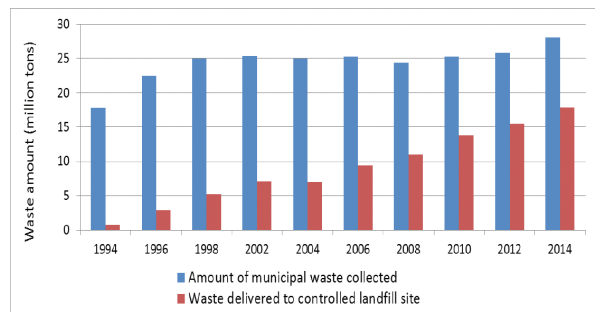


Source: TURKSTAT

TABLE 18- MUNICIPAL WASTE DISPOSAL THROUGHOUT THE YEARS

YEARS	1994	1996	1998	2002	2004	2006	2008	2010	2012	2014
Amount of municipal waste collected (Million Tonnes)	17.76	22.48	24.95	25.37	25.01	25.28	24.36	25.28	25.85	28.01
Waste delivered to controlled landfill site (Million Tons)	0.81	2.85	5.26	7.05	7.00	9.43	10.95	13.75	15.48	17.81
Rate of collected household waste sent to the landfills (%)	4.6	12.7	21.1	27.8	28.0	37.3	45.0	54.4	59.9	63.5

GRAPH 32- MUNICIPAL WASTE DISPOSAL THROUGHOUT THE YEARS



Source: TURKSTAT

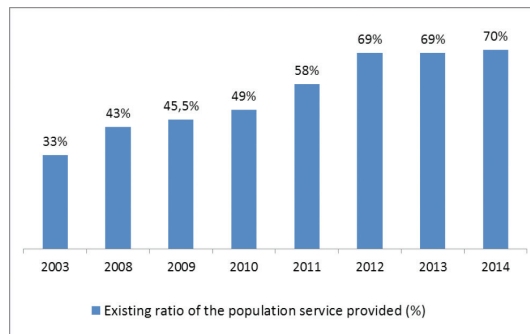
6.2- Number of Landfills - Population Covered by Landfills



Considering the facilities in urban areas in Turkey, while there were 15 landfills in 2003, it increased up to 38 in 2008, 59 in 2011, 69 in 2013 and 79 in 2014.

By year 2014, the ratio of the population covered by landfill to municipality population is 70%. This ratio is targeted to increase up to 83% by year 2017 and by the end of 2023 it is targeted to refurbish the existing infrastructure and raise the ratio to 100%.

GRAPH 33- THE RATE OF POPULATION SERVED BY LANDFILL PLANTS (%)



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

TABLE 19- LANDFILL FACILITIES, MUNICIPALITIES AND THE POPULATION THROUGH THE YEARS

YEARS	2003	2008	2009	2010	2011	2012	2013	2014
Number of landfills	15	38	41	46	59	69	69	79
Municipalities with landfill service provided	150	450	581	616	756	903	903	1073
Population covered by landfills	23	29	32	36.5	41	44.5	44.5	47.4

6.3- Hazardous Wastes



Hazardous wastes, especially originating from the industrial plants, are serious elements of stress for the environment.

A nation-wide proportion of hazardous waste generation can be identified with the Hazardous Waste Declaration System (HWDS) used by the industrial plants generating waste during the operational processes. By the end of 2014, 39,134 plants used the HWDS. The amount of the processed hazardous waste for 2014 was calculated as 1,413,220 tons, excluding the waste generated by the mining industry. 73.1% of the mentioned total was directed to recycling; 22.4% were disposed of; 4.1% stored and 0.5% was exported.

GRAPH 34- DATA FROM THE HAZARDOUS WASTE DECLARATION SYSTEM (2009-2014)

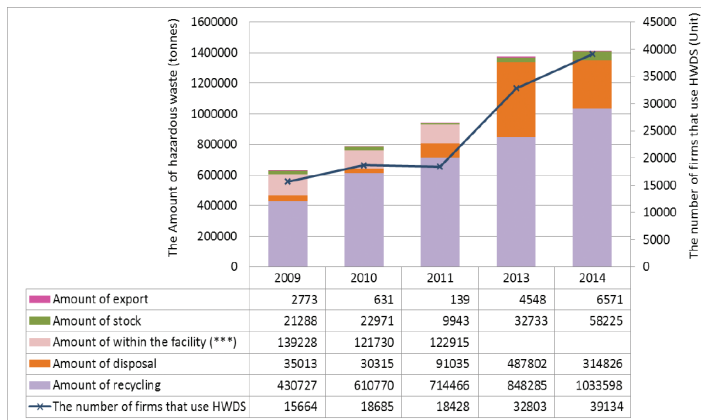


TABLE 20- DATA OF HAZARDOUS WASTE DECLARATION SYSTEM FOR (2009-2014) (*)

YEARS	2009	2010	2011	2013	2014
The number of firms that use HWDS	15,664	18,685	18,428	32,803 ^(*)	39,134
The amount of total hazardous waste (tons)	629,933	786,418	938,498	1,373,368	1,413,220

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

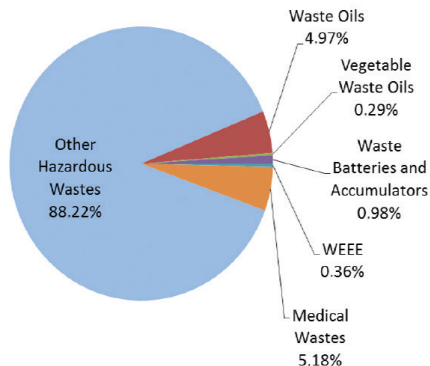
6- WASTE

TABLE 21- ACCORDING TO THE HAZARDOUS WASTE DECLARATION SYSTEM (HWDS) DATA; WASTE OILS, VEGETABLE WASTE OILS, WASTE BATTERIES AND ACCUMULATORS, WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE), MEDICAL WASTES (2013, 2014 YEARS)

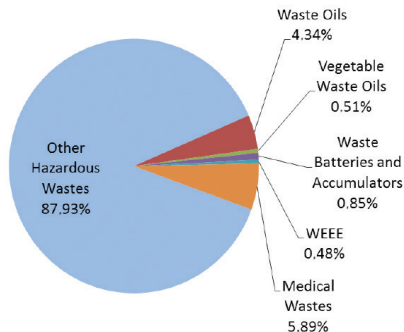
	2013		2014	
	Amount (tons)	The ratio of total hazardous waste (%)	Amount (tons)	The ratio of total hazardous waste (%)
Waste Oils	68,236	4.97	61,335	4.34
Vegetable Waste Oils	4,022	0.29	7,234	0.51
Waste Batteries and Accumulators	13,488	0.98	11,982	0.85
Waste Electrical and Electronic Equipment (WEEE)	4,911	0.36	6,817	0.48
Medical Wastes	71,173	5.18	83,190	5.89

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

GRAPHIC 35- DISTRIBUTION OF HAZARDOUS WASTE ACCORDING TO 2013 YEAR TABS DATA DECLARATION



GRAPHIC 36- DISTRIBUTION OF HAZARDOUS WASTE ACCORDING TO 2014 YEAR TABS DATA DECLARATION



6.4- Mining Wastes D P S I R

Statistical survey about water, wastewater and waste related to mining institutions was carried out by TURKSTAT in 2012, with the data reported by the operators to the General Directorate of Mining Affairs about the production in 2011 and about the mining institutions demanding new license for 2012. Only the facilities which made enrichment were excluded.

According to the survey results in 2012, 951.78 million tons of mining waste was produced. 947.18 million tons of all the produced waste consisted of mineral wastes. It is determined that 3.2 million tons of this waste was hazardous wastes. 0.02% of the total mining waste was recovered and reused within the establishments, 0.1% was recovered and reused out of the establishments, 5.68% was used for reclamation purposes in mining sites and 94.21% was disposed. 72.3% of the disposed waste was stored in landfills, 26.8% was dumped to the pits and 0.9% had been disposed by other methods that include municipality dump sites, incineration, temporarily stored, dumped wastes and those dumped in water sources ^[31].

TABLE 22- NUMBER OF MINING WASTE LANDFILLS

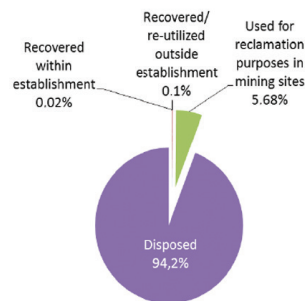
YEARS	2010	2011	2012	2013
MINING WASTE LANDFILLS	2	6	14	21

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

GRAPH 37- THE DISTRIBUTION OF MINE WASTE ACCORDING TO THEIR HAZARD STATE RELATED TO DATA IN 2012



GRAPH 38- THE RECOVERY AND THE DISPOSAL OF THE MINING WASTES ACCORDING TO THE DATA IN 2012



Source: TURKSTAT

6.5- Packaging Released to the Market and Amount of Packaging Waste Recycled

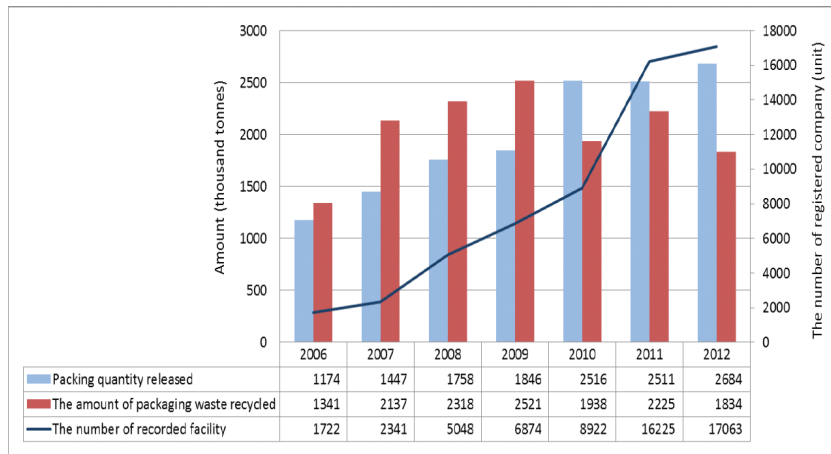


30% by weight and 50% by volume of all waste constitutes packaging waste.

In accordance with the polluter-pays principle of By-Law on Packaging Waste Control; the responsibility of meeting the costs of collection of packaging waste is given to the businesses that release their products with packaging.

Thus, keeping a registry of packaging waste producers is of great importance.

GRAPH 39- RECOVERED AMOUNT OF PACKAGING WASTE THROUGH THE PACKAGING WASTE DECLARATION SYSTEM AND THE NUMBER OF REGISTERED FACILITY



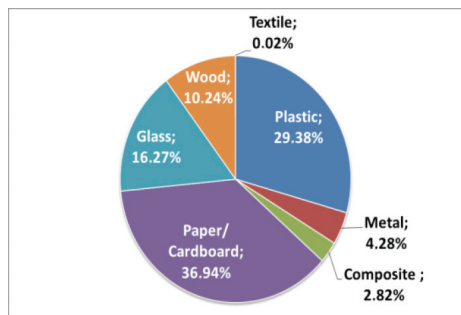
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

TABLE 23- STATISTICAL RESULTS OF THE PACKAGING WASTE IN 2012

Type Of Package	Produced Packaging Amount (ton)	Amount of packaging material introduced to the market (ton)	Recycled Amount (ton)	Achieved Recycling Amount (%)
PLASTIC	1,377,841	908,674	372,246	41
METAL	270,780	141,333	80,917	57
COMPOSITE	103,093	86,973	76,610	88
PAPER/ CARDBOARD	2,168,614	1,049,428	1,176,088	112
GLASS	531,330	497,599	127,751	26
TOTAL	4,451,658	2,684,009	1,833,614	68

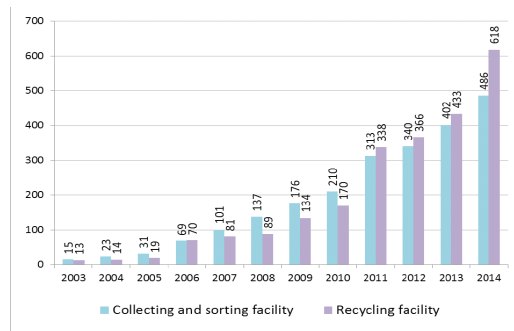
By 2013, Packaging Waste Management Plans for a total of 455 municipalities have been examined and approved. While there were 28 licenced facilities in 2003, it has increased up to 1104 by the end of 2014. At the end of 2014, 486 sorting facilities and 618 recycling facilities has provided service.

GRAPH 40- THE AMOUNT OF PACKAGING MATERIALS INTRODUCED TO THE MARKET IN 2012



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

GRAPH 41- NUMBER OF AUTHORIZED FACILITIES BETWEEN 2003 AND 2014



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

6- WASTE

6.6- End of Life Vehicles D P S I R

In 2014, 18,828,721 vehicles were circulating in traffic. However, some of these are taken out of the traffic due to various reasons, and some became scrap.

M1 (motor vehicles with maximum Capacity of 8 persons excluding the driver, and for passenger transportation only) and N1 (with a maximum weight of 3500 kg and designed to carry load) categorized under By-Law on Control of the End of Life Vehicles are scrapped.

According to 2014 data, the records of approximately 14% of 154,500 vehicles (21,173 vehicles) within the M1 and N1 categories were deleted by the Turkish National Police and considered as scraps.

TABLE 24

YEARS	2006	2007	2008	2009	2010	2011	2012	2013	2014
a. Total number of Motor Vehicles in Traffic	12,227,393	13,022,945	13,765,395	14,316,700	15,095,603	16,089,528	17,033,413	17,939,447	18,828,721
b. Number of Motor Vehicles whose Registration was Cancelled	68,177	66,840	87,230	163,785	151,700	198,801	125,407	223,429	154,500
c. Rate of Registration-Cancelled Motor Vehicle to Total number of Motor Vehicle (%) (bx100/a)	0.56%	0.51%	0.63%	1.14%	1.00%	1.24%	0.74%	1.25%	0.82%
d. Total number of Vehicle Amount Junked by Security General Directorate	29,817	39,515	50,231	78,487	65,502	113,913	73,567	158,879	98,871
e. Rate of Scrap Vehicles to Registration-Cancelled Vehicles (%) (dx100/b)	44%	59%	58%	48%	43%	57%	59%	71%	64%
f. Number of End of Life Vehicles which are scrapped by Turkish National Police (vehicles in M1 and N1 category)	11,826	13,564	20,170	30,672	27,687	41,848	19,919	30,254	21,173
g. Rate of End of Life Vehicles which are scrapped by Turkish National Police (vehicles in M1 and N1 category) to Vehicles whose Registration was Cancelled (%) (fx100/b)	17%	20%	23%	19%	18%	21%	16%	14%	14%

Source: The Ministry of Interior, Security General Directorate

6.7- Management of Ship Wastes

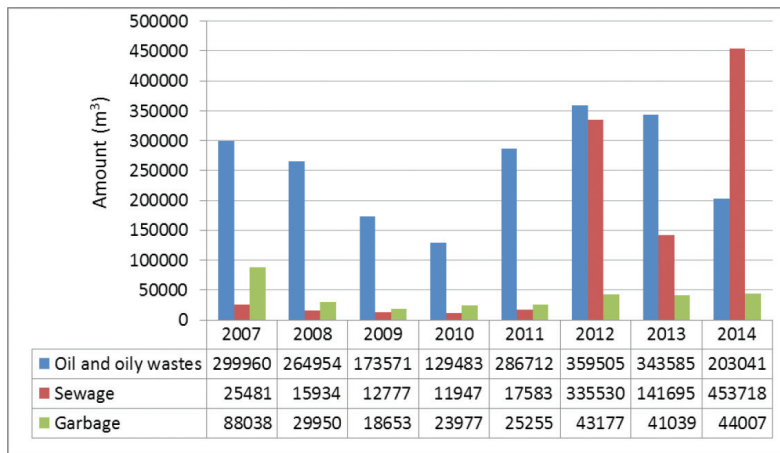


Turkey became a party to the International Agreement for the Prevention of Pollution from Ships (MARPOL 73/78) in 1990 and fulfils the obligations of the agreement and also of the national legislation (By-Law on “Waste Reception from Ships and Control of Waste” Official Journal No: 27061 issued 26 December 2004).

As a requirement of this By-Law; waste receiving facilities have been founded and operated by the institutions in order to prevent the ships to dump their wastes and residues into the oceans and territorial waters of Turkey and to protect the marine areas.

While the number of the licensed waste receiving facilities that serve for receiving wastes from the vessels in the ports was 18 in 2005, this figure reached to 247 in the end of 2014.

GRAPH 42- DISTRIBUTION OF WASTES ORIGINATED FROM SHIPS (m³)



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

The oily wastes collected in these facilities in ports are used as additional fuel in the licensed installations providing the required criteria as in the EU countries. In this way, the ship sourced pollution caused by the increasing sea traffic is decreased.

7.1- General Distribution of Land Cover

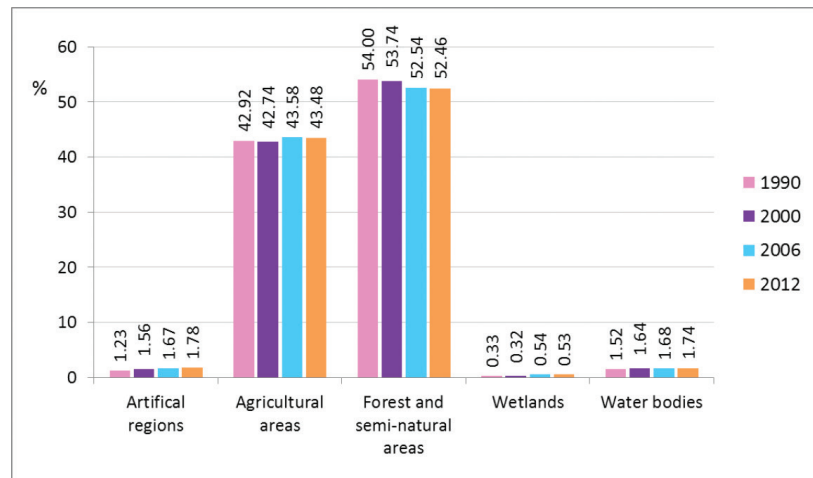
This indicator is a state indicator. It is very important for land use planning purposes to know the diversity of plantation areas clearly to observe the current and possible improvements in the area and to assess and limit the pressures on land by urbanisation and industrialisation purposes.

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

In Turkey between 1990 and 2012, while forests and semi-natural areas decreased by 1,216,871 ha, all other areas have increased, such as agricultural areas by 425,943 ha, artificial regions by 425,757 ha, water bodies by 173,361 ha and wetlands by 160,494 ha. Increasing population, urbanization and industrialization posed threat to natural and agricultural areas.

When the rate of land use in Europe is considered, according to CORINE 2006 data (including Turkey), ratios of forests account for 35%, arable lands for 25%, pastures for 17%, semi-natural flora for 8%, water bodies for 3%, wetlands for 2%, and artificial areas (urbanized) for 4% ^[35].

GRAPH 43- LAND USE IN 1990, 2000, 2006 AND 2012 (%)



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

7.2- Misuse of Agricultural Areas



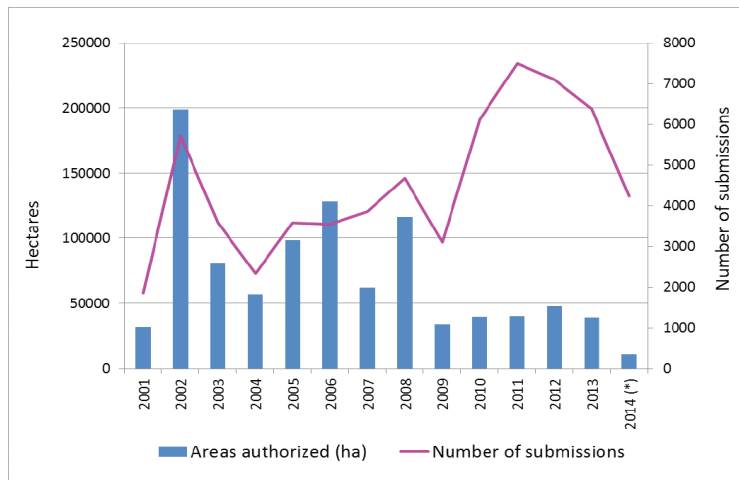
This is a pressure Indicator. Increasing population, urbanization and industrialization poses pressure on agricultural land and.

In the 2001-2013 period, a total of 974,282 hectares of agricultural land was allowed to be used for non-agricultural activity in Turkey.

For the first half of 2014, 4,231 applications have been made for permitting non-agricultural use of totally 27,775 ha of land. Of this, 10,938 ha were permitted, while applications for 16,837 ha were denied permission. Easements were issued for 2,148 ha ^[36].

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 44- MISUSE OF AGRICULTURAL AREAS WITHIN THE SCOPE OF SOIL CONSERVATION AND LAND USE LAW NO 5403



Source: Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform
 (*) Data of 2014 covers the first 6 months.

7.3- Zones Under Threat of Erosion D P S I R

The indicator is a status indicator representing the areas exposed to erosion and the degree of 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.

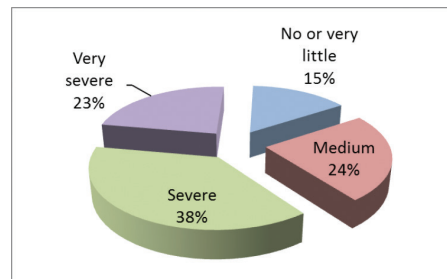
Given below is the erosion information from the Digital Soil Maps (scale 1/25,000) that have been prepared by GIS systems and classified according to the American Taxonomy, relying on field surveys of Repealed General Directorate of Rural Services (soil survey and mapping data 1982-1984).

TABLE 25- AREAS THAT WIND AND WATER EROSION OCCUR AND THEIR DEGREES

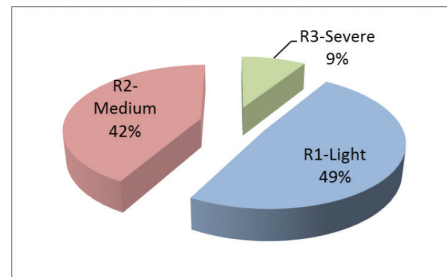
	MAGNITUDE OF EROSION	AREA (ha)
Water Erosion	1-None to slight	10,930,800
	2-Intermediate	17,754,275
	3-Severe	28,410,874
	4-Splitting (Very severe)	16,856,271
Wind Erosion	R1-Light	233,730
	R2-Medium	198,720
	R3-Severe	42,020

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

GRAPH 45- WATER EROSION



GRAPH 46- WIND EROSION



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

8.1- Total Number of Species, Endangered Species, Endemism Rate (%)



This is an impact indicator. Impact of human activities is 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 Angiosperm 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 nearly 34%.

Among the seedless plants, most renowned plant group is the ferns (Pteridophytes). The number of bostfern in species and subspecies in Turkey are 101 and only 3 of them are endemic ^[38].

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 26- 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	Endangered and Rare 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

TABLE 27- 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	~10000	~3,000	-	-
Hemiptera	~1400	~200	-	-
Homoptera	~1500	~200	-	-

Source: National biodiversity strategy and action plan 2007

Turkey is also rich and interesting for fauna, regarding 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/subspecies of 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 has been reported that the Mediterranean seal (*monachus monachus*) has not been seen in the Black Sea since 1994 ^[39].

Numbers of bio-smuggling cases recorded between 2007 and 2014 within the combat against bio-smuggling is as follows

TABLE 28- NUMBER OF BIO-SMUGGLING CASES RECORDED (2007-2014)

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

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

8.2- Number of Non-indigenous 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 470 in 2015 ^[40].

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 ^[39].

In the inland waters, 25 invasive alien species have been identified as of 2014. ^[40].

8.3- Designated Protected Areas



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

As of 2014, total areas protected by Ministry of Forestry and Water Affairs and Ministry of Environment and Urbanization General Directorate for Preservation of Natural Heritage is summed to 8.6% 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 10.2% in 2013 to 8.6% in 2014, mainly because a registry procedure has been introduced for the wetlands by the By-Law on Wetlands.

Globally, protected areas were about 13% of the total world surface area in October 2010 ^[41].

TABLE 29- STATUSES AND SPACE DISTRIBUTION OF AREAS UNDER PROTECTION IN TURKEY

YEARS	2013		2014	
The Ministry of Forestry and Water Affairs, Areas under Protection	Number (Quantity)	Area (ha)	Number (Quantity)	Area (ha)
National Park	40	848,119	39	814,762
Nature Park	189	89,832	201	96,963
Nature Monument (1)	112	6,678	112	6,683
Nature Conservation Area (1)	31	63,694	31	64,208
Wildlife Conservation Area	80	1,191,340	81	1,192,794
Wetlands (2)	121	1,735,495		
Ramsar Areas (2)	14	184,487	14	184,487
Protection Forests	55	251,409	55	250,317
Gene Conservation Forests	258	37,098	276	40,014
Seed Stands	347	46,106	341	45,232
Seed Orchard	178	1,313	176	1,328
Honey Forest	184	24,309	227	30,140
City Forest	126	11,867	127	9,946
SUBTOTAL	1,735	4,491,747	1,680	2,736,874
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	3,024	8,273,612	4,126	6,969,479
Ratio of protected areas in the country's total surface area (%) (3)		10.2%		8.6%

Sources: For areas protected by Ministry of Forestry and Water Affairs:

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

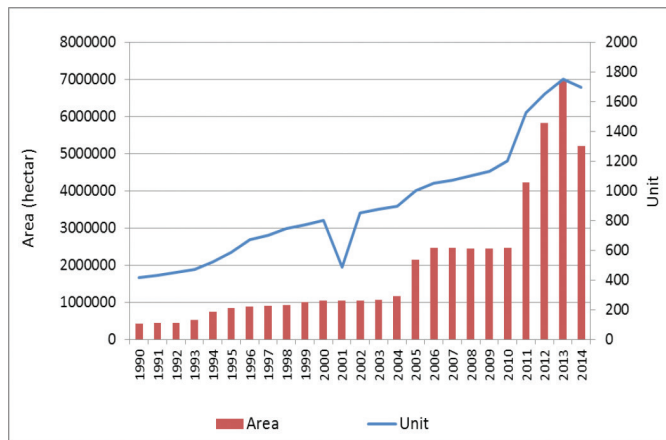
Year 2014 special protection areas and natural sites: General Directorate for Preservation of Natural Heritage

Notes: (1) Because of the border change in Nature Conservation Area and Nature Monument, changes have occurred in area size.

(2) Registry procedure has been introduced for the wetlands by an amendment in the By-Law on Wetlands. According to the By-Law on Wetlands (Official Journal dated 4 Nisan 2014 and no. 28962), there are 14 registered RAMSAR sites as of December 2014.

(3) Surface area for Turkey refers to topographic surface area, which is 814,578 km².

GRAPH 47- ANNUAL PROTECTED AREAS (EXCLUDING NATURAL SITES)



Source: Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Parks <http://www.milliparklar.gov.tr/Anasayfa/istatistik.aspx?sflang=tr>

Notes:

- 1) Natural Sites are not included in the data.
- 2) Registry procedure has been introduced for the wetlands by the By-Law on Wetlands.

8.4- Length Of Protected Coastal Zones



It's a response indicator.

Coastal zones are more affected by human activities and climate change. Objective is to mitigate the impact and protect biological diversity.

The total coastal length of Turkey is 8592 km and 1853.3 km (22%) of it is under protection. ^[42].

TABLE 30- LENGTH OF PROTECTED COASTAL ZONES INTURKEY

2002	2012	2013	2014
1775 km	1853 km	1855.3 km	1855.3 km
20%	22%	22% (*)	22%

Source: Status Report on Nature Conservation (2002-2013), Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Park

(*) Phoenician Undersea Mountains declared as specially protected Area by decision of the Council of Ministers through identification by the Ministry of Forestry and Water Affairs in 2013 is not included in the statistics as it is an open sea area.

8.5- Wildlife Protection Activities D P S I R

This response indicator represents activities for the protection of biological diversity.

A total of 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 with the council of ministers' decision 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 bald ibis, hyena and waterfowl species are protected. In order to breed endangered wild animal species, stations where these animals are raised are established and the grown-up animals are released back to nature in appropriate living spaces.

"The monitoring, protecting and nest detection" activities on the 13 of 21 nesting beaches of the sea turtles are regularly carried out in the responsibility of the Ministry of Forestry and Water Affairs. Within the scope of CITES Convention, studies are performed for the prevention of illegal trade of wild animals ^[40].

Within the efforts all over the country in 2014, 2859 wild animals wounded or in need of care have been collected, 2109 of these have been cured, rehabilitated and relocated in the wild.

TABLE 31- WILDLIFE PROTECTION ACTIVITIES

YEARS	2012	2013	2014
The Number of Wild Mammals, Placed in the nature	63	84	148
Winged Wild Animal Placement Numbers (Partridge – Pheasant)	34,895	88,400	94,638
Number of trout stocked in waters within forest zones,	2,042,000	3,172,000	1,291,000
Total Number of Wildlife Production facilities (Partridge, Pheasant, Mammals, Bald Ibis, Trout, Mountain Gazelle)	20	21	22(*)
The number of wild animals rehabilitated and Released back to nature	921	1,643	2,109

(*) 10 breeding stations are for grouse, pheasant and trout; 12 ranges are for wildlife breeding.

TABLE 32- WILD ANIMAL RESCUE AND REHABILITATION STUDIES OVER THE YEARS

Years	Number of wild animals injured in the wild	Number of wild animals cured and relocated into the wild
2012	1348	1026
2013	2134	1643
2014	3517	2109

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

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

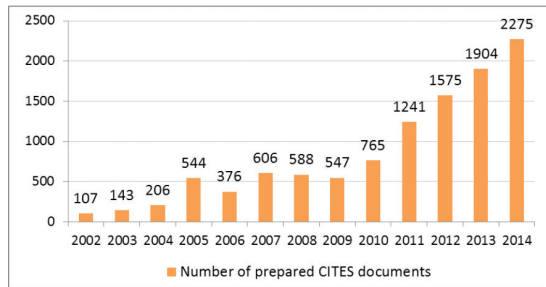


This is a response indicator related with the protection of biological diversity.

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

Turkey has been party to the CITES Convention in 1996. By-Law on CITES National Implementation has been issued in 2001 and amended in 2004. Ministry of Forestry and Water Affairs is the main authority of the Convention.

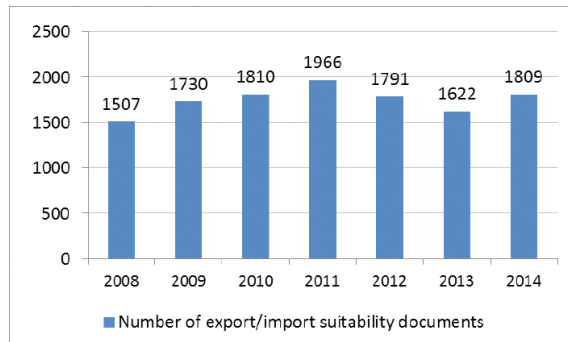
GRAPH 48- NUMBER OF PREPARED CITES DOCUMENTS OVER THE YEARS



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)

Also for the species not covered by CITES annexes, documents on the export/import suitability are being issued.

GRAPH 49- NUMBER OF EXPORT/IMPORT SUITABILITY DOCUMENTS OVER THE YEARS



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

8- BIODIVERSITY

8.7- The Distribution of the Forest Areas



This state indicator describes the cumulative size of forest areas.

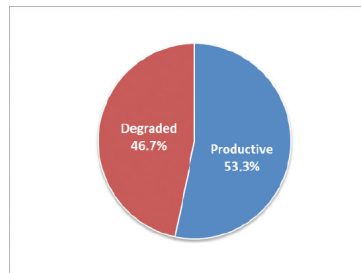
In 2012, total size of forests in Turkey was 21,678,134 hectares which constitutes 27.6% of the country's total surface area.

Out of Turkey's forested lands, 11.6 million hectares are normal (11-100% is closed), and 10.1 million hectares are distorted (0-10% is closed) areas. Thus, 53.3% of forest land is productive while 46.7% is degraded.

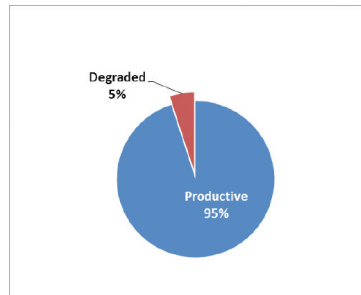
Between 1973 and 2012, the forest land in Turkey increased by approximately 1.5 million hectares. While the tree wealth was 0.9 billion m³ in 1973, this reached to 1.5 billion m³ in 2012 ^[43].

According to The Global Forest Resources Assessment 2010 Report by FAO (United Nations Food and Agriculture Organization) total forest land on Earth was 4 billion hectares. According to this, forest lands made up 31% of Earth's total surface area. In addition to this, there was 1.1 billion hectares of degraded forest area. When the period from 1990 to 2010 is analysed, it can be seen that forest areas have decreased within time.

GRAPH 50- THE DISTRIBUTION OF THE WOODLAND AREA (as a result of the inventory of 2012)

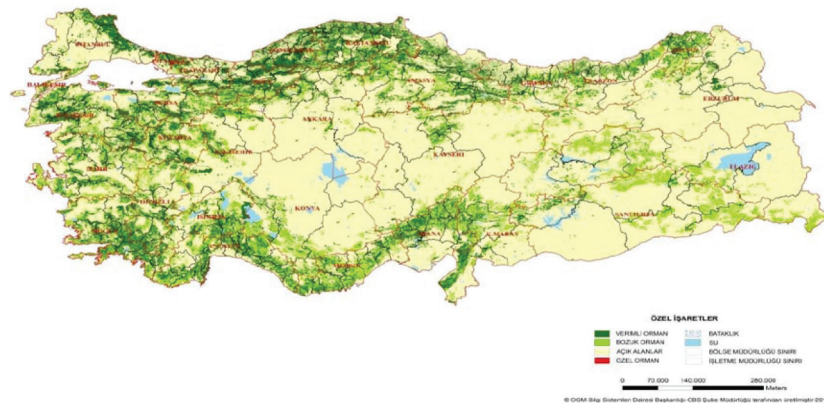


GRAPH 51- THE TREE WEALTH DISTRIBUTION (as a result of the inventory of 2012))



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

TURKEY FOREST AREAS



In The Strategic plan (2013-2017) of General Directorate of Forestry under the Ministry of Forestry and Water Affairs, it is aimed to increase the forest areas to 30% of the country's total surface area.

The term “old growth forest,” refers to the areas where most of the forest bush species which are in critical situation are in need of conservation so that they can survive. Old growth forests are expected to be at least 10% of total areas. Total “old growth forest” in Turkey is 1,002,418 ha, and it constitutes 4.6% of the total forest lands in 2012 ^[44].

TABLE 33- ANNUAL FOREST AREA

YEARS	1973	1999	2004	2008	2010	2012
Forest Area (ha)	20,199,296	20,763,247	21,188,747	21,363,215	21,537,091	21,678,134

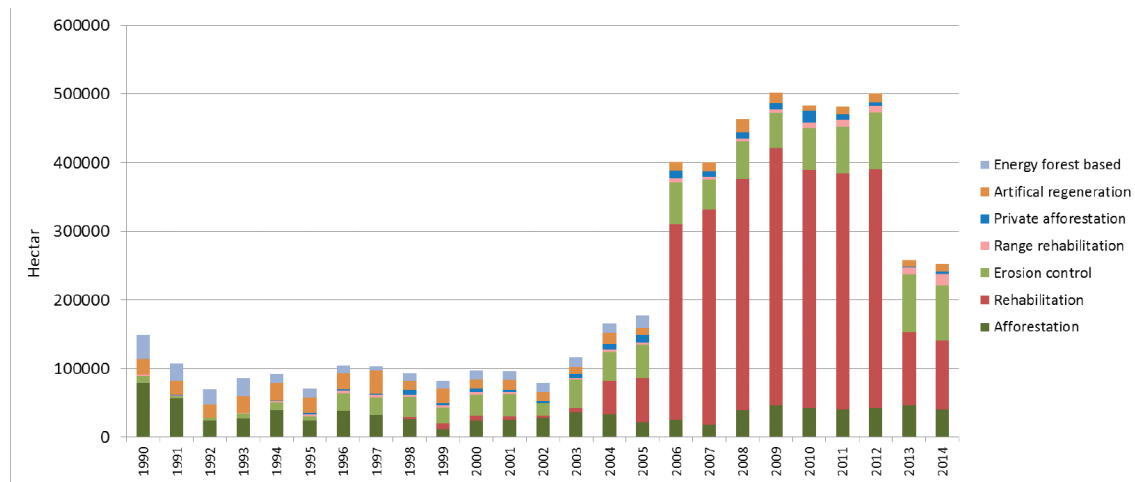
Source: Ministry of Forestry and Water Affairs, General Directorate of Forestry.

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

8- BIODIVERSITY

Half 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 2014, 40,325 ha area was afforested, 100,432 ha area was rehabilitated, in 80,517 ha area erosion was controlled, in 16,383 ha area range rehabilitation has been done, in 3,984 ha area particular planting works were done and in 10,794 ha area artificial regeneration was done as forest establishment activities.

GRAPH 52- (1990-2013) FOREST ESTABLISHMENT ACTIVITIES (ha)



Not: 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.cem.gov.tr/erozyon/Libraries/su/Y%C4%B1llara_G%C3%B6re_Orman_Tesis_%C3%87a1%C4%B1%C5%9Fmalar%C4%B1_6.sflb.ashx

8.8- Distribution of Forests by Tree Species



TABLE 34- DISTRIBUTION OF FORESTS BY TREE SPECIES

TREE TYPE GROUPS	FORESTED AREA		
	Productive	Degraded	TOTAL
	ha	ha	ha
Turkish pine	3,207,914	2,646,759	5,854,673
Oak	2,105,937	3,046,624	5,152,562
Crimean pine	2,580,193	2,112,867	4,693,060
Beech	1,621,257	340,403	1,961,660
Scots pine	751,060	728,588	1,479,648
Fir	406,989	263,400	670,390
Juniper	91,234	484,081	575,315
Cedar	220,328	243,193	463,521
Spruce	230,212	104,260	334,472
Alder	99,984	41,134	141,119
Chestnut	75,249	35,795	111,044
Stone pine	60,889	28,139	89,028
Hornbeam	15,235	4,727	19,962
Lime tree	9,577	1,946	11,523
Ash tree	8,495	948	9,444
Poplar	1,871	4,676	6,547
Eucalyptus	2,398	130	2,528
Other species	69,846	31,796	101,641
TOTAL	11,558,668	10,119,466	21,678,134

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

Diversity of tree species is a positive indicator of biodiversity. By 2012, a total of 27 percent of our forest areas consists of Turkish pine, 23.8% oak and 21.6% Crimean pine.

8.9- Functional Forestry

Today, forests are planned with ecosystem-based functional planning approach on multi-beneficial basis. According to the data of this plan, 62.8% the forests has economical, 31.9% has ecological and 5.3% has social and cultural functions.

TABLE 35- THE DISTRIBUTION OF THE PRIMARY FUNCTIONS OF THE FORESTS

MAIN FUNCTIONS	FORESTED AREA		
	Productive	Degraded	TOTAL
	ha	ha	ha
1- Economic Function	7,941,865	5,679,694	13,621,559
2- Ecologic Function	2,911,614	4,000,810	6,912,424
3- Social and Cultural Function	705,189	438,962	1,144,151
TOTAL	11,558,668	10,119,466	21,678,134

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

9- INFRASTRUCTURE AND TRANSPORTATION

9.1- Highway - Railway Network

The road network intensity gives 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.

There were 65 airports in Turkey in 2014. 53 airports were used for active passenger transportation. There were 198 harbours/ dockages/ marinas / pipeline facilities with processing permit and 180 of them were opened to international traffic. The length of highways was 65,909 km, the railway network was 12,485 km in length in 2014.

TABLE 36- HIGHWAY AND RAILWAY NETWORKS BY YEARS

YEARS	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Highway Network Length (km)	63,244	63,476	63,606	63,672	63,820	63,945	64,255	64,865	65,166	65,491	65,740	65,909
Railway Network Length (km)	10,959	10,968	10,973	10,984	10,991	11,005	11,405	11,940	12,000	12,008	12,097	12,485

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 2013 data, there was 90 km highway and the 13 km railway per population of 100,000. In the EU 28 countries, these figures are respectively, 380 km and 44 km in average. Considering the surface area, there was 83 km highway and 12 km railway per square 1000 km in Turkey. In the EU 28 countries, these figures were 422 km and 50 km respectively ^[46].

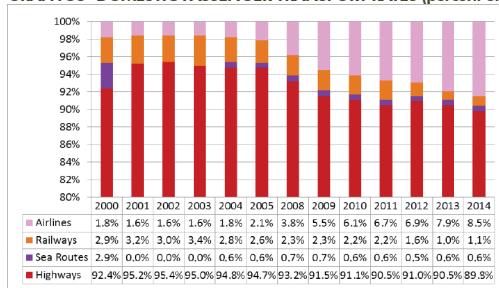
It is estimated that highway network will have reached to 70,000 km and railway network to 30,000 km in length by 2023 ^[47]. Therefore, It is estimated that highway network will have reached 86 km and railway network 37 km per 1000 km².

9.2- Amount of Passengers and Freight Carried by Transportation Types D P S I R

This indicator is a driving force indicator and it takes part on transport related environmental impacts.

In 2000 domestic passenger transportation, the share of the airlines was 1.8% which rose to 8.5% in 2014, whereas in the same period, the proportion of the railway transportation was reduced from 2.9% to 1.1%, maritime transportation from 2.9% to 0.6% and the proportion of highway transportation was reduced from 92.4% to 89.8%.

GRAPH 53- DOMESTIC PASSENGER TRANSPORT RATES (percent on passenger-km)*



Sources: For 2014 year data; Ministry of Transport, Maritime Affairs and Communications.

For more data; Statistics of Highway Transportation (2013). <http://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Yayinlar/YayinPdf/KarayoluUlasimIstatistikleri2013.pdf>

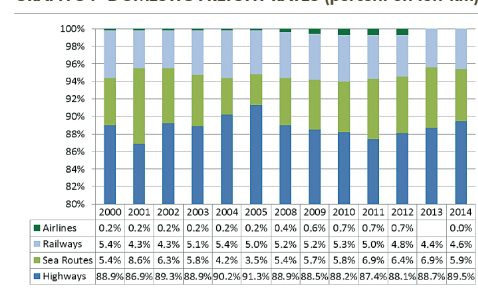
Note: the source of the data related to passenger and freight by airline transportation in 2008, 2009 and 2010 and freight by airline transportation in 2011 and 2012 by ICAO (International Civil Aviation Organization). 2013 Airway Freight transportation values are not included. * Passenger/Km: Unit of 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.

Considering the domestic freight transportation it seems that the highways are the primary option. In 2014, shares of railway and airlines transportation were reduced, whereas the road and maritime transportation slightly increased in comparison to 2000.

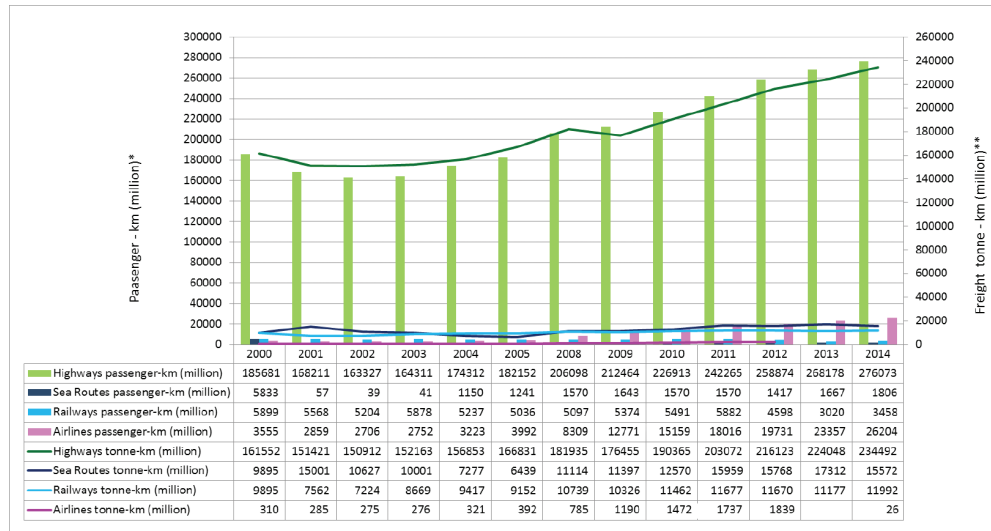
It is targeted for domestic passenger transportation share (as a passenger /km) to be 72% by road, 10% by railway, 14% by airline and 4% by maritime at the end of 2023. Moreover, it is targeted for domestic freight transport share (as ton/km) 60% by road, 15% by railway, 1% by airline, 10% by maritime and 14% by pipeline ^[47].

GRAPH 54- DOMESTIC FREIGHT RATES (percent on ton-km)**



9- INFRASTRUCTURE AND TRANSPORTATION

GRAPH 55- DOMESTIC TRANSPORTATION OF FREIGHT AND PASSENGER ACCORDING TO TRANSPORT PATHS



Sources: For 2014 year data; Ministry of Transport, Maritime Affairs and Communications.

For more data; Statistics of Highway Transportation (2013). <http://www.kgm.gov.tr/SiteCollectionDocuments/KGMdocuments/Yayinlar/YayinPdf/KarayoluUlasimIstatistikleri2013.pdf>

Note: the source of the data related to passenger and freight by airline transportation in 2008, 2009 and 2010 and freight by airline transportation in 2011 and 2012 by ICAO (International Civil Aviation Organization).

2013 Airway Freight transportation values are not included.

* 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.

9.3- Transport Emissions of Greenhouse Gases



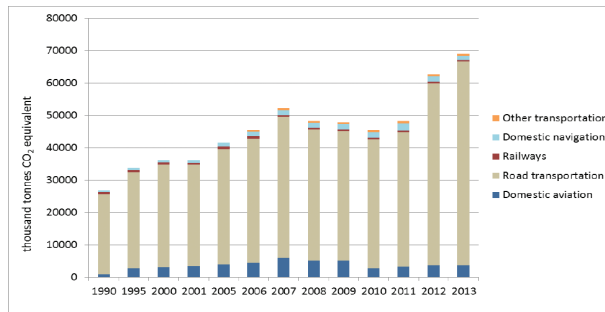
This indicator is a pressure indicator. Contribution of transport to climate change and the distribution of this contribution according to modes, are important for the monitoring and control of emissions.

Turkey's total greenhouse gas emissions are 459,102.3 thousand tonnes CO₂ equivalent, from which 69,040.6 thousand tonnes of CO₂ equivalent (15 %) are transport related emissions according to TÜRKSTAT's greenhouse gas emissions inventory data in 2013. The share of transport related emissions in total greenhouse gas emissions was about 12.3 % in 1990.

According to the TÜRKSTAT 2013 greenhouse gas emission inventory data, 91% of CO₂ emission was originated from road transportation, 5.5% from domestic aviation, 1.8% from domestic navigation, 0.7% from railways and 1% from other transportation modes.

Transport emissions increased continuously between 1990 and 2007 and have decreased in the last five years. In 2012, CO₂ emissions from transport had increased by 14.1% compared to 1990 and accounted for 19.7% of total EU-28 GHG emissions^[48].

GRAPH 56- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT



Source: TÜRKSTAT

CO₂ emissions from the road transportation in Europe as well as in our country, is the main category accounting for more than 90% of the total emissions from the transport sector (excluding emissions from international aviation and shipping)^[48].

TABLE 37- GREENHOUSE GAS EMISSIONS ACCORDING TO TYPE OF TRANSPORT

(thousand tonnes CO₂ equivalent)

YEARS	1990	1995	2000	2001	2005	2006	2007	2008	2009	2010	2011	2012	2013
Transport	26841,14	33886,74	36139,93	36132,77	41571,90	45410,30	52224,25	48242,35	47860,88	45494,60	48250,16	62711,77	69040,64
Domestic aviation	922,93	2775,25	3098,59	3358,36	4088,97	4511,79	6019,39	5217,63	5149,24	2862,12	3316,44	3723,22	3754,39
Road transportation	24683,10	29612,69	31705,73	31388,37	35426,45	38272,48	43580,56	40422,79	40044,82	39719,60	41447,17	56148,26	62857,21
Railways	727,50	774,09	713,31	586,97	757,72	761,28	469,91	499,14	484,33	516,82	532,37	492,65	505,14
Domestic navigation	507,60	724,70	622,30	799,07	1298,76	1463,21	1597,52	1542,99	1634,41	1683,84	2230,24	1647,15	1231,76
Other transportation	0,00	0,00	0,00	0,00	0,00	401,53	556,88	559,81	548,08	712,22	723,94	700,49	692,12

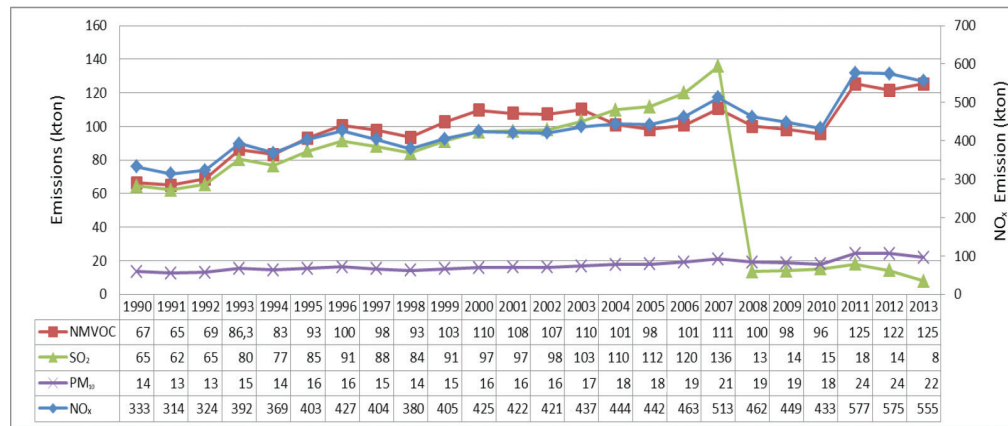
9- INFRASTRUCTURE AND TRANSPORTATION

9.4- Transport Emissions D P S I R

Air pollutant emissions, is a significant pressure indicator affecting air pollution.

The transport is an important sector in the National Air Emission Inventory. The emissions originated from road transport, navigation, aviation and railways are separately calculated. The significant decrease in SO₂ emissions occurred in 2008 due to the reduction of sulphur content in liquid fuels by legal obligation.

GRAPH 57- TRANSPORT EMISSIONS (1990-2013)



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

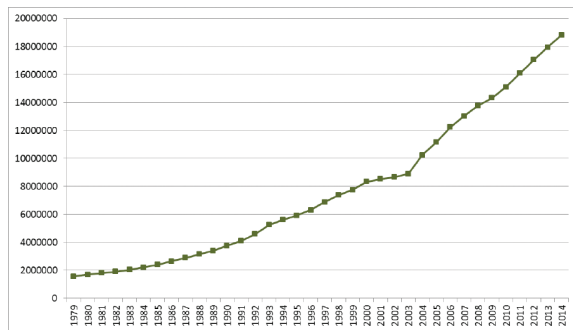
9.5- Number of the Road Motor Vehicles in Use



Emissions resulted 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 18,828,721 in 2014. When types of road motor vehicles share between 1979 and 2014 are compared, the increase in the rates of automobiles, vans and motorcycles is remarkable. Automobiles constitute 52.4% of the total road motor vehicles in 2014, vans

GRAPH 58- NUMBER OF THE ROAD MOTOR VEHICLES BY YEARS (1979-2014)

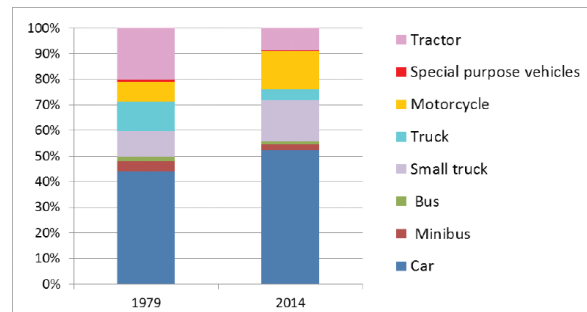


16.3%, motorcycles 15%, tractors 8.6%, trucks 4.1%, minibuses 2.3%, buses 1.1% and special purposed vehicles 0.2%.

When some members of the European Union and Turkey are compared with 2012 data; the number of cars per 1.000 people was 486 in Poland, 621 in Italy, 560 in Finland, 385 in Bulgaria, 530 in Germany, 476 in Spain and 114 in Turkey ^[49].

Exhaust gas measurement and inspection play a significant role in reducing emission originated from Motor Vehicles. The developments in hybrid and electrical vehicle manufacturing technologies also play a significant role in solving the problem.

GRAPH 59- 1979 and 2014 DISTRIBUTION OF ROAD MOTOR VEHICLES IN TERMS OF THEIR TYPES (%)



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

10.1- Primary Energy Consumption by

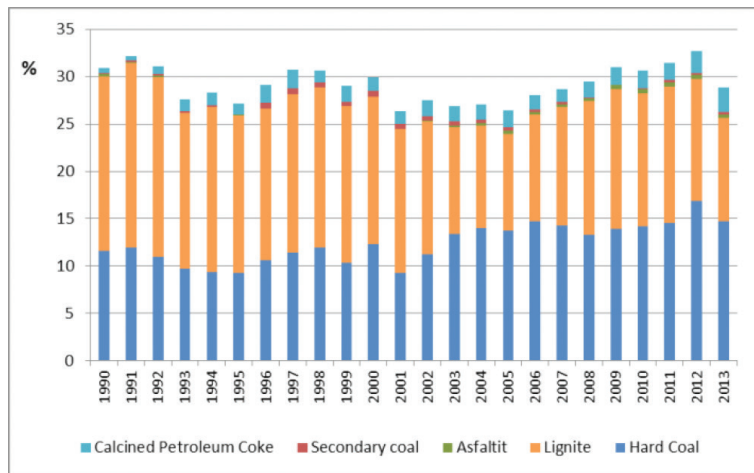
Fuel Type D P S I R

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 applied magnitude of the precautions taken to reduce pollution.

In 1990, a total amount of primary energy consumption rate reached up to 30.89% of total consumption and 11.6% of it is by mineral coal, 18.43% by lignite, 0.23% by asphaltite, 0.13% by coke and 0.5% by petroleum coke. In 2013, a total amount of the primary energy consumption rate increased to 28.83% with the following rates; 14.71% mineral coal, 10.96% lignite, 0.35% asphaltite, 0.23% coke and 2.58% petroleum coke ^[50].

GRAPH 60- PRIMER ENERGY CONSUMPTION ACCORDING TO TYPE OF FUEL (%)



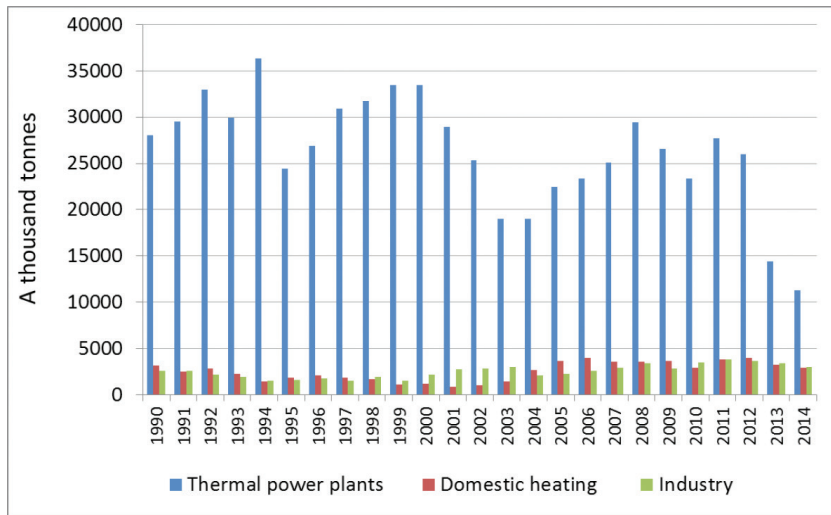
Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs Note: Total petrol goods, natural gas and renewable energy sources are not included. It is the ratio of the total domestic energy consumption to the domestic solid fuel sourced energy consumption.

The share of coal and lignite in EU28 primary energy consumption decreased, from 28.9% in 1990 to 18.5% in 2012 ^[51].

Consumption of lignite by the sectors:

In 1990, 33,771,000 tons of lignite were sold in Turkey. 83% of this amount was consumed by thermal power plants while 9% for domestic heating and 8% were consumed by the industry. In 2014, 17,229,000 tons were sold; 65.6% by thermal power plants, 16.9% by domestic heating and 17.6% in the industry. Lignite sales in 2014, were 49% lower compared to 1990 and 22.6% lower compared to the sales in 2013.

GRAPH 61- LIGNITE SALES BY SECTORS OVER THE YEARS



Source: General Directorate for coal installations of Turkey

10.2- Primary Energy Consumption per Capita D P S I R

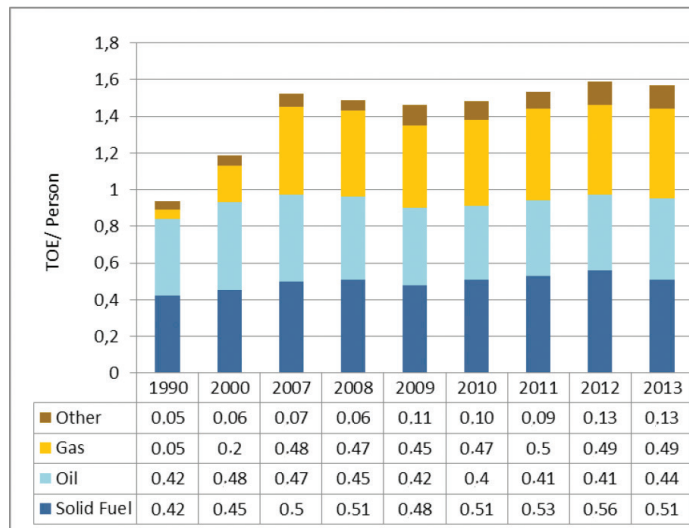
This driving force indicator shows energy consumption levels.

Primary energy consumption in Turkey was 0.94 TOE (Tonnes of Oil Equivalent) per capita in 1990 and 1.57 TOE in 2013. On average, each person in the European Environment Agency (EEA) countries used 2.1 tonnes of oil equivalent to meet their energy needs in 2012 ^[52].

Out of the mentioned 1.57 TOE per capita primary energy consumption in 2013, 32.5% was from solid fuel, 31.2% from natural gas, 28% from oil, 8.2% from other sources (hydro, geothermal, biomass, wind power, geo. heat and other heat, solar).

Through the years it is observed that the demand for solid-fuel consumption has increased slightly while the demand for petroleum consumption has not changed much. However, the amount of the natural gas consumption per capita has significantly increased. In 1990, gas consumption per capita per year was 0.05 TOE which became 0.49 TOE in 2013.

GRAPH 62- PRIMARY ENERGY CONSUMPTION PER CAPITA THROUGH THE YEARS (TOE/PERSON)



Note: Other 'also refers to; the total of hydraulic, geothermal, biomass, wind power, geo. Heat, other heat and solar.

Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

10.3- Primary Energy Consumption by Sectors

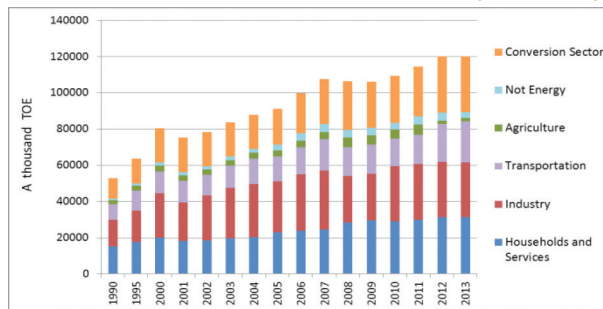


This driving force indicator is related to the energy consumption. Turkey's total primary energy consumption was 120,290 thousand TOE in 2013. Increase in 2013 was 127% compared to 1990, 32% compared to 2005 and 0.16% compared to 2012. Between 2005 and 2012, primary energy consumption in the EU 28 decreased by 7.3% particularly due to the economic recession and energy efficiency improvements ^[51].

Considering the primary energy consumption in 2013, it reveals that households-services (26.11%) and energy conversion sector (25.66%) had the highest consumption rate. With the increasing demand for electricity, industry sector (25.05%) was the 3rd and the transportation sector (18.93%) was the 4th in the energy consumption. This is followed by non-energy and agriculture with 1.36% and 2.89%.

According to the data of TURKSTAT, import dependence was 67.6% in 2000 and it became 73.15% in 2013.

GRAPH 63- PRIMARY ENERGY CONSUMPTION BY SECTORS (Thousand TOE)



Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

As road transportation is a dominant preference for both passenger and freight transportation in Turkey, most of the energy used in transportation sector was consumed in road transportation. It can be concluded that climate conditions in Turkey are the main factor for excessive energy demand in residential sector.

TABLE 38- PRIMARY ENERGY CONSUMPTION BY SECTORS

(Thousand TOE)

YEARS	1990	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total (Thousand TOE)	52,987	63,678	80,500	75,402	78,331	83,826	87,819	91,075	99,824	107,627	106,338	106,139	109,266	114,480	120,093	120,290
Households and Services	15,358	17,596	20,058	18,122	18,463	19,634	20,252	22,923	23,860	24,623	28,323	29,466	28,868	29,974	31,509	31,402
Industry	14,542	17,372	24,501	21,324	24,782	27,777	29,358	28,084	30,996	32,466	25,677	25,966	30,628	30,830	30,368	30,137
Transportation	8,723	11,066	12,008	12,000	11,405	12,395	13,907	13,849	14,994	17,284	16,044	15,916	15,328	15,950	20,796	22,772
Agriculture	1,956	2,555	3,073	2,964	3,030	3,086	3,314	3,359	3,610	3,945	5,174	5,073	5,089	5,756	1,944	1,633
Non Energy	1,031	1,386	1,915	1,638	1,806	2,098	2,174	3,296	4,163	4,430	4,341	4,153	3,459	4,442	4,390	3,479
Conversion Sector	11,377	13,703	18,945	19,354	18,845	18,836	18,814	19,564	22,201	24,879	26,779	25,565	25,894	27,528	31,086	30,866

Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

10.4- Final Energy Consumption by Sectors



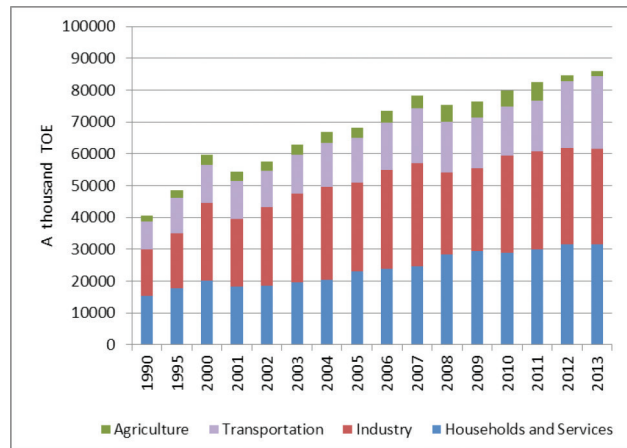
Final energy consumption by sector is a driving force indicator. The trend in final energy consumption by fuel type and by sector provides a broad indication of progress in reducing final energy consumption and associated environmental impacts by the different end-use sectors (transport, industry, services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

The total final energy consumption in Turkey was 85,944,000 TOE in 2013, with an increase of 111.8% compared to 1990, 25.99% compared to 2005 and 1.57% compared to 2012. Over the period 1990 and 2012 final energy consumption in EU28 increased by 2.3%. Between 2005 and 2012 the final energy consumption in the EU28 decreased by 7.1%^[53].

Looking at the amount of final energy consumption in 2013, it reveals that household consumption and services (36.54%) had the highest consumption rate. With the increasing demand for electricity, industry sector (35.07%) was the 2nd, while the transport sector (26.5%) and agriculture (1.9%) followed.

For comparison with the EU countries, in 2012 highest share in energy consumption was by household consumption and services with 39.64% (households 26.18%, services 13.46%); followed by transport (31.84%), industry (25.6%) and agriculture-fisheries-forestry (totally 2.91%) in the EU28 member states.^[53]

GRAPH 64- FINAL ENERGY CONSUMPTION BY SECTORS (Thousand TOE)

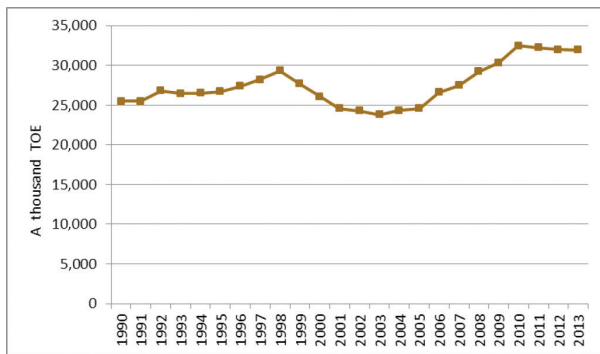


Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

10.5- Primary Energy Production D P S I R

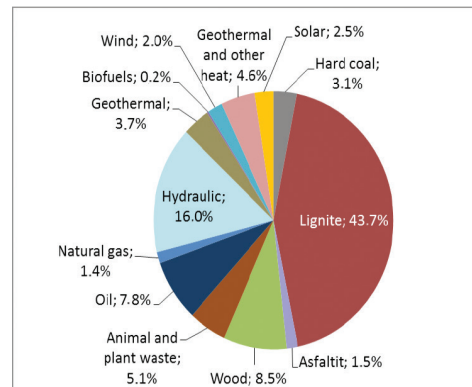
This indicator is a driving force indicator. While total primary energy produced in 1990 was 25,478 thousand TOE, it became 31,944 thousand TOE in 2013. From 1990 to 2013, the primary energy rate has been increased by 25.38%.

GRAPH 65- PRODUCED PRIMARY ENERGY BY THE YEARS (Thousand TOE)



Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

GRAPH 66- DISTRIBUTION OF RESOURCES BY PRIMARY ENERGY PRODUCTION (%), IN 2013



Source: <http://www.enerji.gov.tr/tr-TR/EIGM-Raporlari>

10- ENERGY

10.6- Share of Renewable Energy Sources in Gross Final Energy Consumption D P S I R

This response indicator displays the ratio of the energy produced by the renewable sources.

Renewable energy sources are environment-friendly and have much lower CO₂ 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 contribution of renewables to total energy consumption was approximately 18% in 1990, in parallel with increasing energy demand, this figure decreased to almost 11% in 2013.

TABLE 39- SHARE OF RENEWABLE ENERGY IN GROSS FINAL ENERGY CONSUMPTION (%)

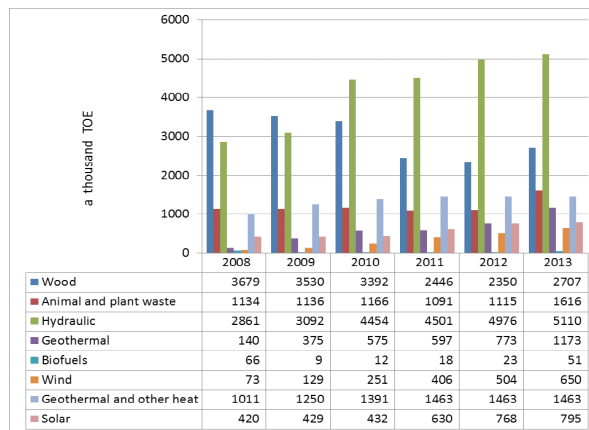
YEARS	2000	2005	2008	2009	2010	2011	2012	2013
Rate (%)	12.5	11	9	9	11	10	10	11

Sources: 1) For 2000-2012 years data TURKSTAT "Sustainable Development Indicators, 2012-2013" Press Releases

2) 2013 Ministry of Energy and Natural Resources were calculated from data

While the primary energy supply value is 120,290 thousands TOE, domestic gross energy production has reached to the value of 31,944 thousands TOE at the end of 2013. Renewable resources share is 43%, equal to 13,565 thousands TOE, within the domestic gross energy production.

GRAPH 67- GROSS ENERGY PRODUCTION FROM THE RENEWABLE ENERGY SOURCES IN TURKEY (Thousand TOE)



Source: Ministry of Energy and Natural Resources, General Directorate of Energy Affairs

10.7- Share of Renewable Electricity in Gross Electricity Consumption D P S I R

This response indicator is obtained by the calculation of 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).

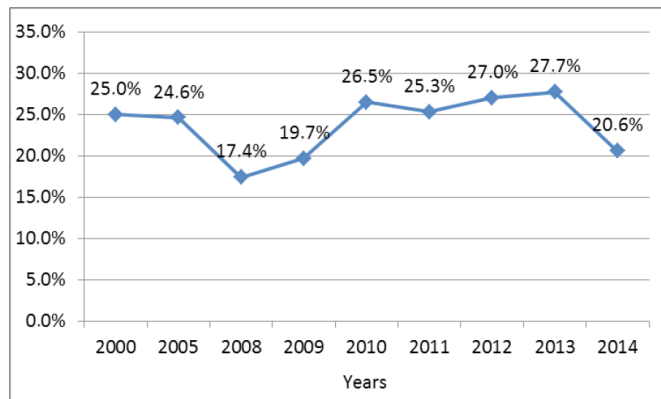
As of the end of 2014, Turkey's gross electricity consumption was 257,220.1 GWh. Electricity produced from renewable sources (52,961.4 GWh) was 20.6% of gross electricity consumption.

TABLE 40- GROSS PRODUCTION VALUES BY SOURCES IN 2014 (GWh)

SOURCES	PRODUCTION (GWh)
GEOTHERMAL	2,364.0
OTHER+WASTE	1,432.6
HYDROLIC	40,644.7
WIND	8,520.1
TOTAL	52,961.4

Source: Turkish Electricity Transmission Company (TEİAŞ), 2014 Production-Consumption Values
<http://www.teias.gov.tr/YukTevziRaporlari.aspx>

GRAPH 68- SHARE OF RENEWABLE ELECTRICITY IN GROSS ELECTRICITY CONSUMPTION (%)



Sources: 1) For 2000-2012 years data TURKSTAT "Sustainable Development Indicators, 2012-2013" Press Releases
 2) 2013 and 2014 data are calculated from data Turkish Electricity Transmission Company.

According to European Statistical Office (EUROSTAT), In 2013, the share of renewable electricity in gross electricity consumption was 25.4% in the EU28 ^[54].

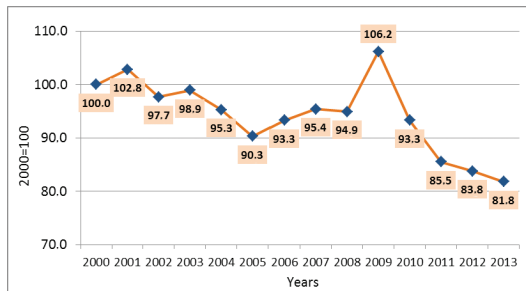
10.8- Primary and Final Energy Intensity

D P S I R / D P S I R

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

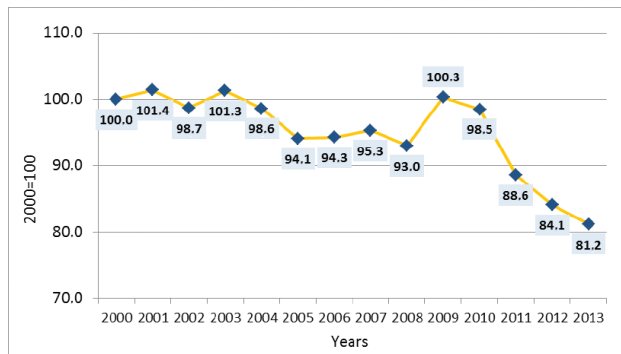
The primary energy expenditure is the indicator which calculates the energy needed to be able to create 1 unit of GDP on basis of countries and regions. The level of this indicator shows the economic structure, energy consumption structure, climate conditions and the energy efficiency rates of the countries or regions. Energy Density Tendency is influenced by structural changes in economy and industry, structural changes in energy consumption, equipment used by final consumers and the efficiency of the construction.

GRAPH 69- PRIMARY ENERGY INTENSITY (climate fix)



There was a 1.5% decrease in the index of primary energy Intensity and 1.4% in the index of final energy intensity between 2000 and 2013. According to previous year, it is seen that there was a 2.3% increase in the rate of the Primary Energy Intensity index while Final Energy Intensity rate reduced by 3.4% in 2013. Compared to 2000, there was 18.2% improvement in the intensity of primary energy index and 18.8% in the intensity of final energy index ^[55].

GRAPH 70- FINAL ENERGY INTENSITY (climate fix)



Source: Ministry of Energy and Natural Resources, General Directorate of Renewable Energy.
Note: 1998 GDP Based data have been used to identify the densities.

10.9- Energy Efficiency in Buildings



This is a response indicator. When energy efficiency and savings potential of the construction sector is compared with current consumption, we can reach a rate of 50%. That 40% of the total energy is consumed in buildings clearly shows the importance of the issue.

Within the scope of the 'By-Law on Energy Efficiency in Buildings', to have an Energy Performance Certificate that determines the energy consumption class of the building is obligatory. As of the end of 2014, a total of 227,600 Energy Identity Certificates, 227,600 for new and 12,430 for present buildings have been already issued. By 2023, the Ministry targets an Energy Identity Certificate to be given to all existing and new buildings.

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 2014, 66 companies have been authorized. It is aimed to reduce the fuel consumption by average of 30% without damaging the comfort conditions in these buildings.

GRAPH 71- NUMBER OF BUILDINGS THAT WERE ISSUED ENERGY IDENTITY CERTIFICATE OVER THE YEARS

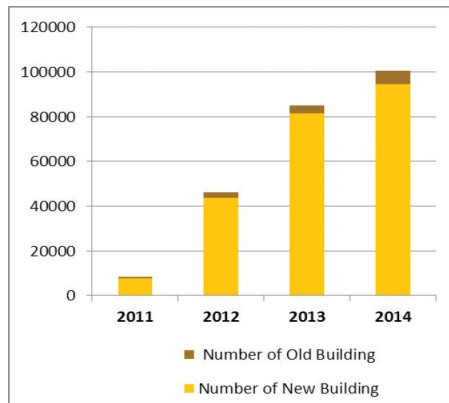


TABLE 41- NUMBER OF BUILDINGS THAT WERE ISSUED ENERGY IDENTITY CERTIFICATE OVER THE YEARS

YEARS	2011	2012	2013	2014
New Building	7,805	43,834	81,375	94,586
Old Building	400	2,300	3,793	5,937
TOTAL	8,205	46,134	85,168	100,523

Source: <http://www.csb.gov.tr/gm/mesleki hizmetler/index.php?Sayfa=sayfa&Tur=webmenu&Id=9690>

11- AGRICULTURE

11.1- Agricultural Land Per Capita D P S I R

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

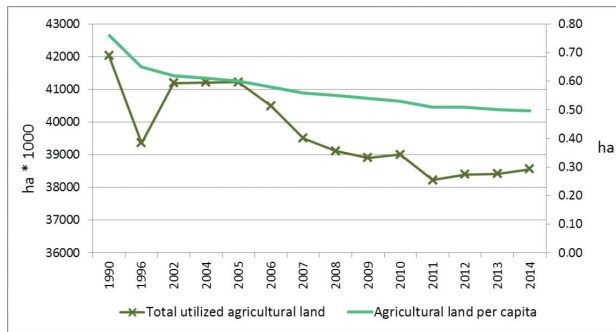
According to the temporary data of TURKSTAT, in 2014, total utilized agricultural land was approximately 38,560 thousand hectares (this includes land under permanent meadows and pastures). Of the total agricultural land, 53.7% was arable areas, 8.4% was permanent crops areas (perennial fruits), and 37.9% was permanent meadows and pastures areas.

Due to the increase in Turkish population, total agricultural area decreased, which resulted in a decline in the amount of agricultural land per capita. From 1990 to 2014, Turkish population rose by 37.6% while agricultural land per capita decreased by 34.7%.

In 1990, agricultural land per capita was 0.76 hectares, this number decreased to 0.50 hectares by 2014. As of 2014, when total arable land is considered (23,943,053 hectares) the area per capita was 0.31.

According to Food and Agriculture Organization of the United Nations (FAO), agricultural land per capita for the world is 0.23 hectares and this number is forecasted to decrease to 0.15 hectares by the year 2050 ^[27].

GRAPH 72- AGRICULTURAL LAND PER CAPITA THROUGH THE YEARS



Sources: Ministry of Food, Agriculture and Livestock, TURKSTAT

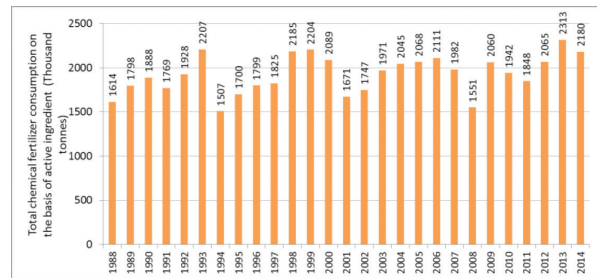
(1) For land under permanent meadows and pastures 2001 General Agricultural Censuses, for other Ministry of Food, Agriculture and Livestock

(2) Data are grouped according to Statistical Classification of Products By Activity in European Economic Community (CPA 2002).

(3) 2014 Data is not permanent.

11.2- Chemical Fertilizer Consumption D P S I R

GRAPH 73- THE CONSUMPTION OF CHEMICAL FERTILIZER ON THE BASIS OF ACTIVE INGREDIENT



Source: Ministry of Food, Agriculture and Livestock

According to 2009 data, for EU-27 countries, an approximate average fertilizer consumption was estimated as 82.5 kg/ha while that for EU-15 countries was 95 kg/ha. However, the rate of the fertilizer consumption for Belgium and Luxemburg was for 173.9 kg per hectares. This figure was 135.9% for countries such as Germany and 145.8 for Netherlands kg/ha, The lowest amount of the fertilizer usage across Europe was Bulgaria (48.7 kg/ha), Leetonia (35.1 kg/ha), Romania (33.4 kg/ha) and Portugal (29.2 kg/ha) ^[56].

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

While total chemical fertilizer consumption on the basis of active ingredient showed fluctuations between 1988 and 2014 in Turkey, it showed a general tendency to increase. Chemical fertilizer consumption on the basis of active ingredient was 1,613,692 tonnes in 1988. This number increased to 2,180,242 tonnes in 2014.

In 2014 total chemical fertilizer consumption was 68.47% nitrogen, 26.15% P_2O_5 , 5.37% K_2O , on the basis of 2,180,242 tons of active ingredient.

In Turkey, Konya has the highest chemical fertilizer consumption with 9.2% of the total consumption on the basis of active ingredient. This was followed by; Şanlıurfa (6.8%), Adana (5.9%), Diyarbakır (4.0%), Ankara (3.5%), Tekirdağ (2.7%), Edirne (2.6%), Mardin (2.6%), Hatay (2.5%) and was followed by İzmir (2.5%).

Considering that there was the 23.9 million hectares of arable land to be used chemical fertilizer in 2014; fertilizer use per each hectare (on the basis of herbal nutrients) was approximately 91.2 kg. There was an excessive use of fertilizers in certain sporadic areas and areas where secondary or tertiary products are planted. By Republic of Turkey Ministry of Food, Agriculture and Livestock villagers are supported to make soil analyses to ensure conscious fertilizer consumption.

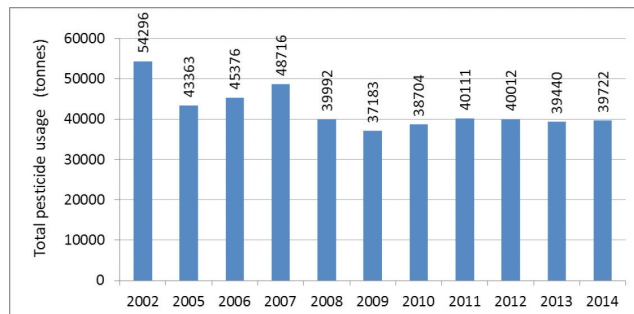
11.3- Pesticide Use D P S I R

This indicator is a pressure indicator. Between 2005 and 2014, while total usage of pesticides fluctuated, it showed a general tendency to decrease. The total pesticide usage in Turkey for 2002 was 54,296,437 kg/lt (kg or lt) and for 2005 it was 43,362,627. This number decreased to 39,721,883 kg/lt in 2014.

In 2014, highest regional pesticide use (29.94% of total pesticide use) was in Mediterranean Region in Turkey. This was followed by Aegean, Inner Anatolia and Marmara Region respectively. The use in East and Southeast Anatolian Region is only 11.17 % of the total Turkish consumption. Black Sea Region has the last place with the 3.41%. In 2014, the province which has the highest pesticide use was Antalya with 5,137,092 kg/lt (12% of the total consumption)

When the amount of pesticide use was evaluated based on groups, the largest group is composed of fungicides (fungi killer) in Turkey as well as in the world. 2014 total pesticide usage was composed of 42% of fungicides, 20% of herbicides, 19% insecticides, 3% acaricides, 0.3% rodenticides and 15.2% by others (nematocides, molluscides, and mineral oils).

GRAPH 74- TOTAL PESTICIDE USAGE AND AMOUNT OF CROP PRODUCTION



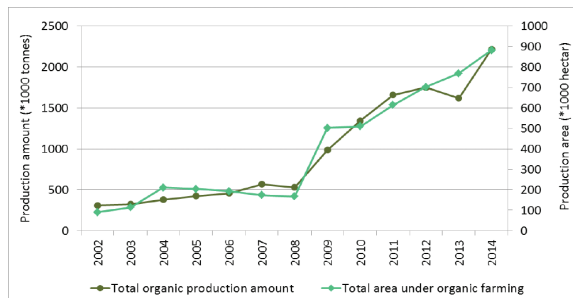
Source: Ministry of Food, Agriculture and Livestock

It is aimed to limit the pesticide usage at about yearly 40 tonnes by 2023 by the Ministry of Food, Agriculture and Livestock and to reduce the ratio of pesticides used in plant protection products to 85% by 2018, and 75% by 2023. Sustainable agriculture that accepts humans and environment as part of the same system must be utilised. With this goal in mind, Integrated Protection Management (IPM) system was improved ^[57].

11.4- Area Under Organic Farming D P S I R

Organic farming is an environmentally friendly farming practice and it is a response indicator. In 1985 the organic agriculture applications started with 8 types of crops due to the demand in exporting and this number reached to 208 in 2014 as there was an increase in the demand. In 2002 12,428 producers planted 89,827 hectares and harvested 310,125 tonnes of organic product. In 2014 this amount reached to 2,217,055 tonnes and 71,472 farmers, planted 883,118 hectares. Total agricultural land applied organic farming including wild collection is 883,118

GRAPH 75- TOTAL AREA UNDER ORGANIC FARMING AND PRODUCTION AMOUNT BY THE YEARS



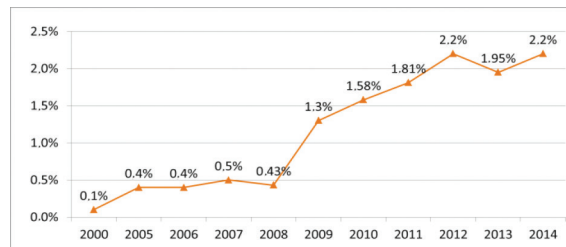
Source: TURKSTAT Note (1) Transition period included. (2) Wild production areas are included.

ha Total Organic Production Area, 532,879 ha area is culture farming.

In 2014, compared to the previous year, while areas dedicated to organic agriculture increased by 14.8%, amount of production decreased by 36.8%.

For 2014, the share of organic farming in total agriculture land is 2.2%. It is aimed to increase this number to 3% by 2015, and 5% by 2023. In 2012, 1% of the world's total agricultural lands and 7.8% of EU countries' total agricultural lands was dedicated to organic agriculture ^[56].

GRAPH 76- THE SHARE ORGANIC FARMING IN TOTAL AGRICULTURE LAND (%)



Source: Ministry of Food, Agriculture and Livestock

11.5- Good Agricultural Practices



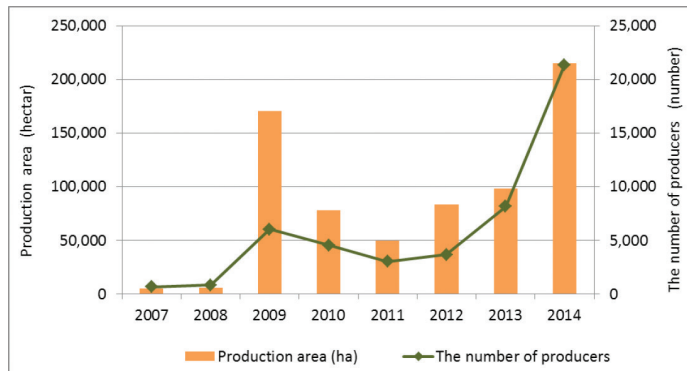
The aim of Good Agricultural Practices is to avoid any remains of the pesticides on the product damaging human health, and to protect environment, soil, water and living creatures, to be careful about the welfare and health of animals and to produce plants in accordance with the standards. Therefore, production has to be traced from the soil to the dining table, and every step has to be recorded. Pesticide, fertilizer and hormone should be used according to the results of analyses and be kept under control. The last product is certificated by the report given by the control institution. In this regard, the indicator is a response indicator.

In Turkey, Good Agricultural Practices Certificate started to be given in 2007. In the same year, 651 producers from 18 provinces harvested 5,360 hectares and in 2014 It has been reached to 4,151,661 tone production amount in 53 provinces with 21,332 producers in 214,771 hectare area.

In 2014, good agriculture producers number increased by 161%, production area increased by 118% compared to 2013, while production amount increased by 159.5%.

It is aimed to increase the number of producers by 10%, and products by 20% each year for good agricultural practice ^[56].

GRAPH 77- GOOD AGRICULTURAL PRACTICES PRODUCTION AREAS AND PRODUCER NUMBER BY THE YEARS



Source: Ministry of Food, Agriculture and Livestock

12.1- Aquaculture Production D P S I R

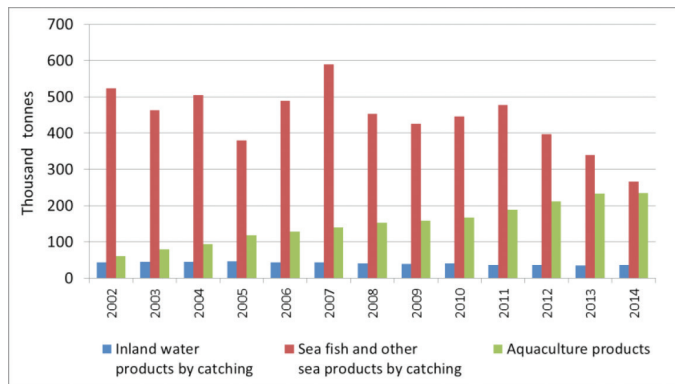
This indicator is a pressure indicator. There is 24 million ha of sea area and 1 million ha of inland water area in Turkey. Based on the TURKSTAT data; in 2014, fishery production declined to 537,345 tonnes with the rate of 11.6% in comparison with the previous year. 43% of the total amount was sea fish, 6.5% other seafood, 6.7% inland water products, 43.8% aquaculture.

In 2014, the amount of fishery products by catching decreased by 19.2% while the amount of aquaculture production increased by 0.7% compared to the previous year. The Fishery products by catching were 302,212 tonnes while the aquaculture production reached to 235,133 tonnes. Compared to the previous year, sea fish and other sea products by catching was decreased 21.5% and Inland fishery catching increased by 3%.

46% of the aquaculture production was done in inland waters and 54% in seas.

With regard to sea fishery production by catching, Eastern Black Sea Region took the 1st place with the rate of 48.6%. It is followed by Western Black Sea region with 22%, Marmara and Aegean regions with 12.6% and Mediterranean region with 4.2% respectively ^[58].

GRAPH 78- AQUACULTURE PRODUCTION DATA BY THE YEARS



Source: Ministry of Food, Agriculture and Livestock, TURKSTAT

To protect fishery sources and provide sustainability, regulations about place, time, length, kind, distance, depth, and hunting equipment related to fishery hunting are made. Activities such as monitoring of fish stocks, protection of endangered species, replenishing of the fish stocks and monitoring and mitigation of water pollution are performed ^[59].

12.2- Fishing Fleet Capacity D P S I R

Indicator is the measurement of the size and capacity of the fishing fleet that is assumed to have a pressure on fishlife and environment.

TABLE 42- FISHING FLEET, TOTAL ENGINE POWER KILOWATTS (kW)

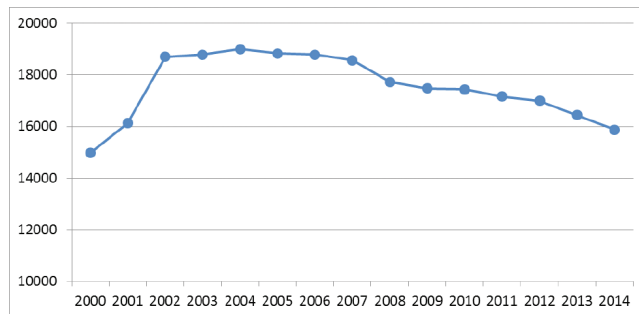
YEARS	2009	2010	2011	2012
Fishing fleet, total engine power kilowatts (kW)	1,084,081	1,147,876	1,131,940	1,125,231

Source: TURKSTAT, Sustainable Development Indicators, 2012-2013.

It is known that neither in the world nor in Turkey the amount obtained by hunting will not increase significantly ^[59]. Despite the high fishing effort, the amount of the fishery has not increased and therefore it is considered that the values about fishery production are on the upper limit ^[60].

Fishing fleet of Turkey has grown and developed regarding power, amount, technology and fishing tools until the years 2000. While in 2000 number of the licensed fishing vessels was 14,975, this increased to 18,999 in 2004, but reduced to 15,877 in 2014.

GRAPH 79- NUMBER OF FISHING VESSEL LICENSES OVER THE YEARS



Source: Ministry of Food, Agriculture and Livestock

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 ^[59].

13.1- The Number of Tourists



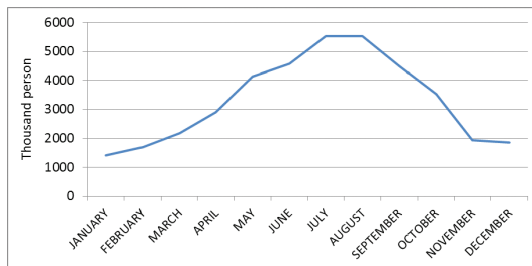
Number of visitors to Turkey within a particular time puts pressure on the environment due to extensive consumption of natural resources in that period, besides wastewater, waste, noise, etc.

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.

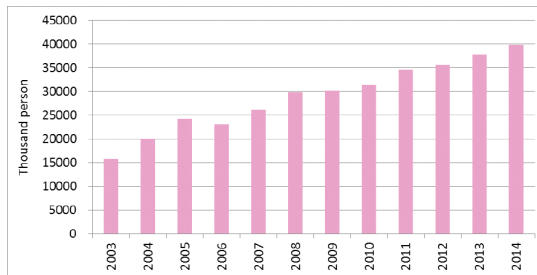
In 2003, 15,774,505 tourists visited Turkey, and this number increased to 39,811,244 in 2014. The number of tourists in 2014 compared to 2013 increased by 5.33%

When the distribution of tourists visiting Turkey by months is considered, 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 water problem.

GRAPH 80- MONTHLY DISTRIBUTION OF TOURISTS VISITING TURKEY IN 2014



GRAPH 81- 2003-2014 PERIOD NUMBER OF TOURISTS



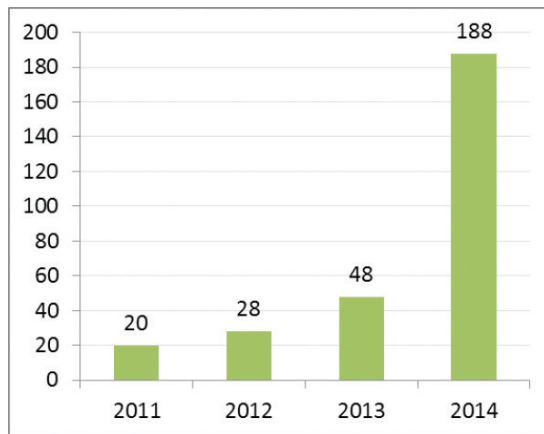
Source: Ministry of Culture and Tourism

13.2- Number of 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 environment friendly activities. Ministry of Culture and Tourism provides a partial subsidy of the electricity expenses of the certificate owners. As of the end of 2014, number of the facilities with the "Tourism Facility Certificate" was 3131 with a bed capacity of 807,316. 188 of these possess "Environment-Friendly Accommodation Facility" certificate (Green star badge).

GRAPH 82- NUMBER OF GREEN STAR CERTIFICATED ACCOMODATION FACILITIES OVER THE YEARS



Source: Ministry of Culture and Tourism

13.3- Tourist overnights and bed capacity per 100 Residents

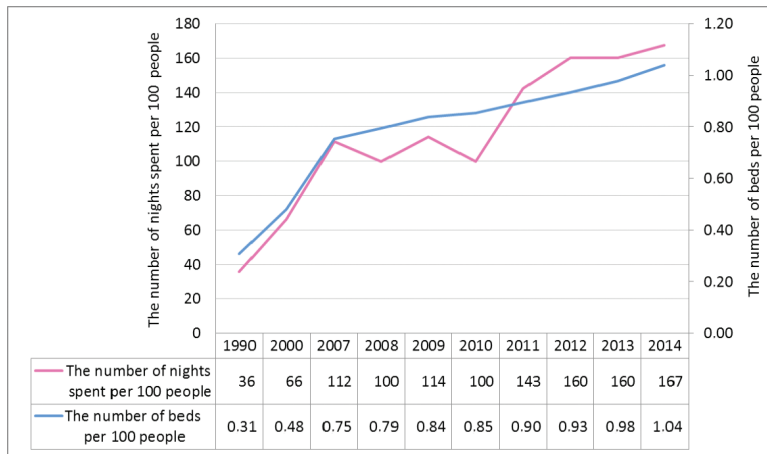


This pressure indicator is obtained by dividing the total overnight stays in the tourism facilities and the total bed capacity of the certificated tourism facilities by total population; expressed as per 100 people.

Increasing tourist number may have adverse effects on environment especially in a region within particular time period, causing serious environmental problems.

Both figures show a general increasing trend in years; while tourist overnights per 100 residents show fluctuations in some years.

GRAPH 83- TOURIST OVERNIGHTS AND BED CAPACITY PER 100 RESIDENTS



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

Source: Ministry of Culture and Tourism

13.4- Blue Flag Implementations

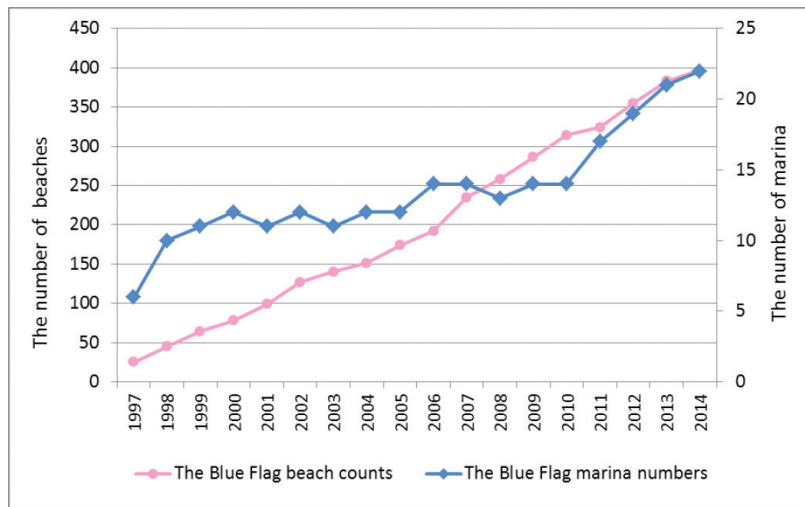


This indicator is a state indicator. Blue Flag is an international environmental award given to beaches and marinas having reached to a standard stated in the criteria. Blue Flag applications which began in 1978 in Europe and in 1993 in Turkey, aim to establish high standards in beaches and marinas.

In the period from 1997-2014, The number of Blue Flag in Turkey increased steadily and reached to 397 beaches, 22 marinas and 12 yachts in 2014.

In our country, the scope of Blue Flag Programme carried out under the coordination of Turkey Environment Education Foundation (TÜRÇEV), Our country ranks third with 397 beaches, followed Spain (573) and Greece (407) in 2014. As for marinas, Turkey ranked 7th in the World.

GRAPH 84- THE NUMBER OF BLUE FLAG BEACHES AND MARINAS BY YEARS IN TURKEY



Source: Ministry of Culture and Tourism

14.1- Forest Fires D P S I R

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

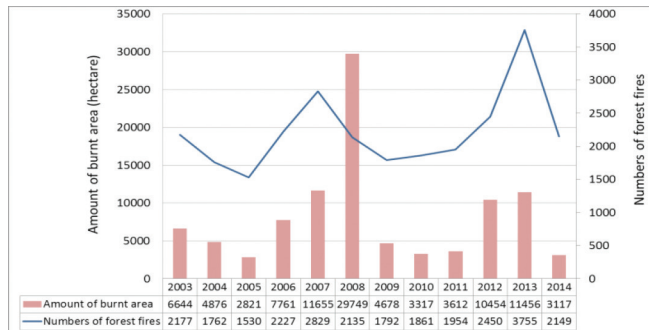
According to the statistical values for the last 12 years (2003-2014), approximately 2218 forest fires occurred, and in average 8345 ha of forest area were damaged annually.

For the last 12 years (2003-2014) 3.7 ha area was damaged in average per incident of fire.

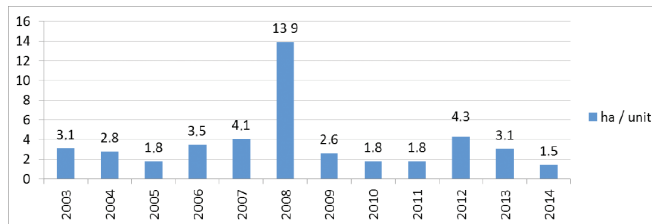
The majority of the forest fires are caused by people. Cause of the 42% of forest fires in 2014, could not be specified. 37% of fires caused by negligence-accidents, 15% by natural causes and 6 % by intention.

85% of forest fires in terms of both numbers and the area occurred between June and October which is the period when the risks are at their peak. The distribution of the burned areas per incident to the months shows that most damage occurred in July with 44%, August with 29% and September with 11% respectively ^[44].

GRAPH 85- 2003-2014 TRENDS IN FOREST FIRE



GRAPH 86- 2003-2014 DAMAGED AREA PER FOREST FIRE



Source: <http://www.ogm.gov.tr/ekutuphane/Sayfalar/Istatistikler.aspx>

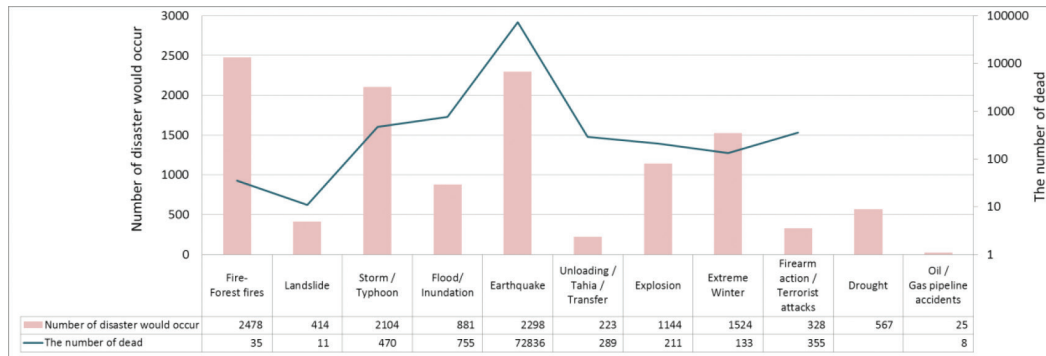
14- DISASTERS

14.2- Disasters by Types D P S I R / D S I R

Natural disasters are impact indicators and technological accidents are pressure indicators. According to Natural Disaster Archive Data Bank of Turkey (TABB), 11,986 disasters occurred between 1990 and 2014 (highway/vehicle accidents except). When disaster numbers have been evaluated between 1990 and 2014, it was seen that fire and forest fires took the first place by 2478 (20.7%). This was followed by 2298 (19.2%) earthquakes, 2104 (17.6%) hurricanes and 1524 (12.7%) extreme winters.

75,103 people have lost their lives between 1990 and 2014 by disasters occurred in Turkey (highway/vehicle accidents not included). The highest death occurred by earthquakes with the number of 72.836 (97 %). 755 (1 %) people died by floods-flash floods, 470 (0.6 %) people died by hurricanes and typhoons.

GRAPH 87- TYPE AND THE OCCURANCES OF DISASTERS AND THE NUMBER OF DEATH
(According to National Disaster Archive Data Bank of Turkey) BETWEEN 1990-2014



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

14.3- Liability Insurance



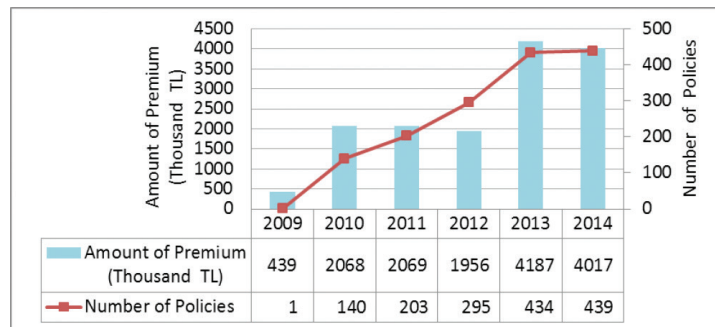
This is a response indicator. The concept of risk brings the concept of insurance as a requirement to assure the risk. In this context, environmental liability insurance is used as a tool of management of environmental risks nowadays.

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

Due to the pollution or the risk of pollution which occurs in inland waters, in territorial waters, in continental shelves and in territorial waters consisting of exclusive economic zones, caused by the coastal facilities; the expenses for cleaning, for transport of wastes, damages due to injuries or deaths of third persons and for damage to

private goods are compensated by Compulsory Financial Liability Insurance of Marine Pollution by Coastal Facilities. Concerning the mentioned insurance, the number of insurance policies was 434 in 2013 and it reached to 439 in 2014; and the premium production was 4,016,666 TL.

GRAPH 88- COMPULSORY FINANCIAL LIABILITY INSURANCE FOR MARINE POLLUTION BY COASTAL FACILITIES



Source: Prime Ministry Undersecretaries of Treasury

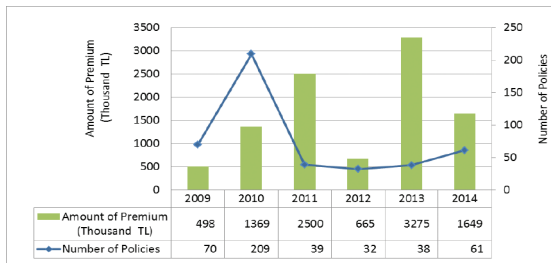
14- DISASTERS

Financial Liability Insurance for Environmental Pollution guarantees the compensation requests of the insured who made their insurance in the scope of environmental legislations and has to pay legally due to the pollution or the risk of pollution which occurs in inland waters, ground waters, seas, soil, and air. Insurer, with this insurance, compensates the pollution or the risk of pollution caused by the activities of the facility identified in the policy; the expenses of the personal injuries, death or material damage to third persons, and also the expenses for cleaning, waste collection and disposal outside the facility.

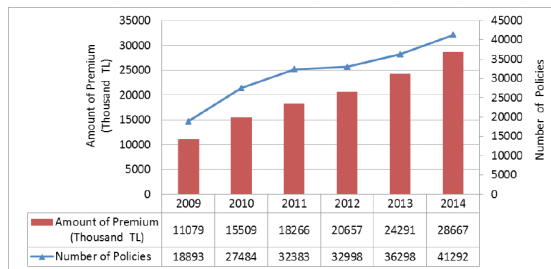
In 2013, there were 38 policies made for Liability Insurance of Environmental Pollution; this figure raised to 61 in 2014 and the premium production related to this insurance was 1,649,396 TL.

Within the scope of "Compulsory Financial Liability Insurance for Dangerous Substances and Hazardous Wastes", direct damages to third parties, physical and financial, as a result of accidents that could be caused by occupational activities related to hazardous substances are compensated. In 2014, the number of policies was 41,292 and the premium production was 28,667,417 ^[62].

GRAPH 89- COMPULSORY FINANCIAL LIABILITY INSURANCE FOR ENVIRONMENTAL POLLUTION



GRAPH 90- COMPULSORY FINANCIAL LIABILITY INSURANCE FOR DANGEROUS SUBSTANCES AND HAZARDOUS WASTES



Source: Prime Ministry Undersecretaries of Treasury

14.4- Risk Assessment and Emergency Response



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 276 Coastal Facilities have been prepared and approved by Ministry of Urbanisation and Environment. This number constituted the 85% of all the coastal facilities in Turkey. Plan includes; risk assessment of coastal facility, emergency response to marine pollution with necessary equipment & personnel, preventive measurements for environment and habitat, damage identification and compensation systems, and rehabilitation processes.

Respect to 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”, Ministry of Environment and Urbanization prepared 6 Regional and 1 National Emergency Response Plans for increasing the response capacity, cooperation between stakeholders, preparedness and coordination.

TABLE 43- THE RATIO OF COASTAL FACILITIES WHOSE PLANS WERE CONFIRMED BY THE MINISTRY OF ENVIRONMENT AND URBANISATION

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

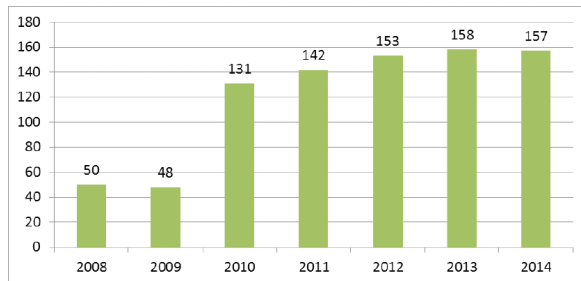
Source: Ministry of Environment and Urbanisation, General Directorate of Environmental Management

15.1- The Number of Laboratories Operating within Environmental Legislation D P S I R

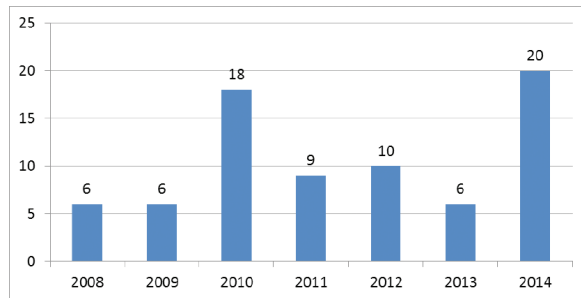
In 2014, in Turkey there were 159 laboratories operating within the scope of environmental legislation. The qualifications and the provinces of these laboratories can be inquired at the following address: <http://laboratuvar.cevre.gov.tr/yonetim/sorgu.asp>

Within the scope of remote inspections, proficiency assessment tests have been conducted for laboratories authorized by the Ministry since 2008.

GRAPH 91- NUMBER of LABORATORIES OPERATING WITHIN ENVIRONMENTAL LEGISLATION BY YEARS



GRAPH 92- 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

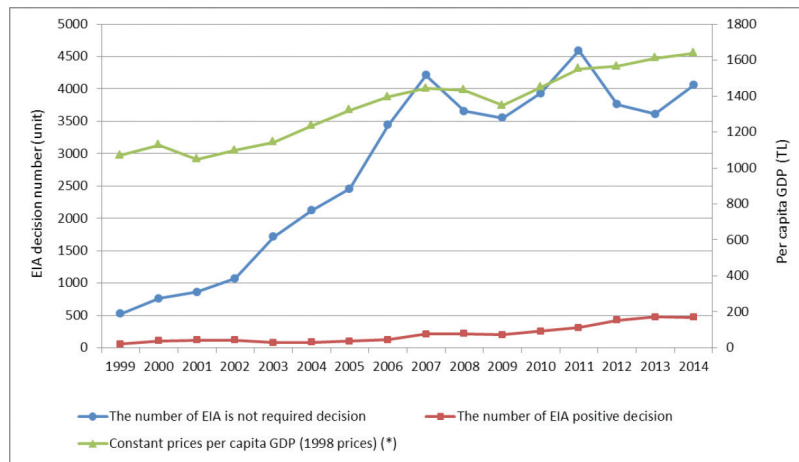
15.2- Environmental Impact Assessment Decisions



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. Parallel to the development of the country, number of EIA Decisions tend to increase in years.

GRAPH 93- THE NUMBER OF EIA POSITIVE AND EIA NOT NECESSARY DECISIONS BETWEEN 1993 WHEN THE FIRST EIA LEGISLATION WAS PUBLISHED AND 2014 AND GDP PER CAPITA



Source: EIA data of the Ministry of Environment and Urbanisation, General Directorate of EIA, Permit and Inspection, the TURKSTAT data for GDP per capita

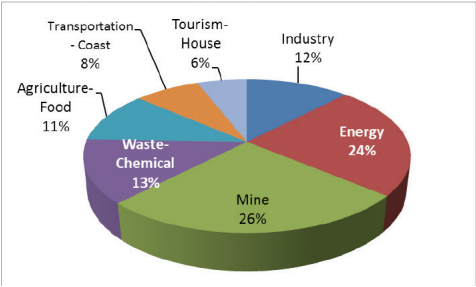
(*) 1986-2023 mid-year population estimations and projections were used and, GDP per capita was revised in 1998.

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.

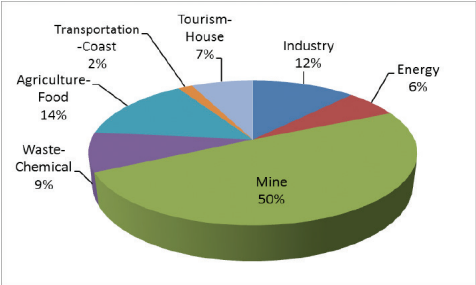
In Turkey, the first EIA Regulation was published in 1993 and by the end of 2014, a total of 3736 “EIA positive” decisions were given. When these decisions are investigated according to the distribution by sector we can see that mining investments ranked the first with 26%, and it is followed by energy investments with 24% and waste industry and the chemical industry investments with 13%.

From 1993 up to the end of 2014 a total of 47,314 “EIA not required” decisions were given and according to the distribution by sector mining investments again ranked the first with 50%. That is followed by agriculture and food investments with 14% and industrial investments with 12%.

GRAPH 94- DISTRIBUTION BY SECTOR OF EIA POSITIVE DECISIONS 1993-2014



GRAPH 95-DISTRIBUTION BY SECTOR OF EIA IS NOT REQUIRED DECISIONS 1993-2014



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

COMPARISON OF THE WATER, WASTEWATER AND WASTE DATA OF 2008, 2010 AND 2012 BY SECTORS

COMPARISON OF THE WATER, WASTEWATER AND WASTE DATA OF 2008, 2010 AND 2012 BY SECTORS

Amount of water abstracted by sectors (Billion m ³ /year)						
	2008		2010		2012	
	Amount	(%)	Amount	(%)	Amount	(%)
Municipalities	4.55		4.79	11.2	4.94	10.2
Villages	1.22		1.01	2.4	1.04	2.1
Manufacturing industry establishments	1.20		1.42	3.3	1.67	3.5
Thermal power plants	4.54		4.29	10.1	6.41	13.3
Organized industrial zones	0.11		0.13	0.3	0.14	0.3
Mining establishments	...	...	0.05	0.1	0.11	0.2
Irrigation	27.00		30.95	72.6	34.00	70.4
Total	38.61		42.64	100	48.30	100

Note: Water transferred between sectors is not included.

... Data not available.

Sources: "Watering" figures; Source: Ministry of Forestry and Water Affairs General

Directorate of State Hydraulic Works (DSİ), <http://www.dsi.gov.tr/dsi-resmi-statistikler> Figures rather than "Irrigation"; Source: TURKSTAT

Amount of wastewater discharged to environment by sectors (Billion m ³ /year)						
	2008		2010		2012	
	Amount	(%)	Amount	(%)	Amount	(%)
Municipalities	3.26	36.8	3.58	38.9	4.07	33.2
Villages	0.20	2.3	0.19	2.1	0.19	1.5
Manufacturing industry establishments	0.84	9.4	1.04	11.3	1.36	11.1
Thermal power plants	4.44	50.1	4.17	45.2	6.31	51.4
Organized industrial zones ⁽¹⁾	0.13	1.4	0.19	2.1	0.23	1.9
Mining establishments	...	...	0.04	0.5	0.10	0.8
Total	8.87	100	9.21	100	12.26	100

Note: Wastewater transferred between sectors is not included.

(1) The amount of discharged wastewater is greater than the amount of abstracted water as it includes wastewater generated from self-supplied water of some establishments.

... Data not available.

Source: TURKSTAT

Waste generation by sectors (1000 tonnes/year)						
	2008		2010		2012	
	Total Waste Amount	Amount of Hazardous Waste in Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste in Total Waste Amount	Total Waste Amount	Amount of Hazardous Waste in Total Waste Amount
Municipalities	24,361		25,277		25,845	-
Manufacturing industry establishments	12,482	1,136	13,366	964	14,420	806
Thermal power plants	25,622	24	18,748	(**)	19,262	5
Organized industrial zones	255	34	313	(**)	421	62
Mining establishments	...	...	729,750 ⁽¹⁾	2,314	951,782 ⁽¹⁾	3,181
Health institutions	50	50	60	60	69	69
Total			787,514		1,011,799	4,123

Source: TURKSTAT

(**) According to the Law no. 5429 privacy policies, data on units could not be given for the number of units three or more or two units dominated.

... Data not available.

(1) Includes overburden and tailings wastes from mining activities.

DEFINITIONS

POPULATION

Population Growth Rate

Indicator shows the average annual increase of the population rate 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 in total population.

ECONOMY

Total Environmental Expenditures of Public Sector

Total Environmental Expenditures of Public Sector Environmental protection expenditures are the spending that are incurred to prevent, reduce and abate the pollution caused by the consumption of goods and services and production processes. For the public sector this expenditure also includes the costs of management, monitoring and the legislation enforcement. Classification of Environmental Protection Activities (CEPA) that is prepared by the United Nations Economic Commission for Europe and European Statistics Office is used to define the scope of environmental expenditures. Environmental expenditures of the public sector cover the environmental expenditures of public institutions, special provincial administrations and municipalities.

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.

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 (SF_6) 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.

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

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

Air Pollutants

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. Upto 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. 24 hour limit values used in this booklet are defined as $100 \mu\text{g}/\text{m}^3$ for PM_{10} and $250 \mu\text{g}/\text{m}^3$ for SO_2 (with tolerance) as mentioned in the “By-Law on Air Quality Assessment and Management.”

WATER-WASTEWATER

Water Usage

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

Oxygen Consuming Substances in Rivers

The primary indicator of oxygen concentration 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.

DEFINITIONS

Classification based on trophic state (nutrient content);

is done as oligotrophic (low nutrients), mesotrophic (normal/medium nutrient content) and eutrophic (high nutrient).

Oligotrophic lakes

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

Mesotrophic lakes

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

Eutrophic lakes

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

The Quality of Swimming Water"

This indicates the quality of swimming water in the coastal areas. According to By-law on Swimming 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 facility and the population that is benefited 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 the liquid and the solids that are removed.

Wastewater Treatment Facilities: Waste water treatment facilities 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 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 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: 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.

Therefore, urban wastewater is treated usually 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 wastes and disposal

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

Landfill of wastes

Landfill facilities are the areas in which the wastes are disposed according to certain technical standards except for the services in which the wastes are stored in the interim storages less than 1 year for disposal, facilities in which the wastes are stored in interim waste storages less than 3 years for recovery or pre-treatment and the units in which the wastes are stored in temporary waste storages for disposal or pre-treatment or recovery in the facility where the wastes are produced. This indicator contains information about the number of waste landfill facilities and the rate of population the service is provided to.

Medical Wastes

It indicates the amount of medical waste produced and the number of disposal/sterilization facility according to years.

Waste oils

This indicator expresses the amount of collected oil which is used, from the gasoline engine, diesel engine, transmission and

DEFINITIONS

differential box, transmission, grease and other private vehicle oils and hydraulic system, turbine and compressor, slide, open-closed gear, circulation, metal cutting and processing, textile, thermal processing, heat transfer, isolation and protection, isolation, transformer, molding, steam cylinder, pneumatic system protector, food and medicine industry, paper machine, bed 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 which are 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 wastes.

Packaging Wastes

It contains the information about the amounts and recycled 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 end user or

the consumer and which are expired and formed after the usage and are reusable other than production wastes.

Economic facilities

It includes the packaging producers, merchandisers and suppliers.

End of life Tires

This indicates the amount of end of life tires 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 collection and the number of treatment facilities.

Mining wastes

This indicates the wastes 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 which employ 10 or more people.

Hazardous Wastes

It includes the information about the amount and recovery quantities of the wastes which have the 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.

Polychlorinated Biphenyls (PCB)

PCBs, one of the 12 persistent organic pollutants, is the common name of polychlorinated biphenyls, which is a group of aromatic chlorinated compounds. The dangerous impacts of PCBs occur when the food and drinks which are contaminated by these chemicals are consumed or inhaled, swallowed or touched. When they are burned for disposal or another purpose, in case not incinerated completely, they produce much more dangerous by-products such as furans (PCDF) and dioxins (PCDD).

Ship Wastes Management

It includes all the wastes and loads produced during the normal activities of a vessel including the sewage within the scope of MARPOL 73/78 APPENDIX-I, APPENDIX -IV and APPENDIX -V', and all other wastes apart from the weight and load residues described in Convention of MARPOL 73/78 APPENDIX -V application.

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).

Mis-Use of Agricultural Land

It means giving permission to the lands that have the agricultural land property into use out of purpose within the law and 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 the 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.

Forests

This indicator states the changes in the total surface areas of the natural and cultivated/planted forests concerning periods.

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 wealth

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 owned 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 TRANSPORTATION

Road and Railroad 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 Transportation Types

This indicator shows distribution by percentage among transportation types for the freight and passengers in the country.

Number of Road Motor Vehicles

It indicates the total number of Road Motor Vehicles such as automobiles (including offroad vehicles), minibuses, autobuses, vans, trucks, and motorcycles, special purposed vehicles, road and work machines and tractors.

ENERGY

Primary Energy Consumption According to the Type of Fuel

Total energy consumption or gross domestic energy consumption represents the amount of energy required to meet the domestic consumption of a geographical entity. The supply from solid fuels, oil, gas, nuclear energy, and renewable sources is calculated as the sum of gross domestic energy consumption. The relative contribution of a particular fuel is measured by the ratio between energy consumption from this fuel and the total gross domestic energy consumption in a calendar year.

Primary Energy Consumption Per Capita

The total energy intensity is the gross energy consumption (or total energy consumption) per capita.

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.

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.

Energy Dependence

Energy dependence indicates to what extent the country is dependent on imports in order to meet the energy needs of an economy. The indicator is obtained by dividing net imported energy to the sum of gross domestic energy consumption and the sum of bunker fuel.

The Share of Renewable Energy Sources in 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.

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 in the amount of 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 entries 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 fresh water products whether fished or cultivated from inland waters each year. The data related to production is the live weight of the product when it is caught.

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 and marinas that have the required standards and it is the total number of blue flags given to the beaches and marinas in Turkey since 1997.

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.

Compulsory Financial Liability Insurance for Marine Pollution by Coastal Facilities

In accordance with the law numbered 5312 on Pertaining to Principles of Emergency Response and Compensation of Damage in Pollution for the Marine Environment by Oil and Other Harmful Substances, the coastal facilities are obligated to make compulsory financial liability insurance against the damages. Within this concept as a result of an incident resulting from the coastal facility mentioned in the policy and Compulsory Financial Liability Insurance for Marine Pollution by coastal facilities which entered into force on 01.07.2007; all the cleaning costs, transportation and disposal costs of waste, costs arising from injury or death of third parties and lost which might occur for private products arising out of the pollution or the danger of

pollution in the sea judicial areas consisting inland waters of Turkey, land water, continental shelf and economic areas.

Financial Liability Insurance for Environmental Pollution

The coastal facilities cannot fulfil their responsibility totally by the law” Pertaining to Principles of Emergency Response and

Compensation of Damage in Pollution for the Marine Environment by Oil and Other Harmful Substances” number 5312. Thus Financial Liability Insurance for Environmental Pollution appeared as a necessity. Due to the pollution or the risk of pollution in all or a number of soil, ground waters, inland waters and sea waters; the expenses of the personal injuries, death or material damage of third persons are compensated accordingly with the Environmental Legislation. Also the expenses for clearance, for collection and disposal of wastes made out of the facility are compensated legally from the owner of the policy as a scope of Liability Insurance of Environmental.

Compulsory Financial Liability Insurance for Dangerous Substances and Hazardous Wastes

Within the scope of Council of Ministers Decision about Compulsory Liability Insurance for the Dangerous Substances dated 11/03/2010 and numbered 2010/190; real and legal entries that have vocational activities related with hazardous matters are obligated to have a compulsory liability insurance against the damages within the scope of the second article of mentioned decision. Within this context; with the “Compulsory Financial Liability Insurance of Dangerous Substances and

Hazardous Wastes” which entered into force on 11.03.2010 as a result of an accident which may occur due to the professional activities about the hazardous substances, the physical and material damages directly exposed by third parties will be compensated.

OTHER

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 with the chosen place. The application of the projects are monitored and inspected.

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.

- [1] Turkish Statistical Institute, "The Results of Address Based Population Registration System, 2014" News Bulletin, 28/01/2015, No: 18616, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18616>
- [2] "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>
- [3] UN, 2011, Population distribution, urbanization, internal migration and development: an international perspective, United Nations Department of Economic and Social Affairs
- [4] UN, 2012, World Urbanization Prospects – The 2011 Revision – Highlights, New York.
- [5] Turkish Statistical Institute, "Environmental Employment, Revenue and Expenditure Statistics, 2014" News Bulletin, 24/12/2015, Volume: 18745, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18745>
- [6] Ministry of Finance, Department of Strategy Development, "Annual Economic Report 2011", <http://www.maliye.gov.tr/YillikEkonomikRapor/Y%C4%B1ll%C4%B1k%20Ekonomik%20Rapor%202011.pdf>
- [7] <http://www.eea.europa.eu/data-and-maps/indicators/greenhouse-gas-emission-trends-5/assessment-1>
- [8] <https://biruni.tuik.gov.tr/gosterge/?locale=en>
- [9] Ministry of Environment and Urbanisation, General Directorate of Environmental Management
- [10] Turkish Statistical Institute, "Greenhouse Gas Emission Inventory, 2013" News Bulletin; 25/05/2015, Volume: 18744, <http://www.tuik.gov.tr/PreHaberBultenleri.do?id=18744>
- [11] Ministry of Forestry and Water Affairs, General Directorate of Meteorology
- [12] <http://www.ncdc.noaa.gov/cag/>
- [13] <http://www.eea.europa.eu/data-and-maps/indicators/main-anthropogenic-air-pollutant-emissions/assessment>
- [14] Ministry of Environment and Urbanisation, General Directorate of Environmental Impact Assessment, Permit And Inspection, "2014 Air Quality" News Bulletin, 24/02/2015, No:27 http://www.csb.gov.tr/db/ced/editordosya/2014_yillik_bulten.pdf

- [15] Ministry of Forestry and Water Affairs, General Directorate of State Hydraulic Works
- [16] Ministry of Development, 10th Development Plan (2014-2018), "Water Resources Management and Security" Specialization Commission Report, Ankara, 2014
- [17] Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring, "North Aegean Basin Water Quality Monitoring Report", Spring Period 2014, Domestic and Industrial Pollution Monitoring Programme, May 2014. <http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcl=691&detId=946&ustId=691>
- [18] Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring, "Ergene Basin Water Quality Monitoring Report", Spring Period 2014, Domestic and Industrial Pollution Monitoring Programme, May 2014. <http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcl=691&detId=946&ustId=691>
- [19] Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring "Gediz Basin Water Quality Monitoring Report", Spring Period 2014, Domestic and Industrial Pollution Monitoring Programme, May 2014. <http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcl=691&detId=946&ustId=691>
- [20] Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring "Küçük Menderes Basin Water Quality Monitoring Report", Spring Period 2014, Domestic and Industrial Pollution Monitoring Programme, May 2014. <http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcl=691&detId=946&ustId=691>
- [21] Ministry of Environment and Urbanisation, General Directorate of the EIA, Permit, and Inspection, Department of Laboratory, Measurement and Monitoring, "Susurluk Basin Water Quality Monitoring Report", Winter Period 2014, Domestic and Industrial Pollution Monitoring Programme, April 2014. <http://www.csb.gov.tr/gm/ced/index.php?Sayfa=sayfaicerikhtml&lcl=691&detId=946&ustId=691>
- [22] Ministry of Forestry and Water Affairs, General Directorate of Water Management

- [23] <http://www.eea.europa.eu/data-and-maps/indicators/nutrients-in-transitional-coastal-and-3/assessment>
- [24] Ministry of Health, Public Health Institution of Turkey
- [25] Turkish Statistical Institute, "Municipal Drinking Water Statistics, 2014" News Bulletin, 22/12/2015, No: 18779, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18779>
- [26] <http://www.eea.europa.eu/data-and-maps/indicators/urban-waste-water-treatment/urban-waste-water-treatment-assessment-3>
- [27] Turkish Statistical Institute, "Municipal Wastewater Statistics, 2012" News Bulletin, 18/02/2014, Volume: 16169, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=16169>
- [28] Turkish Statistical Institute, "Sustainable Development Indications, and 2012-2013" News Bulletin, 26/03/2014, No: 16124, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=16124>
- [29] http://epp.eurostat.ec.europa.eu/portal/page/portal/sdi/indicators/all_indicators
- [30] Turkish Statistical Institute, "Municipal Waste Statistics, 2014" News Bulletin, 28/12/2015, No: 18777, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18777>
- [31] Turkish Statistical Institute, "Mining Enterprises Water, Wastewater and Waste Statistics 2012" News Bulletin, 27/03/2014, No: 16173, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=16173>
- [32] Ministry of Environment and Urbanisation, General Directorate of Environmental Management, Department of Waste Management, "Packaging and Packaging Waste Statistics (2012)", News Bulletin, 28/02/2015, No:9, <http://www.csb.gov.tr/db/cygm/editordosya/2012.pdf>
- [33] The Ministry of Interior, General Directorate of Turkish National Police
- [34] Ministry of Forestry and Water Affairs, General Directorate of Information and Technology
- [35] Environment in Europe, 2010 Status and Overview Synthesis, European Environment Agency, Copenhagen, 2010

- [36] http://www.tarim.gov.tr/SGB/Belgeler/Bakanl%C4%B1k_Faaliyet_Raporlar%C4%B1/2014%20FAAL%C4%B0YET%20RAPORU.pdf
- [37] The Ministry of Food, Agriculture and Livestock, General Directorate of Agricultural Reform
- [38] 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.
- [39] The Ministry of Forestry and Water Affairs, Forestry and Water Council, 2013, 21-23 March 2013, Protected Areas and Wildlife Management Working Group Report, Working Group: 6, Ankara, 2012
- [40] The Ministry of Forestry and Water Affairs, General Directorate of Nature Conversation and National Parks
- [41] <http://www.iucn.org/about/work/programmes/pa.>, 2010, Lockwood et.al. 2006.
- [42] The Ministry of Forestry and Water Affairs, General Directorate of Nature Conversation and National Parks, "Status Report on Nature Conversation (2002-2013)", Ankara. (<http://www.milliparklar.gov.tr/kitap/100/?sflang=tr>)
- [43] The Ministry of Forestry and Water Affairs, General Directorate of Forestry, Forest Management and Planning Department, Existence of Forest in Turkey 2012, Ankara, 2012, (http://web.ogm.gov.tr/Resimler/sanalkutuphane/orman_varligi2012.pdf)
- [44] The Ministry of Forestry and Water Affairs, General Directorate of Forestry
- [45] The Ministry of Transport, Maritime Affairs and Communication, Department of Strategy Development
- [46] The Ministry of Transport, Maritime Affairs and Communication, Statistical Yearbook of the State Railways 2010-2014, <http://www.tcdd.gov.tr/files/istatistik/20102014yillik.pdf>
- [47] The Ministry of Transport, Maritime Affairs and Communication, Turkey Transportation and Communication Strategy Target 2023, http://www.ubak.gov.tr/BLSM_WIYS/UBAK/tr/dokuman_sag_menu/20110323_142238_204_1_64.pdf.
- [48] <http://www.eea.europa.eu/data-and-maps/indicators/greenhouse-gas-emission-trends-5/assessment-1>
- [49] EUROSTAT <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdpc340&plugin=1>

- [50] Ministry of Energy and Natural Resources, General Directorate of Energy Affairs
- [51] <http://www.eea.europa.eu/data-and-maps/indicators/primary-energy-consumption-by-fuel-5/assessment#toc-0>
- [52] <http://www.eea.europa.eu/data-and-maps/indicators/final-energy-consumption-by-sector-8/assessment-2>
- [53] http://www.eea.europa.eu/data-and-maps/indicators/#c5=&c7=all&c0=10&b_start=0&c6=CSI027
- [54] EUROSTAT <http://ec.europa.eu/eurostat/web/sdi/indicators/complete-set-of-indicators>
- [55] Ministry of Energy and Natural Resources, General Directorate of Renewable Energy
- [56] The Ministry of Food, Agriculture and Livestock, General Directorate of Plant Production
- [57] The Ministry of Food, Agriculture and Livestock, General Directorate of Food and Control
- [58] Turkish Statistical Institute, "Fishery Products, 2014" News Bulletin, 26/06/2015, No: 18731, <http://www.turkstat.gov.tr/PreHaberBultenleri.do?id=18731>
- [59] The Ministry of Food, Agriculture and Livestock, General Directorate of Fisheries and Aquaculture
- [60] Ministry of Development, 10th Development Plan (2014-2018), "Aquaculture" Specialization Commission Report, Ankara, 2014
- [61] The Ministry of Culture and Tourism
- [62] Prime Ministry Undersecretariat of Treasury