

Turkey

Mapping national procedures, sources, available data and information

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CONTENTS

1. General information	5
1.1. Government structure	5
1.2. Mapping national procedures	9
1.2.1. Key categories according to IPCC	9
1.2.2. Methodology for retrieving key-category data	19
1.2.3. Responsible authorities and contact persons	20
1.2.4. Procedures to address climate-change issues	20
1.3. Population	20
1.3.1. Country's demographic characteristics	20
1.3.2. Development indicators	22
1.4. Geographic profile	30
1.4.1. Geomorphologic characteristics	30
1.4.2. Ecosystems	31
1.4.3. LULUCF	31
1.5. Climatic profile	32
1.5.1. Precipitation	33
1.5.2. Temperature	34
1.5.3. Other climatic characteristics	35
1.6. Economic profile	35
1.6.1. General	35
1.6.2. Primary sector	36
1.6.3. Secondary sector	39
1.6.4. Tertiary sector	40
1.6.5. Future prospects for the country's economy and development	40
1.7. Transportation	41
1.7.1. Road transport	41
1.7.2. Shipping	42
1.7.3. Railways	43
1.7.4. Air transport	44
1.8. Energy (E)	45
1.8.1. Energy supply	45
1.8.2. Energy consumption	46
1.9. Waste disposal	47
1.9.1. Solid waste disposal	47
1.9.2. Wastewater treatment	48
2. The national GHG inventory	50
2.1. Developing a national GHG-inventory system	50
2.1.1. Governmental authorities responsible for collecting GHG data	50
2.1.2. Supporting institutions	51
2.1.3. Measurement methodology and data sources	51
2.1.4. Activity data	51
2.2. Systematic observations	55
2.2.1. Meteorological measurements	56



2.2.2.	Oceanic observations	57
2.2.3.	Terrestrial observations	57
2.2.4.	Air-quality monitoring	57
3.	Reporting	60
3.1.	GHG emissions per sector	60
3.2.	GHG emissions per type	60
3.3.	Information publicly available	60
4.	Verification	62
4.1.	Methods for QA/QC analyses	62
4.2.	Calculation of data-verification indices	62
	References	63
	Abbreviations	65



1. General information

1.1. Government structure

Turkey formally known as the Republic of Turkey is a Eurasian country that stretches across the Anatolian peninsula in western Asia and Thrace in the Balkan region of southeastern Europe. Allocating between at the crossroads of Asia and Europe makes Turkey a country of significant geostrategic importance.

Turkey is a democratic, secular, unitary, constitutional republic with an ancient cultural heritage and was founded in 1923. Modern Turkish Republic foundation is based on the principles of peaceful foreign policy, secularism, the rule of law, a pluralistic and participatory democratic system together with fundamental human rights and freedoms.

Turkey's political system is a parliamentary democracy. The Turkish Constitution that came into force in 1982 structured as a democratic, secular and social state in which executive, legislative and judicial powers are separated. Legislative power that cannot be delegated is vested in 550 members of the Turkish Grand National Assembly (TBMM). The members of the TBMM are elected for a term of four-years by votes of Turkish citizens over the age of eighteen. The judicial system is independent and consists of independent courts and the National Court of Appeals as well as the Constitutional Court. The President together with the Council of Ministers exercises executive power according to the Constitution.

The TBMM elects the President for a period of seven years by 2007. In 2007 a major modification was done in the Constitution and the President will be elected for a term of twice five-years by votes of Turkish citizens over the age of eighteen. The Council of Ministers is formed of the Prime Minister and the Ministers. The President appoints the Prime Minister and the Prime Minister selected the Ministers. Afterwards the President must be appointed the Ministers.

The Council of Ministers is composed of 26 Ministers. These are; the Prime Minister, 4 Deputy Prime Ministers, and 21 Ministers. The names and the tasks of the other Ministers are presented below.

Ministry of Justice: The duties of the Ministry are mentioned in the second article of the duties and establishment of the Ministry of Justice Code enacted in 29th March 1984. One of It's duty is to establish and organize the courts stipulated by codes; the devise, set up and improve prisons and penitentiary houses, enforcement offices and any kind and degree of justice units; to supervise these units in terms of executive duties.

Ministry of National Defense: The legal regulation on the organization of the Ministry was enacted with the law no. 1325 enacted on 31st July 1970. One of the main duty of the Ministry is to carry out political, legal, social, financial and budget of National Defence tasks.

Ministry of Interior: The Ministry has reached its today's structure by means of the regulations performed at the end of 1983 and the continuity of this most recent structure



was ensured by the law no. 3152 enacted on 14th February 1985. Some of the duties of the Ministry are; to accomplish homeland security and public order, to ensure public safety.

Ministry of Foreign Affairs: The first comprehensive legal regulation on the organization of the Ministry of Foreign Affairs was enacted with the adoption of Act No. 1154 in 1927 which laid the foundation of the Ministry's present day institutional structure. The Turkish Foreign Service consisting of a total of 985 diplomats at the Ministry and its missions abroad, continues to operate with its modest resources and number of personnel to conduct and further promote our international political, economic and cultural relations in the bilateral and multilateral context as well as to contribute to peace, stability and prosperity in our region and beyond.

Ministry of Finance: The Ministry has reached its today's structure by means of the regulations performed at the end of 1983 and the continuity of this most recent structure was ensured by the by law no. 484 enacted on 2nd July 1993. The major duty of the Ministry is to implement and to assist the preparation of fiscal policy of the country.

Ministry of Economy: The organization and tasks of the Ministry has been established, by merging General Directorate of Incentive Implementation and Foreign Investment of Treasury with all the service units of the Undersecretariat of Foreign Trade, with a Decree law no. 637 on 8th June 2011. The mission of the Ministry is developing and implementing policies regarding foreign trade and investments in order to contribute to the national economy and development of the social welfare.

Ministry of National Education: The duties of the Ministry are mentioned in the second article of the duties and establishment of the Ministry of National Education with the law no. 179 enacted in 13th December 1983. One of its duties is to allow the opening of pre-primary, primary and secondary education with the equivalent, and all sorts of formal and open education institutions and other educational institutions outside the higher education institutions.

Ministry of Environment and Urbanism: The Ministry has reached its today's structure with the Decree Law No. 644 on 29th June 2011. The main duties related with urbanism of the Ministry are to carry out civil works and major repairs concerning public buildings, and highways as well as to provide services related to physical planning, land development and housing for low income families as well as to extend disaster relief. Also, the Ministry has the overall responsibility for co-ordination of the environmental activities. Some of the main purposes related with environmental issues are as follows: (a) Protecting and improving environment, (b) protecting land and natural resources with the most appropriate and efficient way in urban and rural areas.

Ministry of Health: The Ministry has reached its today's structure by means of the regulations performed at the end of 1983 and the continuity of this most recent structure was ensured by the bylaw no. 181 enacted on 13th December 1984. The major duty of the Ministry is to take every necessary precaution for ensuring and well-being of everyone's life physically, spiritually and socially in full.

Ministry of Transport, Maritime Affairs and Communications: The transportation and communication services, which were carried out by Ministries of Economy and Public Works in the early years of the Turkish Republic, were given to the Ministry of Transport which was established with the law no 3613 in the 27th of May in 1939. The organization and tasks of the Ministry were rearranged with a decree law numbered 182 on 13th December 1983. With another decree law numbered 211 in 8th June 1984, some clauses were changed. On 17th April 1987, to make the central departments of our Ministry function according to the improved conditions, a rearrangement was made with the law no 3348 and enabled the area of activities of central departments to increase. The mission of the Ministry is to provide the production and control of quality, balanced, safe, environmentally friendly, fair and economic transport, and information and communication services for all users.

Ministry of Food, Agriculture and Livestock: The Ministry has reached its today's structure with the Decree Law No. 639 on 3rd June 2011. The major duty of the Minister is to develop plans and programs for rural areas, agriculture, livestock and fisheries products.

Ministry of Labor and Social Security: The organization and tasks of the Ministry were established with a decree law numbered 184 on 13th December 1983. On 4th October 2000, to make the central departments of our Ministry function according to the improved conditions, a rearrangement was made with the decree law no 618 and enabled the area of activities of central departments to increase.

Ministry of Science, Industry and Technology: The organization and tasks of the Ministry came into force with a law numbered 3143 on 8th January 1985. According to the Law No 3143, some of the main functions and authorities of the Ministry are as follows; (a) To help direct the savings into industrial investments, (b) To carry or have them carried out the necessary research plans and projects to find out the potentials of provinces and regions and put feasible projects into application if necessary, (c) To coordinate all the activities related with the establishment of organized industrial estates and small industrial estates and to support them. The title of the Ministry of Industry and Trade has been changed to the Ministry of Science, Industry and Technology, with Decree Law No. 635 on 3rd June 2011.

Ministry of Customs and Trade: The mission of the Ministry is to simplify customs procedures for international trafficking of goods and travelers and to accelerate Turkey's full membership to EU in harmony with government policies by implementing the simplified customs procedures in effective control mechanisms.

The Ministry is responsible for collecting and safeguarding customs duties, for controlling the flow of goods including animals, transports, personal effects and hazardous items in and out of the country, for fighting against smuggling and for investigation of the smuggling cases. After merging with the trade related services of the ex-Ministry of Industry and Trade in 2011 June, the agency resumes also the responsibility for developing new policies, plans, programmes and strategies in the fields of trade and for taking the measurements to secure consumers' rights and to create consciousness for them. The Ministry has reached its today's structure with the Decree Law No. 640 on 3rd June 2011.



Ministry of Energy and Natural Resources: The Ministry was established upon Presidential Approval No. 4-400 dated 25.12.1963 on the basis of the authority vested by Law No. 4951. Law on Organization of the Ministry was provided for on 13.02.1983 through Decree Law No. 186, which law was finalized by Law No. 3154 enacted on 01.03.1985. The mission of the Ministry is to ensure efficient, effective safe and environment-sensitive use of energy and natural resources in a way that reduces external dependency of our country, and makes the greatest contribution to our country's welfare.

Ministry of Culture and Tourism: The Ministry Development has been established with the Law No. 4848 on 16th April 2003. According to the Law No. 4848, major duty of the Ministry is to keep alive, improve, propagate, introduce, evaluate and ensure the adoption of the cultural values, to prevent the destruction of the historical and cultural assets and to utilize all the tourism opportunities existing in the country to be able to make positive contribution to the country's economy.

Ministry of Forestry and Water Affairs: The Ministry of Environment was established in 1991, which was previously existed as an Under-Secretariat for Environment under the Prime Minister's Office. The Ministry of Environment has merged under the Ministry of Environment and Forestry (MoEF) with the Law on Establishment and Duties of Ministry of Environment and Forestry No. 4856 enacted on 8th May 2003. The Ministry has reached its today's structure with the Decree Law No. 645 on 29th June 2011. The main purposes of the Ministry are developing policies for forest areas, water affairs, protecting of ecosystems and biodiversity, protecting water resources and monitoring of meteorological events.

Ministry of Development: The State Planning Organization which connected to the Premiership had been established on 30th September 1960 in order to prepare Development Plans for achieving financial, social and cultural development. The Ministry Development has been established instead of the State Planning Organization with Decree Law No. 641 on 3rd June 2011. The main duty of the Ministry is to help and advising to the government in determining the economical, social and cultural policies and targets and in the coordination of the activities concerning the economic policy and also to prepare development plan, medium-term programme, annual programmes, strategies and action plans by making national and local analyses and studies in the fields of macro-economical, sectoral (social and economical) and regional improvements.

Ministry of Family and Social Policies: The Ministry of Family and Social Policies has been established instead of the Ministry of State for Women and Families with Decree Law No. 633 on 3rd June 2011. The Ministry has targeted to protect the integrity of the Turkish family by determining and solving the social problems in Turkey and to help the formation of a national policy for families.

Ministry for EU Affairs: The main duty of the Ministry is to coordinate the activities in the process of Turkey's European Union membership and to carry out the full membership negotiations with the EU. The Ministry of EU Affairs has been first established with Decree Law No. 634 on 3rd June 2011.



Ministry of Youth and Sports: The Ministry of Youth and Sports has been established instead of the General Directorate of Youth and Sports with Decree Law No. 638 on 3rd June 2011. The duties of the Ministry are to determine the policies which support the personal and social improvement of youth, to provide opportunities to the young to be able to achieve their own potential considering the needs of different groups of youth and to determine the policies to be applied in the field of sports and to assure the application of international rules and directives.

1.2. Mapping national procedures

1.2.1. Key categories according to IPCC

The IPCC document, *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, has described the key source categorisation. According to the guidance, in each country's national inventory, certain source categories are particularly significant in terms of their contribution to the overall uncertainty of the inventory. It is important to identify these *key source categories* so that the resources available for inventory preparation may be prioritised and the best possible estimates prepared for the most significant source categories (IPCC, 2000).

As a result of studies, key sources were determined for Turkey in 2008 as follows (TURKSTAT, 2010):

- Land Use, Land-Use Change and Forestry (CO₂),
- Public Electricity and Heat Production (Electricity Production) (CO₂),
- Road Transportation (CO₂),
- Cement Production (Mineral Products) (CO₂),
- Solid Waste Disposal (Managed) (CH₄),
- Residential (CO₂),
- Enteric Fermentation (CH₄),
- Agriculture/Forestry/Fisheries (CO₂),
- Solid Waste Disposal (Unmanaged) (CH₄),
- Civil Aviation (Transport) (CO₂),
- Other Industries (CO₂),
- Iron and Steel Industry (CO₂),
- Other Cement Production (energy) (CO₂),
- Agricultural Soil (Synthetic Fertilizer) (N₂O),
- Lime Production (CO₂),
- Emission of HFCs (HFC-134a),
- Manure Management (N₂O),
- Domestic and Commercial Wastewater Handling (CH₄), (N₂O),
- Petroleum refining (CO₂),
- Agricultural Soil (animal manure Applied) (N₂O),
- Mining Surface (CH₄).



Tier 1 level were used to determine the key sources. Determination process were carried out by using Tier 1 level and Trend Assessment. Evaluation was carried out according to the qualitative criteria. The key source categories has shown in Table 1.2.1.

Source categories	Fuel	Gas
Public Electricity and Heat Production	Lignite	CO ₂
	Natural Gas	CO ₂
	Residual Fuel Oil	CO ₂
	Hard Coal	CO ₂
	Gas / Diesel oil	CO ₂
	Naphta	CO ₂
	Second Fuel Coal	CO ₂
Road Transportation	Gas / Diesel oil	CO ₂
	Gasoline	CO ₂
	LPG	CO ₂
	Natural Gas	CO ₂
Residential	Natural Gas	CO ₂
	Hard Coal	CO ₂
	LPG	CO ₂
	Lignite	CO ₂
	Residual Fuel Oil	CO ₂
	Second Fuel Coal	CO ₂
	Gas / Diesel oil	CO ₂
Asphalt	CO ₂	
Agriculture/Forestry/Fisheries	Gas / Diesel oil	CO ₂
Iron and Steel	Second Fuel Coal	CO ₂
	Hard Coal	CO ₂
	Natural Gas	CO ₂
	Gas / Diesel oil	CO ₂
	LPG	CO ₂
	Residual Fuel Oil	CO ₂
	Petroleum Coke	CO ₂
Iron and Steel Production (Metal Production)		CO ₂
Aluminum Production (Metal Production)		CO ₂

Table 1.2.1. The key source categories of Turkey¹

¹ Turkey Greenhouse Gas Inventory (1990-2008), TURKSTAT 2010
http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5270.php



Source categories	Fuel	Gas
Non-Ferrous Metals	Natural Gas	CO ₂
	Residual Fuel Oil	CO ₂
	LPG	CO ₂
	Gas / Diesel oil	CO ₂
	Lignite	CO ₂
	Second Fuel Coal	CO ₂
	Petroleum Coke	CO ₂
Petroleum Refining	Refinery Gas	CO ₂
	Residual Fuel Oil	CO ₂
	Natural Gas	CO ₂
	Gas / Diesel oil	CO ₂
	Gasoline	CO ₂
	LPG	CO ₂
	Petr. Petroleum	CO ₂
Chemicals	Natural Gas	CO ₂
	Lignite	CO ₂
	Hard Coal	CO ₂
	Gas / Diesel oil	CO ₂
	Residual Fuel Oil	CO ₂
Navigation	Gas / Diesel oil	CO ₂
	Residual Fuel Oil	CO ₂
	Hard Coal	CO ₂
Civil Aviation	Jet Kerosene	CO ₂
Railways	Gas / Diesel oil	CO ₂
	Hard Coal	CO ₂
	Lignite	CO ₂
	Residual Fuel Oil	CO ₂
Lime Production (Mineral Products)		CO ₂
Ammonia Production (Chemical Industry)		CO ₂
Carbide Production (Chemical Industry)		CO ₂
Ferroalloys Production (Metal Production)		CO ₂
Soda Ash Production and Use (Mineral Products)		CO ₂

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Other Industries	Natural Gas	CO ₂
	Lignite	CO ₂
	Hard Coal	CO ₂
	Petroleum Coke	CO ₂
	Second Fuel Coal	CO ₂
	Gas / Diesel oil	CO ₂
	Petr. Petroleum	CO ₂
	Residual Fuel Oil	CO ₂
	Asphalt	CO ₂
	Refinery Gas	CO ₂
Other (Cement Production)		CO ₂
Other (Cement Production) (Mineral Products)		CO ₂
Other (Cement Production)	Hard Coal	CO ₂
	Asphalt	CO ₂
	LPG	CO ₂
	Petroleum Coke	CO ₂
	Gas / Diesel oil	CO ₂
	Residual Fuel Oil	CO ₂
	Natural Gas	CO ₂
	Lignite	CO ₂
Other (Sugar)	Lignite	CO ₂
	Natural Gas	CO ₂
	Residual Fuel Oil	CO ₂
	Hard Coal	CO ₂
	Gas / Diesel oil	CO ₂
	Second Fuel Coal	CO ₂
	LPG	CO ₂
Other (Fertilizer)	Natural Gas	CO ₂
	Residual Fuel Oil	CO ₂
	Gas / Diesel oil	CO ₂
	Lignite	CO ₂
	Second Fuel Coal	CO ₂
	Naphta	CO ₂

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Public Electricity and Heat Production	Lignite	CH ₄
	Natural Gas	CH ₄
	Residual Fuel Oil	CH ₄
	Hard Coal	CH ₄
	Gas / Diesel oil	CH ₄
	Naphta	CH ₄
	Second Fuel Coal	CH ₄
Road Transportation	Gas / Diesel oil	CH ₄
	Gasoline	CH ₄
	LPG	CH ₄
	Biofuel	CH ₄
	Natural Gas	CH ₄
Solid Waste Disposal (Managed)		CH ₄
Solid Waste Disposal (Unmanaged)		CH ₄
Residential	Natural Gas	CH ₄
	Hard Coal	CH ₄
	LPG	CH ₄
	Wood	CH ₄
	Lignite	CH ₄
	Residual Fuel Oil	CH ₄
	Second Fuel Coal	CH ₄
	Gas / Diesel oil	CH ₄
	Asphalt	CH ₄
	Animal and plant residues	CH ₄
Agriculture/Forestry/Fisheries	Gas / Diesel oil	CH ₄
Iron and Steel	Second Fuel Coal	CH ₄
	Hard Coal	CH ₄
	Natural Gas	CH ₄
	Gas / Diesel oil	CH ₄
	LPG	CH ₄
	Residual Fuel Oil	CH ₄
	Petroleum Coke	CH ₄
Non-Ferrous Metals	Natural Gas	CH ₄
	Residual Fuel Oil	CH ₄
	LPG	CH ₄
	Gas / Diesel oil	CH ₄
	Lignite	CH ₄
	Second Fuel Coal	CH ₄
	Petroleum Coke	CH ₄

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Petroleum Refining	Refinery Gas	CH ₄
	Residual Fuel Oil	CH ₄
	Natural Gas	CH ₄
	Gas / Diesel oil	CH ₄
	Gasoline	CH ₄
	LPG	CH ₄
	Petr. Petroleum	CH ₄
Chemicals	Natural Gas	CH ₄
	Lignite	CH ₄
	Hard Coal	CH ₄
	Gas / Diesel oil	CH ₄
	Residual Fuel Oil	CH ₄
Navigation	Gas / Diesel oil	CH ₄
	Residual Fuel Oil	CH ₄
	Hard Coal	CH ₄
Civil Aviation	Jet Kerosene	CH ₄
Railways	Gas / Diesel oil	CH ₄
	Hard Coal	CH ₄
	Lignite	CH ₄
	Residual Fuel Oil	CH ₄
Domestic and Commercial Wastewater Handling		CH ₄
Field Burning of Agricultural Residue		CH ₄
Manure Management		CH ₄
Mining (Surface)		CH ₄
Mining (underground)		CH ₄
Rice Cultivation		CH ₄
Enteric Fermentation		CH ₄
Other Industries	Natural Gas	CH ₄
	Lignite	CH ₄
	Hard Coal	CH ₄
	Petroleum Coke	CH ₄
	Second Fuel Coal	CH ₄
	Gas / Diesel oil	CH ₄
	Petr. Petroleum	CH ₄
	Residual Fuel Oil	CH ₄
	Asphalt	CH ₄
	LPG	CH ₄
	Refinery Gas	CH ₄

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Other (Cement Production)	Hard Coal	CH ₄
	Asphalt	CH ₄
	LPG	CH ₄
	Petroleum Coke	CH ₄
	Gas / Diesel oil	CH ₄
	Residual Fuel Oil	CH ₄
	Natural Gas	CH ₄
	Lignite	CH ₄
Other (Sugar)	Lignite	CH ₄
	Natural Gas	CH ₄
	Residual Fuel Oil	CH ₄
	Hard Coal	CH ₄
	Gas / Diesel oil	CH ₄
	Second Fuel Coal	CH ₄
	LPG	CH ₄
Other (Fertilizer)	Natural Gas	CH ₄
	Residual Fuel Oil	CH ₄
	Gas / Diesel oil	CH ₄
	Lignite	CH ₄
	Second Fuel Coal	CH ₄
	Naphta	CH ₄
Other Chemicals Production (Chemical Industry)		CH ₄
Public Electricity and Heat Production	Lignite	N ₂ O
	Natural Gas	N ₂ O
	Residual Fuel Oil	N ₂ O
	Hard Coal	N ₂ O
	Gas / Diesel oil	N ₂ O
	Naphta	N ₂ O
	Second Fuel Coal	N ₂ O
Road Transportation	Gas / Diesel oil	N ₂ O
	Gasoline	N ₂ O
	LPG	N ₂ O
	Biofuel	N ₂ O
	Natural Gas	N ₂ O

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Residential	Natural Gas	N ₂ O
	Hard Coal	N ₂ O
	LPG	N ₂ O
	Wood	N ₂ O
	Lignite	N ₂ O
	Residual Fuel Oil	N ₂ O
	Second Fuel Coal	N ₂ O
	Gas / Diesel oil	N ₂ O
	Asphalt	N ₂ O
	Animal and plant residues	N ₂ O
Agriculture/Forestry/Fisheries	Gas / Diesel oil	N ₂ O
Agricultural Soil (Synthetic Other (Fertilizer))		N ₂ O
Agricultural Soil (Animal Manure Applied)		N ₂ O
Agricultural Soil (Crop Residue)		N ₂ O
Agricultural Soil (N-Fixing Crops)		N ₂ O
Iron and Steel	Second Fuel Coal	N ₂ O
	Hard Coal	N ₂ O
	Natural Gas	N ₂ O
	Gas / Diesel oil	N ₂ O
	LPG	N ₂ O
	Residual Fuel Oil	N ₂ O
	Petroleum Coke	N ₂ O
Non-Ferrous Metals	Natural Gas	N ₂ O
	Residual Fuel Oil	N ₂ O
	LPG	N ₂ O
	Gas / Diesel oil	N ₂ O
	Lignite	N ₂ O
	Second Fuel Coal	N ₂ O
	Petroleum Coke	N ₂ O
Petroleum Refining	Refinery Gas	N ₂ O
	Residual Fuel Oil	N ₂ O
	Natural Gas	N ₂ O
	Gas / Diesel oil	N ₂ O
	Gasoline	N ₂ O
	LPG	N ₂ O
	Petroleum	N ₂ O

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Chemicals	Natural Gas	N ₂ O
	Lignite	N ₂ O
	Hard Coal	N ₂ O
	Gas / Diesel oil	N ₂ O
	Residual Fuel Oil	N ₂ O
Navigation	Gas / Diesel oil	N ₂ O
	Residual Fuel Oil	N ₂ O
	Hard Coal	N ₂ O
Civil Aviation	Jet Kerosene	N ₂ O
Railways	Gas / Diesel oil	N ₂ O
	Hard Coal	N ₂ O
	Lignite	N ₂ O
	Residual Fuel Oil	N ₂ O
Domestic and Commercial Wastewater Handling		N ₂ O
Field Burning of Agricultural Residue		N ₂ O
Manure Management		N ₂ O
Nitric Acid Production (Chemical Industry)		N ₂ O
Other Industries	Natural Gas	N ₂ O
	Lignite	N ₂ O
	Hard Coal	N ₂ O
	Petroleum Coke	N ₂ O
	Second Fuel Coal	N ₂ O
	Gas / Diesel oil	N ₂ O
	Petr. Petroleum	N ₂ O
	Residual Fuel Oil	N ₂ O
	Asphalt	N ₂ O
	LPG	N ₂ O
	Refinery Gas	N ₂ O
Other (Cement Production)	Hard Coal	N ₂ O
	Asphalt	N ₂ O
	Petroleum Coke	N ₂ O
	Gas / Diesel oil	N ₂ O
	Residual Fuel Oil	N ₂ O
	Natural Gas	N ₂ O
	Lignite	N ₂ O

Table 1.2.1 (continued). The key source categories of Turkey



Source categories	Fuel	Gas
Other (Sugar)	Lignite	N ₂ O
	Natural Gas	N ₂ O
	Residual Fuel Oil	N ₂ O
	Hard Coal	N ₂ O
	Gas / Diesel oil	N ₂ O
	Second Fuel Coal	N ₂ O
	LPG	N ₂ O
Other (Fertilizer)	Natural Gas	N ₂ O
	Residual Fuel Oil	N ₂ O
	Gas / Diesel oil	N ₂ O
	Lignite	N ₂ O
	Second Fuel Coal	N ₂ O
	Naphta	N ₂ O
Aluminium Production (Metal Production)		CF ₄
		C ₂ F ₆
Emission of HFCs	HFCs	HFC-134a
Emission of SF ₆	SF ₆	SF ₆

Table 1.2.1 (continued). The key source categories of Turkey

Total national inventory level was calculated by using the Equation 1.1.

$$\begin{array}{l}
 \text{Source Category} \\
 \text{Level Assessment} = \frac{\text{Source Category Estimate}}{\text{Total Estimate}} \\
 \text{L}_{x,t} = \text{Ex,t} / \text{Et} * 100 \quad \quad \quad (\text{Eq.1.1})
 \end{array}$$

Where,

L_{x,t} : Level assessment for source x in year t

Ex,t : Emission estimate of source category x in year t

Et : Total inventory estimate in year t

The key source categories were add up to over %95 of the total cumulative of level assessment, after the level assessment (TURKSTAT, 2010).

1.2.2. Methodology for retrieving key-category data

Greenhouse Gasses (GHG) Emission Inventory Working Group was formed by the ratification of the United Nations Framework Convention on Climate Change and signing of Kyoto Protocol. The aim of the group was to improve the greenhouse gasses emission inventories. The group consists of the Ministry of Transport, Maritime Affairs and Communications, Ministry of Energy and Natural Resources, Turkish Electricity Generation Transmission Corporation and other related organizations under the coordination of TURKSTAT.

In Turkey, the major actor of the preparing of GHG inventory is the Turkish Statistical Institute (TURKSTAT). Input data are collected from related organisations. These sources are as follows:

- Land use change and forestry emissions and removals are provided by the Ministry of Food, Agriculture and Livestock, and the Ministry of Forestry and Water Affairs.
- HFCs, PFCs and SF₆ data are provided by the Ministry of Environment and Forestry.
- Forestry data are provided by the Ministry of Forestry and Water Affairs.
- Energy balance tables are provided by the Ministry of Energy and Natural Sources.
- Transport data are provided by the Ministry of Transport.
- Industrial production data are provided by the Business and Statistics Department in TURKSTAT.
- Agricultural production data are provided by the Agriculture and Environment Statistics Department in TURKSTAT.
- Solid waste data are provided by the Environmental Statistics Group in TURKSTAT (TURKSTAT, 2010).



1.2.3. Responsible authorities and contact persons

Related authorities and contact persons related with the national GHG inventories are given in Table 1.2.2.

Organisation	Contact Person	Telephone	E-mail
Turkish Statistical Institute	Dr.Ali Can Betül Baygüven	+90 312 410 03 61 +90 312 410 03 62	ali.can@tuik.gov.tr betul.bayguven@tuik.gov.tr
Ministry of Food, Agriculture and Livestock	Dr.Hakan Erden	+90 312 287 33 60	herden45@gmail.com
Ministry of Forestry and Water Affairs	Sami Bayçelesi	+90 312 296 40 00	samibaycelebi@ogm.gov.tr
Ministry of Environment and Urbanism	Evren Türkmenoğlu	+90 312 207 65 95	evrent@cob.gov.tr
Ministry of Energy and Natural Sources	Yasemin Örucü Ayşegül Karayazgan	+90 312 212 64 20 +90 312 212 78 61	ay_orucu@yahoo.com.tr aysegul.karayazgan@euas.gov.tr
Ministry of Transport, Maritime Affairs and Communications	Afife Ülkü Koçer	+90 312 203 13 69	aulku.kocer@ubak.gov.tr

Table 1.2.2. Related authorities and contact persons²

1.2.4. Procedures to address climate-change issues

N/A

1.3. Population

1.3.1. Country's demographic characteristics

Turkey's demographic characteristics and development indicators are derived from the Turkish Statistical Institute³.

The Turkish Statistical Institute is founded of the Statistics Council and the Presidency of the Turkish Statistical Institute with Statistics Law of Turkey numbered 5429. The Statistics Council is established to advice on the development and implementation of the Programme and on the production and use of official statistics; to determine and assess the areas in which official statistics are needed and to provide opinions and suggestions for future works to be carried out. The Presidency of the Turkish Statistical Institute consists of central and provincial organisations to implement this law and to perform tasks assigned by it.

The main duty of the Statistics Council established by Statistics Law of Turkey numbered 5429 is to advise on the development and implementation of the Programme and on the production and use of official statistics; to determine and assess the areas in which official statistics are needed and to provide opinions and suggestions for future works to be carried out.

² Turkey Greenhouse Gas Inventory (1990-2009), TURKSTAT 2011, http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php

³ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



Turkey's population is more than 73.7 million people as of December 31, 2010. More than seventy-six percent of the population live in towns and cities. According to the previous census, the population is increasing by 2.2%. In 1927, when the first census was taken in Turkey, the population was 13.6 million. It has an average population density of 96 people per km². People within the 15–64 age group constitute 67% of the total population, the 0–14 age group is 26% of the population, and people 65 years old and above make up 7%.

Regions of Turkey with the largest populations are Istanbul, Ankara, Izmir, Bursa, Adana and Gaziantep. An estimated 70.5% of the population live in urban centers. In all, 19 provinces have populations that exceed 1 million inhabitants, and 20 provinces have populations between 1 million and 500,000 inhabitants. Only two provinces have populations less than 100,000.

Life expectancy stands at 71.1 years for men and 75.3 years for women, with an overall average of 73.2 years for the populace as a whole. Education is compulsory and free from ages 6 to 15. The literacy rate is 96% for men and 80.4% for women, with an overall average of 88.1%.



1.3.2. Development indicators

Development Indicators of Turkey are prepared by TURKSTAT and can be accessible from online database. Population and Demography; Population and Economy; Population and Education; Population, Gender and Development; Population and Social Development; Population, General Health, Reproductive Health and Nutrition; Population and Environment indicators are given at Table 1.3.1 and Table 1.3.7.

INDICATORS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Life Expectancy at Birth (Year)	Total	67.4	67.7	68.1	68.5	68.8	69.2	69.6	70.1	70.3	70.7	71	71.4	71.8	72.1	72.5	72.9	73.2
	Male	65.4	65.7	66.1	66.4	66.8	67.2	67.6	68	68.3	68.7	69	69.4	69.8	70.1	70.5	70.9	71.1
	Female	69.5	69.8	70.2	70.6	71	71.3	71.8	72.2	72.4	72.8	73.1	73.5	73.9	74.3	74.6	75	75.3
Infant Mortality Rate (‰)	Total	51.5	50.1	48.9	47.6	46.4	45.2	42.9	39.6	38.6	34.9	31.5	28.4	25.6	23.1	20.9	18.9	17.5
	Male	57.4	56	54.7	53.4	52.1	50.8	48.3	44.7	43.7	39.6	35.9	32.5	29.5	26.7	24.2	22	20.4
	Female	45.2	43.9	42.8	41.6	40.5	39.4	37.2	34.2	33.2	29.8	26.8	24.1	21.6	19.4	17.4	15.6	14.5
Under Five Mortality Rate (‰)	Total	65.8	62.3	58.9	55.8	52.8	50	47.3	44.8	41.8	38.6	32.7	31.3	30	28.6	27.4	26.2	25.1
	Male	72.1	68.3	64.8	61.4	58.2	55.1	52.3	49.6	46.4	42.8	36.4	34.8	33.4	31.9	30.6	29.3	28
	Female	59.2	55.9	52.8	49.9	47.1	44.5	42.1	39.9	37.1	34.2	28.8	27.6	26.4	25.2	24.1	23	22.1
Total Fertility Rate (Number of Children)		2.9	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
Population Growth Rate (‰)		17	16.6	16.3	16	15.7	15.4	15	14.7	14.4	14.1	13.8	13.5	13.2	12.9	12.6	12.3	12.1
Proportion of Urban Pop. (%)		51.32	---	---	---	---	---	---	---	---	---	59.25	---	---	---	---	---	---
Crude Birth Rate (‰)		24.1	23.7	23.3	22.9	22.5	22.1	21.8	21.4	21.1	20.7	20.3	20	19.6	19.3	19	18.7	18.4
Crude Death Rate (‰)		7.1	7	7	6.9	6.8	6.8	6.7	6.6	6.7	6.6	6.6	6.5	6.5	6.4	6.4	6.4	6.3
Desired Family Size (Number of Children)		---	---	---	2.4	---	---	---	---	2.5	---	---	---	---	2.5	---	---	---
Urban Pop. Growth Rate (‰)		43.9	---	---	---	---	---	---	---	---	---	32.6	---	---	---	---	---	---

Table 1.3.1. Population and Demography⁴

⁴ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Gross National Product Per Capita (\$)		2682	2621	2708	3004	2184	2759	2928	3079	3255	2879	2965	2123	2598	3383	4172	5008	5477
Unemployment Rate (%)	Total	8	8.2	8.5	9	8.6	7.6	6.6	6.8	6.9	7.7	6.5	8.4	10.3	10.5	10.3	10.3	9.9
	Male	7.8	8.7	8.8	8.8	8.8	7.8	6.9	6.5	6.9	7.7	6.6	8.7	10.7	10.7	10.5	10.3	9.7
	Female	8.5	7.1	7.7	9.3	8.1	7.3	6	7.8	6.8	7.6	6.3	7.5	9.4	10.1	9.7	10.3	10.3
Proportion of Population Below \$1 -PPP- per Day (%)		---	---	---	---	---	---	---	---	---	---	---	---	0.2	0.01	0.02	0.01	---
Labour Force Participation Rate (%)	Total	56.6	57	56	52.2	54.6	54.1	53.7	52.6	52.8	52.7	49.9	49.8	49.6	48.3	48.7	48.3	48
	Male	79.7	80.3	79.7	78.1	78.5	77.8	77.3	76.8	76.7	75.8	73.7	72.9	71.6	70.4	72.3	72.2	71.5
	Female	34.2	34.1	32.7	26.8	31.3	30.9	30.6	28.8	29.3	30	26.6	27.1	27.9	26.6	25.4	24.8	24.9
Gini Coefficient		---	---	---	---	0.49	---	---	---	---	---	---	---	0.44	0.42	0.4	0.38	---

Table 1.3.2. Population and Economy⁵

⁵ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Adult Literacy Rate (%)	Total	78.4	79.9	82	85	84.4	85.2	85.1	85.3	85.9	86.3	86.4	86.3	87.5	88.3	87.4	88.1	88.1
	Male	89.8	91.1	92.2	93.5	93.4	94	94	93.9	94.4	94.6	94.5	94.5	95.3	95.7	95.3	96	96
	Female	67.4	68.9	72	76.7	75.6	76.6	76.3	76.9	77.6	78.1	78.3	78.2	79.9	81.1	79.6	80.3	80.4
Gross Primary School Enrollment Ratio (%)	Total	101.9	102.2	100.1	97.64	97.02	96.47	96.68	---	---	---	---	---	---	---	---	---	---
	Male	105.4	105.5	103.2	100.2	99.5	99.01	99.69	---	---	---	---	---	---	---	---	---	---
	Female	98.32	98.58	96.78	94.88	94.38	93.78	93.55	---	---	---	---	---	---	---	---	---	---
Gross Primary Education Enrollment Ratio (%)	Total	---	---	---	---	---	---	---	89.51	94.31	97.52	100.9	99.45	96.49	96.3	95.74	95.59	96.34
	Male	---	---	---	---	---	---	---	96.26	100.7	103.3	106.3	104.2	100.9	100.3	99.48	98.83	99.21
	Female	---	---	---	---	---	---	---	82.43	87.6	91.47	95.31	94.51	91.91	92.14	91.85	92.24	93.37
Net Primary School Enrollment Ratio (%)	Total	91.96	92.63	90.82	90.09	89.34	88.93	89.4	---	---	---	---	---	---	---	---	---	---
	Male	95.06	95.69	93.66	92.13	91.29	90.94	91.8	---	---	---	---	---	---	---	---	---	---
	Female	88.7	89.41	87.83	87.92	87.28	86.79	86.92	---	---	---	---	---	---	---	---	---	---
Net Primary Education Enrollment Ratio (%)	Total	---	---	---	---	---	---	---	84.74	89.26	93.54	95.28	92.4	90.98	90.21	89.66	89.77	90.13
	Male	---	---	---	---	---	---	---	90.25	94.48	98.41	99.58	96.2	94.49	93.41	92.58	92.29	92.25
	Female	---	---	---	---	---	---	---	78.97	83.79	88.45	90.79	88.45	87.34	86.89	86.63	87.16	87.93

Table 1.3.3. Population and Education⁶

⁶ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Gross Secondary Education Enrollment Ratio (%)	Total	38.05	41.21	44.45	47.34	50.9	53.4	52.62	52.79	57.15	58.84	60.97	67.89	80.76	80.97	80.9	85.18	86.64
	Male	45.95	49.44	53.41	56.69	61.2	63.47	61.64	60.2	64.89	67.1	69.67	76.94	93.36	90.8	89.53	95.07	96.24
	Female	29.72	32.58	35.06	37.54	40.15	42.9	43.19	44.97	48.99	50.15	51.84	58.38	67.52	70.67	71.88	74.88	76.66
Net Secondary Education Enrollment Ratio (%)	Total	26.35	28.21	31.13	34.57	36.74	38.74	38.54	37.87	38.87	40.38	43.95	48.11	50.57	53.37	54.87	56.63	56.51
	Male	31.82	33.85	37.41	40	42.35	44.05	43.1	41.39	42.34	44.05	48.49	53.01	55.72	58.08	59.05	61.13	60.71
	Female	20.59	22.31	24.56	28.86	30.89	33.21	33.78	34.16	35.22	36.52	39.18	42.97	45.16	48.43	50.51	51.95	52.16
Average Number of Years of Schooling Completed (Year)	Total	---	---	---	5.37	---	---	---	---	5.97	---	---	---	---	---	---	---	---
	Male	---	---	---	6.48	---	---	---	---	7.01	---	---	---	---	---	---	---	---
	Female	---	---	---	4.33	---	---	---	---	4.96	---	---	---	---	---	---	---	---

Table 1.3.3 (continued). Population and Education⁷

⁷ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Ratio of Girls to Boys in Primary School (%)	93.32	93.41	93.78	94.66	94.85	94.72	93.84	---	---	---	---	---	---	---	---	---	---
Ratio of Girls to Boys in Primary Education (%)	---	---	---	---	---	---	---	85.63	86.97	88.54	89.64	90.71	91.1	91.86	92.33	93.33	94.11
Ratio of Girls to Boys in Secondary Education (%)	64.68	65.9	65.64	66.22	65.6	67.59	70.07	74.7	75.5	74.74	74.41	75.88	72.32	77.83	80.29	78.76	79.65
Proportion of Women Parliamentarians (%)	---	1.8	---	---	---	2.4	---	---	---	4.2	---	---	4.4	---	---	---	---
Ratio of Literate Females to Males (in 15-24 Age Group) (%)	91.4	91.9	91.9	94.1	94.4	95.2	95.8	96.2	96.8	96.6	95.3	95.5	96.3	96.3	95.2	95.5	95.7
Proportion of Female-Headed Households (%)	8.7	9.1	9.1	9.4	9.3	9.6	9.7	10.4	10.4	10.7	11	11	11.9	12.2	11.3	12.3	12.8
Female Share of Paid Employment in Non-Agricultural Activities (%)	15.8	15.5	16.6	16.6	17	16.9	16.8	17.7	18.3	18.2	19.2	19	20.6	20.6	19.9	20.3	20.9

Table 1.3.4. Population, Gender and Development⁸

⁸ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Proportion of Population with Sustainable Access to an Improved Water Source (%)	---	---	---	---	83.1	---	---	---	---	---	---	---	93.6	---	92.7	94.8	---
Proportion of Population with Access to Improved Sanitation (%)	---	---	---	---	67.4	---	---	---	---	---	---	---	81.4	---	82.9	82.6	---
Number of Persons Per Room	---	---	---	---	---	---	---	---	---	---	1.27	---	---	---	---	---	---
Labor Force Participation Rate of Children at 12-14 Age Group (%)	24.2	25.9	22.3	16	18.8	17.8	16.9	14.8	13.5	12.2	10.2	7.1	5	3.8	---	---	---
Proportion of Education Expenditures in the Public Sector (%)	---	---	---	---	---	---	---	---	---	---	9.7	8.9	10.6	11.1	12.1	13.1	14.8
Proportion of Health Expenditures in the Public Sector (%)	---	---	---	---	---	---	---	---	---	---	8.4	8.9	11.3	12.9	15.4	16.9	18

Table 1.3.5. Population and Social Development⁹

⁹ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Contraceptive Prevalence Rate (%)	---	---	---	62.6	---	---	---	---	63.9	---	---	---	---	71	---	---	---
Proportion of Births Attended by Skilled Health Personnel (%)	---	---	---	75.9	---	---	---	---	80.6	---	---	---	---	83	---	---	---
Fertility Rate of Females at 15-19 Age Group (‰)	---	---	---	56	---	---	---	---	60	---	---	---	---	46	---	---	---
Contraceptive Knowledge (%)	---	---	---	99.1	---	---	---	---	98.9	---	---	---	---	99.8	---	---	---
HIV Prevalence Rate Among Pregnant Women Aged 15-24 (‰)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	---	---
Proportion of Children Immunized Against Measles (%)	---	---	---	77.9	---	---	---	---	78.5	---	---	---	---	79.4	---	---	---
Prevalence of Underweight in Children Under 5 Years (%)	---	---	---	9.5	---	---	---	---	8.3	---	---	---	---	3.9	---	---	---
Proportion of Population Below Minimum Daily Nutritional Requirement (%)	---	---	---	---	---	---	---	---	---	---	---	---	1.35	1.29	1.29	0.87	---

Table 1.3.6. Population, General Health, Reproductive Health and Nutrition¹⁰

¹⁰ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



INDICATORS	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Cropland/Arable Land Per Capita (Hectare)	0.44	0.43	0.42	0.41	0.41	0.39	0.39	0.38	0.37	0.37	0.35	0.35	0.35	0.33	0.34	0.33	---
Annual Energy Consumption Per Capita (KGOE)	944	948	971	1013	975	1031	1111	1152	1146	1119	1194	1103	1130	1194	1234	1253	1264
Biodiversity: Land Area Protected (%)	2.93	2.96	2.96	3.17	3.37	3.44	3.56	3.61	3.65	3.7	4.72	4.72	4.9	4.96	5.16	5.62	---
Energy Intensity: Energy Use Per Unit of GDP (%)	6.19	5.03	4.89	3.92	5.21	4.65	5.78	5.32	3.27	4.85	7.97	8.7	7.37	6.96	7.43	9.23	10.35
Carbon Dioxide Emissions Per Capita (Metric Tone)	2.26	2.31	2.37	2.44	2.36	2.51	2.76	2.9	2.84	2.79	3.07	2.79	2.87	3.03	3.12	---	---

Table 1.3.7. Population and Environment¹¹

¹¹ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



1.4. Geographic profile

1.4.1. Geomorphologic characteristics

Turkey (Figure 1.4.1) is situated between the two continents, Europe and Asia, serving as a bridge¹². The covering area of Turkey is 814,578 square kilometers by linking Asia to Europe through the Sea of Marmara and the Straits of Istanbul and Çanakkale. Anatolia, the Asian part is the biggest part (97%) and Thrace, the European part is the smallest part (3%) of the Turkey¹³.

The Turkish shoreline stretches for 8,210 kilometers along the Mediterranean in the south, the Aegean in the west and the Black Sea in the north. In the northwest there is also the important inland Sea of Marmara, between the straits of the Dardanelles and the Bosphorus¹².

Turkey borders on Greece and Bulgaria in the west, Iran, Nakhchevan, Georgia and Armenia in the east and Iraq and Syria on the South.

The topography is extremely varied, the major part of the country consists of highland plateaus with an average elevation of 1,050 meters, surrounded by mountainous areas, which rise towards the east. Mount Ararat is Turkey's highest peak at 5,165 m, situated in the North-east.

Kızılırmak (1,355 km), Fırat (1,263 km), Sakarya (824 km) and Dicle (523 km in Turkish borders) are the Turkey's longest rivers. The land which is located Dicle and Fırat is called as Mesopotamia. Meric, which is located on the European part, forms the border between Turkey and Greece.



Figure 1.4.1. Turkey map¹²

¹² About Turkey Interactive CD, Directorate General of Press and Information under Office of Prime Minister, 2011, <http://www.byegm.gov.tr/docs/Turkiye2011/index.htm>

¹³ Turkey's Official Tourism Portal, <http://www.goturkey.com/turkiye.php?lng=en&content=ceography>



1.4.2. Ecosystems

Turkey is described as a bridge between Europe, Asia and Africa. The differentiation of topographic structure and climatic conditions of Turkey has resulted in a great variety of natural habitats, from sand dunes and arid steppes to alluvial plains, lakes, marines and rivers. At the same time, its mountainous and varied topography, including seas, Istanbul and Çanakkale Straits, make it as much barrier as bridge. Turkish flora includes many wild relatives and genetic diversity of important domestic species (e.g. wheat, chickpea, lentil, apple, pear, apricot, chestnut, and pistachio). Turkey is also home to a number of ornamental flowers, the most notable being the tulip. Among continental countries, Turkey ranks 9th in terms of biodiversity richness with over 33% of its flora being endemic. From this perspective;

- Turkey has 75% of the total 12,000 plant species found in the whole of Europe. Turkey has also 3,000 endemic plant species, which forms 1/3 of this flora
- Due to the location among Europe, Asia and Africa, surrounding of the three sides with different ecological seas, high attitude differences such as 5,000 meters above sea level; 132 mammal, 453 bird, 106 reptile and 345 fish species live in Turkey.
- The wetlands of Turkey have a vital importance for most of the immigrant birds and it is also the breeding area for most of the water birds.
- Two main migration routes of Western Palearctic Region are located in Turkey

Anatolia is similarly rich in fauna, with over 80,000 species. It is the original homeland for the fallow deer and the pheasant. Lions, tigers and leopards once prowled freely across the Anatolian steppe. Today, the mountains and national parks are still abound with wildlife, such as brown bears, wild boar, lynx, wolves, the occasional leopard and over 400 species of birds, several of them endangered.

1.4.3. LULUCF

Emissions and removals from land use, land use change and forestry (LULUCF) are provided by the Ministry of Food, Agriculture and Livestock and the Ministry of Forestry and Water Affairs. TURKSTAT submitted the report about LULUCF to UNFCCC separately. The net removals from LULUCF are given Figure 1.4.2.



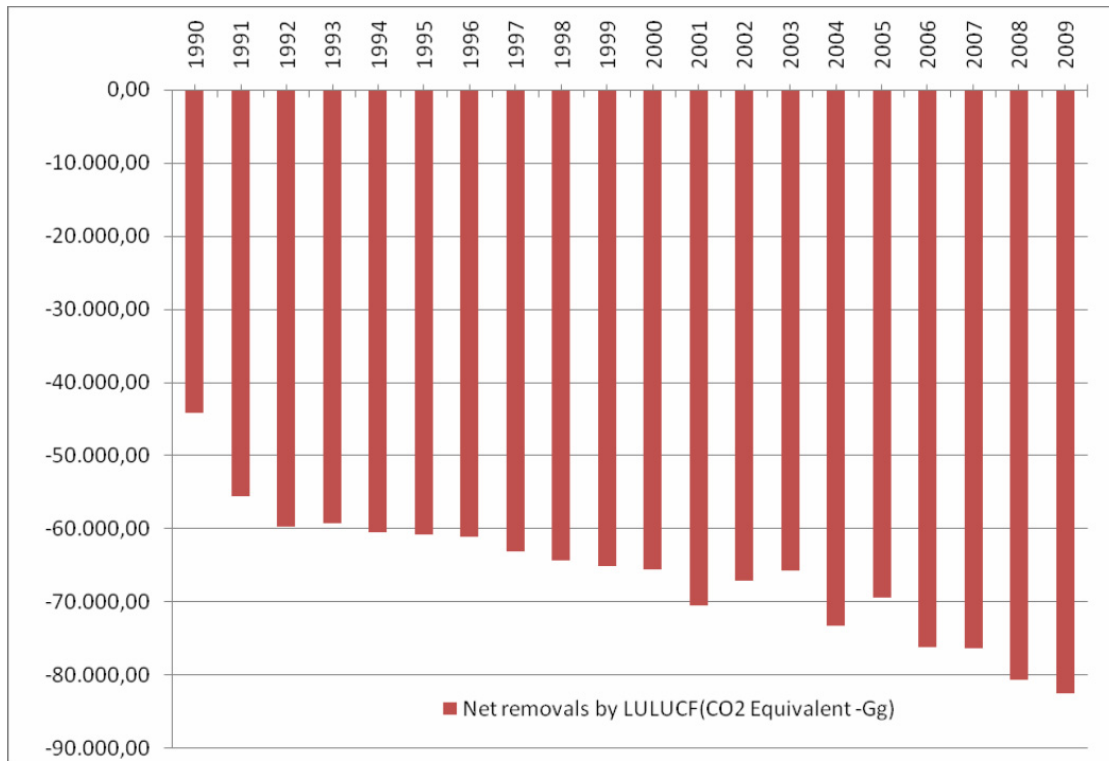


Figure 1.4.2. Net Removals from Sector 5 LULUCF in Gg CO₂ equivalents¹⁴

1.5. Climatic profile

Turkey has five distinct climatic regions; the most important distinctions are between the coast with its moderate winter temperatures and hot, humid summers, and the inland areas with their extremely cold winters and excessively hot summers.

Turkey's climatic regions are:

- I) Mediterranean Climate,
 - Ia) Humid Mediterranean Climate
 - Ib) Semi-humid Mediterranean Climate
- II) Black Sea Climate
- III) Semi-humid Marmara Climate
- IV) Steppe Climate
 - IVa) Semi-arid Central Anatolia Climate
 - IVb) Semi-arid Southeastern Anatolia Climate
- V) Continental Eastern Anatolia Climate

The different types of climates create disparities in agricultural productions, the nature of habitation, density of population, tourism and industrial activities. The climatic regions of Turkey are illustrated in Figure 1.5.1.

¹⁴ Turkey Greenhouse Gas Inventory (1990-2009), TURKSTAT 2011, http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/5888.php



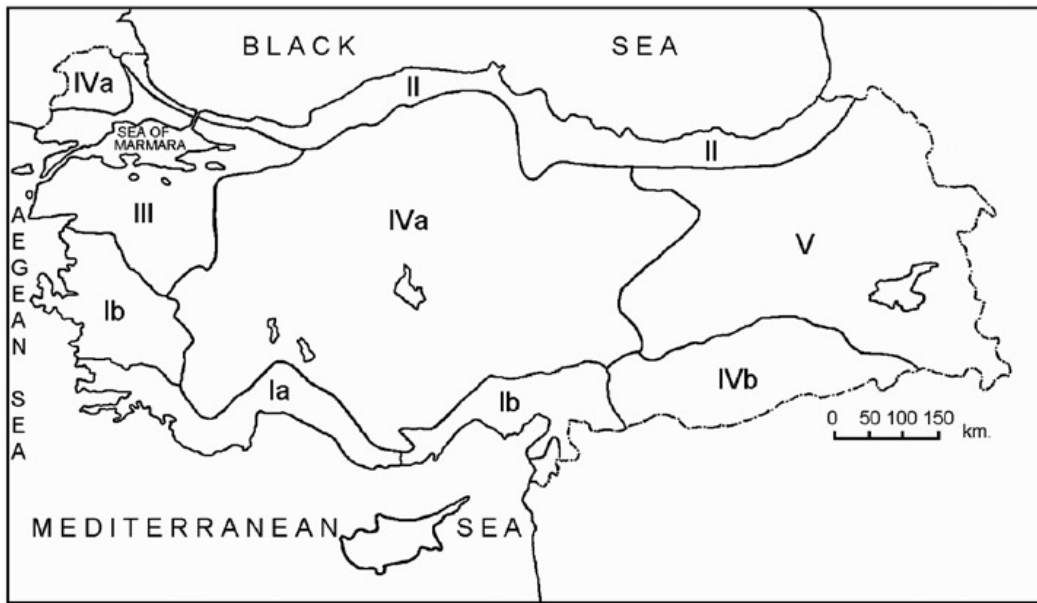


Figure 1.5.1. Turkey's climatic regions¹⁵

1.5.1. Precipitation

Annual precipitation quantity of Turkey depends on the distance from coasts, influence of wind and altitude of the area. The rainiest region appears to be the Black Sea area and the most arid is the Southeast region of the country. Annual amount of the precipitation is above 1000 millimeters on the west and east coasts. The autumn and winter are seasons which most of the precipitation falls in. The geographical distribution of means annual precipitation of Turkey is shown in Figure 1.5.2.

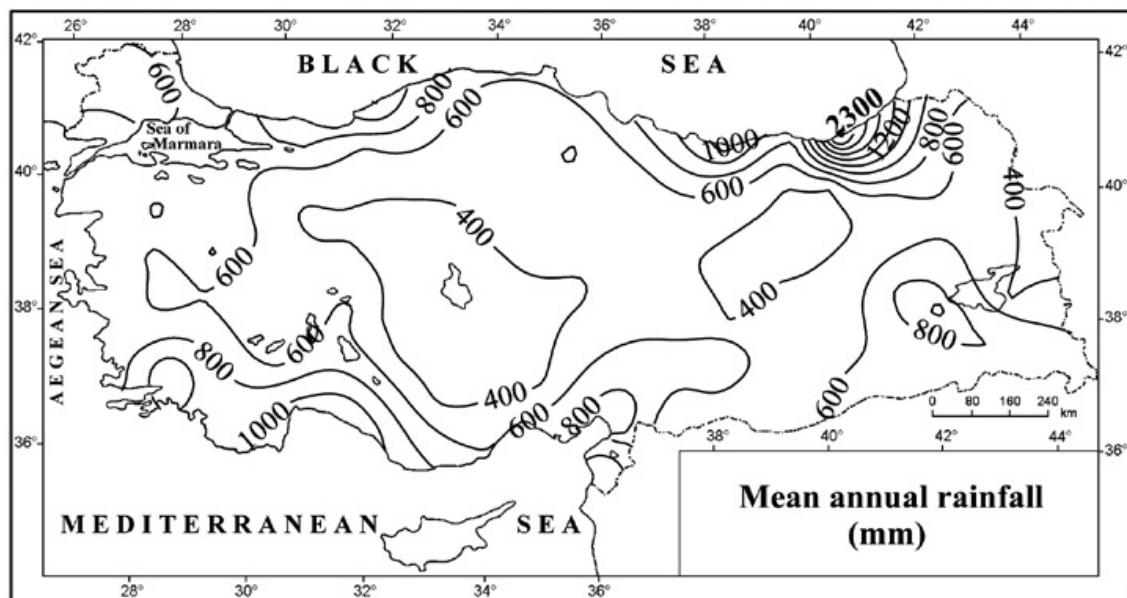


Figure 1.5.2. The geographical distribution of means annual precipitation of Turkey¹⁵

¹⁵ First National Communication on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>

In the Aegean and Mediterranean regions, annual precipitation varies from 600 to 1000 millimeters, depending on location (MoEF, 2007). The greatest amount of rainfall is received by the Black Sea coast. Annual amount of the precipitation is above 1000 millimeters in Black Sea region. Especially, the eastern part of that coast averages 1400 millimeters annually. This region is a unique part of Turkey that receives rainfall throughout the year. In the Anatolian Plateau, annual precipitation averages about 400 millimeters. The Konya Plain and the Malatya Plain are the driest regions where annual rainfall is less than 300 millimeters¹⁶. The mean annual precipitation amounts in Marmara region vary from 500 millimeters to 700 millimeters (MoEF, 2007).

1.5.2. Temperature

The West and South regions of Turkey are under the affects of Mediterranean Climate. Summers are hot and dry, and winters are cool and rainy in there. The Northeast Anatolia is under the influence a continental climate. According to this climate regime, summers are short and cool, and winters are long and intense. The Central Anatolian Plateau has the characteristics of a steppe climate. The properties of steppe climate show arid and hot summers, and cold winters (MoEF, 2007). The spatial distribution of means annual temperatures over Turkey is shown in Figure 1.5.3.

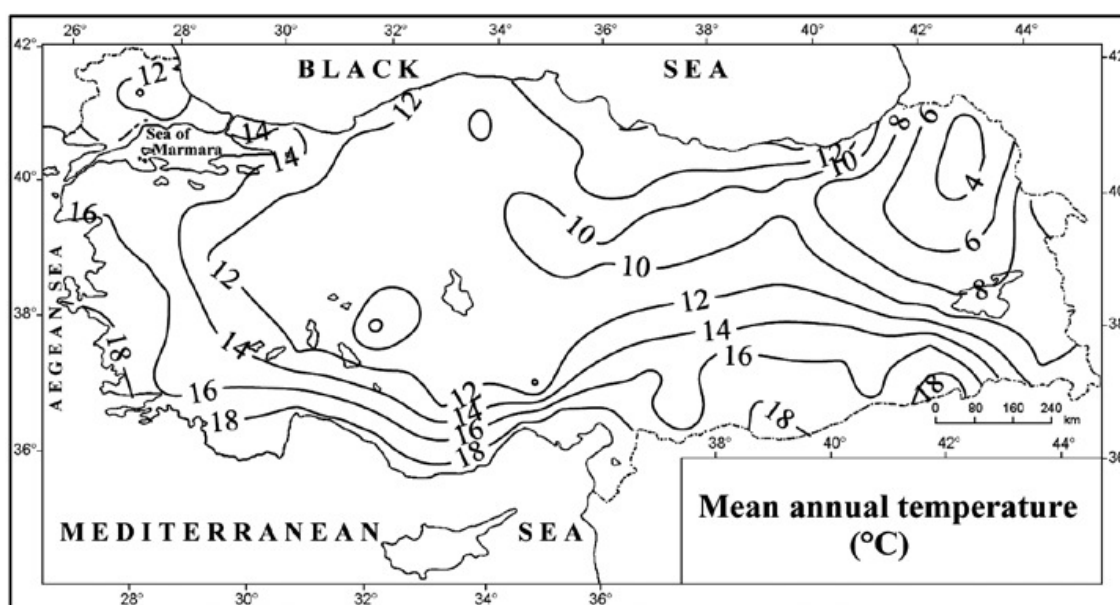


Figure 1.5.3. The spatial distribution of means annual temperatures over Turkey¹⁷

The mean annual temperatures are about 20°C on the eastern of Mediterranean coast. In the coldest month, the temperatures fall in between 5°C and 10°C in January. On the other hand, in hottest month of July, temperatures reach to 27°C-28°C. For the Black Sea climate, the mean annual temperature is about 8°C -12°C. In the Marmara region, mean temperature is approximately 23°C -24°C in month of July. The coldest month in this region is January and

¹⁶ http://www.photius.com/countries/turkey/climate/turkey_climate_climate.html

¹⁷ First National Communicate on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>

the temperature lies between 3°C -5°C. Central Anatolia region's mean July and August temperatures are about 20°C and 22°C. In the coldest month of January the temperature vary from 0°C to -3°C. In Southeastern Anatolia Climate, the mean temperatures of January are between 2°C -5°C in the coldest time interval. However, summers are very hot and mean temperatures are about 30°C in the region. The coldest region of Turkey is Eastern Anatolia. In that region, in the coldest month of January varies -8°C to -10°C. The mean temperature in the warmest time interval is under 20°C in the area (MoEF, 2007).

The more detailed information about Turkey's climatic profile can be taken from Turkish State Meteorological Service.

1.5.3. Other climatic characteristics

The Mediterranean macroclimate zone lies between sub-tropical and temperature zones. Since Turkey is located in that zone, it is allowing to have widely diverse regional and/or seasonal variations (MoEF, 2007). Turkey's diverse regions have different climates, with the weather system on the coasts contrasting with that prevailing in the interior. The Aegean and Mediterranean coasts have cool, rainy winters and hot, moderately dry summers¹⁸.

1.6. Economic profile

1.6.1. General

Turkey has successfully implemented a growth strategy based on competitive markets last two decades. The basic strategy is to support the private business sector (Economic Survey of Turkey 2008, OECD, 2008). Turkey is a dynamic emerging market. The primary actors on the economic growth are industry and service sectors. Agriculture sector still plays an important role and accounts for about 30% of employment. An aggressive privatization program has reduced state involvement and added dynamism to the economy. By the effective macroeconomic policies and structural reforms, Turkey has been one of the resilient stakeholders in the global economy. Turkey's growth trend in terms of gross domestic profile (GDP) growth rate is depicted in Figure 1.6.1.

The effects of the world economic crisis could be seen from 2008 on the GDP. GDP rates dropped to the modest levels after 2001 economic crisis.

In 2010, GDP was 549,814 million €, which suggests that the Turkish economy became the sixteenth biggest economy among 30 OECD countries. GDP in 2010 has increased by 9.0 % to 549,814 million € at constant (1998) prices¹⁹.

Turkey's GDP per Capita trend is depicted in Figure 1.6.2, After the economic crisis (2001) GDP per Capita has started to grow. While in 2002 it was 3,690 € it become 7,532 € in 2010.

¹⁸ http://www.photius.com/countries/turkey/climate/turkey_climate_climate.html

¹⁹ Association of Treasury Controllers, 2011, <http://www.hazine.org.tr/en/index.php/turkish-economy/output-growth>



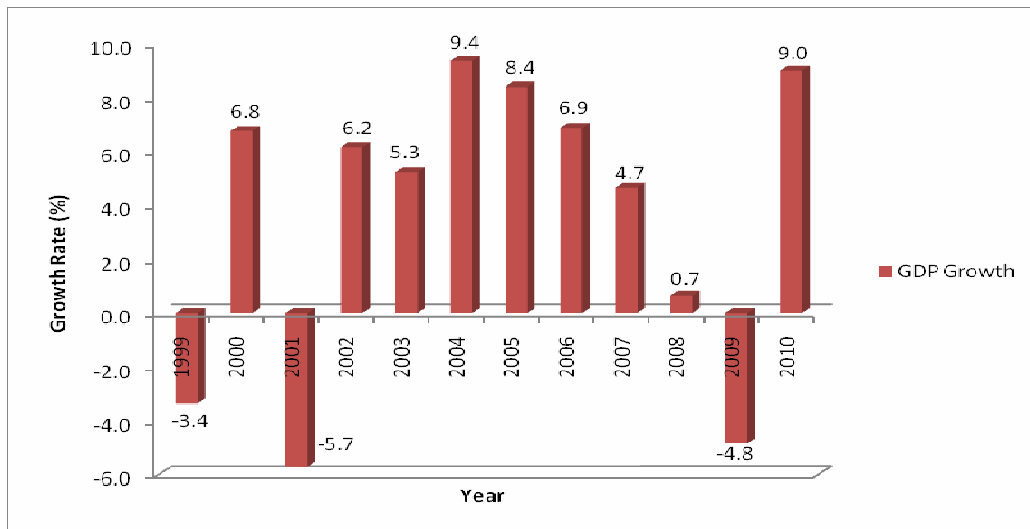


Figure 1.6.1. GDP growth for Turkey at constant (1998) prices²⁰

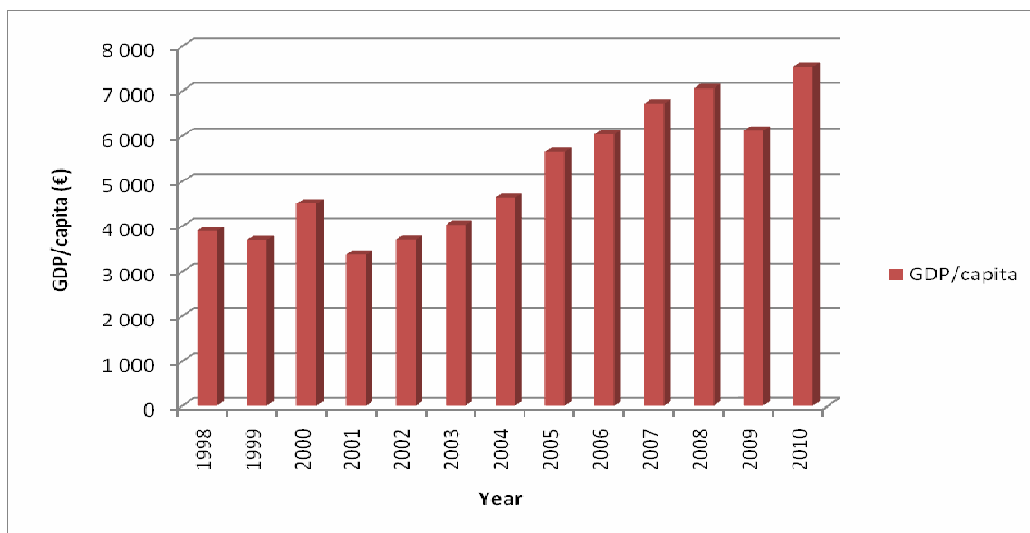


Figure 1.6.2. GDP per Capita for Turkey (EUR)²¹

1.6.2. Primary sector

Turkey is among the world's most important countries having agricultural production. Also, the agricultural sector in Turkey is one of the major employer and contributor to the country's GDP. The Turkish agricultural policy is set out in five-year development plans. The agricultural policies are determined within the framework of the World Trade Organization Agreements and other international obligations.

In Turkey, 67% of cultivated lands are allocated to field crops, 12% to fruit growing and viniculture, 3% to vegetable gardening and 18% to fallow for field crops. The agricultural land and forest area are shown in Table 1.6.1 between 1988 and 2010.

²⁰ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>

²¹ The GDP data in TL and USD currencies are available at Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>. The EUR currency values are taken from TURKSTAT officially.



Year	Total utilized agricultural land	Total arable land and land under permanent crops	Total arable land	Area of cereals and other crop products		Area of vegetable gardens	Total land under permanent crops	Land under permanent crops			Land under permanent meadows and pastures ⁽¹⁾	Forest area ⁽²⁾
				Sown area	Fallow land			Area of other fruits, beverage and spices crops	Area of vineyard	Area of olive trees		
1988	41 940	27 763	24 786	18 995	5 179	612	2 977	1 531	590	856	14 177	20 199
1989	42 074	27 897	24 880	19 036	5 234	610	3 017	1 563	597	857	14 177	20 199
1990	42 033	27 856	24 827	18 868	5 324	635	3 029	1 583	580	866	14 177	20 199
1991	40 032	27 654	24 631	18 776	5 203	652	3 023	1 560	586	877	12 378	20 199
1992	39 953	27 575	24 563	18 811	5 089	663	3 012	1 565	576	871	12 378	20 199
1993	39 913	27 535	24 481	18 940	4 887	654	3 054	1 615	567	872	12 378	20 199
1994	40 049	27 671	24 605	18 641	5 255	709	3 066	1 618	567	881	12 378	20 199
1995 ⁽³⁾	39 212	26 834	24 373	18 464	5 124	785	2 461	1 340	565	556	12 378	20 199
1996	39 364	26 986	24 514	18 635	5 094	785	2 472	1 344	560	568	12 378	20 199
1997	39 242	26 864	24 297	18 605	4 917	775	2 567	1 364	545	658	12 378	20 703
1998	39 344	26 966	24 436	18 751	4 902	783	2 530	1 389	541	600	12 378	20 703
1999	39 180	26 802	24 279	18 450	5 039	790	2 523	1 393	535	595	12 378	20 703
2000	38 757	26 379	23 826	18 207	4 826	793	2 553	1 418	535	600	12 378	20 703
2001	40 967	26 350	23 800	18 087	4 914	799	2 550	1 425	525	600	14 617	20 703
2002	41 196	26 579	23 994	18 123	5 040	831	2 585	1 435	530	620	14 617	20 703
2003	40 645	26 028	23 372	17 563	4 991	818	2 656	1 501	530	625	14 617	20 703
2004	41 210	26 593	23 871	18 110	4 956	805	2 722	1 558	520	644	14 617	21 189
2005	41 223	26 606	23 830	18 148	4 876	806	2 776	1 598	516	662	14 617	21 189
2006 ⁽⁴⁾	40 493	25 876	22 981	17 440	4 691	850	2 895	1 670	513	712	14 617	21 189
2007	39 505	24 888	21 979	16 945	4 219	815	2 909	1 671	485	753	14 617	21 189
2008	39 122	24 505	21 555	16 460	4 259	836	2 950	1 693	483	774	14 617	21 189
2009	38 911	24 294	21 351	16 217	4 323	811	2 943	1 686	479	778	14 617	21 390
2010*	39 054	24 437	21 384	16 333	4 249	802	3 053	1 749	478	826	14 617	21 537

Source: The Summary of Agricultural Statistics, TURKSTAT

(1) Data are results of 1980, 1991 and 2001 General Agricultural Censuses and compiled every ten years.

(2) Normal forest area having 11 % or more than 11 % forest tree density and spoiled forest area having 10 % or less than 10 % forest tree density are included.

(3) Since 1995, only the closed area of fruit and olive trees have been given and the area of scattered trees have not been included.

(4) Statistical Classification of Products By Activity in European Economic Community (CPA 2002) has been used for crop products since 2006.

(*) Data are provisional

Table 1.6.1. Agricultural land and forest area²²

²² Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



Turkey that meets 2.8% of world fruit production and 3% of vegetable production, ranks 6th and 5th in the world respectively. 60% of the world's hazelnut production is met by Turkey²³.

Although it varies every year, Turkey is the world's biggest producer of hazelnuts, sour cherries, cherries, apricots and dried figs; the second biggest producer of pistachios, chestnuts, strawberries, quinces and raisins; the third biggest producer of olives and walnuts, the fourth biggest producer of apples; the fifth biggest producer of tea; the sixth biggest producer of tangerines and table grapes; the seventh biggest producer of lemons and the eighth biggest producer of oranges²⁴.

The agricultural production trends of Turkey are given in Table 1.6.2.

Agricultural Products	2004	2005	2006	2007	2008
CEREALS	33,996	35,287	34,643	35,807	36,720
Wheat	21,000	21,500	16,510	17,234	17,782
Barley	9,000	9,500	8,600	7,307	5,923
PULSES	1,507	1,428	1,398	1,306	814
Chicpeas	650	610	552	505	518
Lentils	560	555	622	535	131
INDUSTRIAL CROPS	14,668	14,668	21,073	18,074	20,338
Tobacco	157	148	98	75	93
Sugar beets	1,357	14,299	14,452	12,414	15,488
Cotton lint	920	945	976	868	673
Sunflowers	900	950	1,087	854	992
FRESH FRUITS AND VEGETABLES	41,073	44,691	42,639	42,436	40,624
Table grapes	3,500	3,050	4,000	2,742	1,971
Apples	2,100	2,550	2,002	2,458	2,504
Citrus fruits	2,707	2,588	3,037	2,989	2,957
Potatoes	4,800	4,200	4,397	4,246	4,225
Tomatoes	9,440	9,662	9,855	9,945	10,985
TREENUTS	592	835	998	882	1,200
Hazelnuts	358	530	661	530	801
TEA(fresh)	1,105	1,192	1,121	1,145	1,100

Table 1.6.2. Trends in agricultural production (1000 tons)²⁴

²³ About Turkey Interactive CD, Directorate General of Press and Information under Office of Prime Minister, 2011, <http://www.byegm.gov.tr/docs/Turkiye2011/index.htm>

²⁴ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



The export trends in some selected food and agricultural products in Turkey are given in Table 1.6.3.

Product Name	2005	2006	2007	2008	2009
Pulses	159	248	189	239	270
Citrus Fruits	384	374	515	576	788
Tomatoes, fresh	144	174	297	389	407
Raisins	240	289	316	350	408
Hazelnuts and Hazelnut Products	1,920	1,456	1,364	1,428	1,184
Apricots, dried	180	105	236	313	379
Wheat	52	101	9	6	61
Other cereals	39	100	67	33	143
Wheat flour	421	273	424	618	581
Tobacco	468	503	449	428	491
Pasta	228	60	108	182	149
Biscuits	142	154	203	255	239
Olive oil	305	179	135	71	96
Frozen Fruits & vegetables	74	94	111	110	91
Sugar conf, chocolate and products	368	435	566	643	585
Dehydrated vegetables	44	54	66	72	63
Fruit juices & concentrates	92	104	160	131	105
Tomato paste	126	93	91	151	182
Fishery products	237	260	264	414	342
Organic products	26	28	29	26	n/a
Total of the first 24 (HS) Chapters	7,828	8,048	9,142	10,840	10,701

Table 1.6.3. The export trends in selected food and agricultural products (USD million)²⁵

1.6.3. Secondary sector

The Turkish Industry has been played a central role in the economy. The manufacturing industry has competitive strength because of geographical position near to the markets, developed infrastructure and telecommunications systems, human resources.

The major Turkish manufacture industries are:

- Automotive and auto parts industries
- Machinery industry
- Electrical machinery industry
- Electronics industry
- Iron & steel industry
- Shipbuilding
- Chemical industry
- Medical products
- Textiles and clothing
- Jewellery

²⁵ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



- Leather
- Ceramic industry
- Glass industry
- Furniture
- Carpets and kilims

The mining industry also plays one of the greatest roles in Turkish economy. Turkey has got the greatest mine resources for most minerals in the world. The major produce minerals in Turkey are boron, marble, basalt, feldspar, magnesite, perlite, pumice, barite and bentonite. Turkey is also significant producer of ferrochromium and steel.

In Turkey, since the energy strategy targeting comprehensive liberalization and establishment of competitive markets, the country attaches great importance to the establishment of an energy sector which functions in rational way. The energy production strategy is development of comprehensive well-functioning sectors. It requires both ensuring establish security and supply for essential elements²⁶.

The construction sector is also one of the managing sectors in economical growth of Turkey. Many investments have been realized in recent years. During the developing process of construction firms, they have designed, built and operated almost all kinds of projects, such as dams, hydroelectric power plants, thermal power plants, industrial plants, motorways, airports, large housing projects, and touristic resorts.

The more detailed information about Turkey's economic according to sector profiles can be supplied from The Undersecretariat of the Prime Ministry for Foreign Trade, Republic of Turkey Ministry of Industry and Trade and Republic of Turkey Ministry of Finance.

1.6.4. Tertiary sector

N/A

1.6.5. Future prospects for the country's economy and development

The 2023 vision of Turkey declared by Prime Minister Recep Tayyip Erdoğan Erdoğan. Economy and development goals are by the year 2023:

- To take place among the top 10 economies in the world.
- To achieve a gross domestic product of \$2 trillion.
- Achieve per capita income of 25 thousand dollars.
- To increase annual exports to \$500 billion.
- To increase a foreign trade volume to 1 trillion dollars.
- To increase employment rate by 10 points, so the working people population will be 30 million and unemployment rate will reduce to 5 percent.
- To build 20.000 MW and 600 MW installed capacity for wind and geothermal energy respectively.
- To use more efficiently utilizing available energy resources.

²⁶ The Ministry of Economy, 2011, <http://www.tcp.gov.tr/>

- To have at least 3 operating nuclear power plants.
- To build 11 thousand km of railway.
- To expand high-speed train network.
- To build 15 thousand km of divided highway.
- To have one of the 10 largest ports in the world.
- To produce own airplane, unmanned aerial vehicle and satellite.

Also, the Project of Turkey's Strategic Vision 2023 is carrying out to set the goals and place where Turkey has to be in 2023 that is the 100th anniversary of Turkish Republic's foundation. The project is performed under the auspices of H.E. Mr. Abdullah GÜL, President of Turkey.

1.7. Transportation

1.7.1. Road transport

In Turkey, 98% of passenger transportation and almost 100% of freight transportation were conducted by road and rail in 2004. At present, 95% of passenger transportation and 91% of freight transportation are conducted by road. There are currently 5.4 million passenger cars on Turkey's roads and the domestic demand for motor vehicles continues to grow unabated. In 2004, 750,000 vehicles were sold and 450,000 of them were cars. In addition, the international transport fleet of Turkey has 27,000 vehicles. In spite of momentous changes, Turkey is ranked among the last in terms of car ownership with its ownership rate of 143 per 1,000 habitants, among the European and OECD countries in 2005. In turkey, there are 64,000 km of highways. In addition investments are done to improve the road system²⁷.

Road network (1990-2004) and Automotive Park (1990-2004) are shown respectively in Figure 1.7.1 and Figure 1.7.2.

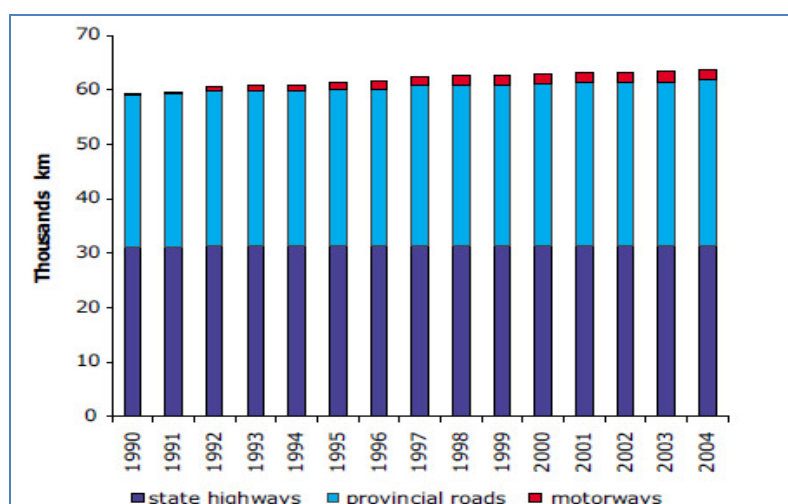


Figure 1.7.1. Road network during 1990-2004²⁷

²⁷ First National Communication on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>

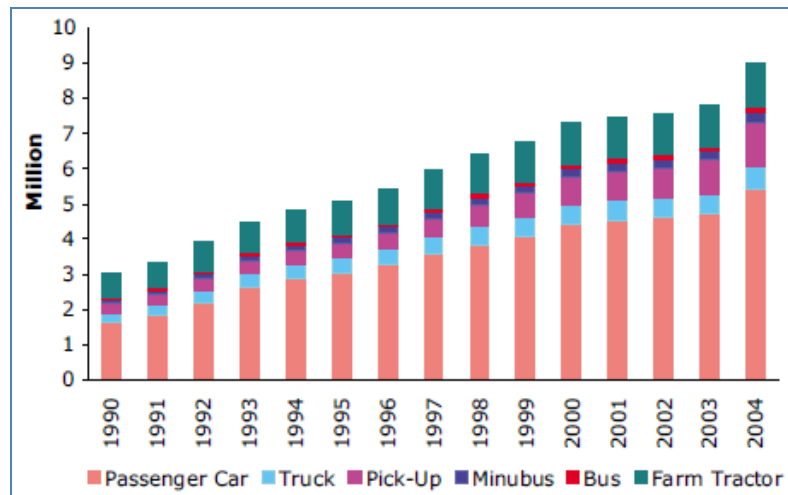


Figure 1.7.2. Automotive Park (1990-2004)²⁸

There are 17,474 km of divided highways in Turkey. As the end of 2002, totally 6,101 km divided highways were constructed. In 7-year period between 2003 and 2009, 11,373 km of divided highways were constructed. By the end of 2012, it is aimed to reach totally 22,055 km of divided highways²⁸.

1.7.2. Shipping

Although three sides of Turkey are surrounded by seas maritime sector has been taken advantage fully. Turkey has a big potential in terms of transportation since it is a natural bridge between Europe, Central Asia and Middle East. Turkey, due to its geographical position in the crossroads of three continents, is located at the heart of a transportation network extending to Atlas Ocean with Gibraltar Strait, to Arabian Peninsula and Indian Ocean with the Sues Canal, to Eurasia and Far East with Mediterranean-Black Sea links through Turkish Straits. That situation reflects the importance of our country in terms of cabotage, international and transit transport²⁸.

Within that framework, the Ministry of Transport, Maritime Affairs and Communications conducts comprehensive activities in the following areas²⁸:

- Development of maritime sector
- increase the share of Turkey's maritime sector and maritime trade
- Improvement cruise transport
- Improvement yacht tourism and to increase the number of yacht ports
- Develop Turkish ship making yards
- Increase safety in the Turkish seas and straits
- Carry out research and development activities in order to improve maritime sector

²⁸ First National Communication on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>

Turkey has a coastline with a length of 8,333 km and emphasises port development and sea transport. Turkey possesses 15 principal state-owned ports, around 30 municipal wharves. The capacity of existing public ports is some 50 million tons a year. With private and semi-private port facilities. Overall capacity is 200 million tons a year²⁹.

1.7.3. Railways

One of the primary objectives of Turkish transport policy is to restructure the railways. As shown in Figure 1.7.3, the railway network of Turkey was 10,984 km long and 21% was electrified at the end of 2004. The railway network of Turkey is relatively underdeveloped and has been inefficient for decades in terms of infrastructure and management due to the absence of modern technology and management techniques. There are studies on renewal, electrification and signalisation of lines. With the completion of ongoing projects, it is estimated that the length of electrified main lines over the entire lines will increase from 22% to 25.4%²⁹.

An ambitious Rail Transport Action Plan has been adopted for restructuring the railway sector by 2008; attention will also be given to rapid modernisation of the railway infrastructure to be realised in harmony with the structure, technical norms and policies of the EU. In this context, within the planned period, rehabilitation of existing tracks of 1,800 km, and completing signaling works of 180 km and electrification works of 160 km are envisaged²⁹.

Bosphorous Tunnel Railway Passage (Marmaray) is the most important part of the shortest rail connection between Europe and Asia. It starts from Bulgaria to Georgia, which will enable an uninterrupted passage to the Bosphorus for the East-West railway corridor. The Marmaray Project is planned by the Ministry of Transport, Maritime Affairs and Communications and construction work started in 2004. It is estimated that the reduction of greenhouse gases in the form of NO₂, NMHC, CO and CO₂ as a consequence of the Marmaray Project will be 130,335 tons/year²⁹.

High Speed Train Project comprises the construction of a new double, totally electrified and signaled high speed line, independent of the existing line, fit for speed up to 250 km/h. The total length of the project is 533 km. The share of railways in passenger transportation will be increased from 10% to 78% by improving the compatibility of railways on Ankara-Istanbul route which is the most dense passenger and freight axis in terms of road, railway and airways²⁹.

²⁹ First National Communication on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>



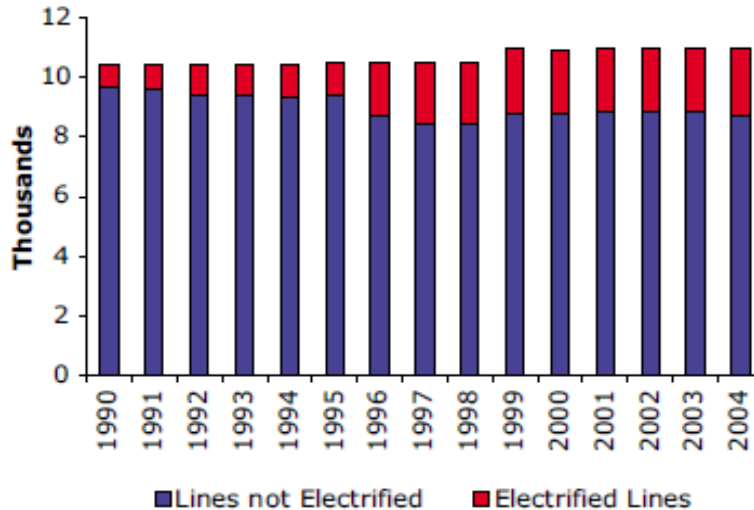


Figure 1.7.3. Rail network³⁰

1.7.4. Air transport

34 different size airports of Turkey are in service for civilian air traffic. The number of international airlines has been increasing steadily as shown in Figure 1.7.4. In 2007, the total passenger number in domestic and international flights has surmounted 70 million. The Ministry of Transport, Maritime Affairs and Communications is carrying out comprehensive activities in the following fields³⁰:

- To improve aviation sector
- To construct new airports, to complete the modernization of the present airports
- To develop regional aviation and economical regional airports
- To implement civil aviation projects
- To carry out international activities in the civil aviation field

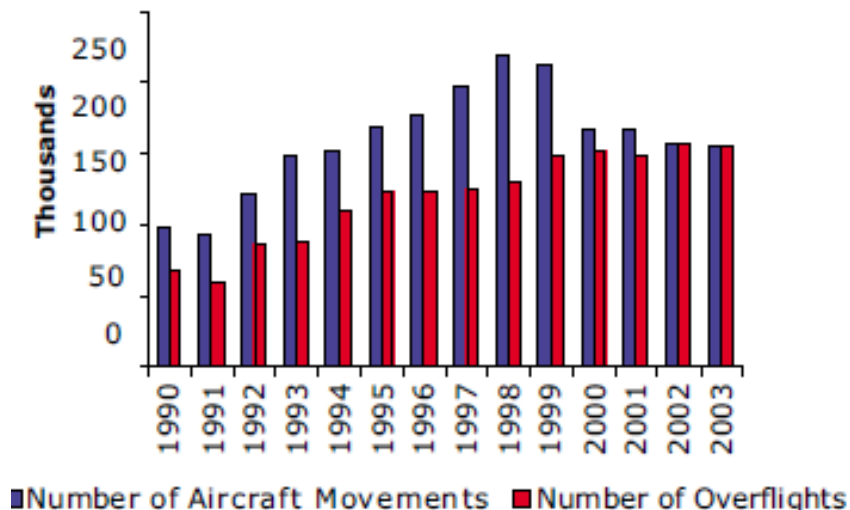


Figure 1.7.4. Number of Planes and Flights (1990-2003)³⁰

³⁰ First National Communication on Climate Change, Republic of Turkey, MoEF 2007, <http://unfccc.int/resource/docs/natc/turnc1.pdf>



1.8. Energy (E)

Institutions providing energy data of Turkey

The Ministry of Energy and Natural Resources (MENR) is the main institution that provides energy data in Turkey. Other related institutions are The Electrical Power Resources Survey and Development Administration (EİE), Turkish Electricity Transmission Company (TEİAŞ), Electricity Generation Corporation (EÜAŞ), The General Directorate of Energy Affairs (EİGM), The General Directorate of Petroleum Affairs (PiGM), The Energy Market Regulatory Authority (EMRA), The Competition Authority, Turkish Atomic Energy Authority (TAEK). 1990-2005 Energy Balance Tables for Turkey are available World Energy Council Turkish National Committee web page³¹ and 2006-2010 Energy Balance Tables, Ministry of Energy and Natural Resources³².

Also, the energy data is available in Eurostat, International Energy Agency and OECD statistics.

1.8.1. Energy supply

In 2010, total primary energy supply of Turkey was 109,3 million TEP, while domestic production was 32,5 million TEP. Total energy supply is divided into four main sources such as: 32% natural gas, 29% coal, 27% petrol, 8% renewables and 5% others. All detailed data is available in Energy Balance Tables reported by the Ministry of Energy and Natural Resources. Total primary energy supply between years 1971 and 2009 is illustrated in Figure 1.8.1.

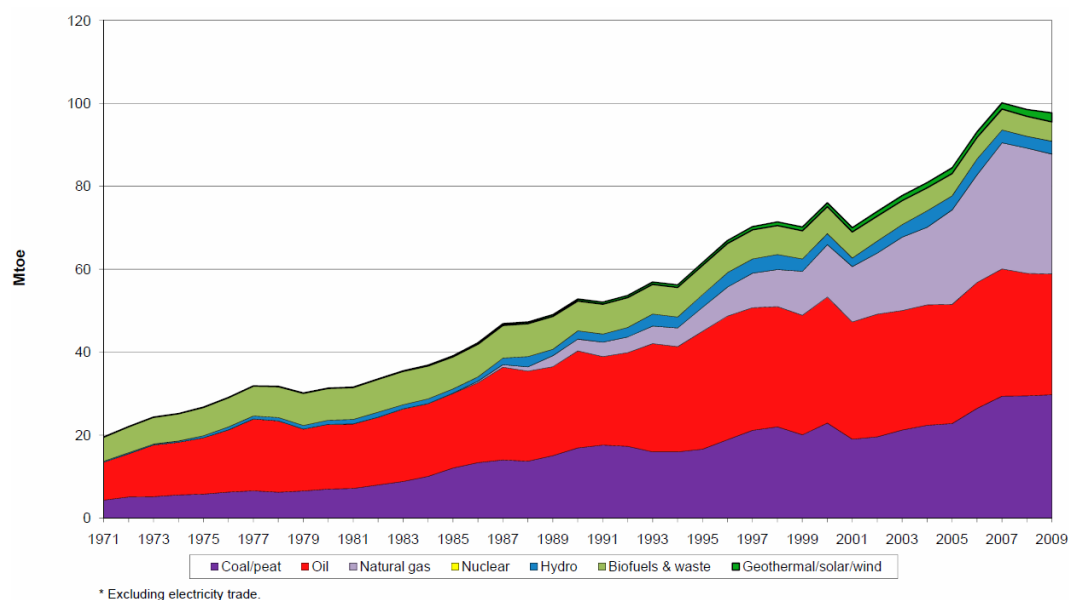


Figure 1.8.1. Total primary energy supply of Turkey³³

³¹ World Energy Council Turkish National Committee, <http://www.dektmk.org.tr/incele.php?id=MTAw>

³² Ministry of Energy and Natural Resources, http://www.enerji.gov.tr/index.php?dil=tr&sf=webpages&b=y_istatistik&bn=244&hn=244&id=398

³³ Energy Balances of OECD Countries, http://www.iea.org/stats/pdf_graphs/TRTPES.pdf

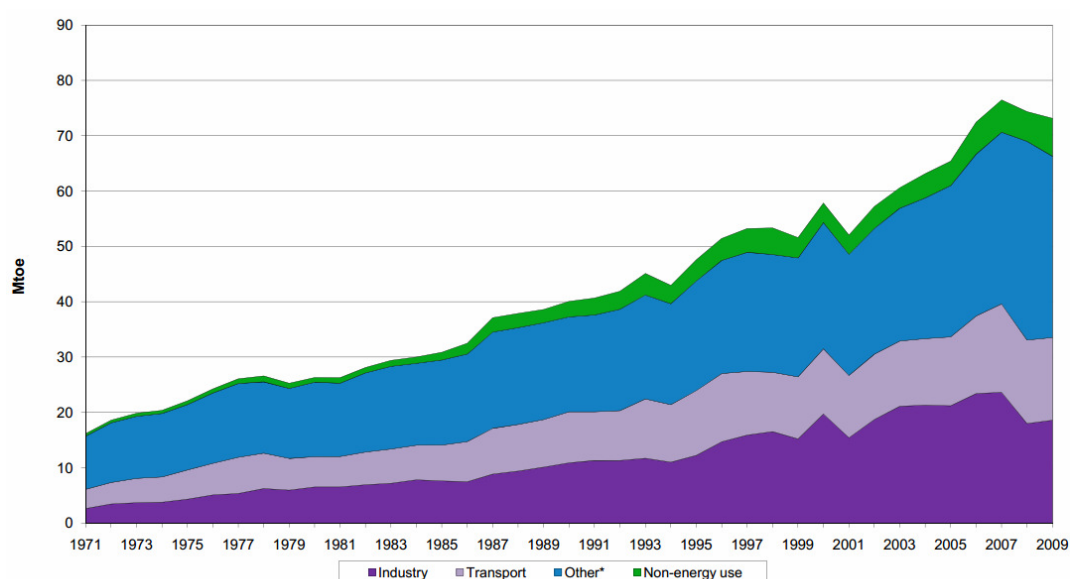


In 2023, it is planned to reach the targets related with supply policy:

- To be able to use of all potential of indigenous coal and hydraulic resources,
- To make maximum use of renewable energy sources,
- To use nuclear energy for electricity generation until 2020,
- To secure rapid and continuous improvement in energy efficiency.

1.8.2. Energy consumption

In 2010, total primary energy demand was 83,4 million TEP. Based on the reference scenario, primary energy consumption is expected to increase by 4% annually by 2020³⁴. In addition, all detailed data for consumption is available in Energy Balance Tables reported by the Ministry of Energy and Natural Resources. Total final energy consumption by sectors from the year 1971 to 2008 is shown in Figure 1.8.2.



* Includes residential, commercial and public services, agriculture/forestry, fishing and non-specified.

Figure 1.8.2. Total final energy consumption by sectors³⁵

³⁴ Ministry of Energy and Natural Resources, http://www.enerji.gov.tr/index.php?dil=en&sf=webpages&b=enerji_EN&bn=215&hn=&nm=40717&id=40717

³⁵ Source: Energy Balances of OECD Countries, http://www.iea.org/stats/pdf_graphs/TRTFC.pdf



1.9. Waste disposal

1.9.1. Solid waste disposal

Municipal Solid Waste (MSW) Management in Turkey

In Turkey, solid waste management are being supported by the municipal authorities according to the legislation and policies operated by the Ministry of Environment and Forestry. The responsibilities and management chart of municipal solid waste in Turkey is illustrated in Figure 1.9.1.

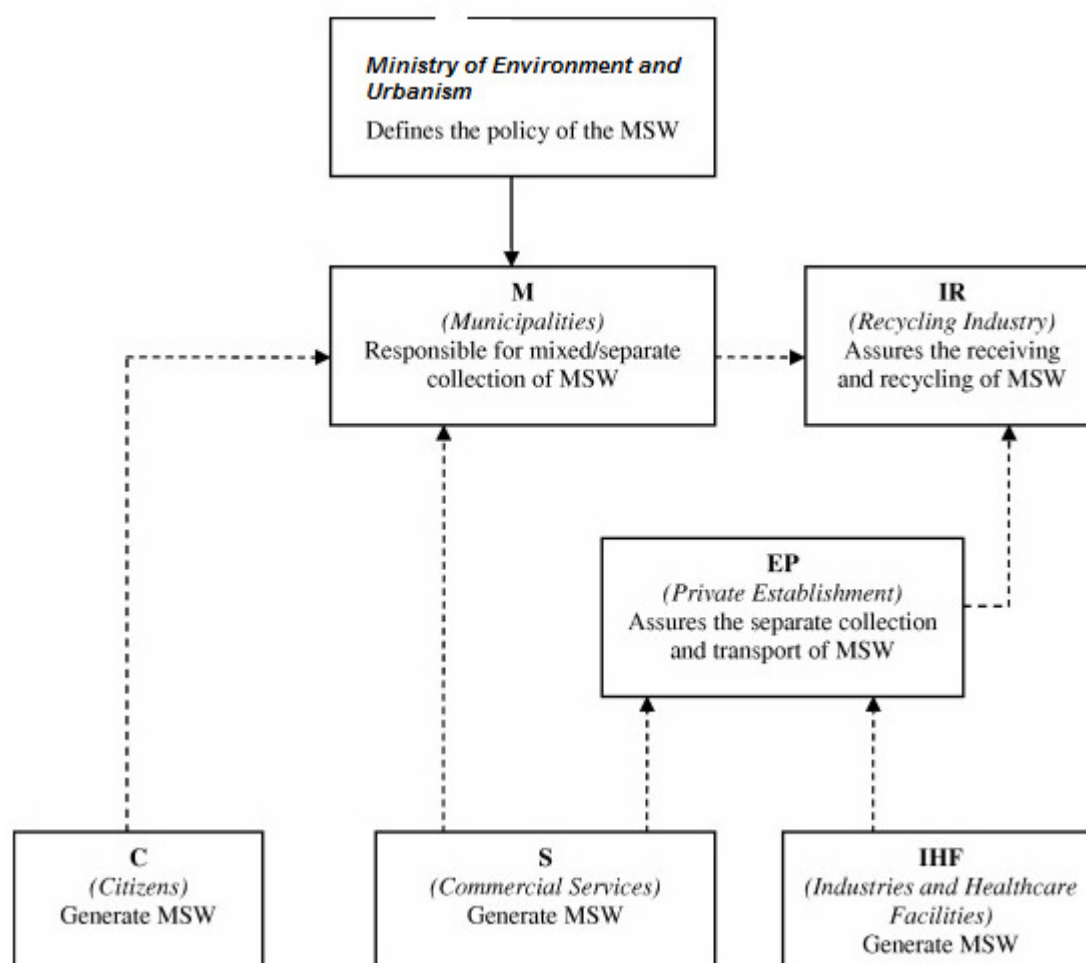


Figure 1.9.1. Responsibilities and management of MSW in Turkey (Revised from N.G., Turan et al., 2008)

Municipal Solid Waste Statistics in Turkey

In 2008, total solid waste collected by municipalities was 24.4 million tons. As disposal methods, it can be reported as 52 % was disposed of in open dumping site and 47 % in sanitary landfill, 1 % in composting. Current situation of disposal methods for municipal solid waste in Turkey is given in Figure 1.9.2.



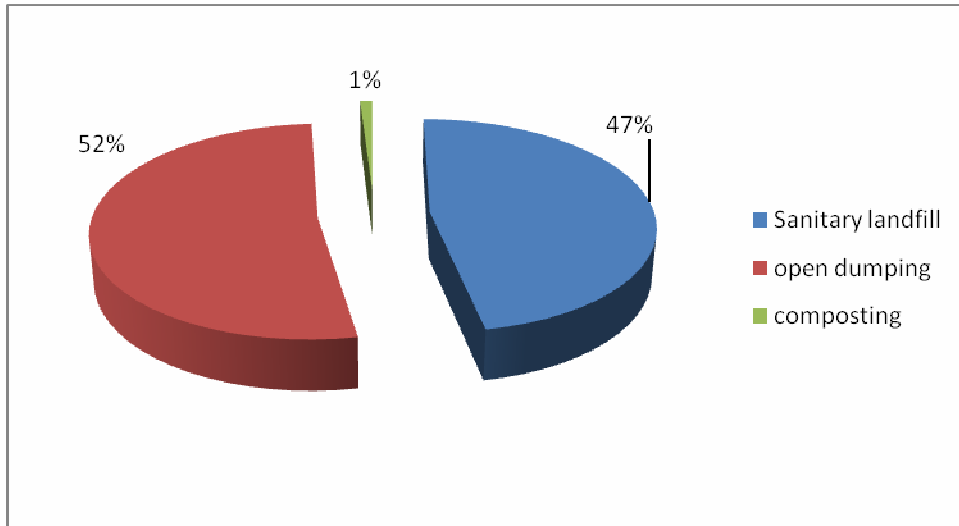


Figure 1.9.2. Distribution of disposal methods for MSW in Turkey³⁶

In Turkey, The Regulation on Landfill requires a significant reduction in the quantity of biodegradable municipal waste (BMW) going to landfill until 2025.

The Regulation on Landfill sets the following national targets as;

- By 2015 reduce the biodegradable municipal waste disposed to landfill to 75% of that produced in 2005
- By 2018 reduce biodegradable municipal waste disposed to landfill to 50% of that produced in 2005
- By 2025 reduce biodegradable municipal waste disposed to landfill to 35% of that produced in 2005.

1.9.2. Wastewater treatment

In Table 1.9.1, main indications for the wastewaters in the municipalities of Turkey are given according to Turkish Statistical Institute, 2010. 2.25 billion m³ of the wastewater (total wastewater produced is 3.26 billion m³) is treated in wastewater treatment plants.

³⁶ Waste Management Action Plan, MoEF 2008,
<http://atikyonetimi.cevreorman.gov.tr/atikyonetimi/Files/Belgeler/sagmenu/atikeylemplani.pdf>

Total population according to 2007 census	70,586,256
Total number of municipalities	3,225
Total municipality population	58,581,515
Municipal population which is served by the sewerage system	51,673,078
The rate of the population which are served by sewerage system to the total population (%)	73
The rate of the population which are served by sewerage system to the municipal population (%)	88
The total waste water quantity drained from the sewerage system (10³ m³/ year)	3,261,455
Number of waste water purifying facilities	236
Physical	29
Biological	158
Advanced	32
Wetland	17
Number of the municipalities which are served by waste water purifying facilities	442
Population of the municipalities which are served by waste water purifying facilities	32,518,318,532
The rate of the population who is served by waste water purifying facilities to the total population (%)	46
The rate of the population which is served by waste water purifying facilities to the total municipal population (%)	56
The number of the municipalities who practicing deep sea water drainage	92

Table 1.9.1. The Main municipal waste water indicators in 2008 (TURKSTAT, 2010)³⁷

³⁷ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



2. The national GHG inventory

2.1. Developing a national GHG-inventory system

2.1.1. Governmental authorities responsible for collecting GHG data

The Coordination Board on Climate Change was re-established to determine the policies related with climate change in 2004. The Minister of Environment and Urbanism is the chairmanship of the Board. The other members of the Board are Ministry of Foreign Affairs, Ministry of Energy and Natural Resources, Ministry of Forestry and Water Affairs, Ministry of Transport, Maritime Affairs and Communications, Ministry of Food, Agriculture and Rural Affairs, Ministry of Science, Industry and Technology, Ministry of Finance, Ministry of Health, Ministry of Development, Ministry of Economy, Turkish Industrialists' and Businessmen's Association and the Union of Chambers and Commodity Exchanges of Turkey.

The Coordination Board on Climate Change has 11 technical working groups given below with coordinator institutions.

- Research of Climate Change Impacts (Coordinator: Turkish State Meteorological Service)
- **Greenhouse Gas Inventory (Coordinator: Turkish Statistical Institute)**
- Mitigation on Industry, Residential Areas, Waste Management and Service Sector (Coordinator: Ministry of Science, Industry and Technology)
- Mitigation on Energy Sector (Coordinator: Ministry of Energy and National Resources)
- Mitigation on Transportation (Coordinator: Ministry of Transport, Maritime Affairs and Communications)
- LULUCF (Coordinator: General Directorate of Forestry)
- Policies and Strategies (Coordinator: Ministry of Environment and Urbanism)
- Education and Public Awareness (Coordinator: Ministry of Environment and Urbanism)
- Adaptation (Coordinator: General Directorate of State Hydraulic Works)
- Finance and Technology Transfer (Coordinator: Ministry of Development)
- Carbon Market (Coordinator: Ministry of Environment and Urbanism)

Turkish Statistical Institute (TURKSTAT) is a scientific and technical institute responsible for collecting, evaluating and analyzing raw data and publishing statistics about economic, social, demographic, cultural, environmental, scientific and technological fields. Preparing the national greenhouse gas inventory is one of the tasks of TURKSTAT under environmental statistics. Ministry of Energy and Natural Resources, Ministry of Environment and Urbanism, Ministry of Forestry and Water Affairs, Ministry of Transport, Maritime Affairs and Communications and Ministry of Agriculture and Rural Affairs have been working with TURKSTAT to prepare CRF reporter for each source key categories.



2.1.2. Supporting institutions

The national greenhouse gas inventory has been prepared by cooperation of Ministry of Energy and Natural Resources, Ministry of Environment and Forestry, Ministry of Transport, Maritime Affairs and Communications and Ministry of Agriculture and Rural Affairs under the coordination of TURKSTAT. For sectoral data, the industrial establishments directly submit their production data to TURKSTAT by seasonal and annual questionnaires.

2.1.3. Measurement methodology and data sources

Turkey as an Annex I party shall submit its national inventory report by 15 April each year. So, Turkey has submitted its sixth national greenhouse gas inventory report (for 1990-2009 period) after The United Nations Framework Convention on Climate Change (UNFCCC) was ratified by Turkey in 2004.

GHG Emission Inventory Working Group coordinated by TURKSTAT has prepared the National Emission Inventory and Common Reporting Format (CRF) tables in accordance with the UNFCCC Reporting Guidelines on Annual Inventories³⁸. The methodologies used in the calculation of emissions are based on the Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories and the IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories. Country specific methods have been used in electricity production and road transportation as recommended by the IPCC Guidelines (TURKSTAT, 2011).

Greenhouse gas emissions have been calculated based on the following data sources (TURKSTAT, 2011):

- Energy balance tables from the Ministry of Energy and Natural Resources,
- Industrial Production from Industry and Business Statistics Department in TURKSTAT,
- Agricultural Production from the Agriculture and Environment Statistics Department in TURKSTAT and
- Land use and land use change data from Ministry of Agriculture and Rural Affairs,
- Data on the forest from the Ministry of Environment and Forestry, basically DG Forestry.
- Data on solid waste from the Environmental Statistics Group in TURKSTAT,
- Transport data from Ministry of Transport, Maritime Affairs and Communications,
- Data on HFCs, PFCs and SF₆ from Ministry of Environment and Forestry

2.1.4. Activity data

Activity data, such as total amount of fuel, total population of animals or rice harvested area, are gathered from official bodies like TURKSTAT, ministries and private sectors. how the activity data is collected and how it is processed have been described in detail in NIRs. The activity data providers are given at the Table 2.1.1 briefly.

³⁸ <http://unfccc.int/resource/docs/2004/sbsta/08.pdf>



IPCC Category Code	IPCC Category	Activity Data
1	Energy	
1.A	Fuel Combustion	Energy Balance Tables by MENR
1.A.1	Energy Industries	Energy Balance Tables by MENR
1.A.1.a	Public Electricity and Heat Production	Energy Balance Tables by MENR
1.A.1.b	Petroleum refining	Energy Balance Tables by MENR
1.A.1.c	Manufacture of solid fuels and other energy industries	Hard Coal Balance Tables by MENR Turkish Hard Coal Enterprises (TTK)
1.A.2	Manufacturing indust. and const.	Energy Balance Tables by MENR
1.A.2.a	Iron and Steel Industries	Energy Balance Tables by MENR
1.A.2.b	Non-Ferrous Metal	Energy Balance Tables by MENR
1.A.2.c	Chemicals	Energy Balance Tables by MENR
1.A.2.d	Pulp, Paper and Print	Energy Balance Tables by MENR
1.A.2.e	Food Processing, Bev. and Tobacco	Energy Balance Tables by MENR
1.A.2.f	Cement Production	Energy Balance Tables by MENR
1.A.2.f	Sugar	Energy Balance Tables by MENR
1.A.2.f	Fertilizer	Energy Balance Tables by MENR
1.A.3	Transport	Ministry of Transport, Maritime Affairs and Communications
1.A.3.a	Aviation	International: private sector Domestic: Air traffic data is provided by General Directorate of Airports Authority for all civil airports in Turkey.
1.A.3.b	Road Transportation	The annual mileage data of the vehicle classes are not available. This value is obtained from an algorithm based on total fuel consumed and fuel consumption assumptions per unit distance travelled.
1.A.3.c	Railways	The transport related data available for railways is limited.
1.A.3.d	Navigation	National: In national navigation only diesel and residual fuel oil are consumed as energy source.
1.A.3.e	Pipeline Transportation	Petroleum Pipeline Corporation (BOTAS)
1.A.4	Others	Energy Balance Tables by MENR
1.A.4.a	Commercial/Institutional	Energy Balance Tables by MENR
1.A.4.b	Residential	Energy Balance Tables by MENR
1.A.4.c	Agriculture/Forestry/Fisheries	Included transport emissions
1.B	Fugitive Emission from Fuels	Energy Balance Tables by MENR
1.B.1	Solid Fuels	Activity data of the coal extraction was taken from the energy balances of MENR

Table 2.1.1. The activity data providers³⁹

³⁹ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



IPCC Category Code	IPCC Category	Activity Data
2	Industrial Processes	
2.A	Mineral Products	TURKSTAT and TCMA (Turkish Cement Manufacturers' Association)
2.A.1	Cement Production	TCMA (Turkish Cement Manufacturers' Association)
2.A.2	Lime Production	Turkish Lime Association
2.A.3	Lime Stone and Dolomite Use	Included to 2.A.2
2.A.4	Soda Ash Production and Use	TURKSTAT determines the total amounts of soda ash produced in Turkey
2.A.5	Asphalt Roofing	-
2.A.6	Road Paving with Asphalt	-
2.A.7	Glass Production	-
2.B	Chemistry Industry	
2.B.1	Ammonia Production	The amount of ammonia produced in Turkey was determined by TURKSTAT via monthly inventories.
2.B.2	Nitric Acid Production	The production data for NH ₃ and HNO ₃ were almost gathered from TURKSTAT industrial production survey results.
2.B.3	Adipic Acid Production	-
2.B.4	Carbide Production	The TURKSTAT industrial production survey results.
2.C	Metal Production	
2.C.1	Iron and Steel Production	Included to 1.A.2
2.C.2	Ferroalloys Production	Production data was taken from TURKSTAT
2.C.3	Aluminium Production	Production data was taken from TURKSTAT
2.D	Other	Production data was taken from TURKSTAT
2.D.1	Pulp and Paper Production	Production data was taken from TURKSTAT
3	Solvent and Other Product Use	
3.A	Paint Application	Automobile Production data was taken from Automotive Manufacturers Association
3.C	Chemical Products, Manufacture and Processing	The direct solvent and chemical usage was not known. Due to household number, population and total car, the NMVOC emission was tried to be estimated.

Table 2.1.1 (continued). The activity data providers



IPCC Category Code	IPCC Category	Activity Data
4	Agriculture	
4.A	Enteric Fermentation	The main activity data (the population of animals) provider was TURKSTAT (provincial animal statistics).
4.B	Manure Management	The provincial animal population data collected from TURKSTAT
4.C	Rice Cultivation	The rice harvested area (in Turkey, Water Management Regime was irrigated and flood type was continues) collected from TURKSTAT
4.D	Agricultural Soils	The following crops data were gathered from TURKSTAT
4.E	Prescribed Burning of Savannas	
4.F	Field Burning of Agricultural Residues	The statistical data (activity data) were gathered from TURKSTAT.
5	LULUCF	
5.A	Forest Land	Forest Management Planning Department of the General Directorate of Forestry
5.A.1	Forest remaining Forest Land	General Directorate of Forestry
5.A.2	Land converted to Forest Land	General Directorate of Forestry
6	Waste	
6.A	Solid Waste Disposal on Land	The annual data on municipal solid waste disposal on landfills were produced by TURKSTAT via Municipal Solid Waste Statistics Survey.
6.B	Wastewater Handling	The urban and rural populations taken from TURKSTAT
6.C	Waste Incineration	-

Table 2.1.1 (continued). The activity data providers

The activity data for the energy sector that forms the largest share of the overall emissions were gathered from Energy Balance Tables. Generating of the Energy Balance Tables are the responsibility of the Ministry of Energy and Natural Resources (MENR). For this purpose, the Section of Energy Statistics and Planning under the Directorate of Energy Affairs collects data from all existing public and private energy industries and analyses the data. The balance tables and all energy statistics are published at the web page of the MENR. For each sub division MENR collects the data from different bodies. The institutions provided the data for the preparation of balance tables is given below.



Hard Coal Balance Tables: Turkish Hard Coal Enterprises (TTK), private companies, Electricity Generation Corporation (EÜAŞ)

Lignite Balance Table: Turkish Coal Enterprises (TKI), Electricity Generation Corporation (EÜAŞ), The Directorate of Mining Affairs (MIGEM)

Asphaltite Balance Table: Turkish Hard Coal Enterprises (TTK), private companies

Natural Gas Balance Tables: Petroleum Pipeline Corporation (BOTAS), Turkish Petroleum Corporation (TPAO), Electricity Generation Corporation (EÜAŞ), Turkish Electricity Transmission Corporation (TEİAŞ)

Oil Balance Tables: General Directorate of Petroleum Affairs (PIGM), Turkish Petroleum Refineries Corporation (TUPRAS) and Ministry of Energy and Natural Resources (MENR)

Balance Tables for Other Fuels: Other fuels used in Turkey are wood, animal and vegetal waste, hydro and geothermal electricity, biofuel, wind, geothermal heat and solar. General Directorate of the Electrical Power Resources Survey and Development Administration (EIE) is responsible for the development of renewable energy resources. Data for wood, animal and vegetal waste, which is indigenously produced and consumed by the residential sector, was obtained from The Ministry of Environment and Forestry. Biofuels have been included in the balance sheet since 2006 and the Energy Market Regulatory Authority (EPDK) is responsible for collecting this data. Petroleum coke is mostly used by the cement sector and imported by sector participants.

Import Balance Tables: TURKSTAT, the Ministry of Economy and private sector

2.2. Systematic observations

The Turkish State Meteorological Service (TSMS) under the Ministry of Forestry and Water Affairs is responsible for building and operating the climatologic and higher atmospheric observation stations, keeping records of these observations, and informing the public and relevant organizations about its forecasts (TSMS, 2011).

The Ministry of Environment and Urbanism is responsible for monitoring the air quality. There are 118 air quality monitoring stations spread over the country and all collected data can be accessible at Air Quality Monitoring System⁴⁰.

The Turkish Military is responsible for operating the oceanographic observations. Also, relevant departments of universities are interested on a project basis (MoEF, 2007).

Terrestrial observations have been carried out by the TSMS and the Ministry of Food, Agriculture and Livestock. The hydraulic observations in the water bodies have been conducted by DSI and the EIE (MoEF, 2007).

⁴⁰ Turkish Air Quality Monitoring System, <http://www.havaizleme.gov.tr>



2.2.1. Meteorological measurements

The Turkish State Meteorological Services is responsible for building and operating the climatologic and higher atmospheric observation stations, keeping records of these observations, and informing the public and relevant organizations about its forecasts. 365 automatic meteorological observation stations, 6 snow observation stations, 4 precipitation observation stations and 8 higher atmospheric observation stations are in operation. In addition, 240 meteorological observation stations will be established at the intensive agriculture and tourism centers in 2011. Faster, cheaper, and continuous data flow is obtained by these automatic observation systems. All the data are collected and published by TSMS (TSMS, 2011).

Meteorological radar is an active remote sensing system which can detect intensity, location, motion and direction of air masses. Radars are an useful tools for large-scale high-resolution meteorological observations and producing of the data needed for weather prediction models. The world's most advanced monitoring system is the meteorological radar for early warning before extreme weather events and natural disasters as a result of these events.

In addition to Ankara, Istanbul, Balikesir and Zonguldak weather radars, radars units installed and became operational in the provinces of Izmir and Mugla since 2010.

By the end of 2010 in our country, there are "Airport Automatic Meteorological Measurement and Reporting System" at 48 airports and "Mobile Automatic Weather Observation and Reporting System at 2 airports. In addition there are 44 airports which have the Electronic Wind Measurement System.

Observational, quality assurance and archiving procedures are consistent with the World Meteorological Organisation (WMO) guidelines. The TSMS is a member of WMO, the European Centre for Medium-Range Weather Forecasts (ECMWF), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the International Civil Aviation Organization (ICAO) and The Economic Interest Grouping of the National Meteorological Services of the European Economic Area (ECOMET) (MoEF, 2007). Turkey is also a member of the Balkans Sub-Regional Drought Management Centre. The aim of the Centre is to provide meteorological and hydrological data for drought forecast, early warning systems for monitoring drought and risk maps for combating the adverse effects of drought (MoEF, 2007).

Since 1994, the TSMS is monitoring ozone concentrations by ozonesonde twice in a month in Ankara. In addition, UV-Biometer monitoring has been conducted since 1997 in Ankara and since 2000 in Antalya (MoEF, 2007).



2.2.2. Oceanic observations

Marine science institutes and fisheries departments of several universities (mainly Middle East Technical University (METU), Dokuz Eylul University (DEU), Istanbul University (IU), Black Sea Technical University (BSTU), Ondokuz Mayıs University (OMU)), research centers (mainly Marmara Research Center (MRC)) and two departments of the Turkish Armed Forces (Office of Navigation, Hydrography and Oceanography (ONHO) and General Command of Mapping (GCM)) conduct oceanographic and coastal marine observations and maintain marine databases. Majority of marine observations are conducted on a project basis. ONHO, in the meantime, serves as the national oceanographic data center. All marine data collected by individual institutions are required by law to be submitted to ONHO following a certain delay allowed by regulations.

Systematic and long term observations are carried out only for sea surface temperature, wave height, and sea level via networks of coastal stations: TSMS operates 38 stations for sea surface temperature and wave height data and GCM operates the National Sea Level Monitoring System (TUDES), which is comprised of 11 stations.

GCM is a member of the European Sea-Level Service (ESEAS) since 2001 through Antalya mareograph station and contributes to the Mediterranean Network for Systematic Sea-level Monitoring in the Mediterranean and Black Seas - regional subsystem of GLOBal Sea Level Observing System (MedGLOSS) Project of the Intergovernmental Oceanographic Commission (IOC) and the Mediterranean Science Commission (CIESM) with four stations. GCM also shares monthly and annual sea level data with the Permanent Service for Mean Sea Level (PSMSL). METU, on the other hand, is a member of the European Global Ocean Observing System (EuroGOOS) (on hold) and MedGOOS while MRC is a member of European Science Foundation Marine Board.

2.2.3. Terrestrial observations

Phenologic observations are conducted by the TSMS and the Ministry of Food, Agriculture and Livestock. Phenological observation network was restructured in 1995 and 2005. Currently, phenological observations are carried out at 300 stations for 71 plants. Since 2000 daily and weekly Agricultural Forecasting and Warnings and since 2004 Agricultural Frost Forecasting and Warnings have been done.

Hydraulic observations are conducted by the General Directorate of Water Affairs (DSI) and the EIE. Additionally, data acquisition and study activities on land use, forests and forest fires are conducted by the Ministry of Forestry and Water Affairs and the Ministry of Food, Agriculture and Livestock. Since 1935, the EIE has been making hydrological observations.

2.2.4. Air-quality monitoring

Monitoring of air quality in Turkey has been carried out by using automatic/semi-automatic measurement devices. In 2005-2007, air quality monitoring stations have been established in 81 provinces of Turkey. Air quality monitoring stations (118 stations spread all over Turkey) that belong to the Ministry of Environment and Forestry, Istanbul and Izmir



Municipalities, Refik Saydam Hifzısıhha and industries are given in Table 2.2.1 and mapping in Figure 2.2.1 (the Air Quality Monitoring System, 2011).

Owner	Number
Ministry of Environment and Urbanism	36 station (2005)
	45 station (2007)
	3 mobile station (2005)
	8 station established by Ministry of Health (2008)
	10 station established by local authorities (2005-2008)
Istanbul Metropolitan Municipality	10 station (2007)
Izmir Metropolitan Municipality	6 station (2007-2008)
Dilovası Organized Industrial Zone	1 station (2007)
Refik Saydam Hifzısıhha	1 station
ICDAS	1 station (2010)

Table 2.2.1. Automatic Air Quality Stations in Turkey⁴¹

All of the air quality monitoring stations measure the amount of particulate matter and Sulphurdioxide (SO₂). Also, in many stations, NO_x, CO, O₃ and meteorological parameters are measured. All available data are accessible through the internet. In addition, SO₂ and PM concentrations have been evaluated and published as monthly, winter season and annual press releases by TURKSTAT. 3 mobile station were established by the Ministry of Environment and Urbanism to measure the air pollutants at the needed locations temporarily.

Turkey has one Global Atmosphere Watch station in Ankara. Cubuk-II EMEP Station was established in 1993, after Turkey had ratified the Convention on Long Range Transboundary Air Pollution in 1979 and the European Monitoring and Evaluation Programme Finance Protocol in 1984 (MoEF, 2007).

⁴¹ Turkish Air Quality Monitoring System, <http://www.havaizleme.gov.tr>



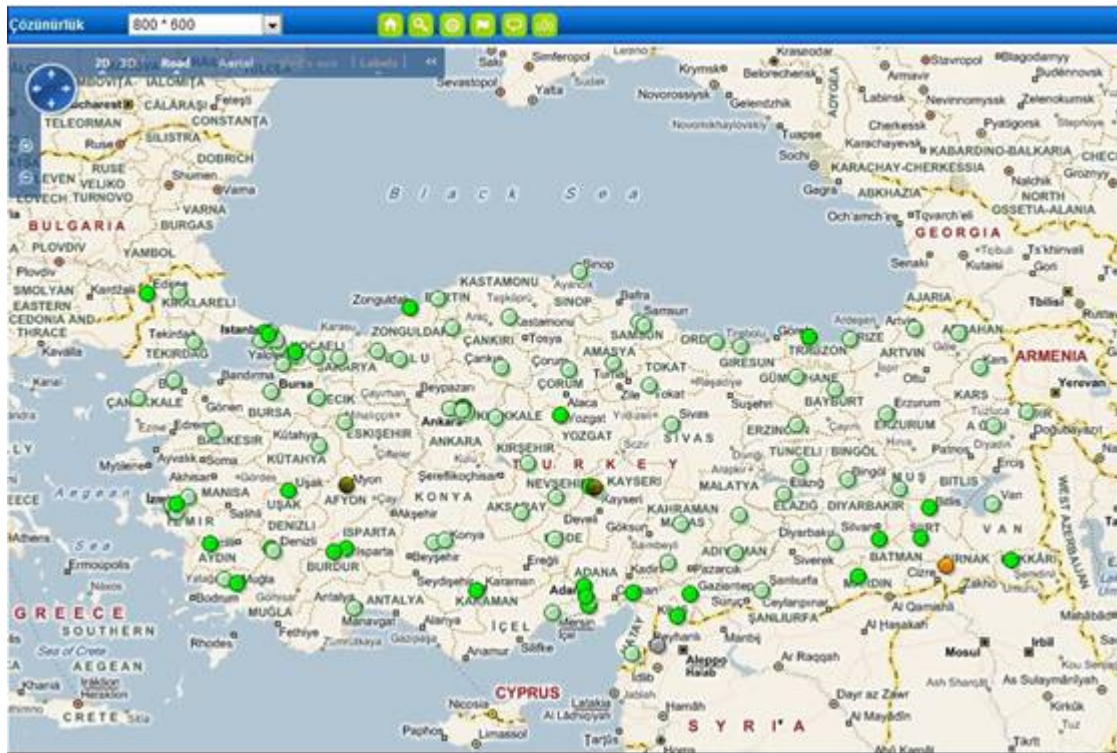


Figure 2.2.1. Air quality monitoring stations in Turkey⁴²

The Turkish State Meteorological Services has 6 local stations (Ankara, Istanbul-Catalca, Amasra, Balikesir, Bolu and Antalya) for sampling dry and wet deposition and measure metals and acid rain. It is planned to extend these stations to the rest of the country.

⁴² Turkish Air Quality Monitoring System, <http://www.havaizleme.gov.tr>

3. Reporting

3.1. GHG emissions per sector

GHG emissions have been calculated and reported in NIR for each sector. For the years 1990-2009, the GHG emissions from energy, industry, solvent and other product use, agriculture, waste and LUCF sectors are given in Table 3.3.1.

3.2. GHG emissions per type

GHG emissions based on type have been calculated and reported in NIR. For the years 1990-2009, CO₂, CH₄, N₂O, PFCs, HFCs and SF₆ emissions are given in Table 3.3.2.

3.3. Information publicly available

National Inventory Report and CRF tables are submitted to the UNFCCC Secretariat by TURKSTAT as the focal point of Turkish National Emission Inventory each year. NIR can be accessed at the web site of UNFCCC.



GHG (million tones)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Energy	132.13	137.9	144.27	150.78	148.62	160.79	178.96	191.39	190.62	190.61	212.55	196.02	204.02	218.00	227.43	241.75	258.56	288.69	277.71	278.33
Industrial Processes	15.44	17.73	18.93	20.92	19.25	24.21	24.32	24.14	24.75	23.93	24.37	23.32	25.55	26.30	28.52	28.78	30.70	29.26	29.83	31.69
Solvent and Other Product Use	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Agriculture	29.78	30.35	30.33	30.51	29.19	28.68	29.10	27.66	28.36	28.61	27.37	25.96	24.51	25.36	25.01	25.84	26.50	26.31	25.04	25.70
Waste	9.68	13.09	16.70	19.46	20.09	23.83	26.24	28.69	30.31	31.62	32.72	32.81	32.12	33.09	31.30	33.52	33.88	35.71	33.92	33.93
Total (w/o land use)	187.03	199.1	210.23	221.66	217.15	237.51	258.62	271.88	274.05	274.78	297.01	278.11	286.20	302.75	312.26	329.90	349.64	379.98	366.50	369.65
Comp.to 1990 % (w/o land use)	100.0	106.5	112.4	118.5	116.1	127.0	138.3	145.4	146.5	146.9	158.8	148.7	153.0	161.9	167.0	176.4	186.9	203.2	196.0	197.6
Land use and land use change	-44.87	-56.31	-60.65	-60.26	-62.20	-61.84	-62.43	-64.34	-65.64	-66.45	-67.56	-72.12	-68.80	-67.56	-75.10	-69.53	-75.94	-76.27	-80.58	-82.5

Table 3.3.1. Aggregated GHG emissions by sectors (CO₂ eq.)⁴³

GHG (million tones)	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CO ₂	141.36	148.3	153.9	162.55	160.82	173.90	192.01	205.18	204.32	203.68	225.43	208.99	218.04	232.64	243.43	259.61	276.72	307.92	297.12	299.1
CH ₄	33.50	37.56	41.02	43.33	43.71	46.87	49.31	50.59	51.90	53.14	53.30	52.74	50.43	51.63	49.37	52.38	53.33	55.58	54.29	54.37
N ₂ O	11.57	12.51	14.58	15.10	12.02	16.22	16.40	14.98	16.65	16.93	16.62	14.69	15.32	15.67	16.00	14.18	15.55	12.35	11.57	12.53
PFCs	0.60	0.74	0.68	0.69	0.60	0.52	0.52	0.52	0.52	0.51	0.52	0.52	0.52	0.52	0.52	0.49	0.40	0.00	0.00	0.00
HFCs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.87	1.42	1.81	2.23	2.38	2.73	3.17	2.67	2.84
SF ₆	0.00	0.00	0.00	0.00	0.00	0.00	0.37	0.61	0.66	0.52	0.32	0.31	0.48	0.48	0.70	0.86	0.91	0.95	0.84	0.80
Total (without LUCF)	187.03	199.13	210.23	221.66	217.15	237.51	258.62	271.88	274.05	274.78	297.01	278.11	286.20	302.75	312.26	329.90	349.64	379.98	366.50	369.6

Table 3.3.2. Aggregated GHG emissions without LUCF (CO₂ eq.)⁴³

⁴³ Turkish Statistical Institute Database, <http://www.turkstat.gov.tr/VeriTabanlari.do>



4. Verification

4.1. Methods for QA/QC analyses

QA/QC and verification of data have been done by Turkish emission inventory working group for each source category and the procedures are explained in NIR.

Control of quality of the inventory was carried out by sector experts both on the basis of the emission factors and activity data. There was also internal quality controls:

- control of consistency to ensure data integrity, its correctness and completeness;
- determination and correction of errors,
- documentation and archiving of material used for the inventory preparation and QC activities (TURKSTAT, 2011).

4.2. Calculation of data-verification indices

N/A



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Abbreviations

BMW	: Biodegradable municipal waste
BOTAS	: Petroleum Pipeline Corporation
BSTU	: Black Sea Technical University
CH ₄	: Methane
CIESM	: Mediterranean Science Commission
CO ₂	: Carbon dioxide
DEU	: Dokuz Eylul University
DSI	: General Directorate of Water Affairs
ECMWF	: European Centre for Medium-Range Weather Forecasts
ECOMET	: Economic Interest Grouping of the National Meteorological Services of the European Economic Area
EIE	: General Directorate of the Electrical Power Resources Survey and Development Administration
EPDK	: Energy Market Regulatory Authority
ESEAS	: European Sea-Level Service
EUMETSAT	: European Organisation for the Exploitation of Meteorological Satellites
EuroGOOS	: European Global Ocean Observing System
EÜAŞ	: Electricity Generation Corporation
GCM	: General Command of Mapping Turkish Armed Forces
GDP	: Gross domestic profile
GHG	: Greenhouse Gasses
HFCs	: Hydro fluorocarbons
ICAO	: International Civil Aviation Organization
IOC	: Intergovernmental Oceanographic Commission
IPCC	: Integovernmental Panel on Climate Change
IU	: Istanbul University
LULUCF	: Land use, land use change and forestry
MedGLOSS	: Mediterranean Network for Systematic Sea-level Monitoring in the Mediterranean and Black Seas - regional subsystem of GLObal Sea Level Observing System Project
MENR	: Ministry of Energy and Natural Resources
METU	: Middle East Technical University
MIGEM	: The Directorate of Mining Affairs
MoEF	: Ministry of Environment and Forestry
MRC	: Marmara Research Center



MSW	: Municipal Solid Waste
N ₂ O	: Nitrous oxide
OECD	: Organisation for Economic Co-operation and Development
OMU	: Ondokuz Mayıs University
ONHO Forces	: Office of Navigation, Hydrography and Oceanography under Turkish Armed Forces
PFCs	: Perfluorocarbons
PIGM	: General Directorate of Petroleum Affairs
PSMSL	: Permanent Service for Mean Sea Level
SF ₆	: Sulfur hexafluoride
TBMM	: Turkish Grand National Assembly
TEİİAS	: Turkish Electricity Transmission Corporation
TKİ	: Turkish Coal Enterprises
TPAO	: Turkish Petroleum Corporation
TSMS	: Turkish State Meteorological Service
TTK	: Turkish Hard Coal Enterprises
TUDES	: National Sea Level Monitoring System
TUPRAS	: Turkish Petroleum Refineries Corporation
TURKSTAT	: Turkish Statistical Institute
UNFCCC	: United Nations Framework Convention on Climate Change
WMO	: World Meteorological Organisation

