

# Environmental Statistics

## WASTE STATISTICS

**Sebahattin SARI**

**Head of Environment, Energy and Transport Statistics  
Department, TURKSAT**

**20-22 March 2017**

**QATAR**

# Contents

- Concepts, Definitions and Classifications
- General description of methodology
- Data Collection Process
- Waste Statistics Variables
- Response Rate
- Data Analysis
- Dissemination
- SDG Indicators
- Challenges
- Useful Link

## Concepts and Definitions

**Source:** Manual on waste statistics: A handbook for data collection on waste generation and treatment (Eurostat)

### Waste

Any substance or object which the holder discards or intends to or is required to discard.

### Hazardous Waste

Waste that poses a greater risk to the environment and human health (i.e. carcinogenic, flammable, oxidant, corrosive, toxic, radioactive and explosive) than non hazardous wastes and thus require a stricter control regime.



## Concepts and Definitions (contd.)

### Waste Generation:

The weight or volume of materials and products that enter the waste stream before recycling, composting, landfilling, or combustion takes place. Also can represent the amount of waste generated by a given source or category of sources.

Waste generation includes exports, but excludes imports, i.e. it is the amount of waste generated within the country.

### Waste Management:

Waste management means the collection, transport, treatment and disposal of waste, including after-care of disposal sites.

## Concepts and Definitions (contd.)

**Recovery:** Recovery is defined as any waste management operation that diverts a waste material from the waste stream and which results in a certain product with a potential economic or ecological benefit. Recovery mainly refers to the following operations:

- material recovery, i.e. recycling
- energy recovery, i.e. re-use a fuel;
- biological recovery, e.g. composting;
- re-use.

**Composting:** Biological process that submits biodegradable waste to anaerobic or aerobic decomposition, and that results in a product that is recovered.

## Concepts and Definitions (contd.)

**Recycling:** Recycling is defined as any reprocessing of material in a production process that diverts it from the waste stream, except reuse as fuel. Both reprocessing as the same type of product, and for different purposes should be included.

**Re-use:** Re-use shall mean any operation by which end of life products and equipment (e.g. electrical and electronic equipment) or its components are used for the same purpose for which they were conceived.

Direct recycling and reuse at the place of generation (i.e. establishment) is excluded.

## Concepts and Definitions (contd.)

**Disposal:** Disposal is defined as any waste management operation serving or carrying out the final treatment and disposal of waste. It covers the following main operations:

**Final treatment:** The physical, thermal, chemical or biological processes, that change the characteristics of the waste in order to reduce its volume or hazardous nature, and that results in a product that goes to final disposal.

- incineration without energy recovery
- biological, physical, chemical treatment resulting in products or residues that are discarded, i.e. going to final disposal.

**Final disposal:** Deposit into or onto land (e.g. landfill), including specially engineered landfill, deep injection, surface impoundment, release into water bodies, permanent storage.

## Concepts and Definitions (contd.)

**Landfill:** Deposit of waste into or onto land, including specially engineered landfill, and temporary storage of over one year on permanent sites.

The definition covers both landfill in internal sites (i.e. where a generator of waste is carrying out its own waste disposal at the place of generation) and in external sites.



## Concepts and Definitions (contd.)

**Primary Waste:** Waste from primary sources, i.e. waste generated during the extraction of raw materials during the processing of raw materials to intermediate and final products, during the consumption of final products, and during a cleaning operation.

**Secondary Waste (or Treatment Residues):** Waste from secondary sources, i.e. waste generated in a process that is known as a waste treatment operation. Includes residual materials originating from recovery and disposal operations, such as incineration and composting residues.

**Sewage Sludge:** Sludge from wastewater treatment. This includes sludge generated by municipal wastewater treatment plants as well as by private treatment plants, e.g. within the manufacturing industries.

## Classifications

- **List of Waste (LoW)** European List of Waste (Commission Decision 2000/532/EC) (EU)
  - Reference nomenclature providing a common terminology with the purpose to improve the efficiency of waste management activities.
  - A common encoding of waste characteristics in a broad variety of purposes like classification of hazardous wastes.
  - Assignment of waste codes has a major impact on the transport of waste, installation permits (which are usually granted for the processing of specific waste codes), decisions about recyclability of the waste or as a basis for waste statistics.
  - Waste are classified based on sources
- **European Waste Catalogue (EWC-Stat/Version 4) (EU)**
  - to establish a framework for the production of Community statistics on the generation, recovery and disposal of waste.
  - to ensure better monitoring of effective implementation on waste management with regular, comparable, current and representative data on the generation, recycling, re-use and disposal of waste.
  - Waste are classified based on type

## General description of methodology

- **Municipal waste** TurkStat has been surveying all of the municipalities annually since 1994 with a waste questionnaire that covers all the waste services given by or on behalf of the municipalities. The data includes the responsible authority on collection, transportation or disposal, the amount of waste collected, the destination of the waste.
- **Clinical waste** has been collected from health institutions via a survey conducted by TurkStat and is given in service sector. The aim of the survey was to determine the amount of medical waste consisted of infectious, pathological, and sharps waste originating from health institutions.
- **Energy sector waste** are collected within the scope of the thermal power plants statistics since 1992. Amount of waste generated and disposal methods of all thermal power plants are investigated within this survey.

## General description of methodology (contd.)

- **Manufacturing industry waste** are collected within the scope of manufacturing industry waste statistics. All manufacturing industry establishments having 50 or more employees have been covered in the scope of the survey. Amount and destination of waste generated by waste categories are investigated with this survey.
- **Mining sector waste** is available in TurkStat since 2010. The scope of Mining Establishments Water, Wastewater and Waste Statistics survey in reference year is mining establishments, which submitted production data for previous year to General Directorate of Mining Affairs or had a new licence for reference year. Establishments dealing only with enrichment processes are out of scope.
- **Organized industrial regions waste** are collected via organized industry environment statistics survey. Waste data for industrial regions are given under service sector. All organized industrial zones having completed their infrastructure are covered in the scope of the survey.

# Data collection process

## Summary

- Variables collected via surveys (questionnaires)
  - Determining the variables
  - Preparation of standard code lists
- Determination of all address framework
  - Determining of scope
- Methods of data collection
  - Surveys
  - Administrative data

### For surveys:

- Preparation of questionnaires
- Preparation of web base application
  - DDI and edit rules of programme (database and edits)
- Data sources (Address framework process)

### Administrative:

- Data transfer

# Official Waste Statistics

Topic	Responsible Institution
Municipal waste statistics	TurkStat
Industrial waste statistics	TurkStat
Medical waste statistics	TurkStat
Agricultural waste statistics	TurkStat
Waste disposal and recovery facilities statistics	TurkStat

Topic	Responsible Institution
Packaging and packaging waste statistics	MoEU
Special waste statistics	MoEU
Hazardous waste export statistics	MoEU

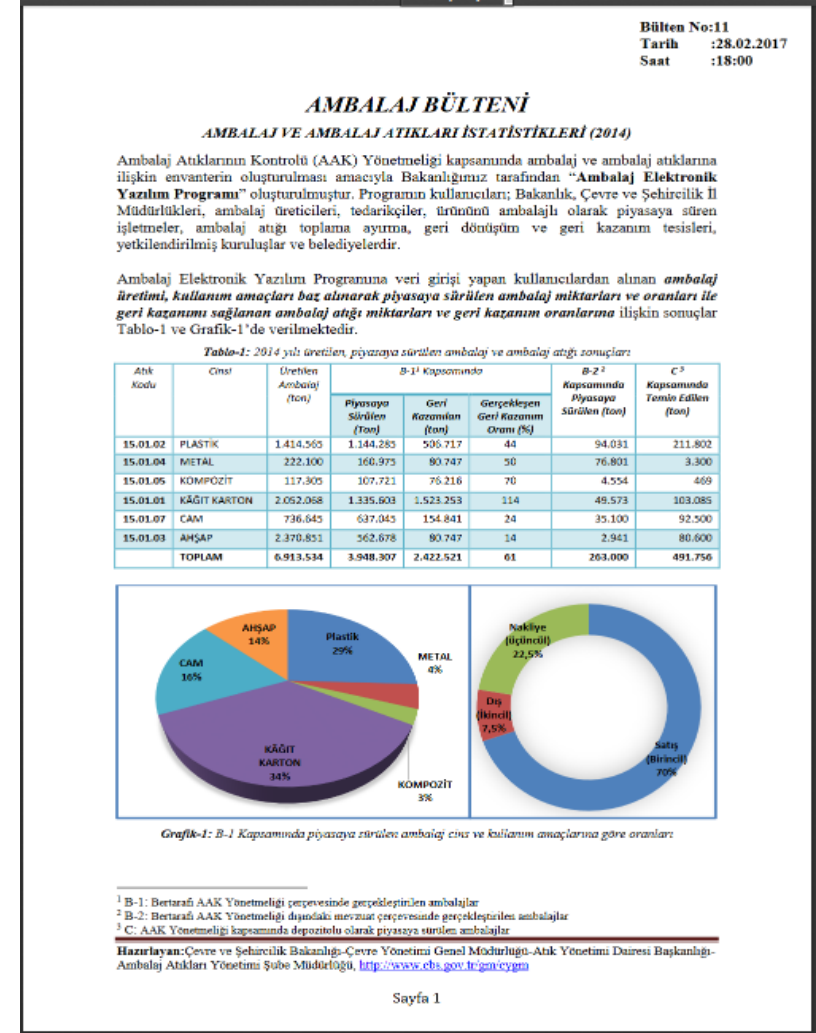
**MoEU:** Republic of Turkey Ministry of Environment and Urbanization

## TURKSTAT Environmental Surveys (biennially)

Name of survey	Scope (data source)	Number of respondents (2017)
<a href="#">Municipal Waste Statistics</a>	All municipalities	1 397
Waste Disposal and Recovery Facilities Statistics	All waste disposal and recovery facilities having a licence or a temporary licence, and regardless of licence, to controlled landfill sites, incineration plants and composting plants operated by or on behalf of municipalities	2000
Waste Statistics of Health Institutions	The hospitals and their clinics as listed in annex-1 of Medical Waste Control Regulation that are producing waste in large quantities	1600
<a href="#">Manufacturing Industry Water, Wastewater and Waste Statistics</a>	All manufacturing industry establishments with 50 or more employees	12 000
Thermal Power Plants Water and Wastewater Statistics	All thermal power plants with 100 MW or more installed capacity	73
<a href="#">Mining Establishments Water, Wastewater and Waste Statistics</a>	All operating mining ores	6 000
Organized Industrial Regions Water and Wastewater Statistics	All organized industrial regions having completed their infrastructure	293

## Administrative Data Disseminated by Other Institutions

- Packaging and packaging waste statistics  
(Directorate General of Environmental Management)
- Hazardous waste statistics  
(Directorate General of Environmental Management)





# Data collection process

## Before the field applications

- Reviewing/updating the questionnaires
- Determination/preparation of the address framework
- Preparation of the web base application
  - DDI and editing rules (by Harzemli editor)
  - Preparation of analysis programme (SAS)
  - Test of the web base application (regional and central)
- Training courses for Regional Offices
- Sending the official letter, brochure and password

# Preparation of the web based application

- The Harzemli Editor application provides a user-friendly interface for defining the questionnaire for web base.
- Produces DDI and rule files as XML format :
  - the reference and structural metadata information of the questionnaire
  - the rule file of the flow and data integrity.
- Takes XML files as inputs and generates the desired data entry application.
- Search fields, page structures, question types and restrictions are defined
- The questions in the questionnaire are designed by a drag-and-drop method and the designed questionnaire displayed instantaneously.
- The properties of variables and variable groups are in the form of "What You See Is What You Get".

# Preparation of the web base application

## SAS Analysis Programming

- Time series analysis
- Treshold control
- Internal consistency controls

## Test of the web base application

- Regional
- Central

# Data collection process

## Before field application Official Letter

- Title of the survey
- Aim of the survey
- Information about how to access to web programme
- Reply period
- Statistical law
  - Confidentially
  - Response obligation and penalty

T.C.  
TÜRKİYE İSTATİSTİK KURUMU BAŞKANLIĞI  
.....**G KOLONU**..... Bölge Müdürlüğü

**Başlangıç Tarihi: 20 Mart 2017**  
**Konu: Atık Bertaraf ve Geri Kazanım Tesisleri İstatistikleri**

07/03/2017

...**C KOLONU**...

Türkiye İstatistik Kurumu Başkanlığı (TÜİK), 5429 sayılı Türkiye İstatistik Kanunu uyarınca çeşitli konularda sayım ve anket düzenlemekte ve sonuçlarını kullanıcılara sunmaktadır. Bu çalışmalardan biri olan "Atık Bertaraf ve Geri Kazanım Tesisleri İstatistikleri, 2016" soru formu ile elde edilecek olan istatistikler; kalkınma planları ve yıllık programların hazırlanması, ülkemizde çevre konusunda meydana gelen değişimlerin izlenmesi, ulusal ve uluslararası bilgi sistemine ve karşılaştırmalara olanak sağlanması ile çeşitli araştırmalara kaynak teşkil etmesi amacıyla kullanılacaktır.

İki yılda bir kez uygulanan bu araştırmaya ilişkin formun, "tuik.gov.tr" adresinde yer alan "ankete giriş" butonu aracılığıyla, tarafınıza teslim edilen/edilecek "kullanıcı adı" ve "şifre" kullanılarak, şifrenin teslimini müteakip (şifre daha önce teslim edildi ise bu yazının tarafınıza teslimini müteakip) 15 gün içerisinde, eksiksiz ve doğru bir biçimde doldurulması gerekmektedir. Sizlerden alınan bilgiler yalnızca istatistikî çalışmalarda kullanılmak amacıyla derlenmektedir. Bu bilgilerin gizliliği, 5429 sayılı Türkiye İstatistik Kanunu ile teminat altına alınmıştır. Kanun uyarınca, bu bilgiler idari, adli ve askeri hiçbir organ, makam, merci veya kişiye verilemez, istatistik amacı dışında kullanılamaz.

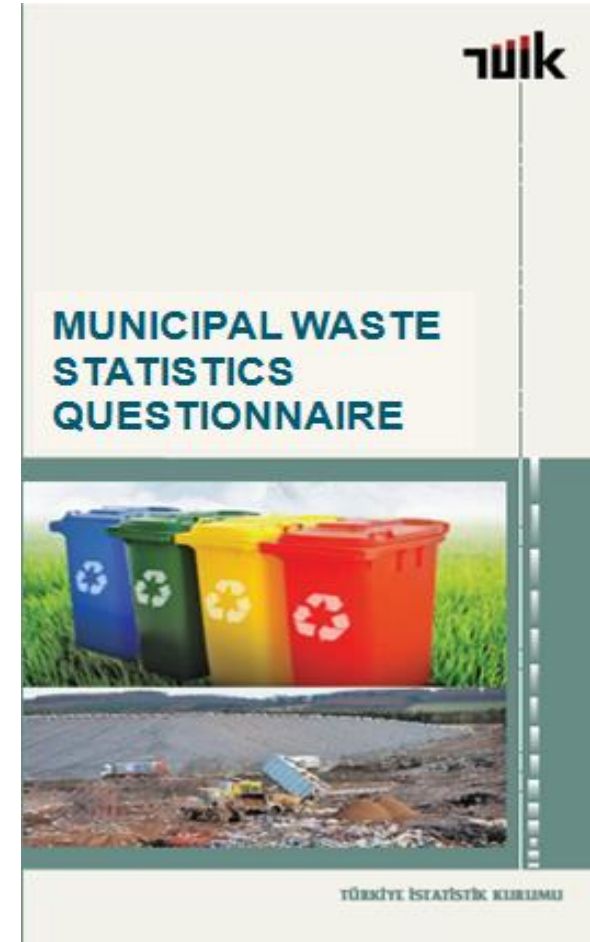
5429 sayılı Türkiye İstatistik Kanununun 54. maddesi uyarınca, istenilen bilgilerin belirlenen şekilde, zamanında, eksiksiz ve doğru bir biçimde verilmemesi durumunda; 2.752 (iki bin yediyüze iki) TL idari para cezası uygulanmaktadır. Çalışma ile ilgili ayrıntılı bilgi almak için aşağıda iletişim bilgileri yer alan Bölge Müdürlüğümüz yetkililerine ulaşabilirsiniz. Çalışma kapsamında vereceğiniz bilgiler ve ilginiz için teşekkür eder, saygılar sunarız.

...**I KOLONU** ...  
Bölge Müdürü

# Data collection process

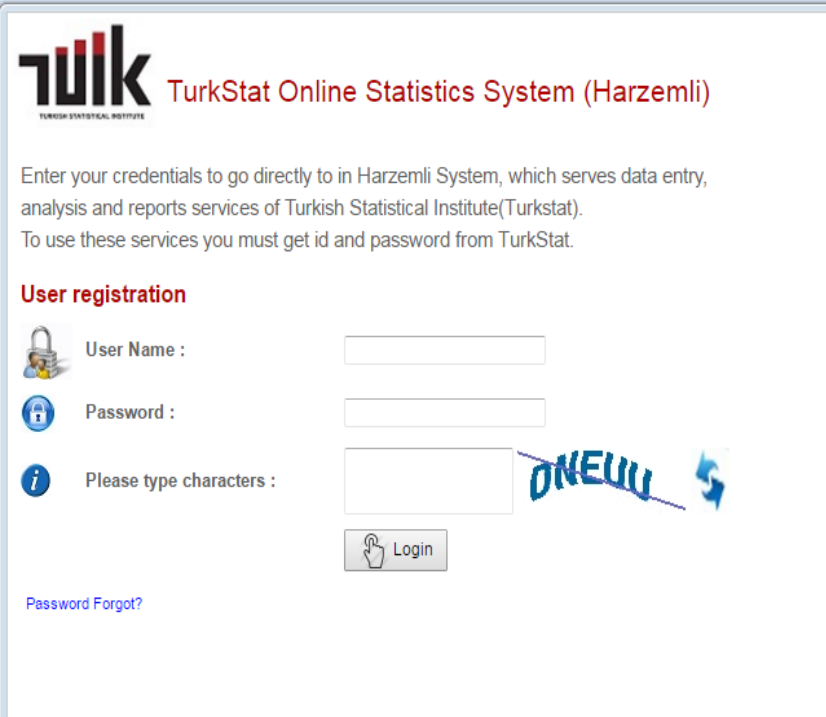
## Before field application Brochure


- Why do we come to you?
- Why do we apply municipal waste statistics questionnaire?
- How do we choose you?
- What is the method of research?
- What are the latest figures?
- How do you enter your data via internet?
- User name and password
- Response obligation
- Data confidentiality
- Contact information of regional and central offices



# Field application


- User names and passwords are delivered to the respondents
- 2 months





 **TurkStat Online Statistics System (Harzemli)**

Enter your credentials to go directly to in Harzemli System, which serves data entry, analysis and reports services of Turkish Statistical Institute(Turkstat).  
To use these services you must get id and password from TurkStat.

**User registration**

 User Name :

 Password :

 Please type characters :

[Password Forgot?](#)

# Variables

## Municipal Waste Statistics

- rate of municipal population receiving waste services
- daily amount of waste collected seasonally
- amount of waste by destination
- information about the waste disposal sites (for both currently in operation or closed sites),
- presence of a methane gas collection system in waste disposal sites
- presence of a waste treatment plant

# Variables

## Industrial Waste Statistics:

Data collected from manufacturing industry establishments, thermal power plants, mining establishments and organized industrial zones are:

- Amount of waste generated,
- Amount of waste recovered,
- Amount of waste disposed of and disposal methods,
- Waste disposal and recovery plants within the establishment,
- Amount of waste received from other establishments for disposal or recovery

by type of waste



# Variables

## Waste Disposal and Recovery Facilities Statistics

- capacity, operation year and the licence of the treatment facility
- amount of waste brought to treatment facilities by type and source
- disposal and recovery method by type of waste
- presence of a methane gas collection system in waste treatment facilities
- operation year for energy recovery unit
- amount of compost produced

# Variables

## Waste Statistics of Health Institutions

- Amount of medical waste generated in health institutions
  - Disposal methods of medical waste
- Number of patients are also obtained from Ministry of Health

## Determination of municipal waste generation on the basis of information on waste collection

1. For the municipal population which are not served by the waste collection services;

**A**= Municipal population not served in each municipality x Waste collected per capita in each municipality

2. Generally, villages are the settlement units with a low population in Turkey. For this reason municipalities having a population equal or less than 2000 inhabitants are assumed to represent villages. The median of the amount of waste collected per capita in those small municipalities is calculated. And

**B**= (Median x total population of villages) was calculated.

3. **Total amount of waste generated** = Total amount of waste collected in municipalities + **A** + **B**

# Data Analysis

## SAS analysis (Regional Offices)

- Data coherency in the question and between the questions
- Data analysis by population, sector, per capita or employee, etc.
- Data control of the respondent with the previous years
- Data control in terms of totals and subjects (ex: Total amount of hazardous waste)

## SAS analysis (Central Office)

- In depth analysis of explanations of the respondents (are they logical or enough)
- Data control with the available administrative records (ex: Medical waste data is controlled with the records of Ministry of Health and Ministry of Environment)
- Data control with the previous years despite the correction via SAS analysis

## Response Rates (Water, wastewater and waste statistics)

Sectors	Response Rates (%)
Municipalities	100.0
Energy sector	94.3
Manufacturing industry	97.6
Mining sector	93.8
Organized Industrial Zones	84.7
Health institutions	100.0
Waste treatment facilities survey	85.5

# Data Dissemination

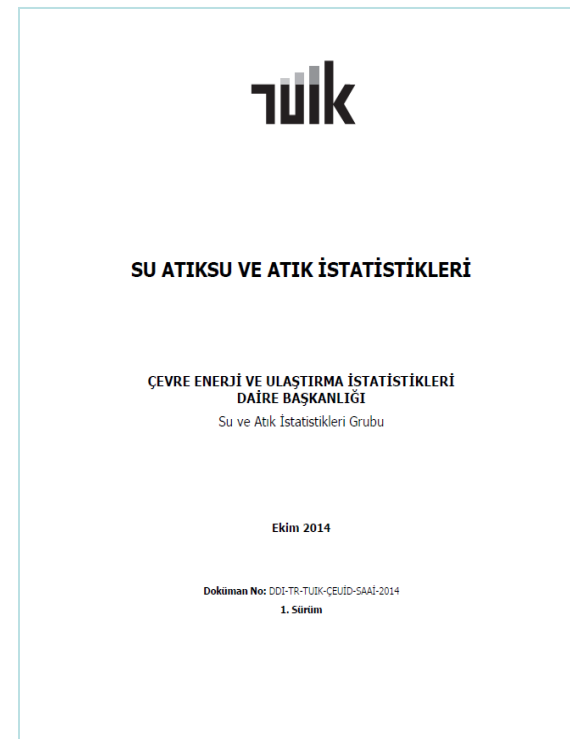
<http://www.turkstat.gov.tr>

## Dissemination

- Preparation of news releases,
- Preparation of press room bulletins,
- Updating metadata
- Updating databases,
- Preparation of [Institutional Quality Reports](#),
- Preparation of tables for other publications (yearbook, web-page, statistics in figures, etc.),
- Transfer of data to Eurostat, OECD, etc.

# Preparation of/Updating environmental statistics manuals

- Water and Waste Statistics Manual
- GHG Inventory Manual
- Environmental Expenditure, Revenue and Employment Statistics Manual
- Environmental Accounts Manual



All steps from data production to dissemination are explained in detail



# Press bulletins

No: 18777  
28 December 2015  
Hrs: 10:00

## Municipal Waste Statistics, 2014

### 28 million tonnes of municipal waste was collected

According to the results of Municipal Waste Statistics Survey 2014, which was applied to all municipalities, waste services were given in 1 396 municipalities out of 1 391. It is determined that 28 million tonnes of waste were collected from municipalities that were receiving waste collection services.

### Average amount of municipal waste per capita per day was calculated as 1.08 kg

According to the survey results average amount of municipal waste per capita per day was calculated as 1,08 kg in 2014. Considering the three largest cities, average amount of waste collected per capita per day was 1,16 kilograms for Istanbul, 1,10 kilograms for Ankara, and 1,12 kilograms for Izmir.

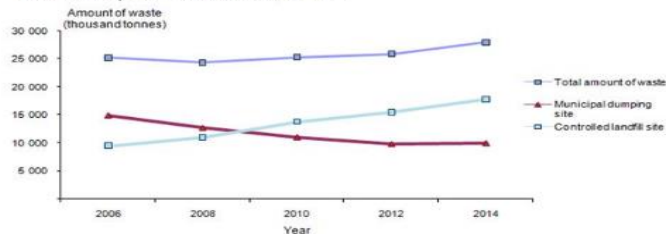
### 64% of municipal waste was sent to controlled landfill sites

Out of the 28 million tonnes of waste collected by municipalities that were providing waste collection services, 63,5% was transferred to controlled landfills, 35,5% was disposed of in municipal dumping sites, 0,5% was brought to composting plants and 0,5% was disposed of by other methods.

Municipal waste indicators, 2006-2014

	2006	2008	2010	2012	2014
Total number of municipalities	3 225	3 225	2 950	2 950	1 396
Number of municipalities receiving waste services	3 115	3 129	2 879	2 894	1 391
Amount of municipal waste collected (thousand tonnes/year)	25 280	24 361	25 277	25 845	28 011
Average amount of municipal waste per capita (kg/capita-day)	1.21	1.15	1.14	1.12	1.08
Amount and disposal methods of waste (thousand tonnes/year)					
Municipal dumping site	14 941	12 678	11 001	9 771	9 936
Controlled landfill site	9 428	10 947	13 747	15 484	17 807
Composting plant	255	276	194	155	126
Burning in an open area	247	239	134	105	4
Lake and river disposal	70	48	44	33	16
Burial	144	100	34	94	7
Other	195	73	122	202	114

Amount and disposal methods of waste, 2006-2014



www.turkstat.gov.tr



Metadata Close

- Analytical Framework, Concepts, Definitions, and Classifications
- Scope of the Data
- Characteristics of Basic Data Sources
- Compilation Practices
- Revisions
- Other subjects

# Dissemination Data Base

CENTRAL DISSEMINATION SYSTEM

By Indicator
By Time
By Region
Report

? Help

↻

**Subject**

Municipal Waste Statistics

⌵
📄

↻

**Measurement**

	Choose a Measurement
📄	Total number of municipalities
📄	Number of municipalities served by municipal waste services
📄	Population of municipalities served by municipal waste services
📄	Rate of population served by municipal waste services in total population (%)
📄	Rate of population served by municipal waste services in total municipal population (%)

Number of chosen Indicators: 0 X Number of chosen Regions: 0 X Number of chosen Time: 0 the result of multiplication cannot be greater than 50000!

# Statistical Tables

The screenshot shows the website interface for the Turkish Statistical Institute. At the top, there is a banner with the TIK logo and the slogan "Statistics is the key of understanding the past, governing today and planning the future". Navigation links include Home, About Us, Publications, Information Request, FAQ, and Site Map. A search bar is also present.

The main content area is titled "Statistics by Theme » Environment Statistics »". It features a left-hand navigation menu with the following items: Press Releases, Main Statistics, Statistical Indicators, Statistics by Theme, Databases, Official Statistics Portal, National Data Release Calendar, and MetaInfo.

The main content area is divided into sections:
 

- Press Releases** (collapsed)
- Statistical Tables and Dynamic Search** (expanded)
  - Dynamic Search**
    - Municipal Waste Statistics (M)
    - Public sector environmental expenditure statistics (M)
    - Air quality statistics
    - Municipal Wastewater Statistics (M)
    - Municipal Water Statistics (M)
  - Statistical Tables**
    - Air statistics
    - Water statistics
      - Water Abstraction for Municipal Water Supply Network
      - Water Indicators of Municipalities
      - Manufacturing Industry Water Indicators
    - Wastewater statistics
    - Waste statistics
    - Environmental accounts
- Metadata** (collapsed)

## International Questionnaires

- Eurostat Waste Statistics Regulation Reporting (WStatR)

# Challenges

- Non-registered data
- Address framework
- Technical terms
- Non-technique respondents
- Unintended faults

## Useful Link

[Environmental Data Centre on Waste](#)

[Eurostat Statistics Explained- waste statistics](#)

[Eurostat Statistics Explained - Environmental statistics at regional level](#)

Thank you for your attention