2.7 WASTE

Dumping and inappropriate management of waste have a significant impact on the environmental media into which the waste is released and can result in water, soil and air pollution, as well as contributing to climate change and affecting ecosystems and human health. However, when managed sustainably, waste becomes a resource that helps save raw materials and energy and therefore contributes to conserving natural resources and the climate.

Spain's economic growth over the last decade has been accompanied by an increase in waste generation. There is therefore a need to prevent production, encourage reuse and promote appropriate management of waste.

During the first year of implementation of the National Integrated Waste Plan (PNIR) 2008–2015, a series of measures, including efforts to encourage co-ordination and collaboration between public administrations, were put into practice with the aim of enhancing the information available about waste and eradicating illegal landfill, among other important goals. Among the prevention measures, some of the most significant were those aimed at reducing the number of single-use plastic bags in circulation. To achieve this, a major communication campaign was launched embracing both public and

private initiatives to reduce consumption and, therefore, generation of this type of waste.

In accordance with the PNIR, on 27 November 2009, a Royal Decree was passed to regulate the direct subsidies granted to Spain's regional governments. Under this Royal Decree, the MARM co-finances, among other actions, closure of dumpsites that do not comply with applicable legislation, exploitation of biogas at landfill sites, construction of recycling points, and projects to promote separate

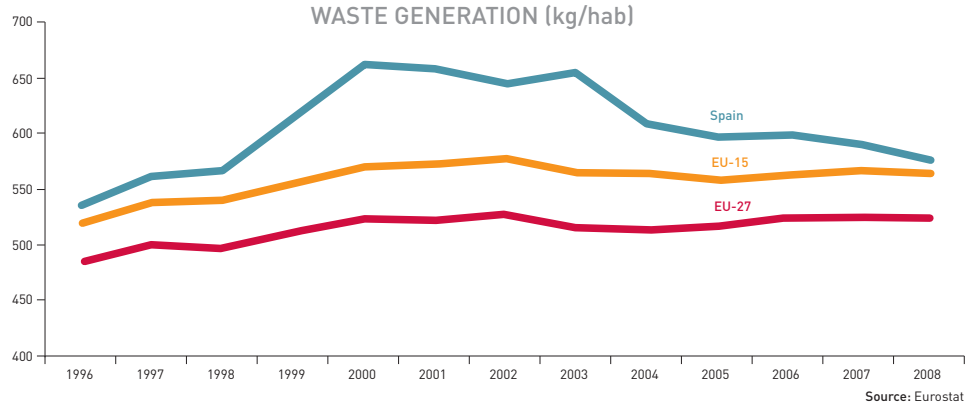
INDICATOR	GOAL	TREND
Urban waste generation	Minimise production	Since 2003, the quantity of urban waste produced per inhabitant has fallen
Urban waste management: landfill and incineration	Increase recycling and reduce the quantity of waste landfilled	In 2008, the volume of urban waste per inhabitant landfilled continued to decrease
Paper and cardboard recycling	Increase the recycling rate	Paper and cardboard collection and recycling rates continue to rise
Glass recycling	Increase the recycling rate	Increase in the glass recycling rate
Packaging waste recycling and recovery	Increase the recycling and recovery rates for used packaging	Recycling and recovery rates exceed the targets set by RD 252/2006
Sewage sludge production and use	Increase sewage sludge reuse	Increase in use as agricultural fertiliser

collection of urban waste's organic component, as well as initiatives to improve processing at urban-waste composting and organic-matter biodigestion plants. Promotion of domestic composting is another of the initiatives encouraged through new pilot projects, which have driven an increase in the number of municipalities that have introduced this prevention practice.

Furthermore, the future Waste Law, which is currently being drafted and will transpose the new Waste Framework Directive into Spanish legislation, is intended to simplify and update existing waste legislation, implement a more ambitious and effective waste policy, promote reuse and recycling, harmonise the existing regulations governing extended producer responsibility, improve regulation of municipal waste, and increase the transparency and environmental and economic effectiveness of waste management.

Urban waste generation

In 2008, the volume of urban waste generated in Spain fell once again and moved closer to the EU average

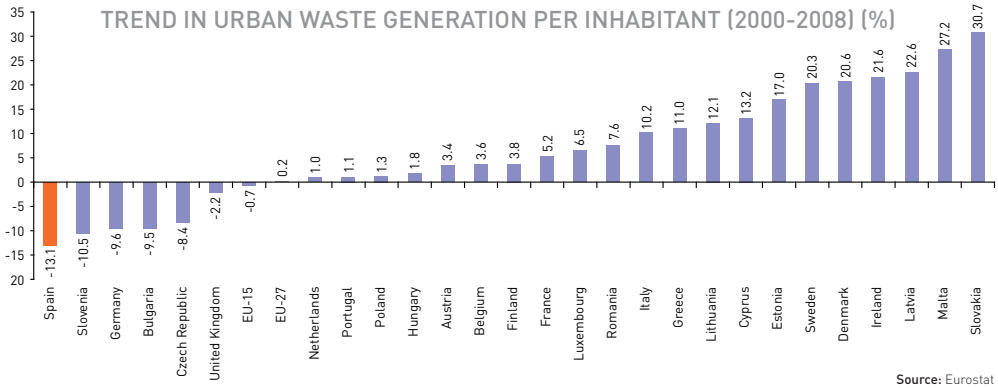


Source: Eurostat

Management of household waste is the responsibility of local authorities, which act under the guidance of regional government. The challenge facing government is to implement efficient and effective management models that ensure compliance with legal obligations and with the aims of regional, national and EC waste legislation.

According to Eurostat data, the trend in urban waste generation per inhabitant in Spain shows a general decrease since 2003 and is approaching the EU average. In fact, it is estimated that in 2008 Spain generated approximately 575 kg/inhab, while in the EU-15 the figure stood at 565 kg.

Analysis of the trend since 2000 shows a decrease in urban waste generation in Spain in comparison with the other EU-27 countries.



Source: Eurostat

In 2008, Spain occupied ninth place in the ranking of Europe's biggest generators of urban waste, an improvement on the eighth position held in 2007.

The absolute urban waste generation figures estimated by the Ministry of the Environment and Rural and Marine Affairs for the past four years (see table) show moderate growth, although there was a slight year-on-year decrease in 2007. In 2008, separate collection accounted for almost 18.4% of the total, while collection of mixed waste made up the remaining 82.6%.

URBAN WASTE (tonnes)

	2005	2006	2007	2008
Urban waste collected	22,353,152	23,648,032	23,562,199	24,049,826
Type: - Separately collected paper, glass, lightweight packaging and organic matter	2,133,435	2,519,340	2,668,897	3,430,066
- Mixed waste	19,657,827	20,431,260	19,993,461	19,858,348
- Other separately collected waste	561,890	697,432	899,841	761,448

The data on urban waste compiled by the MARM from data provided by Spain's regional governments only include figures for domestic-type municipal waste collected from households, small retailers, offices, schools, etc.
'Other separately collected waste' includes, among others, bulky waste and waste electrical and electronic equipment and even rubble from minor building work. These types of waste represent a high percentage of the total tonnage collected at recycling points.

Source: MARM

This increase in waste generation in the last year of the period needs to be viewed in context — in 2008, Spain's population increased by 2.1%, a factor that contributed to the rise in urban waste generation and the related rates.

NOTES

- The indicator shows municipal waste generation, expressed in kilograms per inhabitant (kg/inhab), and refers to waste collected by municipal services (or by similar services contracted by local councils) and processed by waste management systems. Most of this waste originated from households, although waste from similar sources, such as retail outlets, offices and public institutions, is also included.
- According to Law 10/1998, on waste, urban or municipal waste is "waste generated in private households, retail outlets, offices and service businesses, as well as all waste similar to that produced in the aforementioned places or activities and that is not classified as hazardous."
- Mixed waste is defined as household waste and items generated by private households, retail outlets, offices and services, or during the cleaning of public thoroughfares.
- Separately collected waste is the product of separate collection of fermentable organic matter and recyclable materials, as well as that of any other separate collection system that permits retrieval of recoverable materials contained in waste.

SOURCES

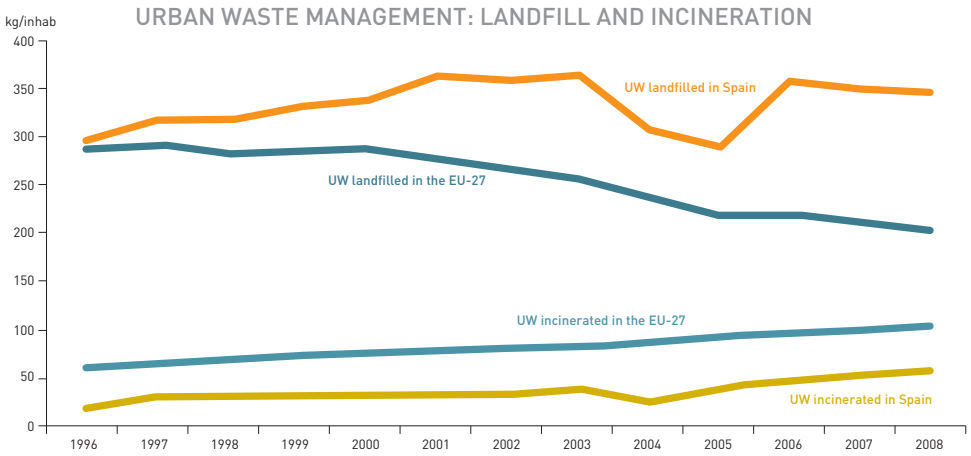
- Eurostat. Eurostat Sustainable Development Indicators. Theme 2: Sustainable Consumption and Production: Municipal waste generated
- Information provided by the Sub-Directorate-General for Sustainable Production and Consumption. Directorate-General for Environmental Quality and Assessment, MARM.

FURTHER INFORMATION

- http://www.marm.es
- http://www.ine.es
- http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Urban waste management: landfill and incineration

The decrease in the quantity of urban waste landfilled, which started in 2006, continued in 2008, while incineration rose slightly



Source: Eurostat

Currently, a high percentage of the waste generated in Spain is disposed of in landfill. To lower this, work is under way to reduce waste generation, encourage reuse, and implement separate collection of differentiated waste to increase the recycling rate. Practically all of Spain's population has access to separate collection systems, at least for glass, paper and cardboard and lightweight packaging.

According to Eurostat data, disposal of urban waste in landfill peaked first in 2003 and then again 2006 before falling significantly in 2007 and 2008. Notably, while the volume landfilled decreased by 28.4% in the EU-27 between 1996 and 2008, in Spain it rose by 9.7% over the same period.

For its part, incineration as a means of disposal is increasing, although usage is below the EU-27 average. Nevertheless, over 1996–2008 the amount of urban waste incinerated per capita in Spain grew by 112.0%, while in the EU-27 the increase was much lower at 54.6%.

In Spain, a large proportion of mixed urban waste is processed in treatment plants, which separate recyclable matter and leave the rest for disposal in landfill

sites or incineration. Taking into account that in 2007 approximately 23 million tonnes of urban waste were produced in Spain in absolute terms, the amount disposed of in landfill sites still remains very high.

Composting is the most widely used treatment option for organic matter, though the compost obtained often fails to meet the required quality parameters. Therefore, increasing separate collection of organic matter to favour production of high-quality compost needs to be a priority.

As has been mentioned, in recent years Spain has increased its capacity to recover waste's energy value by incinerating it. The country currently incinerates around 2 million tonnes of urban waste and the energy value is recovered from the entire amount.

URBAN WASTE PROCESSING IN TREATMENT FACILITIES (t/year)

Facility type	2005	2006	2007
Packaging sorting plants	330,638	606,200	559,271
Composting plants for separately collected organic matter	243,921	160,017	161,781
Sorting and composting plants	6,455,248	6,991,541	7,249,622
Sorting, biomethanisation and composting plants	1,123,818	1,168,565	1,041,153

Source: MARM

NOTES

- The indicator shows the relationship between the amount of waste treated at the various facilities and the number of inhabitants in Spain each year, factors that need to be taken into consideration when interpreting the indicator's results. Moderate increases in the quantity of waste treated combined with greater increases in population can lead to decreases in this ratio, while falls in the quantity of waste treated combined with strong population declines can lead to increases in the indicator.
  See notes for the previous indicator.

SOURCES

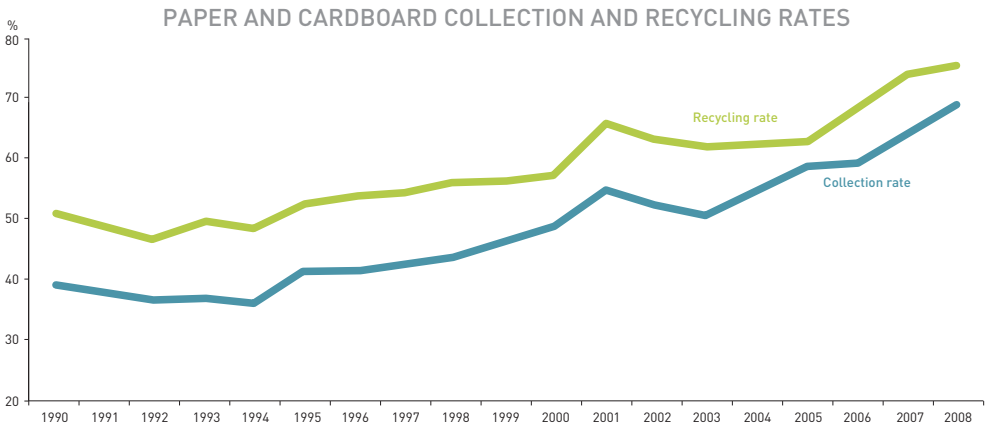
- Eurostat Sustainable Development Indicators. Theme 2: Sustainable Consumption and Production: Municipal waste treatment, by type of treatment method. 5.6.2 Municipal waste landfilled (kg per capita) and 5.6.3 Municipal waste incinerated (kg per capita).
- Information provided by the Sub-Directorate-General for Sustainable Production and Consumption. Directorate-General for Environmental Quality and Assessment, MARM.

FURTHER INFORMATION

- http://www.marm.es
- http://www.ine.es
- http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/themes

Paper and cardboard recycling

In 2008, over 5 million tonnes of paper were recovered



Source: ASPAPEL

According to the *Papel 09* report published by the Association of Spanish Pulp and Paper Manufacturers (ASPAPEL), Spain, which has over 110 paper and cellulose factories, is now the EU's sixth-biggest paper producer behind Germany, Finland, Sweden, Italy and France. Moreover, it also holds sixth position in terms of cellulose production after Finland, Sweden, Germany, France and Portugal.

The same report states that paper recovery in the past 10 years has almost doubled from 2.6 million tonnes in 1998 to over 5 million tonnes in 2008, bringing with it an associated reduction in waste and GHG emissions.

In 2008, the recycling rate reached 77.6%, while in 2000 it stood at 56.8%. The collection rate has also grown strongly in recent years, reaching 68.9% in 2008.

In Europe (EU-27 plus Norway and Switzerland), the recycling rate reached 66.6% in 2008, placing Spain in the group of countries above the EU average.

According to the *Survey on the Collection and Treatment of Waste* carried out by the INE, in 2007 the average weight of separately collected paper and cardboard stood at 25.3 kg/inhab compared to 22.1 kg/inhab in 2006 and 17.9 kg/inhab in 2005.

By autonomous community, the highest values in 2008 were recorded in the Balearic Islands (65.1 kg/inhab), followed by Asturias, Navarre, the Basque Country and the Canary Islands, all of which registered over 40 kg/inhab.

For its part, the utilisation rate in Spain has been above 80% since 1998 and reached 84.9% in 2008. This rate is among the highest in Europe and indicates that to produce 10 kg of paper almost 85 kg of recovered paper were used.

NOTES

- The collection rate, which is expressed as a percentage, indicates the ratio between the quantity of paper recovered and the quantity of paper and cardboard consumed. Used paper and cardboard are recovered for recycling by various means: industrial collection (from companies, publishing houses, printers and large retail outlets), separate collection (from blue containers and door-to-door collection from small retailers) and specific collection (from offices, public buildings, recycling points, etc.). After being cleaned and sorted into different grades, the recovered paper is used as a raw material by the papermaking industry to produce new paper. Recovered paper is thus used paper that has been collected for use as the raw material employed in the manufacture of new paper, in other words, to be recycled.
- The recycling rate for waste paper and cardboard is calculated as the ratio between the quantity of paper recovered and apparent consumption of paper and cardboard. Apparent consumption is calculated by adding the quantity imported to the quantity produced and then deducting exports.
- The utilisation rate, which is expressed as a percentage, is calculated as the ratio between the quantity of paper recovered and the quantity of paper manufactured.
- In the Survey on the Collection and Treatment of Waste carried out in 2007 (INE, press release of 20 October 2009), separately collected waste is defined as the product of separate collection of fermentable organic matter and recyclable materials, as well as that of any other separate collection system that permits retrieval of recoverable materials contained in waste. It does not include waste recovered in screening and sorting plants.

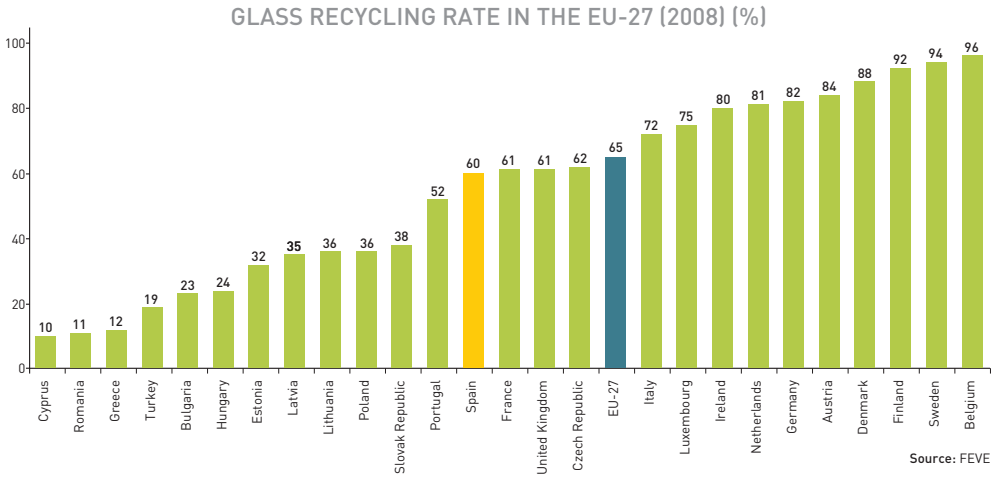
SOURCES

- ASPAPEL. Memoria de Sostenibilidad, various years.
- ASPAPEL. PAPEL 09. 04/2009
- ASPAPEL, 2010: Summary of the latest statistics on the sector (see website).
- REPACAR. 2008 Report.
- CEPI.

FURTHER INFORMATION

- **http://www.marm.es**
- **htpp://www.aspapel.es**
- **htpp://www.ine.es**
- **htpp://www.repacar.org**
- Confederación de Industrias Papeleras Europeas de la UE (CEPI): **http://www.cepi.org/**

Glass recycling



Separate collection of glass for subsequent recycling requires a fundamental element without whose input collection would not take place. This element is the public who, either from their homes or places of work, contribute to the process by separating glass from other waste and disposing of it in the containers placed in streets throughout the country.

In 2008, the glass-recycling rate reached 60%, the target set in Directive 94/62/EEC on packaging and packaging waste, and amended by Directive 2004/12/EC of 11 February 2004.

Analysis by autonomous community reveals significant differences in glass collection, with values ranging from 38.7 kg/inhab to 9.3 kg/inhab.

It is worth pointing out that in 2008 apparent consumption of glass packaging in Spain stood at 1,614,000 tonnes, slightly below the 1,672,000 tonnes recorded in 2007. Ecovidrio's annual report for 2008 offers comprehensive information on operation of the Management System. The following figures are particularly noteworthy:

- No. of municipalities with separate glass collection: 7,960
- Population covered by a collection service: 99.7%
- No. of containers installed (total for Spain): 157,363
- Ratio of population provided with containers (inhabitants per container): 293
- Glass collected per inhabitant (kg/inhab): 15.5
- Total kilograms of glass recycled: 972,657,551

Regional differences can also be seen within the European Union where, according to the European Container Glass Federation, glass-recycling rates vary widely. Spain is positioned mid-table in relation to the other EU-27 countries, among which Belgium, Sweden and Finland, where the rate exceeded 90% in 2008, stand out particularly.

NOTES

- The glass recycling rate is defined as the ratio between the quantity of glass collected and apparent glass consumption. This figure is calculated by adding domestic production to glass imports and then subtracting exports. ECOVIDRIO conducts the entire process of glass recycling for subsequent manufacture of glass packaging (collection, treatment and final recycling, a process that takes place within the same year). This refers only to packaging glass (hollow glass), and does not include other types of glass, such as window panes, car windows, laminated glass, etc. (flat glass).
- Glass is collected from two sources: glass contributed by the public, which is glass collected in containers (green bottlebanks) located on public thoroughfares, and glass of other origin, which is obtained from packaging plants, waste-sorting plants, the hotel and catering sector and other private and public entities.

SOURCES

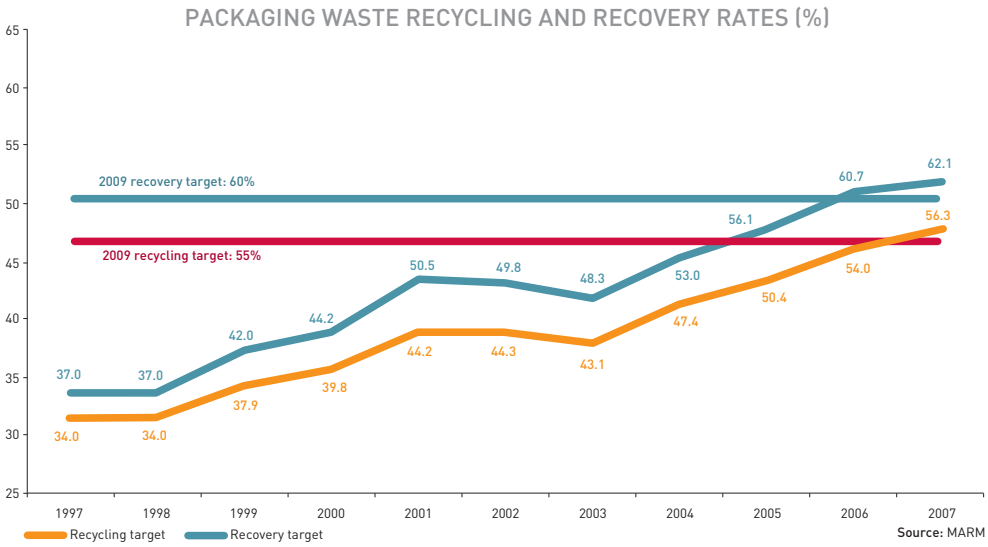
- Ecovidrio. Annual report 2008.
- FEVE.
- The data on collection of glass packaging by autonomous community was provided by the various regional governments.

FURTHER INFORMATION

- http://www.marm.es
- http://www.ecovidrio.es
- http://www.anfevi.com/
- http://www.feve.org

Packaging waste recycling and recovery

The packaging waste recycling and recovery targets set for 2009 were met by 2007



In 2007, the packaging waste recycling rate reached 62.1% and the recovery rate reached 56.3%. Thus, the upward trend in these rates was maintained and the target values for 2009 were met.

In 2008, the Ecoembes Integrated Management System recovered a total of 1,328,747 tonnes of packaging (67% of the packaging placed on the market by enterprises registered with the system). Of this volume, it recycled 1,229,636 tonnes (62% of all packaging managed — 6% more than in 2007) and 99,111 tonnes were recovered for their energy value. In this regard, it is worth noting that by the end of 2008, the number of companies registered with Ecoembes totalled 12,376 and accounted for 90% of the packaging placed on the market. The volume of packaging managed by the Integrated Management System in 2008 stood at 1,982,213 tonnes.

According to Ecoembes' 2008 annual report, in that year the recycling rate reached 62%, exceeding the 55% target set for 2009. The minimum targets set for the various materials by EC Directive 2004/12/EC (60% for paper and cardboard packaging, 50% for metal packaging, 22.5% for plastic packaging and 15% for wooden packaging) were also exceeded.

Spain's streets host over 280,000 yellow recycling containers for lightweight packaging and more than 140,000 blue containers for paper and cardboard, which between them serve over 45 million citizens. In addition to possessing the necessary infrastructure, the systems for managing packaging waste collection must be adapted to the different urban typologies and to the needs of users. They should also be integrated with other waste management activities and municipal services. Efforts to reduce collection costs, inconvenience to citizens and alteration of the environment play an essential part in ensuring the continued success of separate collection of this type of waste, which constitutes the first link in the recycling and recovery chain.

NOTES

- Ecoembalajes España, S.A. (Ecoembes) is a non-profit public limited company whose purpose is to design and implement systems to separate and recover used packaging and packaging waste in order to ensure compliance with the reduction, recycling and recovery targets set in Law 11/1997 of 24 April on packaging and packaging waste.
- The recycling and recovery rate is calculated by comparing the number of tonnes recycled and recovered for their energy value (measured at the point of entry into the recycling and recovery process) with the total packaging waste generated (taken to be equal to the total amount placed on the market). It is assumed that the quantity of reusable packaging from previous years that becomes waste will balance out the reusable packaging placed on the market in that year and then subsequently reused.

SOURCES

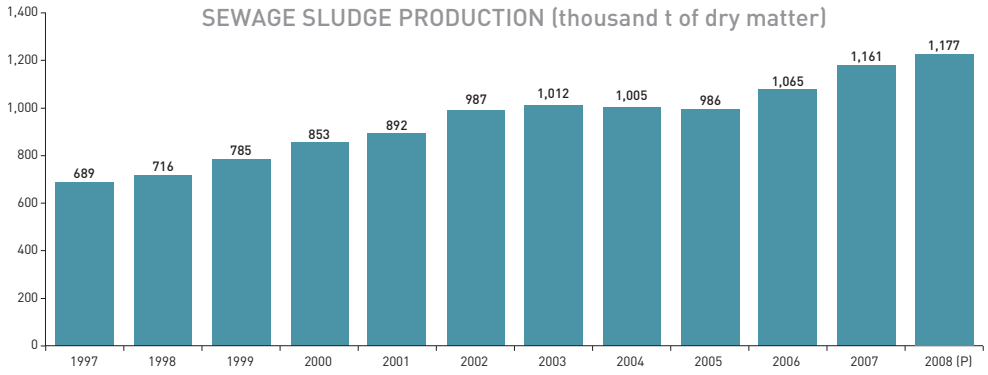
- Medio Ambiente en España (various years). MMA.
- Ecoembalajes España, S.A. (Ecoembes). Press release, Madrid, 13 July 2009, and 2008 Annual Report.

FURTHER INFORMATION

- http://www.marm.es
- http://www.ecoembes.com

Sewage sludge production and use

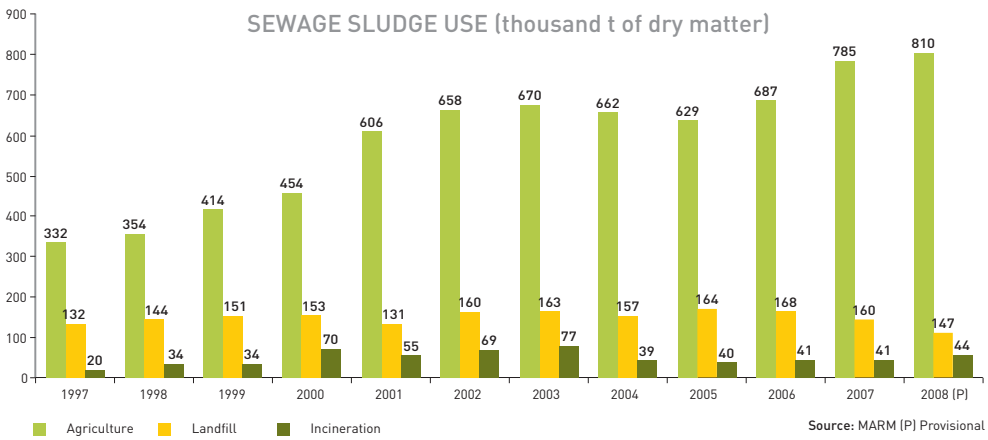
Use of sewage sludge as an agricultural fertiliser continues to be the most widely employed alternative to disposal



Source: MARM (P) Provisional

According to provisional data for 2008, production of sewage sludge continues to rise and, in the year in question, totalled 1,176,613 tonnes of dry matter. With respect to 2007, year-on-year growth stood at 1.4% (below that of other years), while over the 2000–2008 period a 38% increase was recorded.

Treatment of wastewater produces sewage sludge, disposal of which has a significant impact on the environment. In recent years, problems of sewage sludge storage and disposal have worsened as the volume of water treated and, consequently, the volume of sludge requiring management, have increased.



Source: MARM (P) Provisional

As regards management of sewage sludge, in 2008 agriculture was again the main recipient and accounted for 68.8%, up 3.1% on 2007. Meanwhile, landfill fell by 7.7% on the figure for 2007, a year in which it had also shown a decrease on the previous 12-month period. For its part, incineration with energy recovery was the management alternative applied to 3.7% of sewage sludge in 2008, when the amount incinerated rose by 6.3% on 2007.

Use of sewage sludge as fertiliser offers three notable advantages:

- Recovery of the energy value of waste generated by population centres through reuse in agriculture.
- Provision of nutrients for crops, as well as adding organic matter to the soil.
- Reduction in production costs by decreasing use of other fertilisers.

However, the problems deriving from its composition also need to be addressed, which means it should be used in a controlled manner and in accordance with existing legislation.

NOTES

- Council Directive 86/278/EEC of 12 June 1986, on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture, employs the following terms:
  - "(i) residual sludge from sewage plants treating domestic or urban waste waters and from other sewage plants treating waste waters of a composition similar to domestic and urban waste waters;"
  - "(ii) residual sludge from septic tanks and other similar installations for the treatment of sewage;"
  - "(iii) residual sludge from sewage plants other than those referred to in (i) and (ii);"

SOURCES

- National Sewage Sludge Register. Sub-Directorate-General for Means of Agricultural Production. MARM (specific query).

FURTHER INFORMATION

- http://www.marm.es