

PART I

Chapter 1

Key environmental trends

This chapter provides a snapshot of some key environmental trends in Italy between 2002 and 2012. It highlights some of the country's main environmental achievements, as well as the remaining challenges on the path towards a greener economy and sustainable development. The chapter describes Italy's progress in reducing the carbon, energy and material intensities of its economy; in managing its natural asset base, including water and biodiversity resources; and in improving the environmental quality of life.

1. Introduction

During the last decade, economic growth in Italy was among the lowest in OECD countries (Reference I.A). The economy was hit by the most severe recession of the last half century following the global economic and financial crisis. Weak growth has reduced many environmental pressures, but Italy should integrate environment into the strategy to re-launch its economy. The country's rich natural environment and cultural heritage are among its most important assets. Accordingly, its new growth strategy must ensure that natural assets continue to provide the resources and environmental services on which sustained economic growth depends.

This chapter provides a snapshot of some key environmental trends in Italy during the review period (2002-12). It highlights some of the country's main environmental achievements and the remaining challenges on the path towards green growth and sustainable development. The chapter is based on indicators from national and international sources, and broadly follows the OECD framework for monitoring progress towards green growth (OECD, 2011a). Accordingly, it describes Italy's progress in using energy and natural resources efficiently in managing its natural asset base, and in improving the environmental quality of life of its people. It provides a baseline for subsequent chapters, which assess how effective Italy's environmental policies have been in affecting these trends and in using environmental objectives to generate economic opportunities.

Box 1.1. The economic and social context

- Italy's economy is the sixth largest among OECD countries. Average annual growth was 1.6% between 2000 and 2007, the lowest among OECD countries. In 2008-09 the economy shrank by 6.8% due to the global economic crisis. It increased by 2% in 2010 and returned to the pre-crisis average in 2011. However, GDP declined after mid-2011 and is projected to decline further until late 2013.
- With average GDP per capita of USD 31 563 (current PPP), Italy ranks 19th among OECD countries (Reference I.A). It is one of the most economically diverse countries in Europe. In the more economically advanced North GDP per capita averages USD 59 000. In the less developed South (Mezzogiorno), it can be as low as USD 22 000 (70% of the EU average).
- Services account for 81% of gross value-added, while industry accounts for 17.3% and agriculture for 1.7% (Reference I.A). A large number of small and medium-sized enterprises, clustered in several industrial districts, mostly in the North, are the backbone of Italian industry. The Italian National Institute of Statistics (ISTAT) estimates that untaxed transactions in the informal economy are currently equivalent to about 18% of GDP per year.
- Tourism is one of the fastest growing and most profitable sectors of the national economy: with 43.6 million international tourist arrivals and total receipts estimated at USD 38.8 billion in 2010, Italy is the fifth most visited country and fifth highest tourism earner in the world.

Box 1.1. The economic and social context (cont.)

- Italy has a long history of high public debt. Gross government liabilities amounted to 126.5% of GDP in 2010. Although they have declined since the late 1990s, they remain among the highest in the OECD. The level of private sector indebtedness is low, however, while private savings are higher than in a number of other OECD countries.
- In 2010, total public expenditure accounted for 47% of GDP, just below the mean in the euro area of 48% but significantly above the OECD average of 42%. Revenues are high (43% of GDP in 2010), indicating that reduced public spending rather than higher taxes will be needed to tackle Italy's public debt burden. Local governments collect a fairly high share of revenue (14.5%, the fifth-highest level in the EU).
- The general government deficit stood at 4.6% of GDP in 2010 and 3.9% in 2011. Following the Save Italy austerity measures adopted in December 2011, the goal is to reduce the deficit to 1.7% in 2012 and 0.5% in 2013.
- Italy's exports account for 26.7% of total GDP, slightly below the OECD average of 27.1% (2010) (Reference I.A). The main exports are manufactured goods, fabric and textile goods, and transport equipment. Imports account for 28.6% of total GDP and include manufactured goods, metal ores and scraps, and chemical products. Italy's share of imports in GDP is higher than the OECD average of 27.2%.
- Both FDI inflows to, and outflows from, Italy increased from around 1% of total GDP in 2004 to 2.5% and 4.8%, respectively, in 2007. However, both inflows and outflows were below 1% in 2009. Although the government encourages foreign industrial investment through tax concessions, foreign ownership is limited by laws and regulations.
- Following the 2003 labour reform, unemployment fell to 6.2% in 2007, the lowest rate since the early 1980s, but it increased to 8.9% at the end of 2011 (Reference I.B). In the South, the average unemployment rate has been far higher than the national average.^a
- Italy's population was about 60 million in 2011, the eighth largest among OECD countries. Population density is high by OECD standards (199 per km² compared with the OECD average of 34 per km², Reference I.B) although unevenly distributed. The urban population accounts for 52% of the total and is above the OECD average (47%).
- Italy's population is ageing: population growth rate has been low at less than 1% since 1960. While the population aged less than 15 has remained at around 14% of the total population (compared to the OECD average of 18%), the population aged 65 and over has exceeded 20% since 2007 (higher than the OECD average of 14%). These ageing trends are particularly pronounced in the South.
- Inequality in income distribution remains slightly higher than the OECD average (Reference I.B). The at-risk-of-poverty rate^b is 18.2%, higher than the EU27 average of 16.4% in 2010.
- Life expectancy at birth has gradually improved. At 81.8 years, it was the third highest among OECD countries in 2008. The infant mortality rate, as in other OECD countries, has fallen significantly, to 3.7 deaths per 1 000 live births in 2009, which is below the OECD average (4.3 per 1 000).
- While the achievements of 15-year-old students, measured by the OECD Programme for International Student Assessment (PISA), moved closer to the OECD average, they remain below that average. A wide gap in school results is reported between the North and the South.
- More young people than ever before have a secondary school diploma (70% of 25- to 34-year-olds), but the share of young Italians with this level of education is well below the OECD average (82% for that age group, Reference I.B). Italy also has one of the lowest tertiary attainment rates (20% of 25- to 34-year-olds, compared with the OECD average of 37%). It spends 4.8% of its GDP on education, 1.3 percentage points less than the OECD average.

a) However, a significant underground economy, especially in the South, partially offsets the high official unemployment rate, absorbing substantial numbers of people who work for low wages without standard social benefits and protection.

b) The share of the population whose income is below 60% of the national median equivalised disposable income.

2. Transition to a low-carbon, energy- and resource-efficient economy

2.1. Carbon and energy intensities

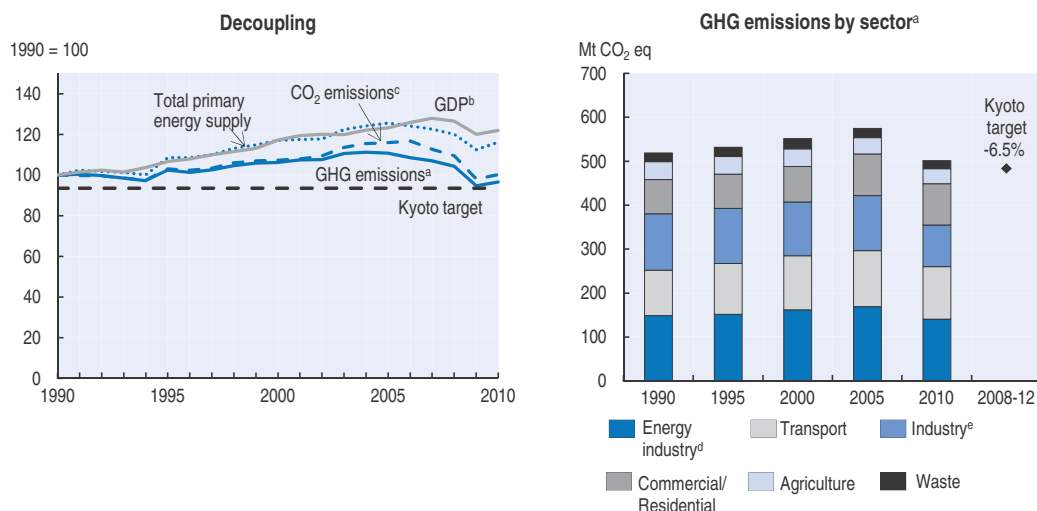
Greenhouse gas emissions

- Italy is the eighth largest emitter of greenhouse gases (GHG) in the OECD and the fourth largest in the EU. GHG emissions per capita (8 tonnes) are lower than the OECD Europe (9.5 tonnes) and OECD (14 tonnes) averages (Reference I.C).
- Gross GHG emissions increased continuously between 1990 and 2004. The increase, which was particularly marked in the 1990-2000 period (6%), slowed to 4.5% between 2000 and 2004. Emissions dropped subsequently, and the decrease accelerated dramatically in 2008 and 2009 due to the economic contraction, but also due a further switch from oil to natural gas in electricity generation and manufacturing and increased use of energy from renewable sources. A slight increase of 2% was recorded in 2010. Overall, gross GHG emissions declined by 9% in 2000-10 (Figure 1.1; Reference I.C).
- GHG emissions from manufacturing, energy generation and transport accounted for 71% of total emissions in 2010; they declined by 22%, 13% and 3% respectively compared with 2000 (Figure 1.1). Emissions from agriculture (-16%) and waste management (-22%) also declined. In contrast, emissions from the residential and service sectors, which account for 19% of the total, increased by 17%.
- On a production basis, CO₂ emissions from energy use increased between 2000 and 2008 but less than economic growth-related decoupling (Figure 1.1). While emissions from manufacturing declined steadily for most of the review period (absolute decoupling), the reduction of emissions from energy and transport occurred only in the second half of the 2000s. Contributing factors were the increased share of natural gas and renewables in electricity generation and the negative impact of the economic crisis on energy and transport demands.
- There was no decoupling of consumption-based emissions in the period 2000-08. Emissions increased at the same or at a higher rate than GDP. After 2008, emissions declined absolutely and more rapidly than GDP and total primary energy supply (TPES).
- Total GHG emissions in 2010 amounted to 501 million tonnes of carbon dioxide equivalent (Mt CO₂ eq), about 3.5% below the 1990 level. When emission removals from the so-called “Kyoto forests” are taken into account, emissions were 6.2% below the 1990 Kyoto Protocol base year emissions in 2010. This is slightly above Italy’s Kyoto objective of reducing GHG emissions by 6.5%, or of reaching an annual average of 483 Mt CO₂ eq in the period 2008-12. (Figure 1.1).

Energy intensity and renewables

- Italy’s TPES and total final energy consumption (TFC) increased consistently and remained steadily coupled with GDP between between 2000 and 2005. Energy demand started to decline in 2005, before the Italian economy entered recession, and then continued to decline at a higher rate than GDP (Figure 1.2).
- Italy’s energy intensity has traditionally been low compared to that of other OECD countries (Reference I.A). This is due to its limited national energy endowment, high energy prices and taxes, and an industrial structure characterised by small firms which mainly operate in sectors that are not energy-intensive. Energy intensity fell by nearly 10% in 2005-11. However, in the OECD context the decline in energy intensity (from an already low starting point) has been slower than in other countries.

Figure 1.1. **CO₂ and GHG emissions**
1990-2010



a) Excluding emissions/removals from land use, land-use change and forestry.

b) GDP at 2005 prices and purchasing power parities.

c) CO₂ emissions from energy use only; sectoral approach. Excludes international marine and aviation bunkers.

d) Includes other energy-related and fugitive emissions.

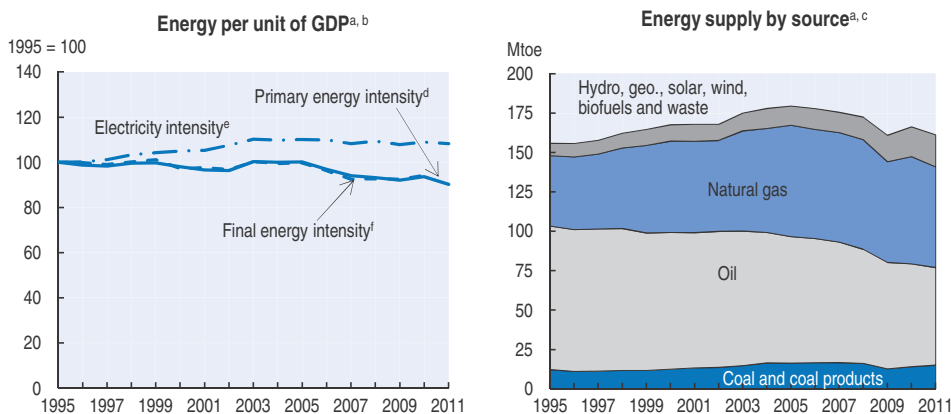
e) Manufacturing and construction; includes solvent use.

Source: ISPRA (2012); OECD (2011), *OECD Economic Outlook No. 90*; OECD-IEA (2012), *CO₂ Emissions from Fuel Combustion*; OECD-IEA (2012), *Energy Balances of OECD Countries*.

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- An increase in the share of gas and renewables in electricity generation has led to a decrease in the carbon intensity of the economy and relative decoupling of GHG emissions from economic growth. At 0.3 t CO₂/USD 1 000, Italy's GHG emission intensity is well below the OECD average (Reference I.C). However, national averages may hide wide variations at regional level.
- Italy's dependency on fuel imports (86% in 2009) is higher than that of most other OECD countries. The share of natural gas in TPES has increased, but use of oil is still high (Figure 1.2). Contrary to many OECD countries, the share of coal in TPES has been low (9.4% in 2011, Reference I.A).
- Fossil fuel imports are supplemented by increasing local production of energy from renewable sources (Figure 1.3). Greater use of primary solid biofuels and waste, wind and solar power was the main factor in the increased share of renewables from 6% to 12% of TPES between 2000 and 2011. This share is well above the OECD average of 8%.
- A series of power outages that affected Italy in 2003 stimulated the government to take steps to increase the security of electricity supply and to attract additional investment to the sector. This has resulted in significant investment in new generation plants, especially gas-fired ones, which have replaced those fuelled by oil. Additional electricity generated between 2000 and 2010 came from renewables, which increased their share from 19% in 2000 to 28% in 2011 (Figure 1.3).
- In 2011, 55% of electricity generated from renewables came from hydro power. Wind power generation, which accounted for 12% of renewable electricity generation and was the seventh largest in the OECD, was 17 times as great as in 2000. Photovoltaic (PV) power production grew exponentially in the late 2000s, reaching 13% of electricity generated by

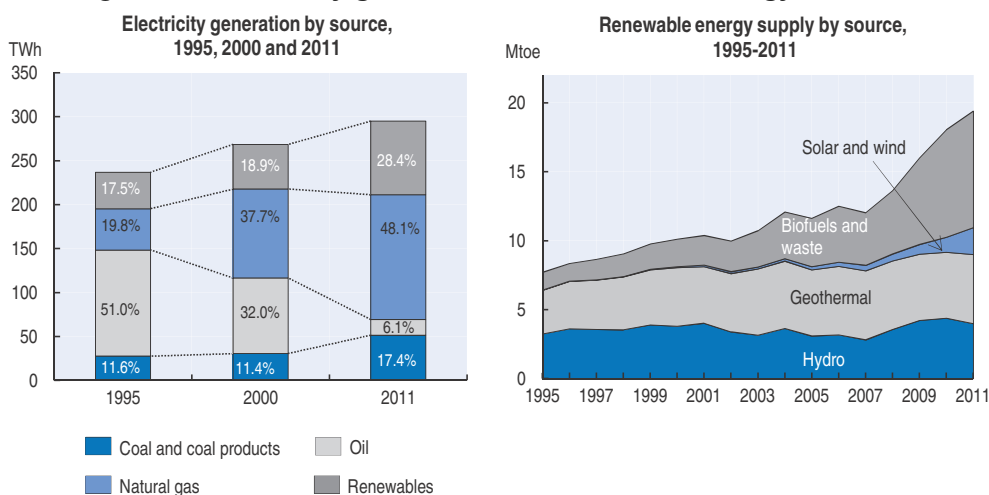
Figure 1.2. Energy intensity and structure^a
1995-2011



a) Total primary energy supply.
 b) GDP at 2005 prices and purchasing power parities.
 c) Breakdown excludes electricity trade.
 d) Total primary energy supply per unit of GDP.
 e) Electricity consumption per unit of GDP.
 f) Total final consumption of energy per unit of GDP.
 Source: OECD (2011), *OECD Economic Outlook No. 90*; OECD-IEA (2012), *Energy Balances of OECD Countries*.

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Figure 1.3. Electricity generation and renewable energy structure



Source: OECD (2011), *OECD Economic Outlook No. 90*; OECD-IEA (2012), *Energy Balances of OECD Countries*.

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renewables in 2011. By the end of the 2000s, Italy had the fourth largest installed solar energy capacity in the OECD. In 2011, Italy became the second largest PV market in the EU.

- Italy closed its last nuclear reactors in 1990. In 2008, government policy changed and a substantial new nuclear programme was planned. A referendum in 2011 failed to approve this decision.
- Total final energy consumption (TFC) grew in all sectors (industry, transport, residential, agriculture, non-energy use, international maritime and aviation bunkers) between 2000

and 2005, reaching 139 Mtoe in that year. Since then, TFC has shown a slow but steady decline except in 2009, when the decrease was more rapid.

- The transport sector is the main energy end-user. It accounted for about 30% of energy consumption in the last decade. The residential sector accounted for about 24% of TFC in 2010. Industry's share decreased from 30% in 2000 to 23% in 2010 (with the biggest decrease after 2008). The commercial sector's share increased from 9% to 13%.
- Passenger and freight transport activity broadly followed Italy's economic performance in the 2000s. Passenger and freight traffic flows by road (measured in vehicle-kilometres) grew between 2000 and 2007 and have remained closely coupled with the GDP trend. Freight transport by road remains dominant, accounting for more than 90% of the total, nearly 15 percentage points more than the EU average (Reference I.A).
- While there has been an increase in use of public transport, especially buses, passenger cars accounted for 82% of passenger inland travel in 2010 compared with some 84% on average in Europe. However, these figures exclude the relatively large share of journeys made by motorbike. Although passenger traffic by air accounts for a small fraction of total passenger transport, it increased by 40% during the review period.
- The increase in vehicle stock in 2000-10 was one of the smallest among the OECD countries (about +12%). However, Italy remains among the top five OECD countries in terms of the rate of private car ownership (Reference I.A).

2.2. Resource efficiency

Material productivity

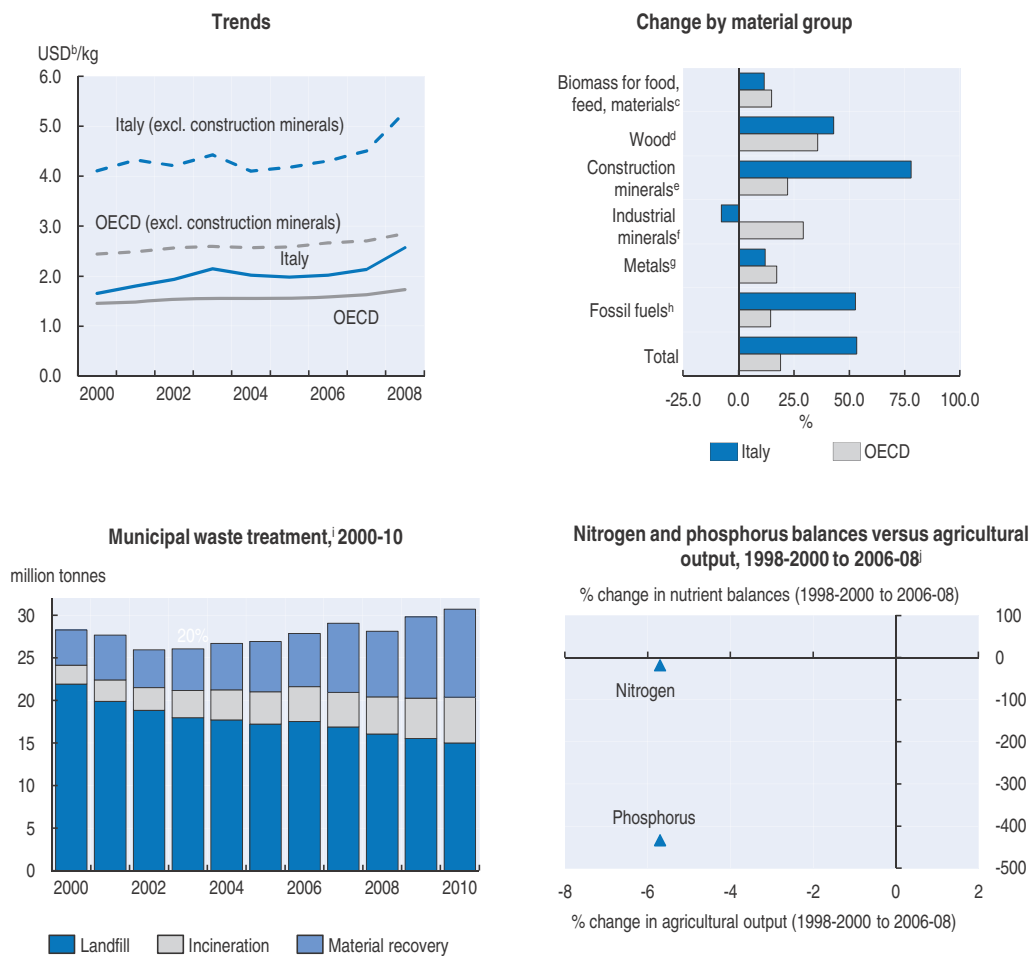
- Italy imports almost all its mineral resources and fossil fuels. Construction materials and small natural gas reserves, mainly in the Po River Valley and offshore in the Adriatic Sea, constitute the country's most important raw material resources.
- Italy (and Japan) achieved the highest rate of absolute decoupling of domestic material consumption (DMC)¹ from GDP growth between 2000 and 2008. Italy's 30% reduction rate was relatively high, although its GDP growth was much lower than the OECD average.
- Between 2000 and 2008, Italy's material productivity (GDP per unit of DMC) increased at a much faster rate (+50%) than the OECD average (+19%) (Figure 1.4). This places it among the OECD countries with the highest resource productivity (Reference I.C). In construction materials and fossil fuels, productivity gains were double the OECD average. The weakest productivity gains were in the use of biomass. The productivity of industrial minerals usage also declined (Figure 1.4).
- Italy's total DMC per capita decreased by 34%, which compares well with the OECD average reduction of 6%. The reduction is less if construction materials are excluded (-20%), but it is still deeper than the OECD average (-4%) (Figure 1.4).

Waste generation and recovery

- Between 2000 and 2010, annual waste generation grew by about 45%, significantly above the rate of GDP growth. This increase was mainly due to increased waste from manufacturing (+50%) and construction and demolition (C&D) (+100%). Manufacturing waste currently accounts for 50% of total waste generated in Italy and C&D waste for a further 32%.
- Hazardous waste from manufacturing grew three-fold during the review period and accounted for almost 7% of the total amount of waste generated.

Figure 1.4. Resource productivity

Material productivity,^a 2000-08



- a) Material productivity designates the amount of GDP generated per unit of materials used. It refers to the ratio of GDP to domestic material consumption (DMC), where DMC is the sum of domestic (raw material) extraction used by an economy and its physical trade balance. A rise in material productivity is equivalent to a decline in material intensity (i.e. DMC/GDP).
- b) GDP at 2005 prices and purchasing power parities.
- c) Domestic production from agriculture and fisheries, plus trade of raw and processed products from these sectors.
- d) Domestic production from forestry, plus trade of raw and processed products from this sector.
- e) Domestic extraction and trade of minerals used in construction (e.g. sand, gravel, stones).
- f) Domestic extraction and trade of minerals used in industry (e.g. salts, potash, phosphate rocks).
- g) Domestic extraction of metal ores, plus trade of metal ores (e.g. bauxite), metal concentrates (e.g. nickel matte), refined metals (e.g. steel, aluminium, copper), products mainly made of metals (e.g. vehicles, machinery, electronics and electrical equipment), and scrap.
- h) Coal, crude oil, natural gas, peat and traded derived products (e.g. plastic and rubber).
- i) Municipal waste is waste collected by or for municipalities and includes household, bulky and commercial waste, and similar waste handled at the same facilities.
- j) Three-year moving averages of gross nutrient balances per hectare of agricultural land.
- Source: OECD Environmental Data; OECD (2011), *OECD Pilot Material Flow Database*.

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- Contrary to trends in many other OECD countries, annual municipal waste generation has increased. The increase was faster than growth in GDP and private final consumption in the period before the 2008 crisis. In 2009-10, municipal waste generation decreased, but at a slower rate than GDP or private consumption. Municipal waste generated per capita increased from 498 kg to 536 kg between 2000 and 2010 and was above the OECD Europe, but below the OECD, average (Reference I.C).
- Although separate waste collection increased from 15% to 34% between 2000 and 2010, there are important differences between the North and the South: about 50% of municipal waste is separately collected in the North and 21% in the South. In 2000, separate waste collection in the South was only 5%.
- In 2010, 49% of municipal waste was landfilled, an important decrease from about 70% in the early 2000s (Figure 1.4). Progress in municipal waste recovery was due to improved separate collection and an increased share of waste undergoing mechanical biological treatment. The amount of waste incinerated doubled, with energy recovery by all but one incinerator.
- Following transposition of the 1999 EU Landfill Directive, the number of landfills decreased from 1 449 in 2000 to 640 in 2008 and sanitary standards improved.
- The number of known illegal dumps has fallen substantially in the last decade, while the number of prosecutions related to waste dumping has increased. However, inadequate and illegal waste disposal still occurs, as illustrated by the serious situation in Campania and the city of Naples.

Nutrient balance

- Concentrations of nitrates and phosphorus in the main Italian rivers decreased during the review period, in line with the reduced intensity of agricultural production (Reference I.C).
- Nitrogen and phosphorus surpluses per hectare remain lower than the OECD average. The nitrogen surplus, at 30 kg per hectare (2008), is well below the OECD average (65 kg per hectare). The phosphorus balance decreased by 433% from 1.0 to -3.3 kg/ha for Italy, much lower than the OECD average (8 kg per hectare) (Figure 1.4).

3. Managing the natural asset base

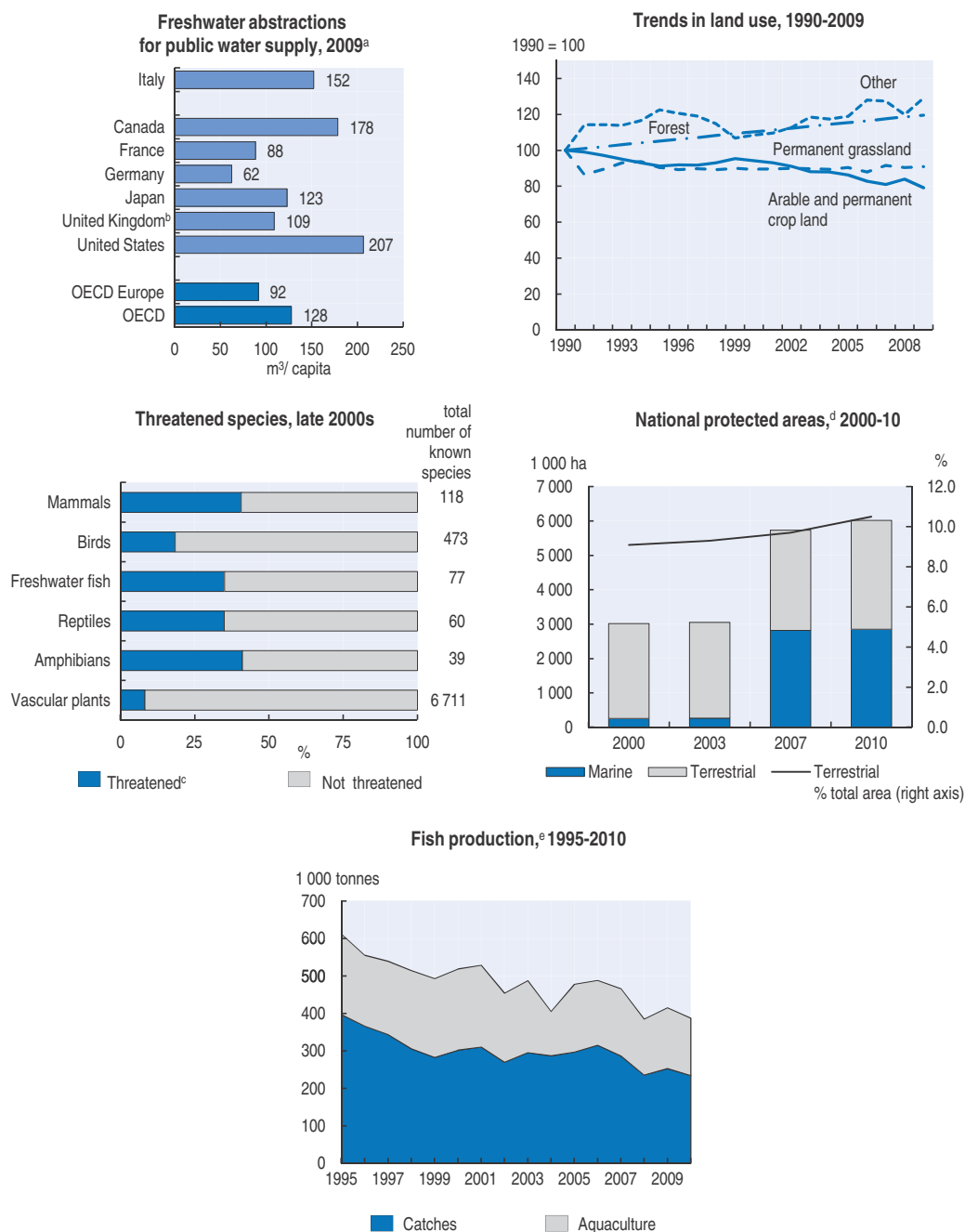
Water resources

- Average rainfall in Italy (about 1 000 mm/year) is well above the European average, but it is not evenly distributed among seasons and regions. There have been several cases of water shortages, particularly in the South, where locally abstracted groundwater is used intensively to supplement the supply from water storage and water transfers. High evapotranspiration and limited storage capacity in coastal areas, due to the alluvial plains at sea level, significantly contribute to high water runoff.
- Despite important gaps in national data on water abstraction, Italy can be classified as a medium-high water-stressed country, i.e. abstracting about 30% of its total available renewable water resources.²
- Water transfers between regions help to alleviate water shortages, especially in southern Italy. Important volumes of water are transferred to Apulia, where 60% of water used comes from water transfers, and Campania, where 24% comes from outside the region.
- Irrigation accounts for the highest share of water used (50%). The share of irrigated land in total agricultural area (17.4%) is well above the OECD average (4.5%). The other major water users are households (19%), industry (17%) and energy production (for cooling) (14%).

- The intensity of water use in agriculture decreased in the last decade: total water use for irrigation fell by 20%, while total irrigated areas fell by 8% and agricultural production remained at a similar level as in 2000.
- Groundwater use for irrigation above recharge rates is undermining the economic viability of agriculture in affected areas. Signs of overexploitation have been recorded in the lower reaches of the Po River plain and around Venice due to industrial and agricultural uses and gas and oil extraction. In other regions – especially southern Apulia and the coastal plains of Campania, Calabria and Sardinia – groundwater withdrawal is the main cause of saline intrusion.
- Water withdrawals for domestic use, mostly from groundwater (86%), have increased only slightly (by 3%) since the late 1990s. Water losses in the supply infrastructure are high. The country-wide average is about 36%, but the rate can be as high as 47% in Apulia. Actual physical losses may be lower since the data do not account for water not properly metered or paid for. Some estimates suggest that illegal activities may account for 4%-20% of Italy's total water abstraction.
- Abstraction for industry has declined slightly, while water demand for energy production and domestic uses has increased. Water use reduction is most evident in more water-intensive sectors, such as pulp and paper and chemical industry.

Biodiversity and ecosystems

- While the share of agricultural land has fallen slightly since the 1990s, the share of forested and wooded land has increased over the last two decades and is now nearly 31%, close to the OECD average (Figure 1.5).³ Despite the increase in forest cover, the forested area per inhabitant (0.3 ha) is much lower than the OECD average (0.9 ha). Forested areas are concentrated in the Alpine areas of northern Italy, and only a few extensive forests grow in central or southern Italy or on the islands.
- Italy's protected areas cover about 10.5% of the total land area, close to the OECD average (Reference I.C). This includes 24 national parks, which account for about half this share.⁴ The size of nationally protected terrestrial areas increased by only 2% during the last decade, but marine protected areas expanded significantly, from 2 610 to 28 530 km² between 2000 and 2010 (Figure 1.5).⁵
- The EU Natura 2000 network covers 21% of the national territory, higher than the EU average of 17.5%. Coverage is higher (nearly one-quarter of the terrestrial area) in the South.⁶
- Approximately 21% of utilised agricultural area (UAA) is characterised by high nature values.⁷ After an increase from close to 0% to 8% of farmland under organic farming between 1991 and 2000, this share increased only slightly (by 1%) in the next decade.
- The use of pesticides has remained at 0.6 t/km² of agricultural land, still much higher than in many other OECD countries (Reference I.C).
- The share of endangered vascular plants is relatively low compared to that in other OECD countries. In contrast, the threat to mammals, freshwater fish and amphibians is higher than in many other OECD countries (Figure 1.5; Reference I.C).
- Risks of erosion remain a concern, with 30% of agricultural land classified as being at risk of moderate to severe water erosion (2009). These risks are largely due to: continued cultivation of fragile and marginal soils; overgrazing of pasture, especially in hilly/

Figure 1.5. **Natural asset base**

a) Or latest available year.


b) England and Wales only.

c) IUCN categories "critically endangered", "endangered" and "vulnerable" in % of known species.

d) Official list of protected areas (EUAP) according to national legislation.

e) Fish catches and aquaculture in inland and marine waters, including freshwater fish, diadromous fish, marine fish, crustaceans, molluscs and miscellaneous aquatic animals. Catches exclude marine mammals, crocodiles, coral, pearls, sponges and aquatic plants.

Source: FAO (2011), *FAOSTAT Database*; FAO (2012), *Fisheries and Aquaculture Information and Statistics Service*; MATTM; OECD Environmental Data.

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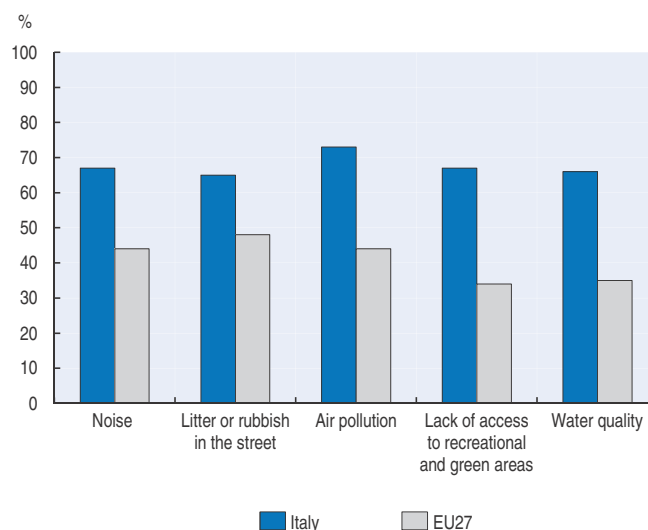
mountainous areas; and poor uptake of soil conservation practices. Soil erosion is aggravated by the increasing incidence and severity of droughts and/or heavy rainfall.

- Italy's 8 300 km coast is vulnerable to sea erosion and human activities (industry, urbanisation, tourism, fishing and aquaculture, transport), which continuously alter natural coastal features. About 30% of the population live in coastal municipalities, while commercial and leisure port activities take place along more than 300 km of coast.
- There has been a steady decline in fish production. In the period 2000-09, landings decreased by 40%. Persistent productive decline is mainly related to the reduction of fishing capacity.
- Aquaculture production remained stable for most of the review period. The largest segment includes shellfish, which accounted for 70% of volume and 46% of value in 2007; 61% of sites are located in the northern regions.

4. Improving the environmental quality of life

- Italians appear to be among the Europeans least satisfied by their country's environmental quality. According to the 2007 European Quality of Life Survey, Italian respondents made the highest level of complaints about nearly all the environmental problems in question compared to the EU27 average (Figure 1.6). About 83% of Italian respondents complained about two or more environmental problems in their area.

Figure 1.6. **Dissatisfaction with environmental quality**
2007^a



a) Percentage of respondents who complained about environmental problems in their area.
Source: European Foundation for the Improvement of Living and Working Conditions (2009),
Second European Quality of Life Survey: Overview.

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Air quality and health impacts

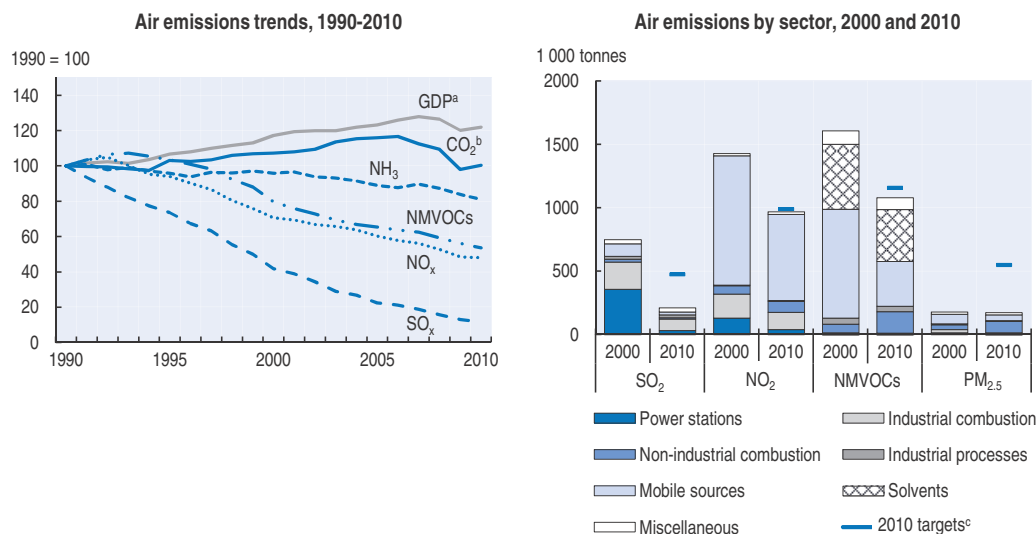
- The reduction in emissions of key local air pollutants was one of the largest among OECD countries during the review period (Reference I.C). Emissions of SO₂ were reduced by 72%, CO by 44%, NO₂ and NMVOCs by more than 30% and NH₃ by 16%. Italy met all the targets set under the EU NEC Directive (Figure 1.7).

- Total emissions of coarse particulates (PM₁₀) and small particulates (PM_{2.5}) decreased by 3% in the period 2000-10. However, emissions from small combustion sources (e.g. small factories and residential heating) have increased considerably and account for 45% of total emissions of PM₁₀ and 52% of those of PM_{2.5} (Figure 1.7).
- Emission intensities have also declined, showing absolute decoupling of all air pollutant emissions from GDP growth during most of the review period. In 2009, Italy's levels of emissions per capita and per unit of GDP were among the lowest among OECD countries (Reference I.C).
- Despite emission reductions, more than half the 30 most polluted cities in Europe are in Italy, with Turin, Brescia and Milan among the most polluted. The population weighted annual mean concentrations of PM₁₀ and ozone (O₃) were higher than the EU27 average during the whole review period (Figure 1.7).⁸ In 2008, population exposure to urban air pollution (ozone and particulates) was the second highest in the EU27.
- Modelling results indicate that PM_{2.5} levels in northern Italy reduce statistical life expectancy by approximately one year. An epidemiological assessment of 13 Italian cities estimates that each year about 8 000 deaths can be attributed to high concentrations of PM₁₀ and ozone precursors (NO_x and NMVOCs).

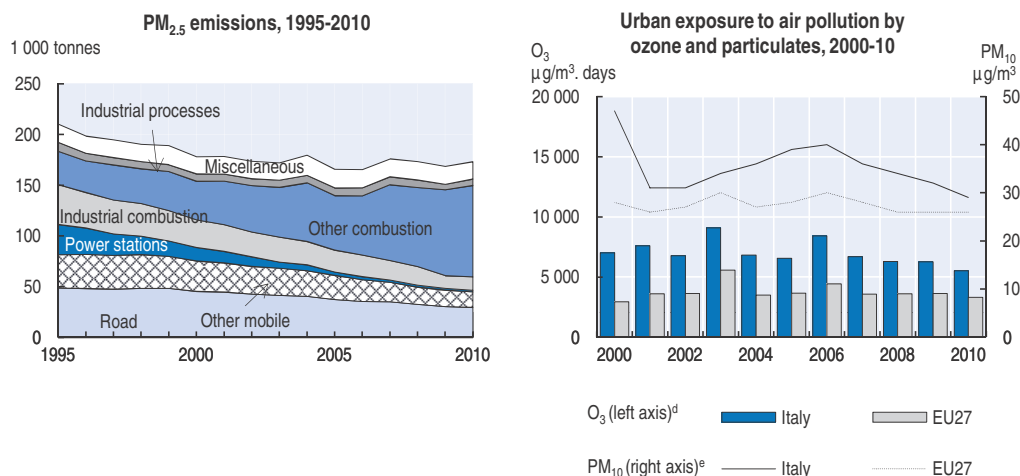
Water quality, drinking water supply and sanitation

- On average, 46% of Italian waterways can be classified as high or good quality with the highest percentage of these two classes recorded in northern Italy (70%) and the lowest in the South (35%); 19% of rivers (5% in the North and 20% in the South) are classified as poor or of bad quality. Assessment of the ecological status of 140 lakes showed that 37% had good or high, 35% moderate, and 28% poor or bad water quality (Figure 4.1).
- A large number of “hot spots” contribute to poor surface water quality. These occur, in particular, when medium or small streams drain areas where large urban or industrial centres are located. They are associated with concentrations of industrial sectors that have heavy environmental impacts (e.g. tanning and textiles in the North, food processing in the South).
- The rate of compliance of coastal waters with mandatory and guidance values was relatively stable at above 90% for much of the last decade. The number of bathing sites closed (i.e. sites where swimming was banned) in summer increased from 125 (2.6%) in 2002 to 310 (6.3%) in 2009, but fell to 33 (0.7%) in 2010. Closing of these sites has been linked to toxic microalgae blooms, which occur in many coastal regions.
- The share of the urban population with access to improved drinking water (piped into the premises) has been close to 100% in urban and rural areas. However, there are areas with highly irregular water supply, especially in the South. Most public supply operators are small and use spring or groundwater as the main water supply sources.
- Although the quality of drinking water is generally good, there are outbreaks of waterborne diseases. In 2000-07, there were three to four outbreaks per year, with 50-500 people affected in each outbreak. About 45% of water-related diseases due to contaminated drinking water were reported in the North and 22% and 33%, respectively, in the Centre and the South. In around 70% of cases, contaminated water distributed by municipal waterworks was the main factor.

Figure 1.7. Environmental quality of life



Pollution from particulates and ozone



a) At 2005 prices and exchange rates
 b) CO₂ emissions from energy use only; sectoral approach. Excludes international marine and aviation bunkers.
 c) Targets set by EU Directive 2001/81/EC (NEC Directive) on national emission ceilings for certain atmospheric pollutants.
 d) Population weighted sum of maximum daily 8-hour average ozone concentrations greater than 70 μg/m³ calculated over a year at urban background stations in agglomerations.
 e) Population weighted annual mean concentrations of particulate matter at urban background stations in agglomerations.
 Source: EEA; OECD Environmental Data; OECD (2011), *OECD Economic Outlook No. 90*.

StatLink  <http://dx.doi.org/10.1787/888932772742>

- In 2008, 82% of the Italian population was connected to public wastewater treatment plants. Around 60% of wastewater was subject to tertiary treatment. However, rates vary among the regions. They are as low as 28% in Sicily and close to 80% in eight other regions.

Urbanisation and urban green spaces

- Italy's urban population, which exceeds 50% of the total, lives in high-density cities: there are 50 cities whose population is over 100 000 and about 100 with a population of between 50 000 and 100 000.

- The share of artificial surfaces in total surface area amounts to 5% and the share of sealed surfaces to 2.8%, both slightly above the EU average. However, the average index of artificial and sealed surfaces per capita are among the lowest in the EU, at 255 m² (compared with the EU27 average of 390 m²) and 144 m² (compared with the EU27 average of 200 m²), respectively.⁹
- Despite efforts to enlarge the share of green space in total municipal area, green space covers 5% or less in 28 out of 48 large Italian cities. Public urban green space covers more than 20% of the municipal area in only 8 cities.¹⁰

Contaminated sites

- There are around 5 000 officially registered contaminated sites. This includes 57 contaminated sites of national interest, which cover around 3% of the Italian territory.¹¹ In about 34% of these, water bodies are contaminated. In addition, 10 000 potentially contaminated sites fall under regional responsibility.

Natural risks

- Large parts of Italy are prone to earthquakes. Nearly 3 000 municipalities (out of 8 100) are subject to seismic events, including 368 with high risk.¹² In addition, the area between Campania and Sicily is particularly exposed to volcanic eruptions (by Mount Vesuvius and Mount Etna), geothermal activities, and other geological risks such as sinkholes. Risks to the population are aggravated by poor spatial planning and by housing development that has not been subject to proper evaluation and permitting procedures.
- Italy is prone to floods and landslides, with more than two-thirds of municipalities categorised as at high or very high risk. These disasters result in injuries and fatalities, as well as economic loss and damage to infrastructure.¹³ In an average year, losses caused by hydrogeological events amount to EUR 3.6 billion.
- On average, 7 000 forest fires are recorded per year. Although the number of large fire incidents has fallen since 2008, they are still a danger to human health, ecosystems and the economy. Some incidents have been linked to land clearance for housing, as building permission was often easier to obtain when woodland had been destroyed.
- Italy appears to be particularly vulnerable to the impacts of climate change, as it is characterised by complex climate patterns due to the presence of high mountain ranges (the Alps and Apennines) and the Mediterranean Sea. These impacts include: water scarcity and desertification; erosion and flooding of coastal areas; glacier and snow cover loss; intensification of hydrogeological risk (particularly in the Po River basin); and health effects associated with heat waves.

Notes

1. Domestic material consumption is the sum of domestic (raw material) extraction used by the economy and its physical trade balance (imports minus exports of raw materials and manufactured products).
2. Water stress is defined as the intensity of use of freshwater resources, expressed in terms of gross abstractions as a percentage of total available renewable freshwater resources (including inflows from neighbouring countries) or as a percentage of internal resources (i.e. precipitation-evapotranspiration). Medium-high water stress (20-40%) implies the management of both supply and demand, and conflicts among competing uses need to be resolved. It should be noted,

however, that national water-stress levels may hide important variations at subnational (e.g. river basin) level, particularly in countries with extensive arid and semi-arid regions. In the last decades estimates of Italy's water resources availability, abstraction and use have not been carried out on a regular basis. This has been due to legislative delays, uncertainty in the distribution of competence among administrative levels, and the large number of institutions involved.

3. In most cases expansion of forests occurs on abandoned farmland.
4. This percentage is expected to increase further, as procedures for establishing five national parks (four in Sicily) and five marine protected areas are currently under way.
5. Expansion was mostly due to the establishment of the Pelagos Sanctuary for Mediterranean Marine Mammals in 2002 as a special marine protected area. It covers about 90 000 km² of territorial and international waters in the north-western Mediterranean Sea between France and Italy, encompassing the island of Corsica and the Toscano Archipelago. The Pelagos Sanctuary contains habitat suitable for the breeding and feeding needs of the cetacean species regularly found in the Mediterranean Sea, especially fin whales and striped dolphins.
6. The Natura 2000 network includes 601 Special Protected Areas (SPAs) under the EU Birds Directive (14.5% of the land area), 2 287 Sites of Community Importance (SCIs) under the EU Habitats Directive (16% of the national territory), and 210 marine protected areas covering nearly 5 000 km² of coastal waters.
7. High nature value farmland area indicates an area where farming systems maintain a high level of biodiversity. These areas are often characterised by extensive farming practices, associated with high species and habitat diversity or the presence of species of European conservation concern.
8. In 62 out of the 110 Italian provincial capitals, the daily concentration of airborne particulates (PM₁₀) exceeded the allowed threshold of 50 µg/m³ on more than the 35 days imposed by the law. In 10 provincial capitals (including Naples, Milan and Turin) the limit was exceeded on more than 100 days.
9. The highest sealing rates occur in hot spot areas, which include the "industrial triangle" between Milan, Turin and Genoa, the Po River basin, and the coastal regions.
10. This includes: Palermo (31.9%), Ravenna (29.9%), Brescia (29.1%), Ancona (28.1%), Rome (27.5%), Monza (25.9%), Naples (24.2%) and Terni (21.8%). The largest increases in urban green space in 2000-09 were recorded in Palermo (+4.6%), Pescara (+4.4%), Turin (+3.4%), Verona (+2.4%) and Modena (+2.1%).
11. Several sites are extensive, such as the 1 500 km² Domizio-Flegrea Littoral and Agro Aversano area along the northern coastal zone of the Campania region, which contain high levels of heavy metals potentially dangerous for human health and are known for illegal dumping of industrial and other waste, the Sullcis-Iglesiente-Guspinese site in south-western Sardinia contaminated by metallurgical industry operations, and Porto Marghera near Venice, a site contaminated by the petrochemical industry and industrial waste disposal.
12. During the decade, several parts of Italy were affected by 11 earthquakes with a magnitude of over 4.0 on the Richter scale. The largest seismic event affected central Italy in 2009. This 6.3 magnitude earthquake, whose epicentre was near the city of L'Aquila, resulted in the deaths of 308 people and serious damage to the city's infrastructure.
13. For example, in 2009 floods and mudslides in Messina in north-eastern Sicily killed at least 31 people. In 2011, the government declared a state of emergency in the north-western Liguria region and Tuscany after storms affected the coastal regions, killing at least 10 people and causing widespread flooding and mudslides.

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