APAT
Agency for Environmental Protection and Technical Services

ENVIRONMENTAL DATA YEARBOOK 2007

VADEMECUM

CLIMATE CHANGE

AIR QUALITY

NOISE

ANTHROPOGENIC RISK

ARPA Environmental Protection Agencies of Regions
APPA and Autonomous Provinces

SOCIO-ECONOMIC FRAMEWORK

The European Union, with its almost four million square kilometres, has a surface area equal to approximately two-fifths that of the United States and China. The surface area of Italy, at 301,336 km^2, accounts for 7.7% of the entire European surface area.

In terms of population, the European Union's approximately 459 million inhabitants put it in third place worldwide, after China and India. Within the 25-member European Union, Italy ranks after Germany, France and the United Kingdom among the most populous European countries, with 59,131,287 residents as of 31 December 2006.

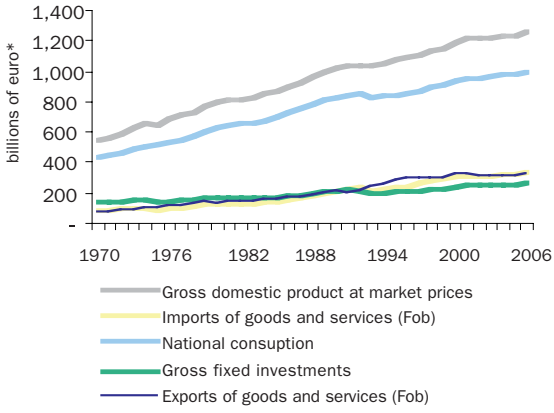
The population density in Italy is 195 inhabitants per square kilometre. Though regions such as Campania (426), Lombardy (397) and Latium (308) register figures for population density well above the national level.

A number of the main territorial and demograohic statistics for Italy	
Maximum extension (km)	1,200
Territorial surface area (km^2)	301,336
Regions	20
Provinces	107
Municipalities	8,101
Resident population	59,131,287
Foreign residents	2,670,514
Families	23,600,370
Members per family	2.5
Population density (inhab./km^2)	195

Thanks to the expansion of the European Union from 15 to 25 member countries, the Gross Domestic Product (GDP), meaning the sum of the goods and services produced by the European Economy is now greater than that of the GDP of the United States.

Between 1970 and 2006 the main aggregates of the income statement for national resources and investments registered considerable growth, with the GDP doubling, along with consumption and investments, while imports and experts were quadrupled.

Looking at the specific figures for 2006, the national GDP stood at 1,255,848 billion euro, calculated in values keyed to the reference year of 2000, while national consumption (75% of which was determined by the spending of resident families) was equal to 991,544 billion euro.



Main aggregates of the income statement of resources and investments.

**= values keyd to the references year of 2000*

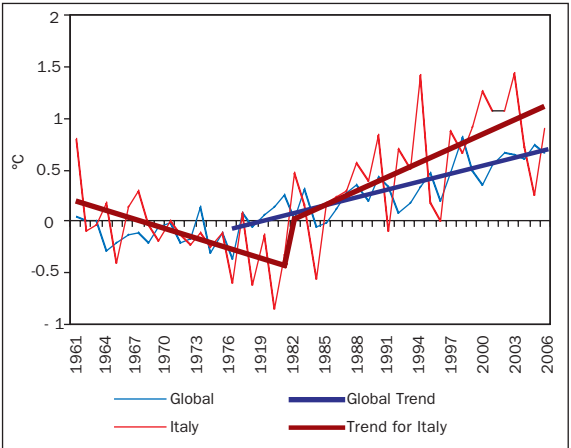
In all the European Union member States (EU25), more than 60% of the GDP (69.3% in Italy) is generated by the tertiary sector (which includes banking activities, tourism, transport and insurance). Industry and agricultural, though they still play significant roles, have declined in economic importance in recent years. In Italy, the incidence of the primary sector in terms of value added for 2006 was only 1.9 percentage points (as compared to 8.1% in 1970), while the industrial sector (meaning industry in the strict sense, plus construction) accounted for 28.8% (as compared to 41.4% in 1970).

CLIMATE CHANGE

During 2007, the scientific community, political decision-makers and public opinion focused their attention on the issue of climate change.

Global warming is unmistakable, and it is highly likely probable that anthropogenic emissions of greenhouse gases are the cause.

Recent worldwide analyses confirm the estimate of an average warming of the earth's surface of approximately 0.74°C over the last century; over the last 50 years, the rate of warming (+0.13°C per decade) has nearly doubled, as compared to the last 100 years. *As far as Italy is concerned, the most recent estimates obtained by* APAT *point to a decrease of 0.6°C in the average temperature between 1961 and 1981, followed by an increase of 1.54°C through 2006, for an overall increase of approximately 0.94°C in 45 years.*

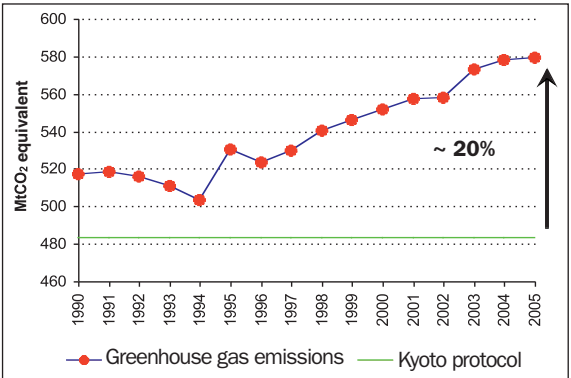


Mean temperature anomaly series (with respect to 1961-1990 normals) and estimated trend between 1961 and 2006. Global (blue) and Italy (red)

In the case of Italy, the probability of impact from climate change is highest for water resources, biodiversity and forests, plus soil, marine-coastal environments, agriculture and fishing activities and tourism.

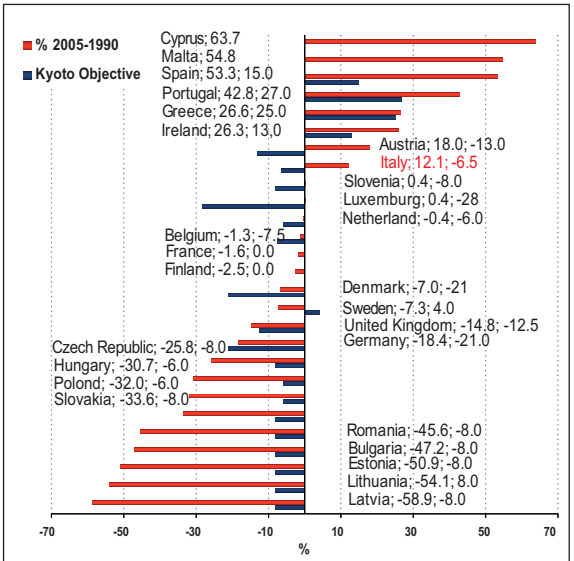
In terms of the main greenhouse gas, the average global concentration of carbon dioxide has risen from 280 ppm during the period 1000-1750 to 379 ppm in 2005, paralleling a rise in carbon dioxide emissions from practically zero to approximately 26.6 billion tons, taking into account only emissions generated by processes of combustion.

Italy is not exempt from this upward trend in the emission of greenhouse gases: the most recent figures from the National Inventory show that *emissions increased from 516.85 to 579.55 million tons CO_2eq during the period 1990-2005, for a 12.1% rise, while, according to the Kyoto Protocol, Italy should reduce its emissions, during the period 2008-2012, to levels 6,5% lower than those of 1990, i.e. to 483.26 Mt CO_2eq; as of 2005, therefore, greenhouse gas emissions exceeded the objective by slightly more than 96 million tons (approximately +20%).*



Total greenhouse gas emissions and level set for compliance with the Kyoto Protocol

Within the European Union (EU15), there is no question that the great majority of the countries are not in line with the objectives set under the Kyoto Protocol. Germany has met the objectives, while the United Kingdom, Finland, France and Sweden reduced emissions in 2005 beyond the objectives set for the period of 2008-2012.



Comparison of greenhouse gas emissions levels in 2005, compared to the benchmark year of 1990, and the Kyoto objective for the period 2008-2012 in the European countries (EU27)

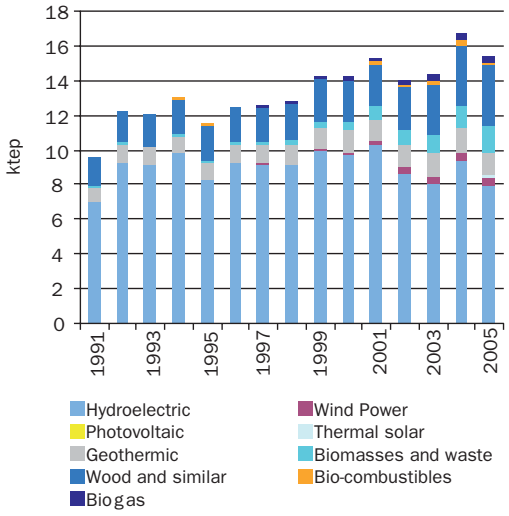
The main response measures involve mitigation (meaning the reduction of greenhouse gas emissions) and adaptation to the climate changes underway.

The policy framework defined by the European Council for the EU sets the following objectives for 2020:

– reduction of greenhouse-gas emissions by 20% compared to 1990;
– 20% of total energy consumption to be contributed by renewable sources;

– reduction of energy consumption by 20% compared to forecasts;
– 10% of total transport energy consumption to be contributed by bio-fuels.

In Italy, the production of energy from renewable sources still plays a relatively limited role (7.8% of the total gross domestic supply in 2005), but the level is on the rise (+60.6% during the period 1991-2005). In greater detail, while the contribution of hydroelectric power shows annual fluctuations tied to meteorological conditions, the contribution of non-traditional sources – wind, solar, waste, wood (excluding wood for burning), bio-combustibles and biogas – increased by 339% between 1991 and 2005.



Overall production of energy from renewable sources in fossil replacement equivalent

ENVIRONMENT AND QUALITY OF LIFE: *AIR QUALITY*

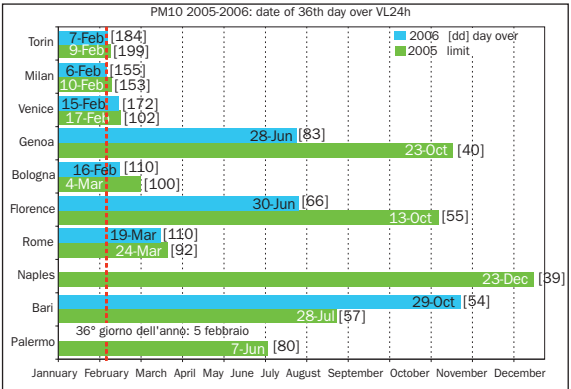
Air quality is one of the environmental emergencies that most worries administrators of local and central governments, involving all citizens on a daily basis.

The most critical pollutants, given the high concentrations found in the air, are O_3, PM_{10} and NO_2.

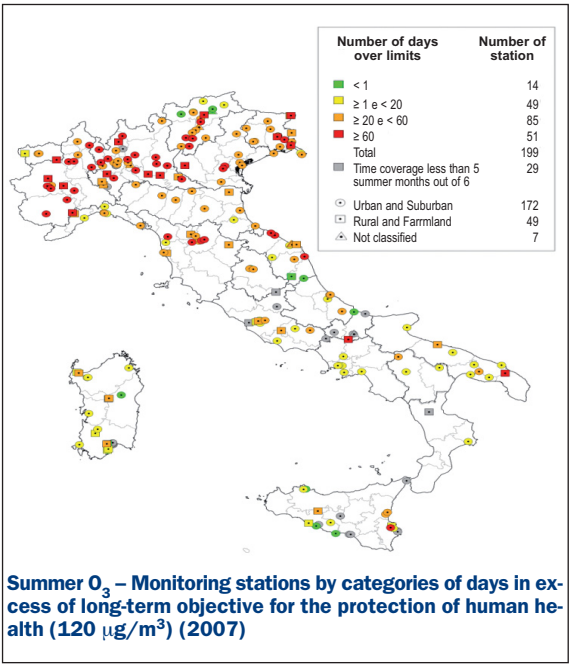
The emission reductions of fine dust (PM_{10}), nitrogen oxides (NOx) and non-methane volatile organic compounds (NMVOC) registered in recent years, both in Europe and domestically, have not led to improved in air quality, on account of the complexity of the problem of "air pollution", which calls not for emergency measures but long-term integrated initiatives.

In Italy, 61% of the PM_{10} monitoring stations exceeded the daily upper limit in 2006; in the summer of 2007, exceedances of the reference level for the protection of human health were registered by 93% of the stations monitoring ozone.

Even accounting for the readily apparent difference in monitoring density between Northern and Southern Italy (greater in the North than in the South), the cities of the Po River area "use up" the 35 days per year allowed under the law for levels of PM_{10} in excess of 50 $\mu g/m^3$ more rapidly than the rest of Italy.



PM_{10} – Date on which limit on days over daily limit is reached and total number of days over limit (2005-2006)

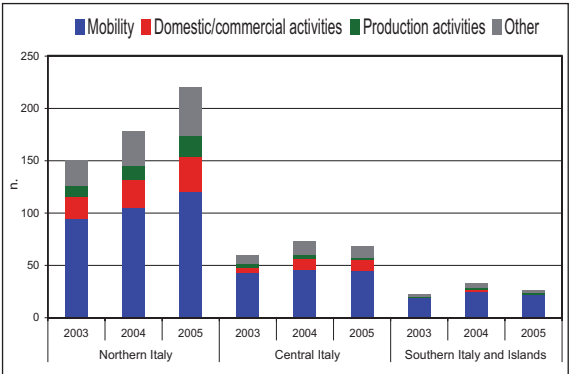


Summer O_3 – Monitoring stations by categories of days in excess of long-term objective for the protection of human health (120 μg/m³) (2007)

In Italy, in 2005, 43% of PM_{10}, 65% of NO_x and 43% of NMVOC were caused by transport sector. In detail, harmful gas emissions during the period 1990-2005 showed two contrasting trends: emissions tend to increase because of the continuous growth in the vehicle pool and in the distances travelled, though, in reality, they decrease, thanks to the renewal of the vehicle pool.

As part of efforts to improve air quality, Italy has endorsed, under its Legislative Decree no. 351 of 4 August 1999, European Directive 96/62/EC, which sets criteria for assessing and managing air quality, based on, among other elements, plans and programs of reclamation.

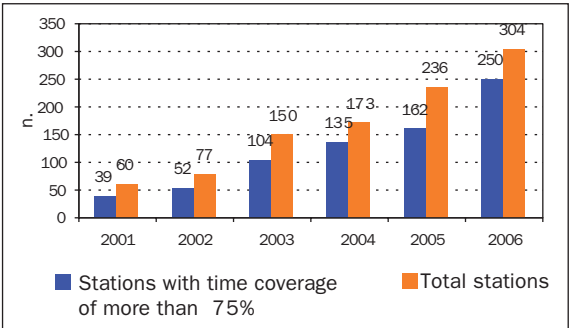
Between 2003 and 2005 there was a noteworthy increase in the measures taken to restore air quality in the regions of Piedmont and Lombardy, while the number of such measures fell in the Latium Region.



Measures taken to restore air quality

The single most frequent type of measure undertaken by Italian regions involves sustainable mobility (16%), followed by clean vehicles in private and pubic transport (15% and 14% respectively).

In terms of actions for the restoration of air quality, investigative initiatives should not be neglected, with particular mention going to the unmistakable improvements made in the monitoring and communication of information on the local and national levels.



PM_{10} – Number of monitoring stations with time coverage of more than 75% and total number of stations

ENVIRONMENT AND QUALITY OF LIFE: *WATER QUALITY*

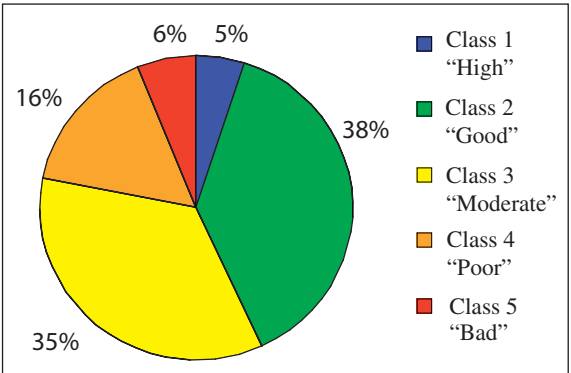
Until just a few years ago, water was considered a "natural" resource available to everyone, completely renewable and free: of noteworthy "value", but without a price. In contrast, today water has acquired a dual role: as an *environmental component* (it plays a key role in preserving ecological and territorial balances, as well as the quality of landscape and of life and health) and as *raw material* (on account of the scarcity that afflicts extensive areas, water has taken on strategic importance in terms of sustaining a model of life and development).

Water body quality is assessed with regard both to the designated use (production of drinking water, swimming, mussel growing etc.) and to the specific objectives of environmental quality (SECA, SEL, SCAS).

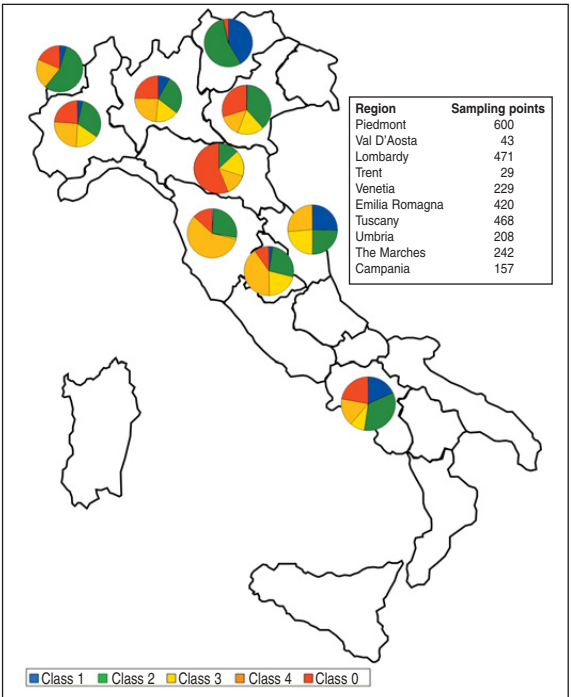
The data for 2006 on the Ecological State of Waterways (SECA) points to a not especially critical situation, with 22% of the monitoring stations positioned in water bodies of inferior quality, while 43% of the sites monitored fall within quality classes 1 and 2, meaning a "high" (5%) or "good" (38%) rating.
Looking at lake quality (SEL – Ecological Status of Lakes), out of a total of 173 stations in 14 regions, 74% are ranked in the classes from "moderate" to "high", a figure that has risen by 4% compared to 2005.

The Chemical State of Underground Waters (SCAS) points to the zones that present the most critical problems in terms of quality.
The number of sampling points in the regions vary significantly (from 29 to 600). In the Marches, Trent, Campania, Val d'Aosta and Venetia, the percentage of sampling points ranked in classes 1 to 3 falls between 56% to 96%, while the sampling points in Emilia Romagna and Tuscany fall within classes 4 and 0 at respective percentages of 70% and 60%.

The massive human settlement of the territory, togeth-



Percentage distribution of the classes of the SECA quality index (2006)



The quality status of underground bodies on the regional level (2,863 points monitored – 10 regions) (2006)

er with the dimensions of the production system, place noteworthy pressure on domestic water resources. *The quality of water resources* is influenced not only by wide spread pollution from fertiliser and plant-care products, but also by localised pollution from industrial discharges and shortcomings in the purification system.

The quantitative factor, expressed as the water demand on the national level, found Italy among the European leaders at the end of the 90's, in terms of consumption per inhabitant (approximately 2,000 l/day per inhabitant, as compared to the EU15 average of 1,677 l/day). The Italian economic sectors that consume the most water are Agriculture and Industry (48% and 19%).

The underlying criteria for the most recent national legislation (Legislative Decree 152/06, Ministerial Decree No. 185 of 12 June 2003, Ministerial Decree no. 367 of 6 November 2003) and European-Community measures (Directive 2000/60/EC) set the groundwork for the development of an integrated, sustainable operating strategy.

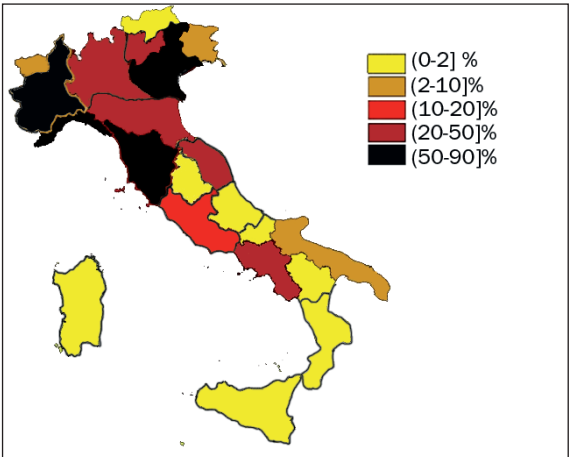
The legislation provides numerous instruments for the protection of waters; the primary tool of strategic planning is the Water Defence (PTA), implemented in four regions and approved in nine others (the deadline for approval of the PTA is 31 December 2008).

Also remarkable are the programs of measures for water bodies used for drinking (whose monitoring in the years 2002-2004 showed that the Sardinia Region presents the most critical problems, followed by Liguria and Emilia Romagna), the upgrading measures for the reclamation of zones not suitable for swimming and Community Directive 91/271/EEC on the construction and upgrading of collecting systems (in 2005 the level of compliance was 82% in sensitive areas and 78% in normal areas) and waste water treatment plants (the level of compliance in 2005 was 80% in sensitive areas and 77% in normal areas).

ENVIRONMENT AND QUALITY OF LIFE: *PHYSICAL AGENTS*

The term "Physical Agent" refers to the sum total of the forms of environmental pollution considered to be physical in nature, on account of the characteristics of the agent, the interaction with the individual and the extent of propagation within the environment, such as ionising radiation, electromagnetic fields, noise in the inhabited and living environment, vibrations, light pollution and UV radiation.

Noise pollution is one of the foremost environmental problems, at a level of priority that has led the European Community to take measures to limit it.
The control activities carried out by the Agency System, primarily in response to complaints from citizens, show that the types of sources held to be highly disturbing are commercial and tertiary activities (38%), production activities (26%), construction sites (11%) and roadway infrastructures (10%).
Roadway, railway and air traffic have registered a general increase in volume, with distinctive characteristics of the rise tied to the individual sources. The increase in these factors is one of the primary obstacles to be overcome in order to establish virtuous trends.
To date, efforts have been undertaken to raise the awareness of local government bodies, in order to promote preventive actions, such as the acoustical classification of municipal territories and the resulting reclamation plans.
Unfortunately, the response of local governments has not been fully satisfactory, *with an analysis of the results as of 2006 showing the situation to be stationary compared to previous years, as no more than 32% of Italian municipalities have approved acoustical classifications.*
The most positive situations are found in Tuscany (84%), Liguria (77%), Venetia (69%) and Piedmont (64%).



Percentage of municipalities that have approved acoustical classifications, out of the total number of municipalities for each region/autonomous province (2006)

Prolonged exposure to ***electromagnetic fields*** is considered a potential threat to human health.
There are two main categories of sources of electromagnetic fields: sources of low frequency fields (0-300 Hz), or ELF fields, (electric power lines, substations, home appliances etc.); sources of high-frequency fields (100 kHz - 300 GHz), or RF fields, (radio, TV, cell phones, radar).
Between 2003 and 2006, there were increases in violations of the legal limits by both radio and television plants (RTV) (+25%) and radio base stations (RBS) (+50%). Even though the density of RBS plants is almost double that of RTV plants, and the RBS site density is five times that of RTV, the higher level of environmental pressure is exercised by RTV plants, at 8,570 kW, as compared to 1,777 kW for RBS plants. In terms of both radio frequencies (RTV and RBS) and extremely low frequencies (ELF), control activities constitute a fundamental operation on the part of the responsible authorities (ARPA/APPA).

Analysis of the data from the NIR (Non-Ionating Radiation) Observatory, between 2004 and 2006 shows a decrease in the number of preliminary opinions for RBS (-8.9%), an increase in the number of opinions for RTV (+4.2%), a decrease in the number of controls for RBS (-2.8%) and a slight increase for RTV (+0.8%). In terms of restoration initiatives undertaken to date, regarding the violations observed during the control activities, it is interesting to note the differences between the two types of sources: RTV and RBS. In 2006, a significantly higher percentage of restoration efforts were concluded for RBS (76%) than for RTV (46%). However, the smaller number of operations completed for RTV plants, as compared to RBS, is traceable to their greater complexity.

Light pollution is an alteration in the natural quantity of light caused by the introduction of artificial light. The increased luminosity of the night-time sky has negative repercussions on the quality of the environment, on human life and on astronomical research.
The regions highlighted in blue (in the figure) are those where weak stars, meaning the less luminous ones, can still be seen from more than 60% of the regional territory.

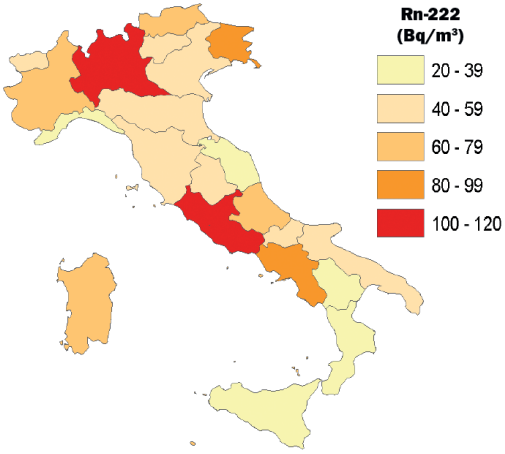
The main source of light pollution is the flow of light dispersed towards the sky, originating primarily from private electrical plants and, to a lesser degree, public systems (25%-30%).
The increase in the luminosity of the night-time sky, due to the diffusion of artificial light, should not exceed 10% of the lowest natural level. Otherwise the sky should be considered “polluted”. Italy has the most advanced laws to be enacted for the protection of the night-time sky and the promotion of energy savings, with no fewer than 17 of 20 regions, plus an autonomous province, having passed such laws.

The control of environmental radioactivity in Italy is jus-

Italian regions (in blue) in which weak stars are still visible from more than 60% of the regional territory

tified by the need to protect the population and workers from exposure to ***ionising radiations***. It got underway following the first tests of nuclear warheads carried out in the atmosphere in the 50's and the 60's. A rough idea of radioactivity in Italy can be obtained by observing the concentration of artificial radio nuclide activity over time.

The main sources of ionising radiation are those tied to the cross-border circulation of radioactive materials, natural sources (radon) and exposure for therapeutic purposes. The state of radon exposure is expressed by the results of a survey carried out during the 80's and the 90's, but still valid for the characteristics of such exposure, illustrating the noteworthy differences in the average concentrations of Rn-222 in the various Italian regions.



A map showing concentrations of Rn-222 activity in habitations (1989-1997)

Latium and Lombardy show particularly high concentrations of radon (Rn-222), with the difference compared to the other regions being due to the different uranium contents of rocks and soils and to variations in their permeability.

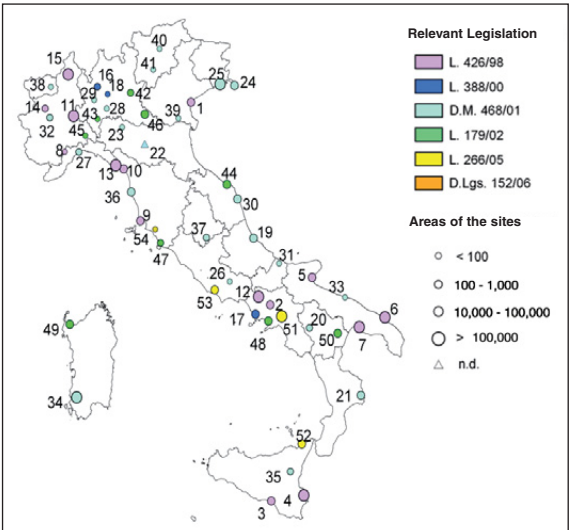
In Italy, the monitoring of environmental radioactivity is organised, in compliance with Legislative Decree 230/95 and subsequent modifications and additions, as well as with European-Community legislation, around a set of networks structured on three levels: local, regional and national.

An analysis of the state of the monitoring plan has pointed to less than complete coverage of the national territory, meaning that corrective action must be taken.

ENVIRONMENT AND QUALITY OF LIFE: *SOIL CONTAMINATION*

Soil plays a fundamental function in protecting the environment, serving as a filter and a barrier, so as to mitigate the effect of pollutant dispersion. Soil contamination, if heavily contaminated by hazardous substances, may lose its intrinsic properties modifying its protective functions, and its productive and ecological functions are degraded. Impacts of soil contamination also regard surface and ground waters, the atmofphere and the food chain, giving rise to risks to human health. Soil contamination may impact on limited and well defined areas, corresponding to known point sources (contaminated sites), or it can affect extensive areas by release into the environment of large quantities of polluting substances from multiple sources dispersed throughout the territory (diffuse contamination).
At present, there are 54 contaminated Sites of National Interest in Italy, the restoration efforts for which are being coordinated directly by the Ministry of the Environment, Land and Sea. Approximately 15,000 contaminated sites fall under the responsibility of the regions, with 4,000 of these sites calling for reclamation. A national homogeneous overview of diffuse soil contamination is not yet available, even though the related problems are present in almost all the regions. In Italy, the main activities responsible for local contamination are the refining of petroleum products, the chemical industry, the metallurgical industry, the manufacture of asbestos and certain waste management activities.

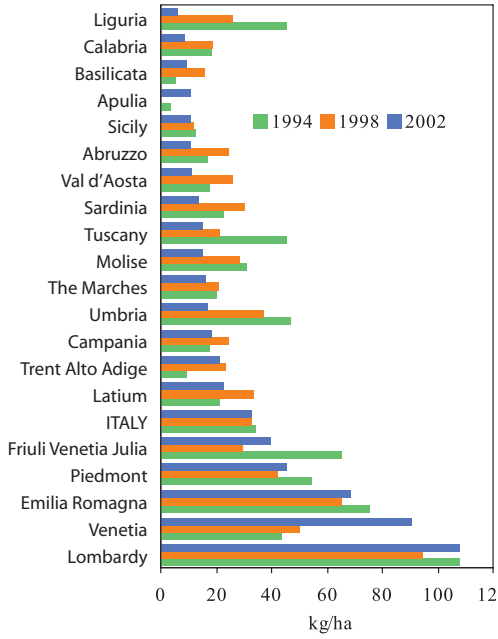
In the case of diffuse contamination, contributing causes can be atmospheric fall-out and intensive agricultural/farming or other human activities scattered throughout the territory and/or prolonged over time and that cannot be easily identified as individual or point contaminant sources. Industrial and vehicle



Localisation, dimensions and relevant legislation on Sites of National Interest (2006)

emissions into the atmosphere lead to fall-out in soil of acidifying contaminants, heavy metals and organic compounds. Intensive farming practices, making abundant use of pesticides, chemical fertilisers and manure, can result in an excess of nutritional elements, in accumulation of heavy metals and in the spread of biocide substances. The most effective response is to undertake initiatives designed to mitigate the pressures. The observed trend of excess nitrates has gradually decreased in almost all Italian regions in the last decades, thanks to the measures taken to comply with the current legislation.

Soil contamination problems affect all industrialised countries. Over the last 15 years, numerous international initiatives have been developed to define joint strategies for the management of the problem. In 2006, the European Commission implemented the "Thematic Strategy for the Protection of Soil", in



Regional surplus of nitrogen on Utilised Agricultural Area (UAA)

which contamination is identified as one of the "priority threats" to the functions of soil. The proposed Framework Directive on the Protection of Soil was approved by the European Parliament in November 2007.

BIODIVERSITY AND NATURAL, AGRICULTURAL AND FOREST AREAS

Italy is one of Europe's richest countries, in terms of biodiversity, possessing *half of the European vegetal species and a third of its animal species*.
Italy also possesses an especially rich stock of forests, and *the national forest index is constantly growing*, thanks to both forestation activities and natural forest expansion. Offsetting this trend, however, is the incidence of *forest fires,* which showed a resurgence in the first eight months of 2007, following the gradual decline registered through 2006.

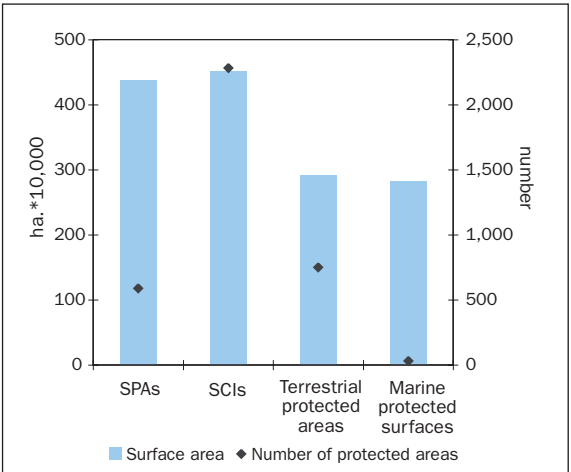
In addition to natural environments, *agricultural areas* also play an important role. In Italy, almost 44% of the national territory is earmarked for agriculture, and a portion of this area, *the equivalent of approximately 21% of the UAA (Utilised Agricultural Area), presents characteristics of noteworthy naturalistic value, in terms of biodiversity and as connecting zones with natural spaces.*

This wealth of biodiversity, however, is seriously threatened, with the risk of it being lost forever. *The percentage of Vertebrate species at risk fluctuates, depending on which author is consulted, from 47.5 % to 68.4%.* The situation is especially dire for Fishes in inland waters, Amphibians and Reptiles. *In addition, 15% of the higher plants are at risk and 40% of the lower plants*.

The main threats to the natural heritage are tied to the impact of human activities and to the growing demand for natural resources and ecosystem services. For example, the transformation and modification of natural habitats constitutes an indirect threat to approximately 50% of the Vertebrate animal species, while major direct threats include poaching and illegal fishing.

There is controversy over the role of activities tied to agriculture as causes of impact on the natural heritage. On the one hand, agricultural surface areas are subject to the negative impacts of other activities and other spheres of production, though, at the same time, they can cause pollution, loss of stability of terrains, loss of biodiversity, simplification of the landscape etc..

To attempt to overcome these problems, Italy has endorsed numerous conventions and international agreements designed to safeguard biodiversity. Internationally, Italy signed the Ramsar Convention of 1971 on wetlands of international importance. On the European level, the EU has issued two key directives for the preservation of biodiversity: the Bird Directive (79/409/EEC) on the protection of wild birds and the Habitat Directive (92/43/EEC) on the preservation of the natural and semi-natural habitats of wild flora and fauna. The specific objectives of the Habitat Directive include the creation of a cohesive European ecological network entitled Nature 2000. On the national lev-

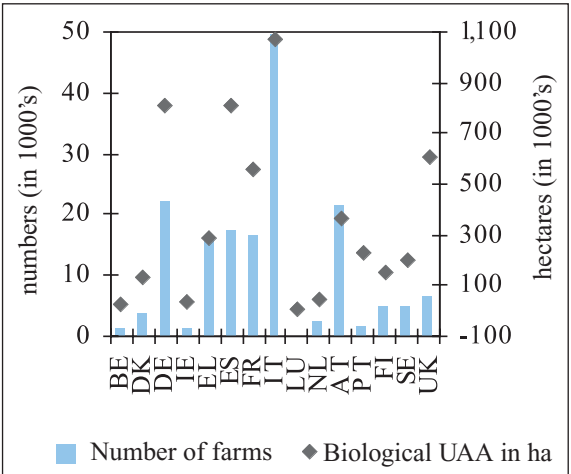


Domestic distribution of surface areas and number of protected areas (excluding RAMSAR Areas)

el, a fundamental reference for the conservation of biodiversity is the Framework Law no. 394 of 6 December 1991 on protected areas.

At present, 14.5% of Italian territory holds Special Protection Areas (SPAs), 15% holds Sites of Community Importance (SCIs) (all approved by the European Commission) and 9.7% contains protected terrestrial areas, while 30% of domestic coastal waters are protected. There are also 50 protected Ramsar sites.

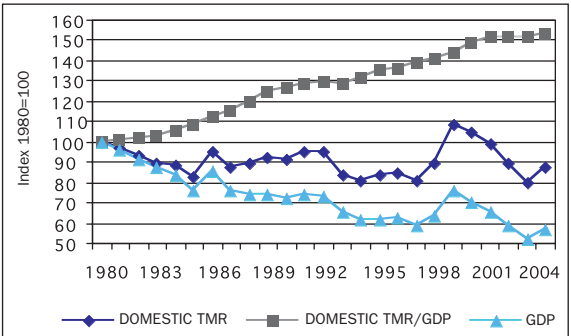
In terms of relations between agriculture and the environment, special attention has been focussed on biological agriculture. In Italy, the surface areas involved in or being converted to biological agriculture in 2006 were equal to 1,148,162 hectares (+2.42% compared to 2005), representing 9% of the national UAA.



Number and UAA of farming enterprises run under the biological method in Europe (2005)

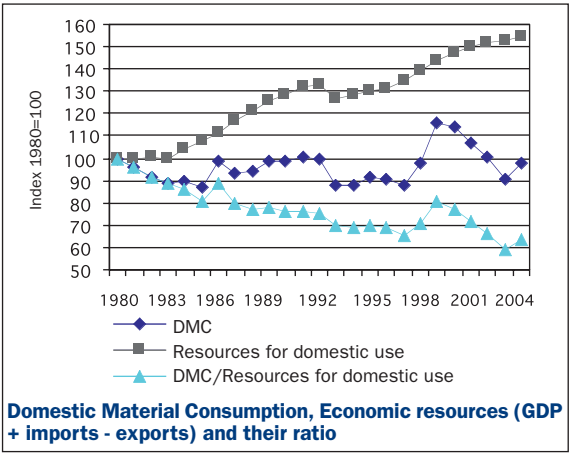
USE OF RESOURCES AND PRODUCTION OF WASTE: *USE OF MATERIAL RESOURCES IN THE ITALIAN ECONOMY*

The use of material resources plays a crucial role in generating environmental pressures, in terms of both the demand for natural resources (input) and their transformation (output).
Domestic Total Material Requirement (Domestic TMR) provides information on the resources found within the national territory, as well as the potential pressures borne by the territory as a result of their extraction.
During the period 1980-2004, the TDE showed a downward trend overall, in contrast to growth in the GDP (+53%). In absolute terms, growth was decoupled from environmental pressure, though the trend in question shows little stability.



Domestic Total Material Requirement, GDP and their ratio

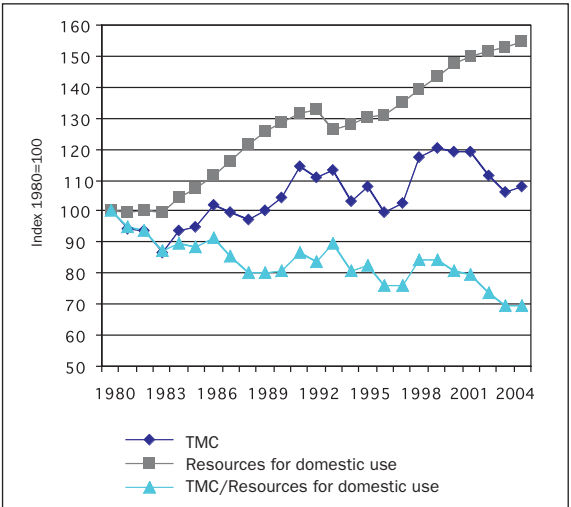
Domestic Material Consumption (DMC) provides information not only on the quantity of materials needed to satisfy domestic demand, but also on the potential of the Italian economy to generate direct pressure in terms of outlet materials.
The time series 1980-2004 do not show a well defined trend for the DMC over the long term. Specifically, it



Domestic Material Consumption, Economic resources (GDP + imports - exports) and their ratio

cannot be held that there is decoupling in absolute terms, seeing that no noteworthy decrease in the indicator has been observed.

What can be observed is a noteworthy decoupling in relative terms, meaning a tendency for the values of



Total Material Consumption, economic resources (GDP + imports –exports) and their ratio

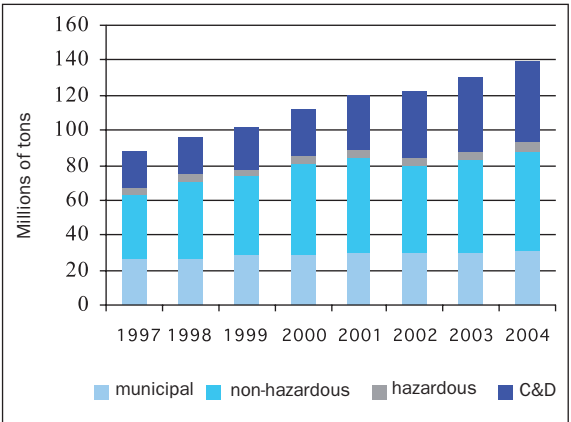
the goods purchased and the services used in our country not to depend on the quantities of materials used domestically.

Total Material Consumption (TMC) serves as a reference for evaluating a contribution made by a country to the extraction of resources globally, as well as to the potential pressure tied to the output side of the use of materials, triggered directly or indirectly by the country in question.

The ratio between the TMC and the total economic resources available for domestic use shows a noteworthy improvement in efficiency, sign of a relative decoupling.
In short, though the use of resources has become more efficient, and the quantity of resources extracted directly from Italian territory has decreased, the potential pressures in Italy have remained essentially stable, while the demand for natural resources and environmental services borne by the environment has actually increased.

USE OF RESOURCES AND PRODUCTION OF WASTE: *THE WASTE CYCLE*

Between 1997 and 2004 total waste generation grew by 60%, going from approximately 87.5 million tons in 1997 to slightly less than 140 million tons in 2004.



Break-down of total waste production

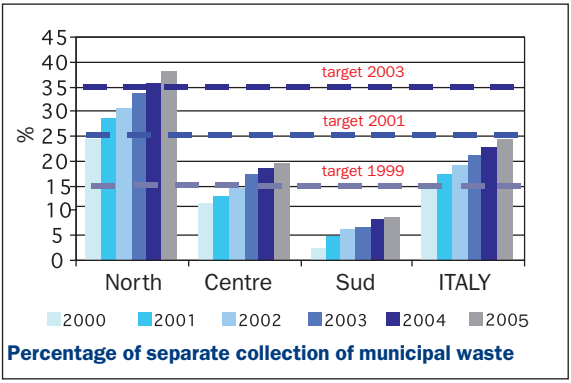
In the case of *municipal waste* as well, following a period of limited growth, production has accelerated, with a percentage increase of 5.5% (between 2003 and 2005), reaching a total quantity of approximately 31.7 million tons.

The generation of *hazardous and non-hazardous waste* (not including C&D) also continues to grow, having gone from slightly more than 40 million tons in 1997 to approximately 62 million in 2004.

The general objective of waste management is the rational and sustainable use of resources, and yet the outlook that emerges is not comforting.

Separate collection, which plays a priority role in municipal waste management, stood at slightly less than 7.7 million tons in 2005, equal to 24.3% of to-

tal municipal waste generation, a figure significantly lower than the target of 35% set for 2003.



Percentage of separate collection of municipal waste

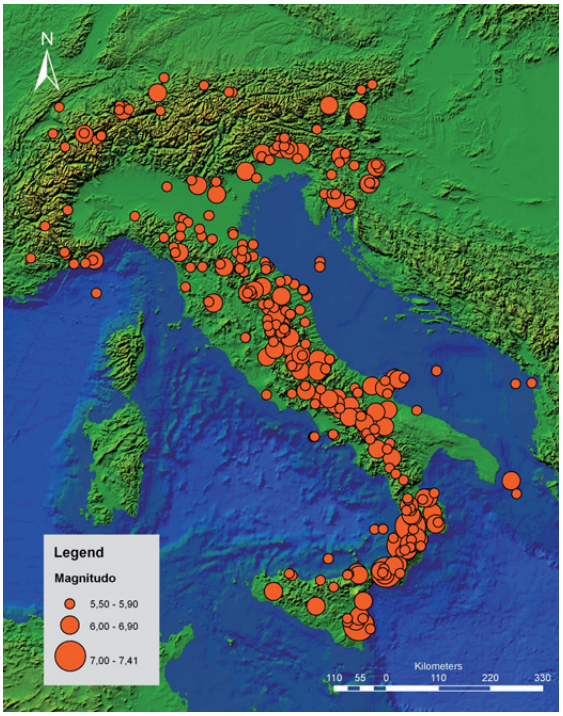
Significant differences can be noted between the three macro-areas: the North, with a percentage of 38.1%, exceeds the target of 35%, while the central regions (19.4%) and the South (8.7%) still fall short of the target.

In terms of the *management of municipal waste*, an analysis of the data for 2005 points to a decrease in landfilling (-2.7%) and a rise in other types of management: specifically incineration (+7.4%), other forms of material recovery (+5.0%), mechanical-biological treatment (+13.6%) and composting from selected matrixes (+12.9).
The total amount of *hazardous and non-hazardous waste* managed in 2004 stood at slightly less than 95 million tons, of which 46.7 were sent to be recovered, 34.8 were earmarked for disposal and nearly 12.8 were placed in storage.

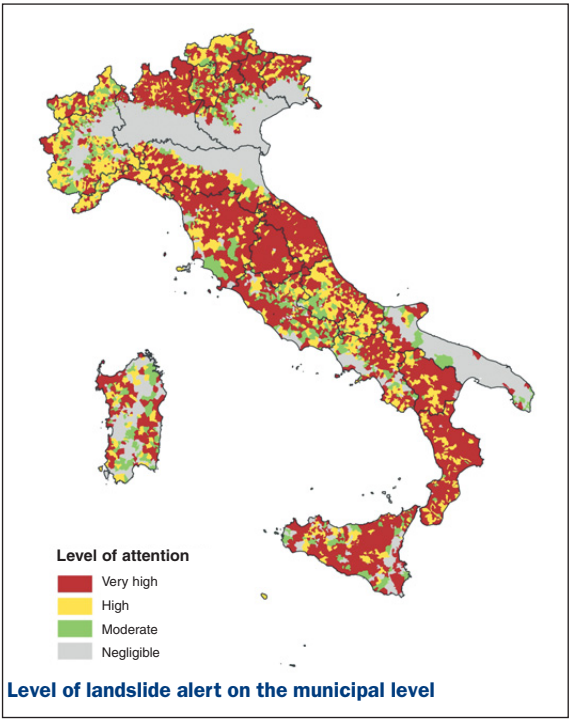
ENVIRONMENTAL RISK: *RISK OF NATURAL ORIGIN*

Natural risk manifests itself through the occurrence of events of endogenous origin (volcanic and tectonic activities) and of exogenous origin (erosion of elevations and sedimentation of low-lying areas).
Italy is one of the European countries facing the greatest seismic risk.

The areas facing the greatest seismic risk are found in the Friuli sector, along the central-southern spine of the Apennine range (inter-Apennine basin), along the



Distribution throughout the national territory of major seismic events (magnitude ≥5.5)

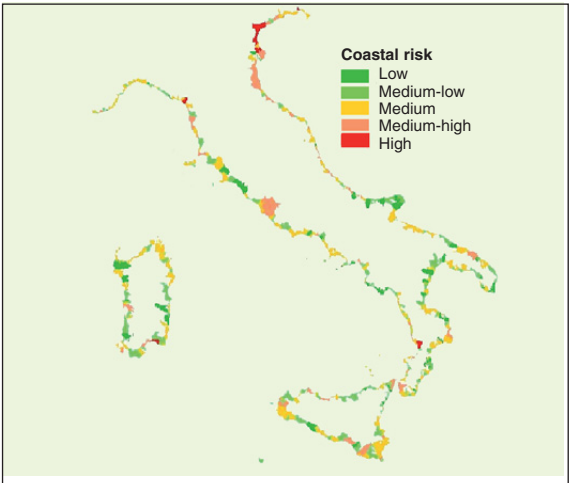


Level of landslide alert on the municipal level

Calabrian edge of the Tyrrhenian and in southeast Sicily.
Worldwide, Italy is one of the countries facing the greatest volcanic risk.

The conditions of greatest volcanic risk are found in the Vesuvius and Phlegraean areas, the Island of Ischia, the Etna sector, the Aeolian Islands and the Alban Hills.
Italy is also a fragile in terms of “hydrogeological disarrays: roughly 10% is classified as facing a high risk of flooding, landslides or avalanches, and more than 2/3 of the areas at risk hold urban centres, infrastructures or production areas. Landslides, in addition to being the most frequent type of natural disaster, al-

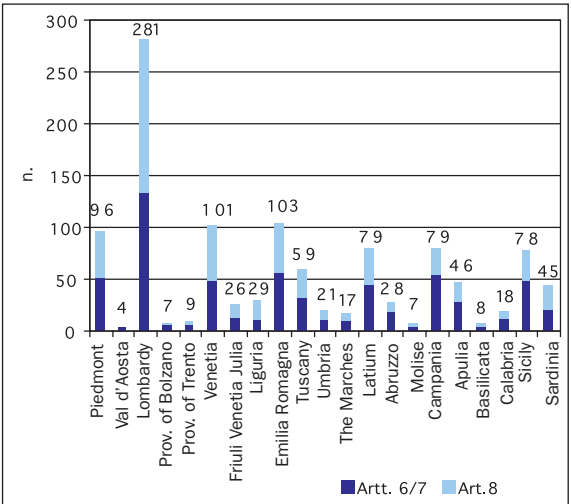
so cause the greatest number of victims: almost 470,000 landslides were recorded in Italy in 2006, involving an area of approximately 20,000 km^2. To date 5,596 municipalities have been affected by landslides, representing 69% of the total.
The risk of coastal erosion is also extremely relevant.



Map of coastal risk by municipality

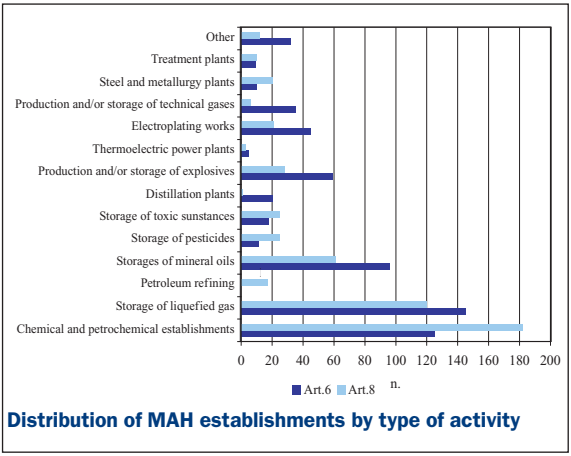
ENVIRONMENTAL RISK: *ANTHROPOGENIC RISK*

"Anthropogenic risk" is that which arises (directly or indirectly) from human activities that are potentially hazardous to the environment and to human life.
Knowledge of the number and the distribution throughout the territory of the Major Accident Hazards (MAH) establishments makes it possible to draw up risk maps; Knowledge of the activities of a plant, on the other hand, makes possible a general identification of the associated hazard.
The regions with the greatest concentrations of MAH establishments are: Lombardy, Emilia Romagna, Venetia and Piedmont, followed by Lazium, Campania and Sicily.



Regional distribution of MAH establishments

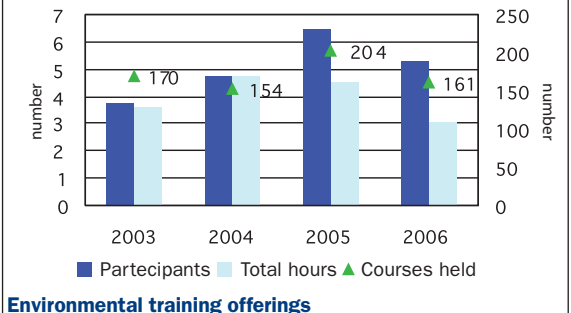
The main types of establishments are chemical and/or petrochemical plants, plus depots of liquefied gas (mainly LPG).



Distribution of MAH establishments by type of activity

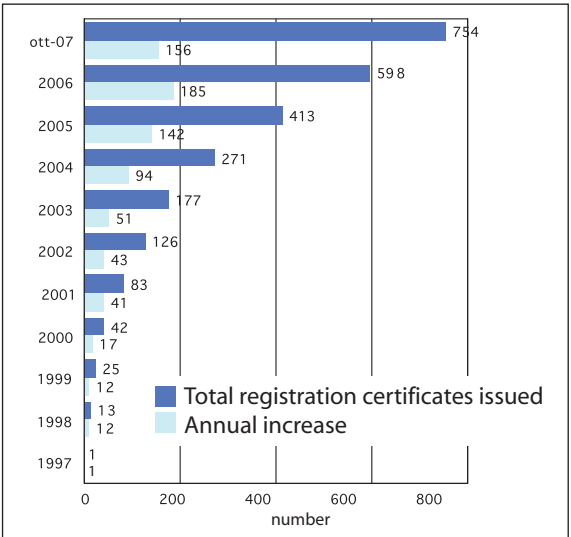
INSTRUMENTS FOR ENVIRONMENTAL KNOWLEDGE AND AWARENESS

An effective action of response, in accordance with the DPSIR model, is environmental education, meaning a form of activity not limited to school but extending into adulthood, in the field of continuing education and professional training.
The tools used by the Agency System to arrive at a broader and more in-depth environmental knowledge and awareness include reporting activities and their products, the level of use of telematic equipment for accessing environmental data/information, library services and environmental training and education in the strict sense, plus the activities carried out by the System's Measurement Laboratories and the enactment of the European EMAS and Ecolabel regulations.
In recent years, the supply of environmental information over websites has registered a growth phase, in terms of periodic bulletins, databases with connected cartography and general services; there has also been an increase in direct dialogue with users. In 2006, 179 laboratories participated in PTS and inter-laboratory comparisons organised free of charge by the APAT. The most widely used reporting product of the System was the "thematic report".
The Agency System has promoted a variety of environmental education initiatives and training courses, both face-to-face and remote. In 2006, there were 224



Environmental training offerings

environmental education projects and 160 training initiatives, with more than 5,000 participants.
Training efforts include the cooperation project between APAT and the Egyptian Environmental Affair Agency, as well as that between APAT and the Moroccan Ministry of the Environment. As for penetration of the EMAS and Ecolabel European Regulations, from 1997 to the present the annual growth has been continuous and significant. As of October 2007, the number of EMAS registrations issued was 754. The most virtuous regions, in terms of the number of EMAS registered organisations, are: Emilia Romagna, Tuscany, Lombardy, Piedmont and Venetia, with Campania holding sixth place, demonstrating a certain amount of attention on the part of Southern Italian regions. The lack of uniformity in development throughout the territory reflects the different levels of local awareness and/or incentives.
Between 1998 and 2007 a total of 145 Ecolabel licenses were issued, making for 1,827 products/services labelled. The trend was positive for both licenses and products/services. Last year, the largest increase was registered in the tourism accommodation sector.



Number of EMAS registration certificates issued in Italy over time