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National Network for the Environmental Protection

ITALIAN ENVIRONMENTAL DATA YEARBOOK 2016

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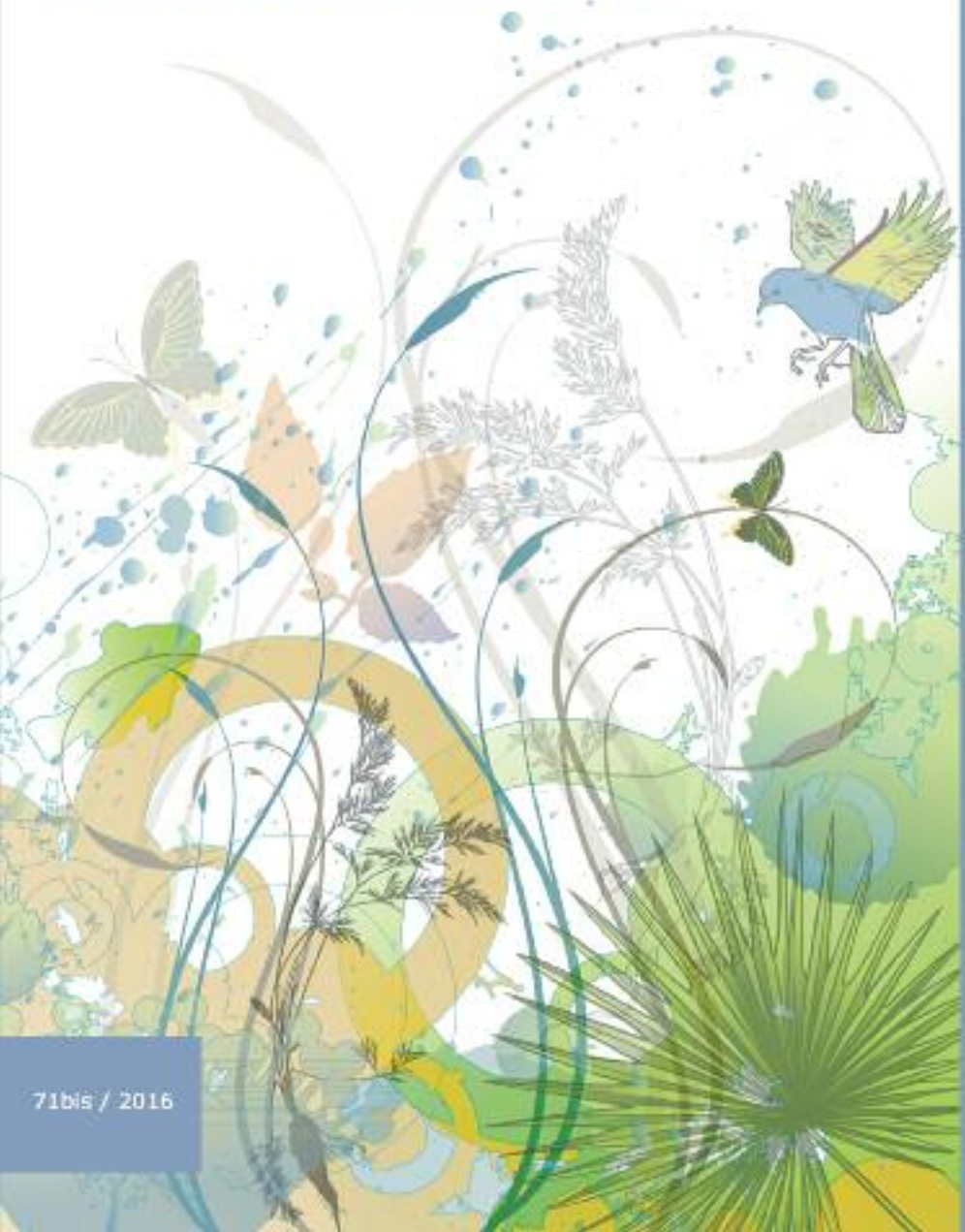
SUMMARISING... THE ENVIRONMENT



71bis / 2016

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On the occasion of the fourteenth edition of the Environmental Data Yearbook, starting from the same database at ISPRA disposal, some distinguished information products have been created with the aim of disseminating more punctual information to be addressed to a great community of users from policy-maker to research, from economic business to private citizen.

From the 2016 edition 6 products have been released:
• **Environmental Data Yearbook** - full version, it presents the indicator sheets populated during 2016, organized by productive sectors, environmental conditions and answers. It is available in electronic format (PDF).
• **2016 Environmental Data** - it presents an accurate selection of Environmental Data Yearbook indicators aimed at monitoring the Seventh Environmental Action Programme (7°EAP) main objectives. The document is organized around 5 sections or chapters according to the first three priority objectives and sub-objectives 4a and 7a listed in the 7° EAP. Each chapter presents an introduction and a selection of Environmental Data Yearbook indicators identified on the basis of the European Environmental Agency correspondents to monitor adequately the achieving of the goal. It is available in electronic format (PDF).
• **Summarising… the environment** – information brochure, it presents in a concise format some relevant environmental issues. It is available in electronic version (PDF).
• **Indicators Platform** – tool for online consultation of the indicator sheets and the creation of reports. The Platform allows to publish, manage and organize the contents related to the different editions of the Yearbook and to create synthetic versions personalised according to the cognitive needs of individual users (http://annuario.isprambiente.it).
• **Multimedia** – it presents the 2016 edition of the Environmental Data Yearbook and shows briefly some environmental issues which are considered a priority for the reference target. The 2016 edition of the Environmental Data Yearbook film is available at (http://annuario.isprambiente.it).
• **Comic strip**: it is titled "Inspector SPRA investigation", it periodically (yearly) deals with a single environmental issue with the aim of disseminating information and the Yearbook data to a young audience of no expert people. For the 2016 edition the selected issue is "Water" (Watch out for Water!). It is available in electronic format (PDF).

Summarising... the environment describes concisely some environmental issues of priority importance or topical for citizens and policy-maker. In this edition are shown and highlighted also some comparisons with european data. Information and statistic data on environmental conditions are disseminated through a clear and accessible language, made particularly communicative also using a graphic layout, immediate and easy to read.
The brochure contains a synoptic picture of the Yearbook indicators which are considered more significant for the description of the addressed issues and some infographics used to represent data.
The addressed issues are: Biodiversity; Climate: state and changes; Atmospheric Pollution; Inland water Quality; Sea and marine environment; Soil; Waste; Physical Agents; Natural Risk; Chemical agents; Allergenic pollen index; Assessments, Authorizations and Environmental Certifications; Environmental Knowledge.

The brochure is distributed to institutions, international organisations, media and opinion leaders, it is available at: www.isprambiente.gov.it; http://annuario.isprambiente.it

The document has been prepared by the statistic coordinators in cooperation with the thematic coordinators (see general section Task Force Environmental Data Yearbook 2016).

1. BIODIVERSITY

The level of threat to vertebrates, vascular plants, bryophytes and lichens is still high and introductions of alien species are increasing.
Special Protection Areas (SPAs) and Sites of Community Importance (SCIs) are growing, while the number of terrestrial and marine protected areas and of wetlands is unchanged.

Italy is one of the richest countries in Europe in terms of biodiversity, including over 58,000 species in its fauna and over 6,700 species in its higher plants, 20.4% of which are endemic.

Regarding the fauna, although comparison is limited to some animal groups for which reliable species lists are available, it can be observed as in Italy, among insects for example, Ortopthera are about three times that of Poland, ten times that of Great Britain and Norway, and 150 times that of Iceland; the number of species of Lepidoptera is more than double that of Britain, while Coleoptera species are approx. 12,000 compared to 6,000 in Poland, 3,700 in Britain, 3,375 in Norway and 239 in Iceland. As for the flora, even net of naturalized exotic species, the 6,700 species mentioned above make up about a half of the 12,500 species estimated for Europe.

The level of threat is however high, since about 31% of vertebrates, 15% of vascular plants and 22% of bryophytes and lichens are at risk of extinction.

Biodiversity is threatened mainly by human activities and the growing demand for natural resources and ecosystem services. The main threats to terrestrial vertebrates, except birds, are habitat loss and degradation (about 120 species) and pollution (about 80 species).

Fisheries also is an important impact factor for the marine environment. Italy is currently following a policy of limiting fishing effort, according to the EU Common Fisheries Policy.

Fishing effort has been constantly decreasing since 2004, except in 2008-2009 when it rose from 25.2 to 26.5, then it started to decrease again in 2009-2014, reaching 21.1. Catch per unit effort (CPUE) value is 8.4 kg/die, showing a slight increase compared to 2013.

The introduction of potentially invasive alien species is also a threat for biodiversity. In Italy there are currently about 2,700 recorded non-native animal and plant species.

Italy is party to several international conventions and agreements aimed at the protection of biodiversity, e.g. the Convention on Biological Diversity. The Natura 2000 network includes Special Protection Areas (SPAs) and Sites of Community Importance (SCIs) which, net of overlaps, amount to 2,589 sites covering an area of 6,398,653 ha, of which 5,817,555 ha inland. This represents 19.3% of the national territory, a slightly higher average than the European average (about 18%).
In Italy there are 871 protected areas for biodiversity conservation, covering a land surface of more than 3 million ha, equal to 10.5% of the national territory, as against an average of about 15% in Europe.

Protected marine surfaces in Italy include 27 Marine Protected Areas;

moreover there are 64 wetlands under the Ramsar Convention.
Italy has adopted a National Biodiversity Strategy, as part of its commitments under the Convention on Biological Diversity (CBD, Rio de Janeiro 1992).

2. CLIMATE: STATE AND CHANGES

Average temperature increases but total greenhouse gas emissions decrease.

The European Union has been at the forefront in reaching a global climate agreement. After the lack of Agreement in Copenhagen, in 2009, EU contributed significantly to the successful outcome of Paris Climate Change Conference (December 2015 – COP 21). The Agreement sets out a global action plan aimed at avoiding dangerous climate changes, holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change. The Agreement has been signed by 177 Countries including the European Union, which represent 94.4% of global emissions.

Before and during Paris Conference, countries presented national climate action plans (Intended Nationally Determined Contributions, INDCs). Undertakings to reduce greenhouse gas emissions provided by national action plans are not sufficient to keep global warming below 2°C, but the Agreement sets out the modalities to reach this goal. EU was the first major economy to submit its intended contribution in March 2015, defining the implementation modalities of the target objective to reduce emissions of at least 40% by 2030 compared to 1990.
On April 22nd 2016, the Agreement has been opened to signature for one year and it will enter into force thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification.
According to the White House "At least 34 Countries representing the 49% of the total global climate-altering greenhouse gas emissions have ratified or declared that will ratify the agreement by 2016". Recently USA and China announced the ratification of the Agreement.

The increase of land surface average temperature observed during the last thirty years in our Country was nearly always higher than the average global one. 2015 was the hottest year on record for Italy (since 1961). The average temperature anomaly (+1.58 °C) was greater than the global one (+1.23 °C) and represents the 24th consecutive positive value. The anomalies with respect to the normal values were particularly high in July and in the last two months of the year, when mild climate was associated to a long period of stable and dry weather almost throughout the whole Country. New temperature records were registered above all in the northern areas and at high altitude stations in the Alpine Arc. Also the indices of temperature extremes characterized 2015 as one of the warmest years of the last half century. In particular, in 2015 the average number of

tropical nights, (when minimum temperature exceeds 20°C), registered the second highest value of the whole series since 1961 (behind 2003), with an anomaly of about 26 nights above the normal value. The Warm Spell Duration Index (WSDI) indicated an anomaly of +28 days with respect to 1961-1990 average. It is the 4th highest value on record (since 1961).

The main response measures to climate change are related to mitigation, which refers to emission reduction of greenhouse gases and to adaption which aims at minimizing possible negative consequences and to prevent possible climate change-related damages. Such measures are complementary.

In Italy, in 2014, total greenhouse gas emissions, expressed in CO_2 equivalents, decreased by 4.6% compared to the previous year and by 19.8% compared to the base year (1990). Between 1990 and 2014, all greenhouse gas emissions passed from 522 to 419 millions of tonnes CO_2 equivalent, a variation mainly obtained thanks to CO_2, emissions reduction contributing 81.9% of the total and proving to be in 2014 below 21.4% compared to 1990.
The overall trend of greenhouse gas is mainly determined by the energy sector which represents more than 81% of total emissions. The reduction observed especially from 2008 is a consequence of the energy consumptions and the industrial productions as well as the growth of energy production from renewable sources and energy efficiency improvement.

Since 90', EU28 shows a decoupling of economic growth from GHG emissions more accentuated compared to national one. Only during the last years national emissions reduction shows a trend convergent to European one. However national emissions have felt the effects of the economic crisis to a greater extent than European ones.

In 2014, greenhouse gas emissions (except for LULUCF activities) in the EU28 decreased by 24% compared to 1990, with GDP (Gross Domestic Product) increase by 48% compared to the same period. This decoupling was partly due to the growing of renewable energy quotas, national dedicated support systems and significant cost reduction, low carbon fuel in the energy mix and energy efficiency improvement. The trend and decrease of greenhouse gas emissions and relative future evolution prove that 2020 greenhouse gas reduction target will be reached in the long-term, the rhythm of such reductions will be slow, driving EU emissions towards 27-30% below 1990 levels by 2030. This will be not sufficient to achieve reduction target by 40% and it is considered that EU is not on the right path to achieve the EU's 2050 decarbonisation objective. Therefore the European Commission on October 23rd

2014 set out new objectives to reduce air emission to be achieve by 2030, with the aim of reducing greenhouse gas emissions at European level by 80% by 2050 compared to 1990. These objectives consider a reduction of total emissions by 40% compared to 1990, at least 27% of renewable energy in the final consumption and an indicative objective of about 27% of energy efficiency.

With regard to Adaptation, Italy according to the European requirements , approved and adopted its National Strategy for Climate Change Adaptation (SNAC).

At present the Strategy represents the most important "national vision" document about how our Country intends to address climate change impacts and minimize risks with the aim to safeguard population health and well-being, preserve natural resources, enhance natural, social and economic systems adaptation ability and finally to benefit from potential future opportunities associated to new climate conditions. The Strategy which is the outcome of a broad networking process between policy makers and the national scientific community, as well as the result of different national stakeholders consultations achieved during two years work, identifies a set of actions and directions to address climate change impacts both in the short (2020) and the long term (beyond 2020) by providing a new national reference framework.

3. AIR POLLUTION

In Italy, as well as in Europe, there are significant signals of air quality improvement: main pollutant emissions continue to decline and their atmospheric levels show decreasing trends. Despite these positive signs, however, air quality situation remains critical; in particular high levels are still recorded for atmospheric particulate matter, nitrogen dioxide and ground-level ozone, which too often exceed regulatory standards in extensive areas. Italy, with the Po valley, is one of the most critical areas in Europe.

In 2014, the annual limit value for PM10 (40 μg/m^3 as an annual average) was met in almost all stations (only 3 stations out of 388 exceeded it). If compared with the World Health Organization (WHO) reference value, which is 20 μg/m^3, 70% of the monitoring stations exceeded this target. Considering the daily limit value of 50 μg/m^3 (not to be exceeded more than 35 times in a calendar year), the stations in exceedance were 29%, rising to 88% when considering the WHO reference value, which provides for daily concentration exceeding 50 μg/m^3 only 3 times in a year, based on known short-term health effects. The highest values were mostly recorded in medium-large cities in Po valley, central and southern Italy and Sicily.

In 2014, PM10 limit values were exceeded in most of Europe, and 94% of exceedances were recorded in urban and suburban areas.

As for PM2.5, the limit value of 25 μg/m^3 was met in almost all monitoring stations (166 out of 170), while the WHO reference value of 10 μg/m^3 was exceeded in almost all of them (159 out of 170).

Like PM10, also PM2.5 limit is exceeded in several EU countries, such as Bulgaria, Czech Republic and Poland besides Italy.

As for ozone, the Long Term Objective (LTO) for human health protection was exceeded in most of the monitoring stations, and only 6% of them (17 out of 288 stations) complied with the LTO.

In Europe, the highest ozone levels occur in the Mediterranean countries; in 2014 ozone LTO was met only in 14% of the stations.

As for nitrogen dioxide, the hourly limit value of 200 μg/m^3 (not to be exceed more than 18 times in a calendar year) was met in all monitoring stations (barely 1 station exceeded it) and only 19 stations (4%) exceeded the WHO reference value (which no exceedances of 200 μg/m^3). The annual limit value for the protection of human health and the WHO reference value, both set at 40 μg/m^3, were exceeded in 10% of the monitoring stations throughout the country. Almost all of exceedances were recorded at traffic monitoring stations located in medium and large urban areas.

In Europe, during 2014 exceedances of nitrogen dioxide annual limit value occurred in 27 of the 28 EU Member States, and 94% of exceedances were recorded in traffic stations.

Italy's PM10 emissions have reduced by 34.5% from 1990 to 2014. Over the entire period the road transport sector, which in 2014 contributed to PM10 total emissions with a share of 13.1%, recorded a reduction of 56.9%.

4. INLAND WATER QUALITY

At hydrographic district level, the highest percentage of water bodies with an ecological status achieving the quality objective is observed in the Eastern Alps District, with 56% rivers and 34% lakes of good or high quality. With regard to the chemical conditions of rivers, the highest percentage of water bodies achieving the quality objective is observed in the Padano District (88%) and in the eastern Alps District (83%); with regard to lakes, the best situation is observed in the Eastern Alps District (87%). National Synthesis Data (Reporting WISE 2016) highlights that for surface waters (7,494 river water bodies and 347 lake water bodies) 43% of rivers achieves the quality objective for the ecological status and 75% for the chemical conditions; with regard to lakes, the quality objective is achieved by 21% of bodies for the ecological status and by 47% of bodies for the chemical conditions.

With reference to the chemical status of groundwater (index SCAS) on a total of 794 water bodies identified referred to 15 regions, 727 are classified water bodies, of which 65.3% falls into the "good" class, while the remaining 34.7% into the "poor" class. Taking into consideration the totality of identified water bodies, the 8.4% does not prove to be classified, the 59.8% proves to be in a "good" status and the 31.8% in a "poor" status.
With reference to the quantitative status of groundwater (Index SQUAS), on 718 water bodies identified referred to 13 regions, 682 are classified water bodies, of which 84.2% falls into the "good" class, the remaining 15.8% in the "poor" class. Taking into consideration the totality of identified water bodies, the 5% does not prove to be classified, the 79.9% proves to be in a "good" status and the 15.1% in a "poor" status.
At present these data are under completion; from a last national update emerged that 1,053 groundwater bodies have been identified , of which 59% falls into "good" class both for the chemical and the quantitative status. The transposition of the Directives 2000/60/EC and 2006/118/EC, from Leg. Decree No. 152/06 and Leg. Decree. 30/2009 respectively, has allowed to define for groundwater the quality status of water bodies and the criteria to assess the good chemical status.

The first phase of monitoring programs is fixed over the period 2010-2015. Data on inland (rivers and lakes) surface water quality, collected through the collaboration of Regional and Provincial Environmental Agencies, refer to the first six-year monitoring cycle (2010-2015) as indicated in Leg. Decree No. 152/06.

The quality status of rivers and lakes is represented by the ecological status indices, considering the quality of structure and function of ecosystems and the chemical status assessing if water bodies meet environmental quality standards.

With regard to the ecological status of rivers, the highest percentage of water bodies meeting the quality objective is observed in the Eastern Alps District, with the 56% of water bodies in good or high quality status, following the Sardinia District (55%) and the Padano District

with the 47%.
With regard to lakes, the best situation is observed always in the Eastern Alps District with the 34% of water bodies achieving the quality objective, followed by the Padano District (30%). In the Northern Apennines District and in the Southern Apennines District, data reported related to rivers and lakes are grouped by "surface waters" and show respectively the 36% and the 38% of water bodies in quality falling within good or high.
In several districts the water bodies are not monitored yet, with high percentages in the District of Sicily (51.5% of rivers and 84% of lakes), in the Eastern Apennines District (16% of rivers and 43% of lakes), and in the District of Sardinia (30% of rivers and 31% of lakes).
As regards the chemical status of rivers, the Padano District shows the highest percentage of water bodies in "good" status (88%), followed by the Eastern Alps District (83%). As regards lakes, the best situation is observed in the Eastern Alps District with the 87% of water bodies achieving the quality objective, followed by the Central Apennines District (72%).
In the Northern Apennines District and in the Southern Apennines District, data reported related to rivers and lakes are grouped by "surface waters", with respectively the 77% and the 69% of water bodies in "good" status. A common data in most of districts is the high percentage of not yet monitored water bodies higher than 80% for rivers and lakes of the District of Sicily and of the District of Sardinia.

The monitoring aimed at the assessment of the chemical status of groundwater concerned 727 water bodies on a total of 794 water bodies (coverage of 91.6%) observing that 65.3% shows a "good" chemical status. The SCAS Index has been elaborated also in terms of surface to consider the dimensions of the classified water bodies from which emerges that 57.9 % of groundwater is in "good" status and the remaining 42.1% in "poor" status.
In order to assess the quantitative status of the groundwater resources, in terms of hydrogeological balance equilibrium (the capacity to support water extraction on the long-term in relation with recharge factors), the quantitative status index of groundwater has been elaborated (SQUAS). In terms of surface, data analysis shows that 84.2% of groundwater bodies is in "good" class while the remaining 15.8% in "poor" class, in terms of surface, while the 90.7% of groundwater is in "good" status.

The safeguard of waters represents a very important field of action in which the principles of cooperation, solidarity and common good must be recognized as key values by national and international policies.
In 2014, the compliance of collecting systems with the Urban Wastewater Treatment Directive achieved 100% in 15

regions and in the autonomous provinces of Trento and Bolzano, while achieved between 92% and 97% in the other regions. The organic load produced by agglomerations on the national territory (with potentiality greater than or equal to 2,000 p.e.) is 79,383,763 p.e., while the portion of the organic load treated.

5. SEA AND COASTAL ENVIRONMENT

In the last decades significant geomorphological changes have been observed along Italy's coasts, due to both natural processes and human activities. Microalgae Ostreopsis cf. ovata was detected in 10 coastal regions, while 90% of coastal bathing waters are classified as excellent.

A regular monitoring of natural coastal evolution and of impacts from human activities constitutes the necessary knowledge base for devising any protection, management and intervention measure.

During the 2011-2014 monitoring period, quality status of coastal bathing waters with regard to sanitation parameters (faecal bacteria) was for 90.0% excellent, for 4.8% good, for 1.8% sufficient and for 2.2% poor. For about 1.2% of bathing waters it was not possible to carry out the classification, due in most cases to irregularities in the monitoring frequencies.

Italy's coastal bathing waters represent 33% of all monitored costal bathing waters in Europe. The percentage of Italian bathing waters classified as "excellent" is higher than the European average which is 85.5%.

In 2015, microalgae Ostreopsis cf. ovata was detected in 10 coastal regions, while it was always absent in samples collected along the coasts of Abruzzo, Emilia-Romagna and Veneto regions.

An important goal of the EU Water Framework Directive is to achieve the "good" status of water bodies by 2015 (or, in the event of an extension, by 2027). The chemical and ecological classification of coastal and transitional waters, hereafter presented, refers to management plans (update #1) of the eight river basins identified by Italy.

The ecological quality of coastal and transition waters is assessed by means of Biological Quality Elements (BQE) classification in comparison to the natural or near natural classification values, i.e. the reference values.

Based on the river basins' Management Plans, for coastal marine waters in the Po Delta, Northern Apennines and Apulia (Southern Apennines) basins we find a "moderate" ecological status in respectively 100% and 50% of water bodies. In the Eastern Alps basin, the "good" status is found in over 90% of water bodies, like in Campania (82%) and in the Central Apennines basin (79%). The Sardinia basin stands out with 64% of water bodies in "good" status and as the only Region with 5% of water bodies in "high" status.
With regard to transition waters, in almost all river basins we have an high percentage of water bodies not reaching the "moderate" status class: in particular, for Po Delta and Apulia (Southern Apennines) basins, 100% and 67% respectively of water bodies are in "poor" and "bad" status.

The chemical quality status of water bodies refers to the measurement of priority and priority hazardous substances in water bodies, sediment or biota, compared against their related Environmental Quality Standard (EQS)

which must not be exceeded to achieve "good chemical status" classification. Highly critical cases are observed in the Po basin, northern Apennines, and Campania and Apulia Regions (Southern Apennines basin), in all of which more than 50% of marine coastal water bodies are in "not good" chemical status (exactly 50% for the Po basin). Conversely, in the Eastern Alps and Sardinia basins, 62% and 53% respectively of water bodies are in "good" status.

As for transition waters, 75% of Po delta coastal lagoons and 53% of water bodies of Eastern Alps basin are in a "good" chemical status. In contrast, 80% of water bodies of northern Apennines basin, 75% of Apulia and 100% of Campania (Southern Apennines basin), and 55% of Sardinia basin are in a "not good" chemical status.
The process causing the increase of algal primary production and biomass in waters is called eutrophication. It also causes the consequent accumulation of organic matter that can lead to hypoxia/anoxia of bottom waters, suffering of benthic communities and fish kills. Eutrophication can have seriously negative impacts on the health of marine ecosystems and the sustainable use of resources and services. It is one of the 11 descriptors of the EU Marine Strategy Framework Directive (2008/56/EC) for which Italy has performed an initial assessment in 2012 in accordance with art. 8 of the Directive.

The processing of available data, in particular of data regarding concentration levels of nutrients and chlorophyll 'a' indicators, made it possible to highlight how the Northern Adriatic, especially the areas facing the Po delta and the Emilia-Romagna region coast, is the area most at risk of eutrophication. Despite the overall picture of the last 10 years shows a decrease in the Northern Adriatic trophic level, there are still events of intense algal blooms, triggered and sustained mainly by nutrients supply from the Po basin, and dystrophic events with hypoxia/anoxia in bottom waters.

ISPRA monitors the physical state of the sea and performs systematic measurements of marine and maritime climate parameters. From the analysis of wave parameters (Hs significant wave height, direction, T period), as for 2015 it is evident the seasonal nature of storms, although in winter months a lower number of storm surges was recorded compared to the average of previous years. In particular, the month of December is marked by the absence of storm surges in correspondence of the monitoring points.

In the last decades Italy's coastline has shown a significant geomorphological evolutions, due both to natural processes and man's interventions: from 1950 to 1999, 46% of low coasts have undergone

changes of more than 25 meters; between 2000 and 2007, 37% of the coastline has undergone changes of more than 5 meters, and the stretches of coast under erosion (895 km) are still more than those in progradation (849 km).
Despite many conservation and restoration interventions, between 1999 and 2007 Italy's beaches have lost about 16 km^2, compared to 15.2 km^2 of areas in progradation. Moreover, their surface decreased of further 600,000 m^2.

675 km of Italy's coasts, approximately 8.2% of the entire national coastline, are artificialised, in particular with: shore-connected defence works, occupying 414 km of the coastline (62% of the total artificialised coastline); port works, occupying 252 km of the coastline (37% of the total); replenishments for the remaining 9 km (1%). Between 2000-2007, additional 14.2 km of coastline were artificialised, mainly for the construction of new port facilities for 12.1 km (+5.7% compared to 2000), and for defence works for 2.1 km (+0.5%).

6. SOIL

Soil consumption does not stop in Italy.

In Italy soil consumption shows no sign of decreasing, we passed from 2.7% of consumed soil in the 50's, to 7% in 2015. Although transformation time of soil has recently decreased (after having raised 8 m2/sec in 2000 we passed to 4 m2/sec of last two years 2013-2015) at 2015 about 21,000 square Kilometres have been irreversibly consumed.

Estimates recently updated by Eurostat are substantially in line with national monitoring ones and the portion of territory with artificial covering in Italy is estimated, for 2012, equal to 7.0% of the national total, against the 4.1% of EU average. Italy ranks fifth after Netherlands (12.3%), Belgium (12.1%), Luxembourg (10.1%) and Germany (7.2%) (Eurostat, 2016).

With regard to geographic distribution, the highest percentage values of consumed soil are observed in the North of Italy, in particular in the North-West (2015). At provincial level, the highest percentage of consumed soil, respect to the administrative territory, is observed in Monza Brianza Province with more than 40% in 2015.
Among municipalities, the highest value of sealed soil (85%) has been observed in the municipality of Casavatore (NA).
Soil consumption in coastal area shows values definitely higher than in the rest of the national territory. Soil consumption in coastal area within 300 m is equal to 22.9%, while between 300 m and 1,000 m is equal to 19.3%. The highest values, more than 45% of consumed soil within 300 m from the sea, are observed in Liguria Region and in the Marche Region.

Different areas of the national territory are prone to soil loss by water erosion. Re-naturalization of different deserted agricultural areas indicates a reduction of the phenomena in the mountain areas, while the increase of mechanization in hilly agricultural areas and the spread of fires suggests an increase of the phenomena.
Soil loss by water erosion and the decrease of organic carbon of soils are strictly related and are two of the main causes which contribute to loss of soil functions and to activate desertification processes.

Mountain areas most affected by desertification phenomena are in the southern regions although in the northern regions some critical issues can be also observed.

According to recent estimates made at European level, Italy ranks first for soil loss by water erosion with values higher than 8 t/ha*yr against a European average of about 2.5 t/ha*yr (RUSLE, 2015).

7. WASTE

Municipal waste (MW) generation in Italy is almost stable.
The separate collection amounts to 47.5% of total production, still not enough to achieve the target of 65% set for 2012.
Preparation rates for reuse and recycling of municipal waste have increased, but the target set by regulations for 2020 is not reached yet.

In 2015, municipal waste generation reached nearly 30 million tonnes, remaining almost stable compared to 2014 (-0.4%). The national per capita MW generation confirms this trend, passing from 488 kg/inh. in 2014 to 487 kg/inh.in 2015.
In 2015 per capita MW generation by macroarea continued to be uneven, with 494 kg/inh. in northern Italy, 543 kg/inh. in central Italy and 444 kg/inh. in southern Italy.

At European level (EU 28), municipal waste generation for 2013 decreased by 1.2% compared to 2012 (from about 246.1 million tons to around 243.2 million tons), confirming the decreasing trend started in the previous years (between 2011 and 2012 the decrease was 1.9%).
The figure for per capita MW generation confirms this decreasing trend of municipal waste generation, which passed from 488 to 481 kg/inh. per year (-1.4%).

In 2015, separate collection amounted to 47.5% of municipal waste total generation, marking a further improvement, though still not enough to reach either the target set for 2011 (60%) or that for 2012 (65%). In northern Italy separate collection totalled 8 million tons, in central Italy 2.9 million tons, and in southern Italy 3.1 million tons, corresponding to 58.6%, 43.8% and 33.6% respectively.
The analysis of management data shows that, in 2014, 31.5% of municipal waste was still disposed of in landfills. Landfills are, therefore, the most widespread management model, although no more prevalent; on the whole, in fact, recycling, treatment and other types of disposal account for over a half of the annual waste generated (68.5%).

In 2014 the percentage of municipal waste preparation for reuse and recycling was 44.6%. Over a third of the recycled quantities (39%) consists of organic fraction, and 27% of paper and cardboard.
Despite a gradual increase in rates of preparation for reuse and recycling, a further increase is still required to achieve the target set by regulations.


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8. PHYSICAL AGENTS

Citizens keep on maintaining the focus on the issue of electromagnetic fields. High noise levels can affect our well-being; the negative effects of noise on human health include stress, decreased psychological well-being, sleep disturbance as well as cardiovascular disease. According to the World Health Organization (WHO) most of Italian people is day-time and night-time exposed to serious noise levels. The main noise source is road traffic.

Nuclear activities: most of radioactive waste, in terms of activity, can be found in Piemonte Region (73.8%). Follow Campania Region with 11.9% and Basilicata Region with 8.9%. The regional distribution of radioactive waste, in terms of volume, shows a greater concentration in Lazio Region with 27.6%, followed by Piemonte Region (19%) and Lombardy Region (15.8%).
Environmental radioactivity: in absence of relevant nuclear accidents, radon represents the main source of exposure to radioactivity.
In Lazio Region and Lombardy Region is observed a high concentration of radon (Rn-222). This discrepancy with the other regions is due to the different concentration of uranium in rocks and soils and to their different permeability.

Electromagnetic pollution: in Italy the total power of plants (SRB) is equal to 7293.30 kW and it is slightly lower than the one of RTV plants which is equal to 7974.73 kW. It is observed that the number of cases of exceeding the regulatory limits with regard to RTV plants (equal to 483) is 7,6 time higher than that of SRB plants (equal to 63). In July 2016, cleaned up exceeding cases related to RTV plants prove to be 76% of the total while those related to SRB plants 92% of the total. Concerning RTV plants is observed a gradual decrease of sites (equal to 4% from 2013 to 2014 and to about 5% from 2014 to 2015) and a variation on the plants with a decrease of about 2% from 2013 to 2014 and a slight increase equal to 4% from 2014 to 2015. Instead, as regards SRB plants from 2013 is observed a stationarity of sites (variation percentages below 1%) and an important increase of services equal to 14% from 2013 to 2014 and to 13% from 2014 to 2015.

From 2014 to July 2016 the cases of exceeding the regulatory limits related to RTV plants have been constant (346) while those related to SRB have remained almost unchanged moving from 51 to 54.

As regards experimental checks, for RTV a variable trend is observed which in any case from 2010 to 2015 led to a decrease equal to 40% of the number of checks carried out; however for SRB except for 2012, the number of checks remained unchanged attesting around 1,100 annual checks. For 2015, from experimental checks carried out on SRB plants 36% proves to be carried out at the request of citizens; while for RTV plants checks carried out at the request of citizens prove to be 40% of the total experimental checks.
However, the percentages highlight the attention of population to this issue.
Noise: in 2015, the 45.9% of noise sources controlled by ARPA-APPA showed at least an exceedance of the regulatory limits, highlighting a noise problem.
The most controlled sources proved to be

also for 2015, the service and commercial activities (54.5%) followed by product activities (29.2%).
The percentage of Italian municipalities approving noise classification plan is equal to 59% (31 December 2015). Regions with the highest percentages of zoned municipalities are Valle d'Aosta (100%), Tuscany (99%), Marche (97%), Lombardy (95%), Veneto (91%), Liguria (rises to 85%), Province of Trento (76%), Piemonte (74%), Emilia Romagna (71%); while the regions registering percentages below 15% are: Province of Bolzano (14%), Apulia (12%), Abruzzo (10%) and Sicily (2%). At present in the Regions of Friuli-Venezia Giulia, Basilicata and Molise the Noise Classification Plan doesn't prove to be a tool used for municipality planning. Instead, as regards Calabria Region information is not available.

Consistent increases in the number of zoned municipalities compared to the previous year are not observed neither the percentage of people living in municipalities with approved noise classification plan, which is equal to 66% of total population (+2% comparing to 2014), nor the percentage of zoned surface equal to 50% of the whole national surface (unchanged compared to 2014).

9. NATURAL HAZARDS

In 2015 there were no damaging earthquakes in Italy. Earthquakes with magnitude equal or greater than 2 were 1,963, as recorded by the Italian National Seismic Network operated by INGV. The two most intense earthquakes, with magnitudes 4.7 and 4.5, had very deep hypocenters and thus they were not damaging.
The surface faulting index reveals the most critical areas to be in the Tyrrhenian side of Calabria, as well as in eastern Sicily, central-southern Apennines and Friuli-Venezia Giulia.
217 landslides caused 12 victims and damages to the road and rail networks.

Italy is particularly prone to natural hazards for its distinctive geological and geomorphological structure.
Natural events potentially hazardous to people are divided in two main categories, based on their genetic mechanism: endogenous events (e.g. earthquakes, volcanic eruptions) which are related to processes from within the Earth, and exogenous events (e.g. floods, landslides, avalanches) which occur on the Earth surface.
The study of earthquakes, surface faulting and volcanic eruptions is very important in a country like Italy, where the hazards from such events often affects densely populated and industrial areas. Hydrogeological instability has also become (since the second postwar period) a problem of great social and economic importance, precisely for the interactions between natural processes and human activities.
A fact-finding analysis of hazard conditions is therefore important for an effective land use management, which must be supported by a policy of both prediction and prevention.

In 2015, unlike 2016 (see supplementary information box), there were no damaging earthquakes in Italy.
Earthquakes with magnitude equal or greater than 2 were 1,963, as recorded by the Italian National Seismic Network operated by INGV. The two most intense earthquakes, with magnitudes 4.7 and 4.5, had very deep hypocenters (deeper than 200 km) and thus they were not damaging.

In Italy there is a large number of capable faults, that is active faults able to produce surface or near-surface rupture or significant deformation during an earthquake.
Surface faulting is a part of seismic hazard that focuses on potential surface rupture/tectonic deformation during a seismic event.
The intense urbanization of the last decades has widely affected even areas near capable faults, and currently there are no regulatory measures to curb this trend. The surface faulting index reveals the most critical areas to be in the Tyrrhenian side of Calabria, as well as in eastern Sicily, central-southern Apennines and Friuli-Venezia Giulia.

Seismic hazard poses a risk also to the valuable cultural assets of Italy: heritage assets located in municipalities classified as seismic zone 1 (dangerous areas where very strong earthquakes may occur) are 10,297, i.e. 5.4% on a total of 190,931.
During 2015, the Mount Etna registered

three critical eruptional events, which forced the partial closure of the nearby Catania airport because of the ash both deposited on airstrips and dispersed in the atmosphere. Italy's heritage assets are exposed to volcanic hazard as well: those located in high hazard areas are 3,064, corresponding to 1.6%.
With regards to weather, in 2015 there were numerous events of heavy rain falling in a short amount of time, which were followed by flash floods.

Ground effects, such as failure of embankments, floodings, erosion-depositional events, landslides, coastal instability, were significant. In 2015 the annual accumulated rainfall was decidedly lower than in 2014, with the exception of Sicily and Calabria regions which were instead affected by several events, with higher values than previous years. In these regions, the recurrence of events of similar intensity in the same areas amplified the ground effects and the damages.

In Italy, the population living in flood risk areas equals to: 1,915,236 inhabitants (3.2%) for the "high hazard" scenario P3 (return period between 20 and 50 years); 5,922,922 inhabitants (10%) for the "medium hazard" scenario P2 (return period between 100 to 200 years); 9,039,990 inhabitants (15.2%) for the "low hazard" scenario P1 (low probability of floods or extreme events).
Heritage assets at risk from flooding are 29,005 as for the "medium hazard" scenario P2, and 40,454 as for the "low hazard" scenario P1.

In 2015 there were 217 major landslides in Italy, which caused 12 victims and damages to the road and rail networks. These events occurred throughout almost the entire country, in particular in Sicily, province of Bolzano, Abruzzi, Emilia-Romagna and Veneto, and include the rapid flow along the stream Ru Secco in San Vito di Cadore (BL) on 08/04/2015, which caused 3 deaths, and the landslide in Calatabiano (ME) on 24/10/2015 triggered by intense rainfalls, which damaged the Fiumefreddo pipe, causing the interruption of the water supply in the city of Messina for several days.

Overall, the population at risk of landslides in Italy is equal to: 503,282 inhabitants living in "very high hazard" areas P4; 744,397 inhabitants living in "high hazard" areas P3; 1,587,177 inhabitants living in "medium hazard" areas P2; 2,132,393 inhabitants living in "moderate hazard" areas P1, and 680,197 inhabitants living in areas of attention.
Considering the 2 most hazardous classes (P3 and P4), the population at risk equals to 1,247,679 inhabitants, representing 2.1% of the total.
The Italian regions with the largest number of inhabitants living in landslide hazard areas classified as P3 and P4 are: Campania, Tuscany, Liguria and Emilia-Romagna.

As for the heritage assets, 34,651 are at risk from landslides, including 10,335 which are located in areas of high and very high hazard class.

Italy is one of the European countries most threatened by all types of natural hazards, including earthquakes, volcanic eruptions, landslides, and floods.
With regards to seismicity and capable faults, in Europe only Greece has a greater hazard than Italy. In Europe, 16% of the UNESCO heritage sites fall in high seismicity areas, while 62% of the sites are located in low seismicity places. For Italy, however, the scenario is reversed, with 28% of UNESCO sites in high seismicity areas and only 16% in low seismicity areas.
Furthermore, because of its geological and morphological features (75% of the territory is mountainous-hilly), Italy is the European country most affected by landslides. Of the almost 900,000 landslides surveyed in Europe, more than 600,000 occurred in Italy (EuroGeoSurveys survey, to be published).
Concerning flood hazard following heavy or exceptional rainfalls, Europe's most exposed areas are in Great Britain and nearby the main mountain ranges.
Therefore, central-northern Italy has the same high flood hazard found in the Alps and Pyrenees regions and in great river plains of France, Germany, Austria, Czech Republic, Slovakia, Hungary, and the Balkan area.
In addition, flood hazard in Italy is particularly high for its important cultural assets.

In Italy there are 6 volcanoes that, in case of eruption, pose a risk to the UNESCO cultural and natural heritage sites, on a total of 10 volcanoes in Europe considered dangerous for the UNESCO sites. In particular, at Italy's level, the buffer zones of the Vesuvius and Phlegraean Fields volcanoes reach UNESCO cultural sites, while the buffer zones of the other 4 volcanoes involve only UNESCO natural sites. At Europe's level, the buffer zone of the Methana volcano (Greece) involve the cultural site of Epidaurus, while the other 3 volcanoes reach only UNESCO natural sites.

CENTRAL ITALY EARTHQUAKE OF 24 AUGUST 2016

(UPDATED TO SEPTEMBER 2016)

A 6.0-magnitude earthquake struck central Italy on 24 Aug. 2016 at 03:36 a.m. The epicenter was few kilometers north of the town of Accumoli (RI), in the Lazio region, near the borders with the Marche, Umbria and Abruzzo regions. About an hour later a second earthquake of magnitude 5,4 occurred, few kilometers east of Norcia (PG). The two main earthquakes were followed by thousands of aftershocks, and the seismic sequence is still ongoing (Fig. 1).

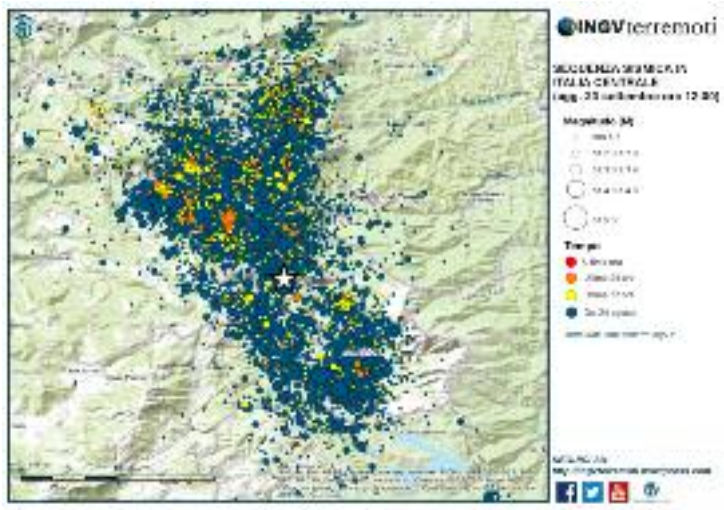


Figure 1: *Update at 23 Sept. 2016 of the seismic sequence started with the 6.0-magnitude earthquake of 24 Aug. 2016 Source: www.ingv.it*

The focal mechanisms of the two earthquakes show an almost pure normal motion from NE to SW, occurred along a tectonic structure (possibly segmented) showing Apenninic orientation (NW-SE). The 2016 seismic sequence is typical of the central Apennines and especially of the affected area, where earthquakes of even greater magnitude occurred in historical times. In particular, the two known most destructive historical precedents in the area are the Monti della Laga earthquake in 1639 (estimated magnitude 6.2), which reached a MCS intensity IX-X in Amatrice and VIII-IX in Accumoli, and the Valnerina earthquake in 1703 (estimated magnitude 6.9), which reached a MCS intensity X in Accumoli and IX in Amatrice.

The earthquake sequence of August-September 2016 caused severe damage and the death toll was very high due to the great vulnerability of buildings, mostly masonry structures lacking earthquake-resistant design criteria. In addition, the local building stone, consisting of sandstone, does not have good geotechnical properties because of

its high degradation and erodibility. The death toll was high also because the earthquake unfortunately occurred at the end of August, a busy summer period when the populations of the villages in the area are swelled by holidaymakers (mostly second home owners from bigger cities). The "site effects" also contributed to building damage, due to the local geological and geomorphological conditions of the built environment.

In the most affected villages, seismic micro-zoning studies are underway to precisely characterise from this point of view the ground on which those towns stand.
Immediately after the quake of August 24, several teams of geologists from Italian academic and research institutions performed surveys in the epicentral area to locate and map the earthquake environmental effects, the main of which were landslides and surface faulting. The gravitational effects resulting from ground shaking (20% fractures and 80% landslides) are distributed over an area of 3,000 km^2. More than 86% of the landslides occurred within 15 km from the epicentre. Most landslides consists of rock falls (72%), and of rotational and translational movements (28%). The collapses (with blocks up to 15 m3) mainly affected the road network, causing the temporary closure of important roads, but sometimes they also damaged homes (Figure 2). The co-seismic activation of pre-existing landslides amplified the seismic shaking impact in many villages. For example, in Pescara del Tronto and Accumoli, very steep slopes have collapsed even due to the collapse of retaining walls, consistently contributing to the damage.
Figure 3 shows the trace of the surface rupture observed for at least 4.5 kilometers along the western side of the Monte Vettore massif. This feature certainly has clear tectonic-structural origin, but also a gravitational component that is accentuated in the fractures observed along the slope south of the SP34 road to the Forca di Presta pass.

Figure 2: *Left: Collapse of blocks that interrupted the road between the Salaria and the village of Tufo (AP); Center: Block collapsed on a road sign at the entrance of Tufo; Right: Wall of a house in Capodacqua (AP) damaged by a block rolled from the overlying slope*
Source: ISPRA

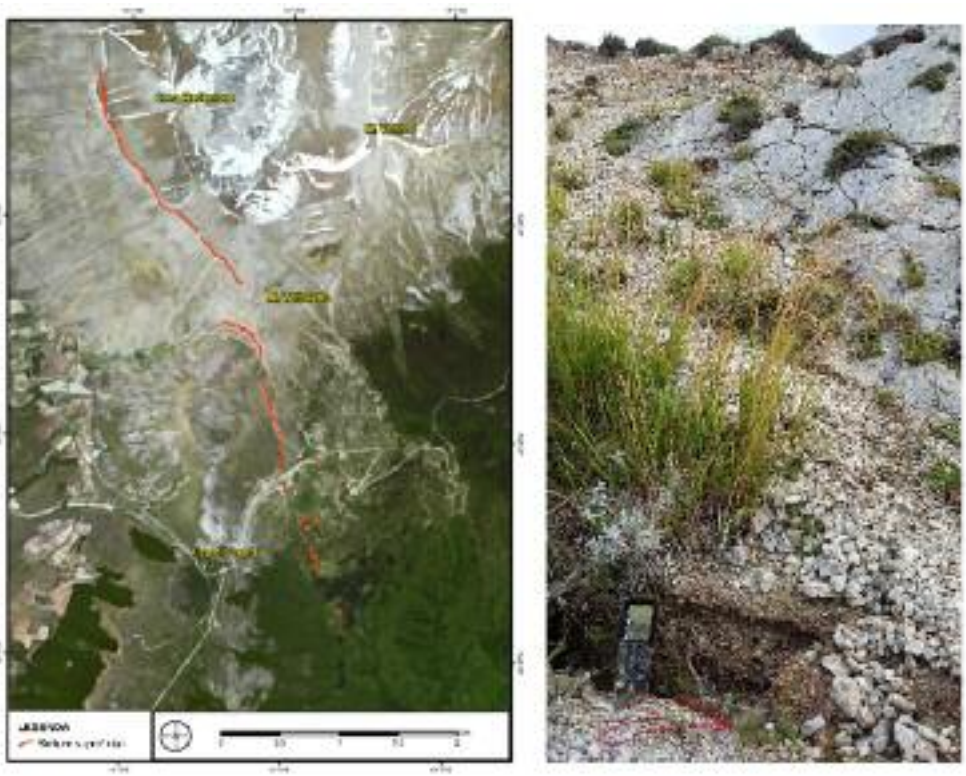


Figure 3: *Left: Trace of surface ruptures observed along the western slopes of the Vettore and Vettoretto; mounts. Right: surface rupture with a throw of about 15 cm towards SW. Source: ISPRA*

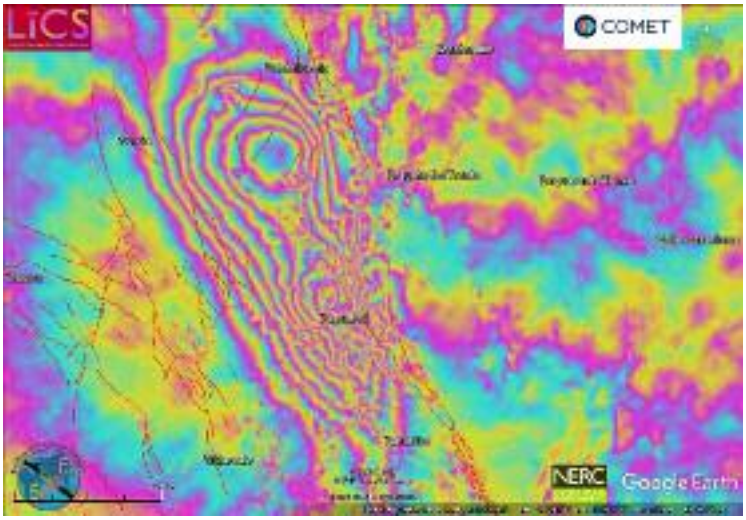


Figure 4: *Interferogram of Sentinel-1 images acquired from ascending orbits before and after the earthquakes of 24.08.2016 (comet.nerc.ac.uk/) with faults (red lines) taken from the ITHACA catalog of the active and capable faults. Source: sgi.isprambiente.it/GMV2/index.html*

Thanks to the analysis of satellite radar images through the InSAR technique (Interferometry Synthetic Aperture Radar), it was possible to define earth's surface deformation in the area affected by the earthquake. The results of Sentinel-1, COSMO-Sky-Med and ALOS-2 images analysis show a double-spoon deformation (due to the movements associated with the two main quakes), with a maximum ground subsidence of approximately 20 cm in the Accumoli area. Furthermore, the horizontal deformation along the direction E-W, which affected an even greater area than that affected by vertical movements, had a maximum displacement of 16 cm towards West (Figures 4 and 5).

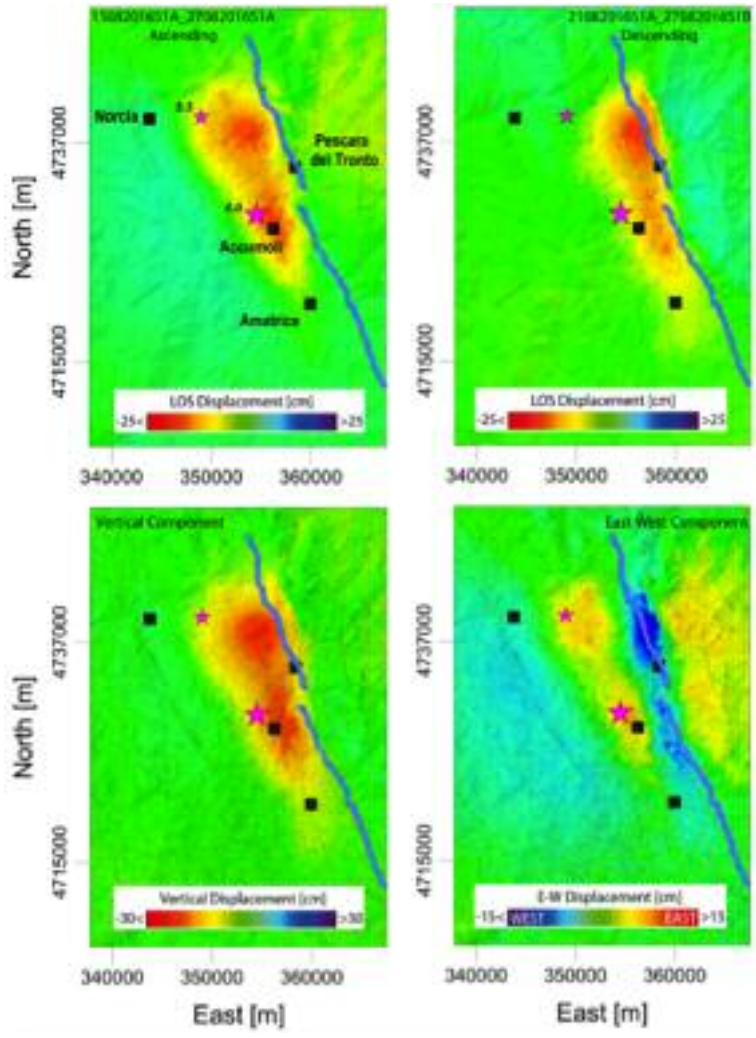


Figure 5*: Above: Maps of coseismic deformation (along the radar Line of Sight) obtained from ascending and descending orbits (IREA- CNR and INGV), using the Differential SAR interferometry technique, starting from Sentinel-1A and 1B radar data acquired on 15.08.2016 and 21.08.2016 (pre-event images) and on 27.08.2016 (post-event images); Below: Maps of the vertical and east-west displacement of ground, obtained by jointly exploiting the ascending (South-North) and descending (North-South) orbits. The blue line represents the ground trace of the fault. Source: www.irea.cnr.it/index.php?option=com_k2&view=item&id=755:terremoto-di-amatrice*

10. CHEMICAL AGENTS

Since 1930 the global production of chemical substances has increased from 1 million of tonnes to several hundreds of millions of tonnes. EU is the world's second largest producer after China and about 100,000 chemical substances are estimated on the European market. Italy is the third producer after Germany and France in Europe, and the tenth in the world. The chemical enterprises operating in Italy are 2,740 and they employ about 109,000 workers, but the use of chemical products concerns all productive sectors.

The chemical agents are potentially dangerous substances for man and the environment. Their use is spread in all productive sectors and are incorporated in most objects of common use. Their use is essential in daily life contributing to economic wellbeing also in terms of employment.
It is not possible to give a simple response to risk issue, as it varies with the substance, the time and the exposure modality. As reported in the EU White Paper "Strategy for a future Chemicals policy", the incidence of diseases, even very serious ones and allergies, has significantly increased in the last decades. A not yet adequate knowledge on the consequences for human health and the environment contributes to arouse worries. The 7th EAP – The new general Union Environment Action Programme to 2020, "Live well, within the limits of our planet" has set the objective to produce and use the chemical substances to limit possible harmful effects.

The European Union has updated legislation on chemical substances and has issued REACH Regulation (Registration, Evaluation, Authorization and Restriction of Chemicals), establishing an integrated system of registration, assessment, authorization and restriction of chemical substances. The aim is to improve the security level in the management of the substances, maintaining competitiveness and stimulating innovation in the chemical industry. Simultaneously CLP Regulation has been issued with the aim of harmonizing and making information on chemical products risk more effective. The companies which produce, import or use chemical substances are first responsible for security in the management.

The European Agency for chemical substances (ECHA) and the qualified authorities for the Member States carry out a control activity on the accomplishments by enterprises and can intervene with specific measures in case the risk of substances is not adequately controlled.

The main objective of REACH is to improve knowledge of hazards and risks originating from chemical products already existing (those produced on the market before 1981) and new (after September 1981) and, at the same time, to maintain and improve competitiveness and innovative capability of the European chemical industry.

With REACH Regulation have been started evaluations of 222 priority substances. The process of restrictions has been made more efficient compared to the previous legislation. As a matter of

fact before REACH, were adopted averagely two restrictions per year; now the average has increased of 50%. At the end of 2015 the number of restriction proposals for substances revealing unacceptable risks in specific conditions of use was equal to 30. Finally, with the authorization process have been identified about 180 substances "of very high concern" channeled in a substitution path with more safe alternatives. CLP Regulation, with the adoption of the United Nations' Globally Harmonised System of Classification and Labelling of Chemicals (GHS), facilitated communication on hazardous substances around the world. The classification process however has been made more efficient, concentrating on more significant types of danger. Since 2009 have been set up about 200 harmonized classifications. In addition to the above described regulations which can be generally applied to chemical substances, there are also specific sectoral regulations as in the case of pesticides, subject to an aimed rule as dangerous by definition. The monitoring of pesticides in waters is included in the Directive on sustainable use of pesticides (Directive 2009/128/EC), with the aim of identifying possible adverse effects which have not been taken into account in the authorisation phase. The produced information gives also the possibility to support decision processes aimed at limiting the risks for the environment. In more than ten years of monitoring activities an increase of territorial covering and of the representativeness of surveys has undoubtedly occurred. The levels of contamination referred to environmental limits as defined by the legislation in force, prove a state of contamination already pointed out in the previous years, with a considerable exceedance of limits especially in superficial waters. In superficial waters, 274 monitoring points (21.3% of the total) have concentrations exceeding the environmental quality limits. The substances that more frequently caused the exceedance are: gliphosate and its metabolite AMPA (aminomethylphosphonic acid), metolachlor, tricyclazole, oxadiazon, terbuthylazine and its major metabolite, desetyl-terbuthylazine. The analysis of the evolution of contamination shows a gradual increase of the territorial diffusion of contamination during the period of observation from 2003 to 2014, with a direct association to the extension of the monitoring network and to the number of the substances searched. However considerable differences persist among regions and with regard to water status the whole national context is not adequately represented. Furthermore, it is important to consider that the contamination phenomenon is continuously evolving, mainly because of

the introduction of new substances in the market to which monitoring plans hardly conform to. Therefore it is possible to affirm that we are still in a temporary phase in which the entity and degree of pesticide contamination are not sufficiently known.

New EU Regulation has laid the groundwork for a more safe and efficient management of chemical substances. Ten years which is the period of time since REACH was issued are not a enough to fully estimate the long-term effects. However a first analysis is absolutely positive. With REACH have been started the evaluations of priority substances and have been adopted restrictions for substances of unacceptable risks in certain conditions of use. Finally with the authorisation process, the "very high concern" substances are channeled in a substitution path with more safe alternatives.

11. ALLERGENIC POLLENS INDEX

A great variability in the allergenic pollens index is observed at local level.

The allergenic pollens index is obtained from the annual sum of daily pollen concentrations for the main and most common allergenic families in Italy. It allows to evaluate the allergenic pollen load in a specific area and to compare it with that of other places, as well as to study its variability in space and time.

These data contribute to the evaluation of health risk associated with allergies and allow for the initial assessment of any specific mitigation measures possibly taken by competent authorities.

Some variability, potentially very strong locally, was confirmed by comparing data from 2015 with those of previous years. The variability is mainly attributable to weather conditions recorded during the year, that can favour or reduce the presence of airborne pollens. This is especially true when the families involved are Cupressaceae/Taxaceae, Urticaceae and Graminaceae, which are responsible for most of the monitored pollens. Even in presence of this high seasonal variability, the allergenic pollen index confirms that the areas with the greatest/lowest presence of airborne pollens are basically always the same.

The Cupressaceae-Taxaceae family, in particular, is present throughout the country and especially in central Italy. The use of cypress trees is very widespread in urban green areas, for their great ornamental and functional features. However, they produce large amounts of highly allergenic pollen and their use should be therefore strongly reduced in favour of species with the same beauty and functionality features, but not as troublesome to human health.

Aerobiological monitoring is carried out in most European countries, and the monitoring networks of 35 countries adhere to the EAN - European Aeroallergen Network (https://polleninfo.org).

This distribution led to the need to standardize this activity, which in 2015 resulted in the Technical Document CEN/TS 16868:2015, defining the reference method at European level for performing aerobiological monitoring. Regarding airborne pollens in Italy, the peculiarity is the high biodiversity with the presence of numerous plant species with allergenic pollens blooming in very different periods. This implies a greater complexity in the monitoring and a commitment extending for most of the calendar year.

12. ENVIRONMENTAL ASSESSMENTS, AUTHORISATIONS AND CERTIFICATIONS

Towards a sustainable development with EIA, SEA and IEA. EMAS and EU Ecolabel are constantly growing.

EIA (the Environmental Impact Assessment), SEA (the Strategic Environmental Assessment) and IEA (the Integrated Environmental Authorisation) are all mandatory tools which discipline several aspects related to sustainability of human activities affecting the environment.

Among the works subject to national EIA, procedures end positively in about 84% of cases. In 2015 have been issued 51 EIA decrees of which 48 positive with prescriptions and 3 negative. Over the years, the type of projects subject to EIA, under the government jurisdiction have undergone some variations according to the changes of European directives and Italian regulations. This more articulated normative system and the evolution of the procedure itself, allowed realization conditions give rise to always more complicated regulatory frameworks.
In fact, the average number of prescriptions contained in the decrees has increased compared to the number of decrees revealing a growing trend. Furthermore the percentage of provisions in which the Agency System (ISPRA/ARPA/APPA) is involved, on the total of given prescriptions is equal to 20%, with a considerably growing trend from 2010 to 2015, reflecting the consolidation of the role played by the System in the assessment and environmental monitoring actions.
In the decrees issued in 2015 there is a total of 2,225 provisions of which 1,152 (equal to 52%) represent the highest value of prescriptions attributed to the Agency System since 1995.

The Strategic Environmental Assessment (SEA) starts with the elaboration of plans/programmes and continues parallel to their complete development to assure the integration of the environmental and sustainable aspects in the planning/programming. In 2014 (19 regions out of 20) stands out clearly that the largest number of SEAs concluded in the different regions concerns inter-municipal/municipal urban plans; in particular the SEAs of municipal plans represent 81% of total SEAs. Data related to screenings show that most of concluded checks in 2014 are concentrated in Lombardy (23%), Emilia-Romagna (18%), Tuscany (12%) and Veneto (9%), which together cover 62% of the total of screenings.
The 94% of the screenings carried out are of exclusion from VAS, of which, about 40% subject to the observance of certain prescriptions.
With respect to SEAs, at national level the number of procedures over the period 01/04/2015 – 30/04/2016, equal to 25, is mostly determined by the preparation of Flood Risk Management Plans of the river basin districts (7/25) according to Directive 2007/60/CE and by the update of the river basin Management Plans (5/25) according to the Water Framework Directive 2000/60.
The procedure for IEA issue falls within

the actions aimed at integrated pollution prevention and reduction.
In particular, in 2015, IEAs granted to refineries mostly contributed to SOx and CO emission reduction respectively with 6,750 and 2,370 tonnes/year and equal to 73% and to 26%, while IEAs of chemical plants contributed to the abatement of NOx and SOx respectively with 2,576 and 801 tones/year equal to 73% and to 23%. With regard to PTS, both the refineries and the chemical plants contributed slightly to such reduction respectively with 142 and 103 tonnes/year equal to 2% and 3%. Chemical plants contributed also slightly to CO emission reduction with 43 tones/year (1%). The emission reduction of micropollutants results to be null for thermoelectric power plants.

In 2015, there is evidence of a total abatement respectively of 7,551 tonnes/year of SOx equal to 59%, of 2,576 tonnes/year of NOx equal to 20%, of 2,413 tonnes/year of CO equal to 19% and of 245 tonnes/year of Powders equal to 2%. With regard to VOC, in the period 2013-2015, IEAs of refineries and of thermoelectric power plants have mainly contributed to VOC reduction respectively with 2.910 tonnes/year equal to 98% and 1,298 tonnes/year equal to 97%, while IEAs of chemical plants have contributed slightly to such reduction with 19 tonnes/year equal to 56%.

The managers of operational plants with IEA issued by the Ministry of the Environment Land and Sea (MATTM) have the obligation of self controlling the plant included the monitoring of emissions and periodical dissemination of results to control agencies. In 2013 the number of plants subject to surveillance is nearly doubled compared with 2010, ranging from 74 to 146, while in 2014 varied of some tens. That is to indicate that the authorisation process of existing plants has concluded and that the request of authorisations for new plants is almost inexistent. The plants controlled with in situ inspection have always increased over the years and for 2014, represent about the 60% of the total. The control activity carried out in 2015 led to the identification of a number of plants with no-compliance to IEA almost unchanged in absolute terms respect to 2014, but higher in percentage terms; in fact, in 2015 have been observed no-compliance falling back whether under the penalty administrative system or under the penal one in one plant out of three.

In the EU Environmental Legislation, some elements are emphasized in a different way compared to the Italian Legislation. In the French environmental Code (2013), for example, the content of EIA must be scaled to environmental awareness of the areas potentially involved by the project and to the relevance and the nature of the works themselves. The Spanish Environmental Impact Assessment Legislation (2013) establishes for EIA and SEA a similar procedural system, with a unified

terminology, differentiating for both an ordinary procedure and a simplified procedure. The proposer applies the project, the impact study and the result of consultations with public authorities and the interested audience.
The SEA Directive (2001/42/EC), entered into force on 21 July 2001, considers that the European Commission should prepare a report on the application and effectiveness of the Directive every seven years. The first report to the Council, the European Parliament, the European economic and social Committee and to the Committee of the Regions, COM 469, dates back to 2009. As stated in the conclusions of the study (27 Member States) with regard to the considered period, in most cases the States reported of EIA experiences as still limited. The Commission is preparing the second Report for the period 2007-2014, to be presented by 2016.
From EC data with regard to the situation reported at the end of 2012 comes to light that at EU level given a total number of a bit less of 50,000 installments subject to IPPC regulation more than 6,000 have been registered in Italy. Only Germany and France have a greater number of installments, while Spain and United kingdom have a number comparable to Italy. Generally with regard to the other main categories of activity is observed a grater incidence of energy and chemical plants in EU while of metal and mineral industry in Italy. Considering the important variety of the productive fabric and the applicative approaches adopted among EU Members would be less meaningful to refer to a "european average".

The number of companies and enterprises endorsing EMAS and EU Ecolabel community regulations (voluntary certifications) is increasing.

EMAS Scheme being applicable to every type of organisation (company or Public Administration) results to be particularly versatile, it can contribute to improve the resource management and to empower company towards the environment.

In 2015 have been issued 1,745 EMAS certificates in Italy and the Region with the greatest number of registrations (191) is Lombardy. The most active organisations concerning registration are those operating in the waste and material recover sector (263) which further increased in the last year, and Public Administrations (186) which decreased instead.

In Europe in November 2015 have been counted 3,928 organisations registered. Germany ranks first with 1,200 registrations active, followed by Italy (1,015) and Spain (943).

From an analysis of the type of organisation registered emerges that the most productive sectors are waste (468), Public Administrations (379) and energy (266). The distribution in terms of dimension highlights a relevance of micro/small enterprises (48%) followed

by medium (30%) and large (22%).

EU Ecolabel trade addresses to 10-20% of the best product/services in environmental terms present on the european market, taking into account also the performance aspect of products beyond the ecological aspects. At present 35 groups of EU Ecolabel products/services are available. Eu Ecolabel licenses in force in 2015 are 365, on a total of 748 products/services certified.

At European level, in March 2016, EU Ecolabel licenses in force are 1,875, on a total of 36,403 products/services certified. The greatest number of licenses has been attributed to France (26% - 486 licenses in total), followed by Italy (18% - 337 licenses) and Germany (12% - 231 licenses). However from an analysis of the number of certified products and services, Italy holds the record with 16,815 products-services, followed by France (3,745) and Spain (3,165). The product group ranking the highest number of licenses is Tourist Accommodation Service (654 licenses), followed by All-Purpose Cleaners and Sanitary Cleaners (276) and Tissue Paper (133). However, with regard to the subdivision of the number of products and services, at the first place rank Hard Coverings (12,117) and to follow Tissue Paper (6,964) and Copying and Graphic Paper (4,194).

13. ENVIRONMENTAL KNOWLEDGE

New tools for environmental information.

Environmental information is of strategic importance not only for policy makers, but also for all stakeholders including citizens; on-line databases and publications are now indispensable tools to spread environmental information and awareness.

ISPRA and the ARPAs/APPAs contribute to the need for environmental knowledge, in particular through their websites and reporting products (e.g. thematic and cross-thematic reports, guidelines, etc.) Based on a survey carried out by ISPRA, in the period 2013-2015 there was a general improvement of the availability of environmental information and communication tools offered by the websites of both the National System for Environmental Protection (ISPRA and ARPAs/APPAs) and some of the main Italian research institutions performing activities in the environment field: 23 sites out of 29 have in fact registered a growing or constant score.
The evaluation of the information availability took into account the main types of services and sections (30) relating to environmental information and communication, present in the websites of the National System for Environmental Protection, of the Ministry of Environment and of some research institutions.

The presence/absence of each identified type of services and sections was checked within the website; in case of presence, it was always attributed a score equal to 1.

In particular, the "medium" score (20.6) achieved by the research institutions' websites was higher than the one obtained by the environment agencies (19.1) and also than the overall average score (19.6).
In 2015 only 6 tools over 30 , showed an increasing trend (Environmental themes, Online databases and forms, Online magazines, Mobile version of websites and Toll-free numbers), compared to 14 in 2014. Some tools, not necessarily in a 'ready for adoption' stage, maintained a constant presence: among them there are Media and Social networks (66%), RSS (55%) and Newsletters (52%). Others tools, instead, suffered a setback: among them there are Regulations and bulletins (-7%), Indicators (-28%), Press Area contents (-6%), Youtube (-4%), while there was an increase in the presence of Online databases and magazines (+ 7%), Environmental themes (+ 4%) and of Mobile version of websites (+ 21%).
This last element underlines the need to take increasingly into account digital users who access via smartphones.

The comparison between communication and information tools found in the ARPAs/APPAs' websites and those found in the websites of research institutions, shows a difference between the two categories due to their nature, aims and available means.

Notably, research institutions mostly use innovative tools such as Website mobile versions, Youtube channels, Apps. Multimedia products, for example, are found in 100% of the analysed research institutions websites (compared to 52% of ARPAs/APPAs websites), while Social networks are used by 88% of research institutions websites, against 57% of environmental agencies. These latter, however, show a greater strength in the data dissemination with a substantial availability of Bulletins and Databases, found in 100% of the environmental agencies websites, versus 25% and 88% respectively in research institutions websites. Indicators are also more present in ARPAs/APPAs websites (86%) than in research institutions websites (25%). Actually, Indicators are the tools through which environmental agencies make publicly available their environmental monitoring and control activities.

Some tools are used uniformly by both categories of institutions, either because mandatorily present in any public institution website (such as E-mail or Certified e-mail) or for a common mission to disseminate environmental information (Publications, News, Themes).

As for environmental information products, for years 2014 and 2015 Newsletter is the most used tool by ARPAs/APPAs in order to achieve a more extensive dissemination of information about the environment and their institutional activities.
The reporting tool most widely used is the "thematic report", with an average total number of publications of one hundred. The thematic areas of main interest are "air" and "water".

BIODIVERSITY: IMPORTANCE, THREATS AND CONSERVATION

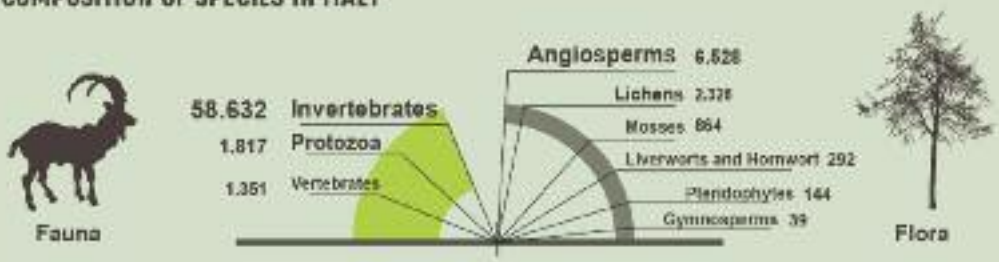
WHAT IS BIODIVERSITY

Biodiversity can be synthetically defined as the variety of living forms that are found in a given environment. Biodiversity is generally studied at three different levels, which correspond to the three organization levels of the living world: the genetic, the species, and the ecosystem levels.

IMPORTANCE OF BIODIVERSITY

Biodiversity has a great value in itself, comparable with the great value of cultural assets and works of human genius. Besides this fact, which already fully justifies measures for its protection, biodiversity is also important as a source of goods, resources and services (the so-called ecosystem services) essential for mankind survival and with a key role in national economies. Among the ecosystem services, it's worth mentioning: the supply of food, fuels, building materials; the purification of air and water; the function of stabilizing and regulating the climate; the positive effects on flooding, drought, extreme temperature jumps and wind force; the essential contribution to the pollination of plants; the great strategic importance as a reservoir of genetic resources for food and pharmaceutical purposes; cultural and aesthetic benefits and many more.

COMPOSITION OF SPECIES IN ITALY



some species are:

Critical endangered (CR)

Marsican brown bear
Ursus arctos marsicanus

Endangered (EN)

Red coral
Corallium rubrum

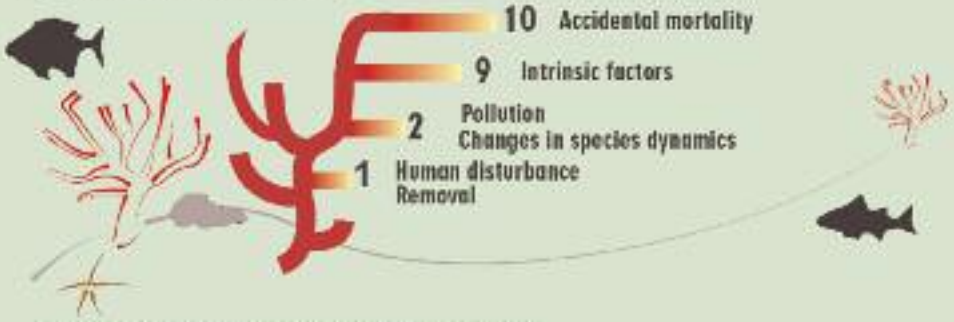
Vulnerable (VU)

Morimus funereus
Morimus funereus

MAIN SOURCES OF THREAT

NUMBER OF SPECIES INTRODUCED

MAIN THREATS TO CORALS



ACTIONS AIMED AT BIODIVERSITY PROTECTION

Both indirect and direct measures are adopted at national and international level to contrast the loss of biodiversity. Actions aimed at reducing sources of pressure, for instance through the control of pollutant emissions or the protection of water quality, belong to the first category. Measures aimed at the direct conservation of species and ecosystems, such as the creation of protected areas and accession to international conventions and agreements, belong to the second type.

Italy is party to numerous international conventions and agreements

Habitat Directive
Birds Directive

Convention on Biological Diversity

Natura 2000 Network

(data released in January 2014)

1.792
SCI
Sites of Community Importance

522
SAC
Special Areas of Conservation

610
SPA
Special Protection Areas

CLIMATE CHANGES

ABOUT CLIMATE CHANGE

Among global emergences Climate Changes are a priority which has become a relevant item on political agendas of national and international institutions. Climate Changes are broadly recognized as one of the most important challenges to face for mankind. Several studies highlight how commitments for emission reduction even if entirely implemented are no longer sufficient to comply with the global warming threshold of 2°C and will be even less sufficient to achieve the goal of 1.5°C provided for Paris Agreement. Climate Changes are the result of interactions of natural and anthropic complex systems. Even without ignoring the effects of natural phenomena, such as the variability of the intensity of solar radiation, the majority of scientific community is convinced that "most of warming observed in the last fifty years is attributable to human activities". The fourth Assessment Report of the Intergovernmental panel on Climate Change (IPCC) has reaffirmed that "warming of the climate system is unequivocal" and with "a very high confidence level", indicating human activities as the cause of such warming.

CAUSES OF CLIMATE CHANGES

Fluororate gases

They cause a strong greenhouse effect. The concentration of these gases in the atmosphere is low and EU Legislation considers a gradual reduction of them.

Greenhouse gases

Deforestation

Trees help to regulate climate by taking up carbon dioxide CO_2 from the atmosphere. By cutting them down, this process goes missing and CO_2 contained in wood is released in the air, thus increasing greenhouse effect.

Energy consumption from fossil sources

Combustion of carbon, oil and gas produces carbon dioxide and nitrogen oxide.

Nitrogenous fertilisers

They produce nitrogen oxide emissions.

Livestock productivity

Bovines and Sheep produce high levels of methane during the digestion process.

4,6%

In Italy, in 2014, greenhouse gas emissions, expressed in CO_2 eq decreased

522 419

CO_2 eq millions of tonnes

Between 1990 and 2014, all greenhouse gas emissions decreased thanks to CO_2 prevalent reduction

81,9%

CO_2 contribution to total emissions in 2014

Tropical nights

Year	
2015	+25
2003	+44
1976	-10
1961	-1

The word tropical nights is used to indicate those nights in which minimum temperature doesn't exceeds 20 °C.

Average temperature

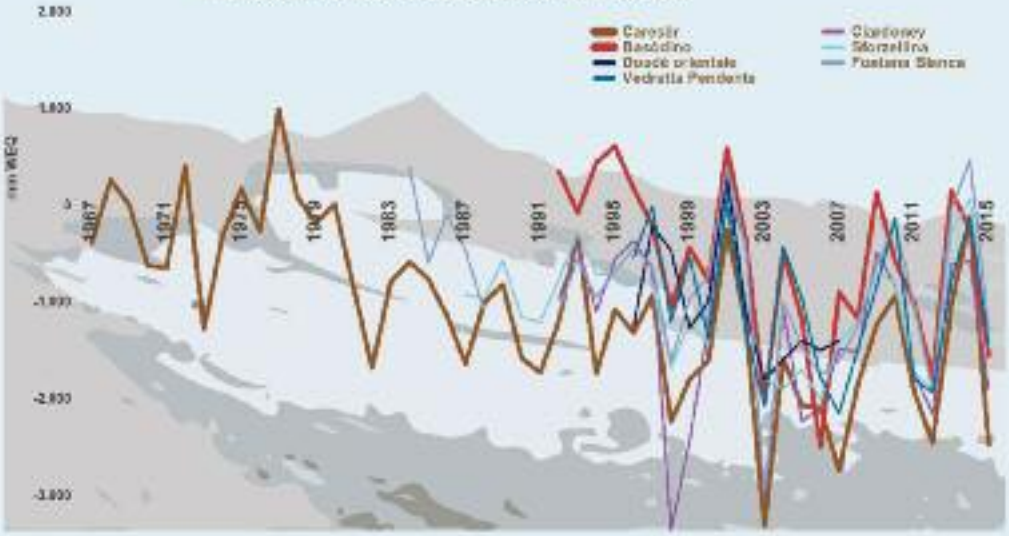
Italy

+1,58 °C

Global

+1,23 °C

Net mass balance of some Italian glaciers



MAIN RESPONSE MEASURES

Mitigation

Reduction of Greenhouse gas emissions.

An example of mitigation :

Decoupling

GDP/ Emission

In 2014 greenhouse gas emissions in EU-28 decreased of 24% compared to 1990, with a GDP increase of about 48% thanks to the growth of the renewable energies quota.

Adaptation

Minimize possible consequences of climate changes.

An example of adaptation:

Italy approved the National Strategy for Adaptation to Climate Changes (SNAC) .

SOIL: IMPORTANCE, THREATS AND PROTECTION

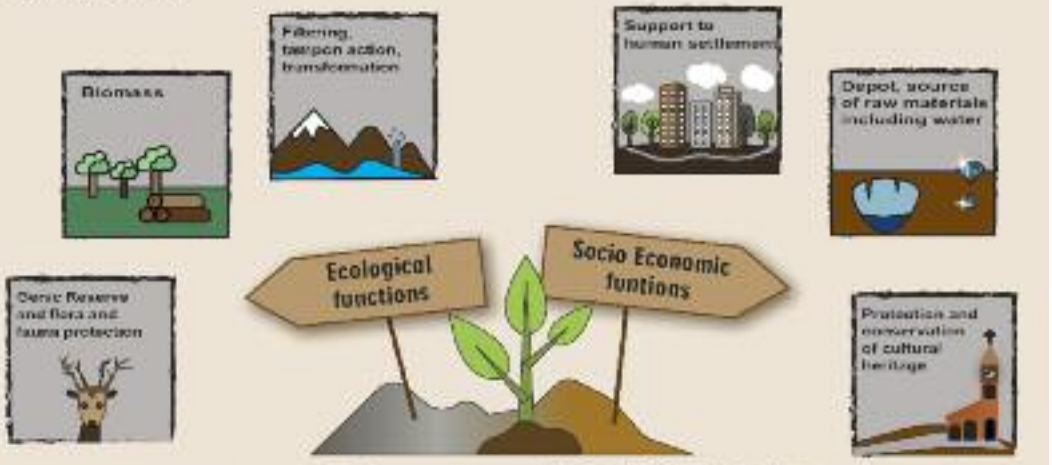
ABOUT SOIL

With the term "Soil" we mean the thin porous and biologically active medium which represents " the top layer of the earth's crust, formed by mineral particles, organic matter, water, air and other living organisms. It represents the interface between earth, air and water and hosts most of the biosphere".

IMPORTANCE OF SOIL

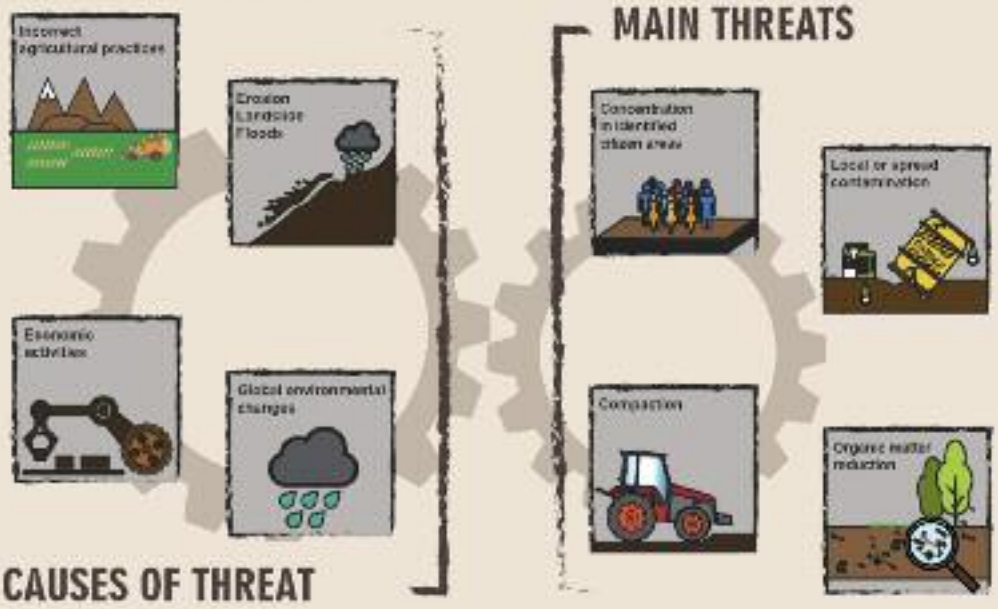
Soil not only represents the physical basis on which to develop human activities, but it also performs a series of ecosystem supply, control and support services which bring it at the core of environmental balances , from adaptation and mitigation of climate changes to food security and human health. Soil is a non-renewable resource : therefore each degradation process nearly always represents an irreversible loss with consequences at global level.

SOIL FUNCTIONS



MAIN THREATS

CAUSES OF THREAT



SOME IMPORTANT DATA

Water Erosion

It causes a very Soil loss equal to

8,5 t/ha*year

european average is of 2,46 t/ha*year

Artificial covering of soil

7%

European average is of 4.1%

Sensitivity to desertification

10% very vulnerable

42,9% medium vulnerability

26% low vulnerability

ACTIONS AIMED AT SOIL PROTECTION

CAP

Common agricultural policy

The priority objectives established by the European Union and introduced by rules regulating land conservation in good agricultural and environmental conditions (BCAA) are four:

- to protect soil from erosion;
- to maintain the level of soil organic matter ;
- to protect the soil structure;
- to maintain a minimum level of ecosystem and to keep habitat conservation.

In Italy on May 12 2016, the draft law on control of built soil consumption has been approved. In particular it allows soil consumption exclusively when there are non-consistent alternatives for reusing already urbanized areas and in the regeneration of the same, recognizing the objectives established by the European Union about the goal of the net soil consumption equal to zero to achieve by 2050

GEOLOGIC HAZARD

WHAT IS GEOLOGIC HAZARD

Natural hazard is defined as the probability of occurrence, within a specific period of time in a given area, of a potentially damaging natural phenomenon (UNDRO 1979). Therefore geologic hazard is the probability of occurrence of geological phenomena such as earthquakes, tsunamis, volcanic eruptions, landslides, floods, sinkholes, subsidence, etc.

Because of its geodynamical, geological and geomorphological features, Italy is subject to many hazardous geological events, both endogenous (earthquakes, volcanic eruptions) and exogenous (landslides and floods). Earthquakes are the most damaging events, both for loss of lives and in economic terms. Low magnitude earthquakes (M ≤ 3-3,5) occur daily in many areas of the country without causing any damage, while events exceeding the damage threshold occurred approx. every 4 years in the period 1997-2016 (every 3 years considering the period covering 2009-2016). Seismic hazard in Italy is high, due to the frequency of occurrence of destructive earthquakes and because in some areas of Apennines, Calabria and eastern Sicily, earthquakes with magnitude up to 7 and MCS intensity up to XI (highly destructive) may occur.

HAZARDOUS GEOLOGICAL EVENTS

Volcanoes

The main sources of hazard linked to volcanic activity are: magmatic fragments and ash, lava flows, pyroclastic flows, burning clouds, lahars flowing down from a volcano, gas emissions.

Landslides and floods

Over 70% of Italy's landscape is mountainous or hilly. This feature, together with periodic, severe weather events and with an increasingly invasive human impact, puts large areas of the country at risk of flooding and landslides (hydraulic-geological hazard.

Earthquakes

Earthquakes are the most damaging events, both for loss of lives and in economic terms. Eastern Alps, Apennines, Calabria and Sicily have a high hazard level.

The use of not always appropriate agro-pastoral practices, and at the same time the abandonment of hydraulic-forestry maintenance techniques, especially in mountainous-hilly areas, have contributed to increase geological hazards, along with the increasing number of forest fires.

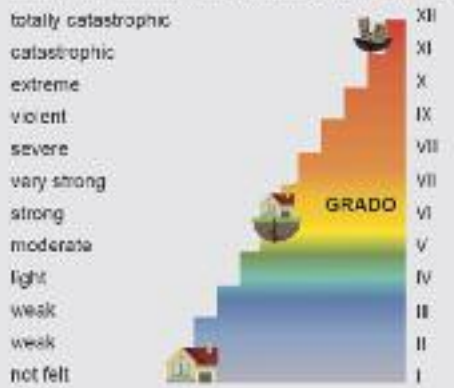
1997-2016

Damaging earthquakes occurred at an average of one every four years.

1688-1706

During this period, 14 strong earthquakes occurred almost yearly. Similar sequences may repeat.

Mercalli-Cancani-Sieberg intensity scale (MCS)



THE MOST DESTRUCTIVE EARTHQUAKES IN HISTORICAL TIMES

Verona area, 3 Jan. 1117 (IX MCS)

Messina (Sicily) and Calabria, 28 Dec. 1908 (XI MCS)

Alta Irpinia, 23 luglio 1930 (X MCS)

Friuli, 6 May and 11 and 15 Sept. 1976 (X MCS)

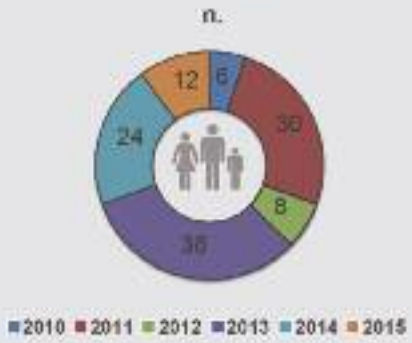
Val di Noto (Sicily), 11 Jan. 1693 (XI MCS)

Fucino (Abruzzi), 13 Jan. 1915 (XI MCS)

Belice (Sicily), 15 Jan. 1968 (X MCS)

Irpinia (Campania), 23 Nov. 1980 (X MCS)

VICTIMS OF MAJOR FLOODS IN ITALY



ESTIMATES OF TOTAL DAMAGE OF MAJOR FLOODS COMPARED WITH GDP

MITIGATION MEASURES FOR GEOLOGICAL HAZARDS

An indispensable protection tool against geological hazards is knowledge. Knowing how geological phenomena have occurred in the past enable us to estimate possible future scenarios. Much of the knowledge on Italy's seismicity is contained in the national Seismic Hazard Map and in Zones defined in the territorial Seismic Classification.

As for the hydrogeological instability, representing the second main geologic hazard in Italy in terms of damage and loss of life, the mitigation measures put in place are both of structural and non-structural type.

Seismic Microzonation (SM)

Microzonation is the process of estimating site-specific response based on some geological, lithological, geomorphological, tectonic, geotechnical and geophysical characteristics of the sites.

Centro MS

In 2015 the Center for Seismic Microzonation and its application (Centro MS) was founded.

Prevention measures for hydrogeological instability

Since 1999 both Italy's Government and Ministry of the Environment have financed nearly 500 structural interventions for soil protection, to prevent damage from landslides, floods and avalanches.

Mission Office for hydrogeological instability and the development of water infrastructures

INDICATOR	DPSIR	TEMPORAL COVERAGE	TREND
1. BIODIVERSITY			
- Terrestrial protected areas - Marine protected areas - Natura 2000 Network - Wetlands of International Importance	R	1922-2010 2003, 2012 2003-January 2016 1976-2013	
- Consistency of fishing activities	D/P	1996-2014	
- Consistency and level of threat of animal species - Consistency and level of threat of plant species - Dissemination of non-native animal and plant species	S/I S/I P	2005, 2009, 2012, 2013, 2014, 2015 1992, 2002, 2005, 2008, 2013, 2014, 2015 1900-2014	
2. CLIMATE: STATE AND CHANGES			
- Total greenhouse gas emissions and emissions from energy processes	P	1990-2014	
- Average temperature - Tropical nights - Heat waves	S/I S/I S/I	1961-2015 1961-2015 1961-2015	
3. AIR POLLUTION			
- Emissions of pariculate matter (PM10): trends and breakdown by sector	P	1990, 1995, 2000, 2005-2014	
- Atmospheric concentration of PM10 - Atmospheric concentration of PM2.5 - Atmospheric concentration of O_3 - Atmospheric concentration of NO_2	S S S S	2014 2014 2014 2014	

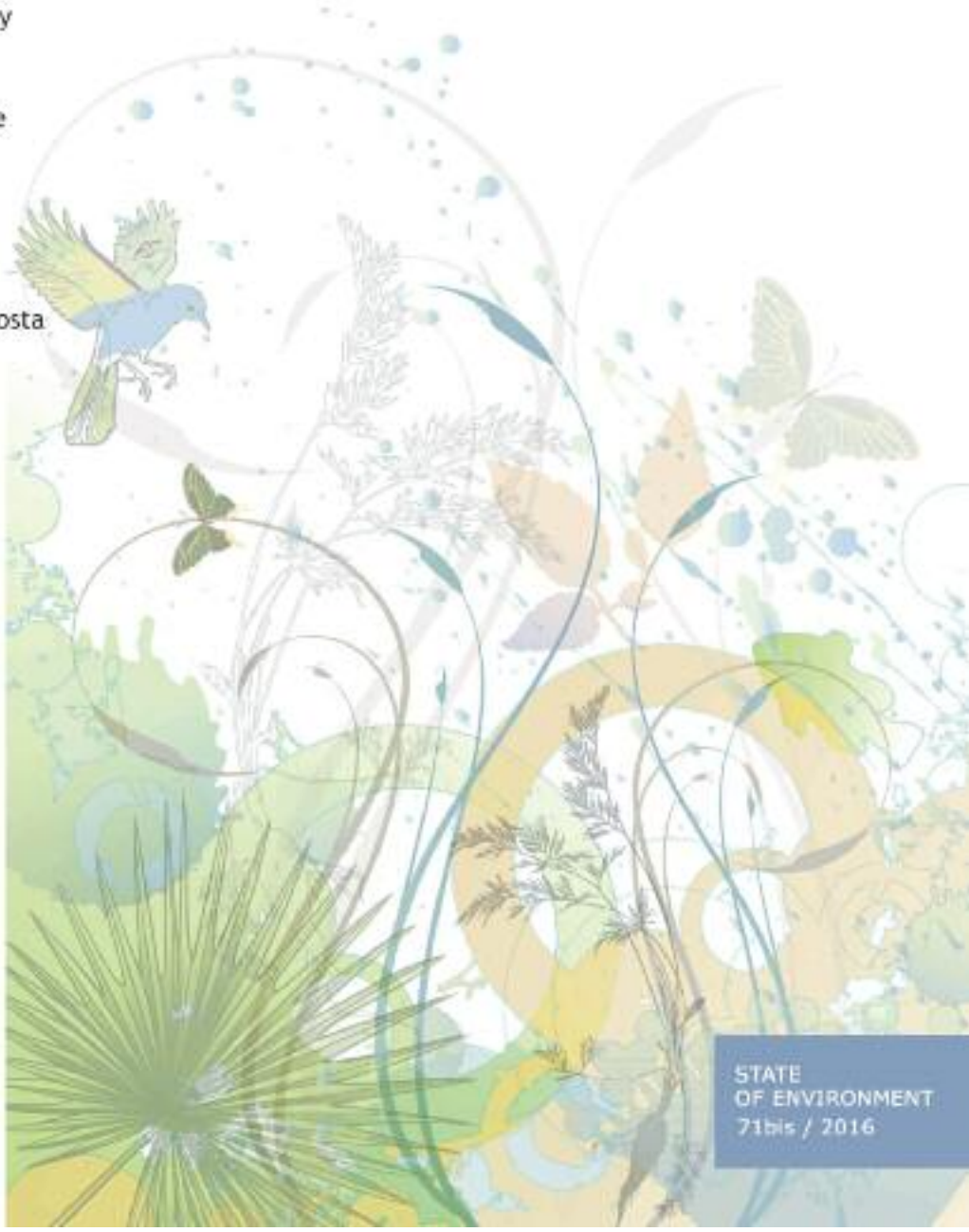
INDICATOR	DPSIR	TEMPORAL COVERAGE	TREND
4. INLAND WATER QUALITY			
- Purifiers: conformity of urban waste water sewage system	R	2014	
- Percentage of purified waste water	R	2014	
- Quality Index of the ecological status of surface water	S	2010-2015	-
- Quality Index of the chemical status of surface water	S	2010-2015	
- Quality Index of the chemical status of groundwater (SCAS)	S	2010-2015	
- Quantitative status index of groundwater (SQUAS)	S	2010-2015	
5. SEA AND COASTAL ENVIRONMENT			
- Artificialised coast with maritime and coastal defence works	P/S/R	2000-2007	
- Coastal dynamics	P/S/I	1950-1999, 2000-2007	
- Protected coast	P/S/R	2000-2007	
- Concentration of Ostreopsis ovata	S/I	2015	
- Bathing water classification	S	2011-2014	-
- Ecological status of coastal marine waters	S	2010-2016	
- Ecological status of transitional waters	S	2010-2016	
- Chemical status of coastal-marine waters	S	2010-2016	
- Chemical status of Transitional waters	S	2010-2016	
- Eutrophication	S	2001-2009	
- Sea storms	S	2002-2015	

INDICATORE	DPSIR	TEMPORAL COVERAGE	TREND
6. SOIL			
- Water erosion	S	2014 (SIAS project 14 regions), 2015	
- Soil sealing and soil consumption	P	50's (IGM maps of different date), 1989, 1996, 1998, 2006, 2008, 2013, 2015	
- Soil consumption in coastal area	P	2006-2015	
- Percentage of organic carbon (OC) content in the topsoil (0- 30 cm)	S	2014	
-Desertification	S/I	1990-2000 2004, 2006, 2007, 2008, 2009	
7. WASTE			
- Municipal waste generation	P	2007-2015	
- Quantity of municipal waste separately collected	R	2007-2015	
- Percentage of preparation for reuse and recycling	R	2010-2014	
- Quantity of waste disposed of in landfill, total and by type of waste	R	2000-2014	
8. PHYSICAL AGENT			
- Number of prior opinions and monitoring interventions on sources of RF and MO fields	R	2015	
- Quantity of radioactive waste held	P	2014	
- Exceedance of normative reference values for electromagnetic fields generated by plants for radio-telecommunication, remedial actions	S/R	2016	
- Monitored sources and relative percentage where at least an exceedance of limits has been observed	D/S	2000-2003, 2006-2015	
- State of implementation of municipal noise classification plans	R	2015	

INDICATOR	DPSIR	TEMPORAL COVERAGE	TREND
- Traffic noise: exposition and disturbance	S	2012	
- State of implementation of noise characterization of airport's neighbourhood	R	2015	
- Concentration of indoor radon activity	S	1989-2014	-
9. NATURAL HAZARDS			
- Population at risk of flooding	I	2015	
- Population at risk of landslides	I	2015	
- Cultural assets at risk of landslides and flooding	I	2015	
- Cultural assets at risk of earthquakes	I	2015	
- Cultural assets at volcanic risk	I	2015	-
- Surface faulting index for urban areas	S	2006	
- Floods	P/I	1951- 2015	
- Landslides	S/I	2015	
- Earthquakes	S	2015	
- Surface faulting (capable faults)	S	2000-2012	
10. CHEMICAL AGENTS			
- Safety of chemical substances: REACH	D/R	2008-2015	
- Water quality–pollution from pesticides	I/S	2003-2014	-
11. ALLERGENIC POLLEN INDEX			
- Allergenic pollen index	P/S/I	2015	-

INDICATORE	DPSIR	TEMPORAL COVERAGE	TREND
12. ENVIRONMENTAL CERTIFICATIONS			
- Monitoring of plants of state jurisdiction	R	2009-2015	
- Reduction of the emissions released into the air of macro-polluters (SOx, NOx, CO, Dusts)	I/R	2015	
- Reduction of the emissions released into the air of micro-polluters (VOC – Volatile Organic Compounds)	I/R	2012-2015 (E-PRTR) 2013-2015	
- EU Ecolabel certified licenses and products	R	1998-2015	
- Organisations with EMAS registration	R	1997-2015	
- EIA Decrees of state jurisdiction	R	June 1989-2015	
- Prescriptions contained in EIA Decrees of state concerned	R	June 1989-2015	
- SEA Procedure of state jurisdiction and of Regions and Autonomous Provinces jurisdiction	R	For State EIA: from 01/04/2015 to 30/04/2016 For regional EIA: 2014	-
13. ENVIRONMENTAL KNOWLEDGE			
- Web environmental information and communication	R	2013-2015	
- Number of environmental information products	R	2014-2015	-

ISPRA
ARTA Abruzzo
ARPA Basilicata
ARPA Calabria
ARPA Campania
ARPA Emilia-Romagna
ARPA Friuli Venezia Giulia
ARPA Lazio
ARPA Liguria
ARPA Lombardy
ARPA Marche
ARPA Molise
ARPA Piemonte
ARPA Apulia
ARPA Sardinia
ARPA Sicily
ARPA Tuscany
ARPA Umbria
ARPA Valle d'Aosta
ARPA Veneto
APPA Bolzano
APPA Trento



STATE
OF ENVIRONMENT
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