ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

Sistema Nazionale per la Protezione dell'Ambiente

INFOGRAPHICS

2019 Release

STATO DELL'AMBIENTE

89 / 2020

SISTAN
Sistema Statistico Nazionale

ENVIRONMENTAL DATA YEARBOOK 2019

LEGAL NOTICE

As of 14 January 2017, Italian Institute for Environmental Protection and Research (ISPRA), and the 21 Regional and Provincial Agencies for the Protection of the Environment (ARPA/APPA), join the **National System for the Protection of the Environment** (SNPA), Act No 132, 28 June 2016.
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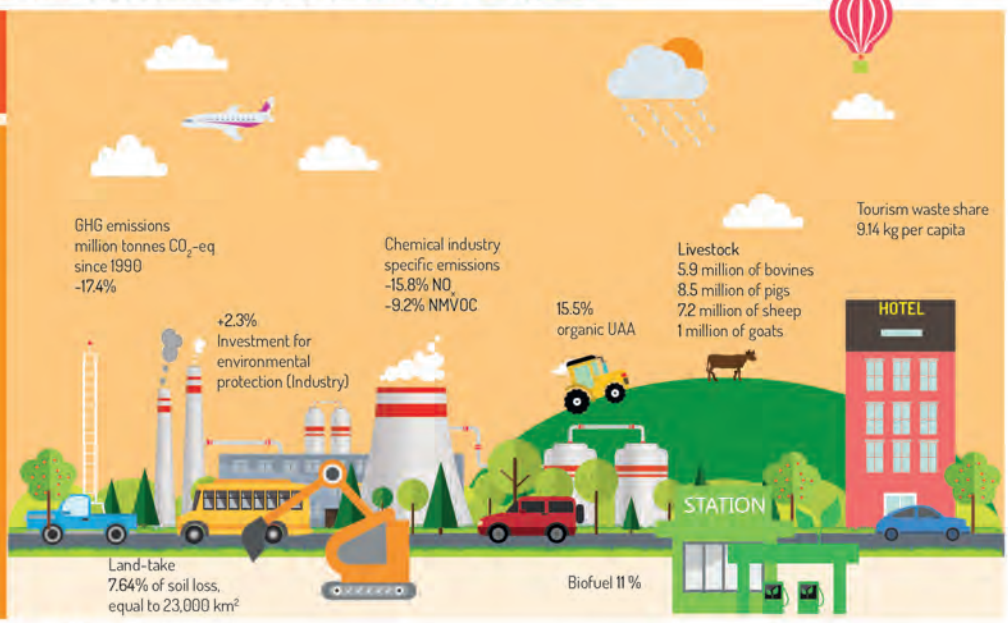
ENVIRONMENTAL DATA YEARBOOK INFOGRAPHIC

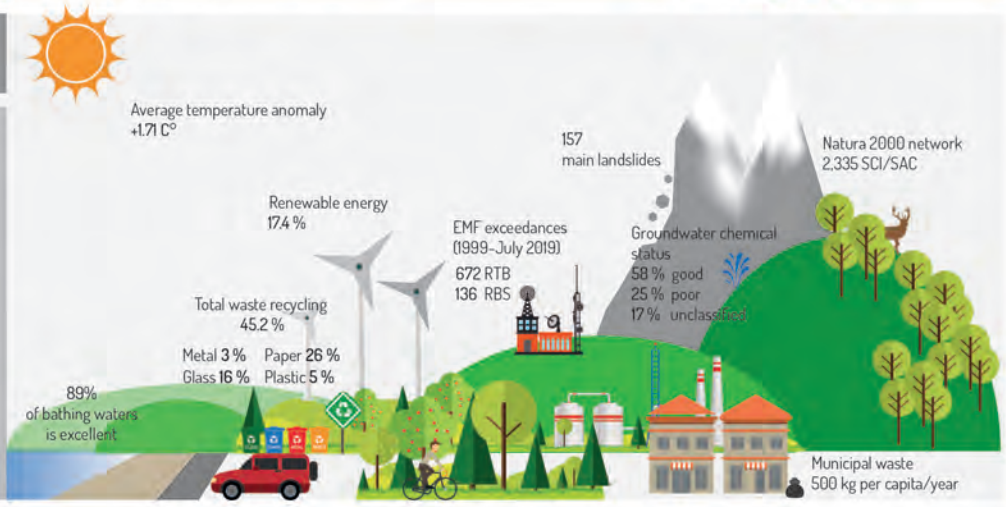
Drivers and economic activities

Industry, Tourism, Energy, Transport, Farming and forestry, Fishery and aquaculture



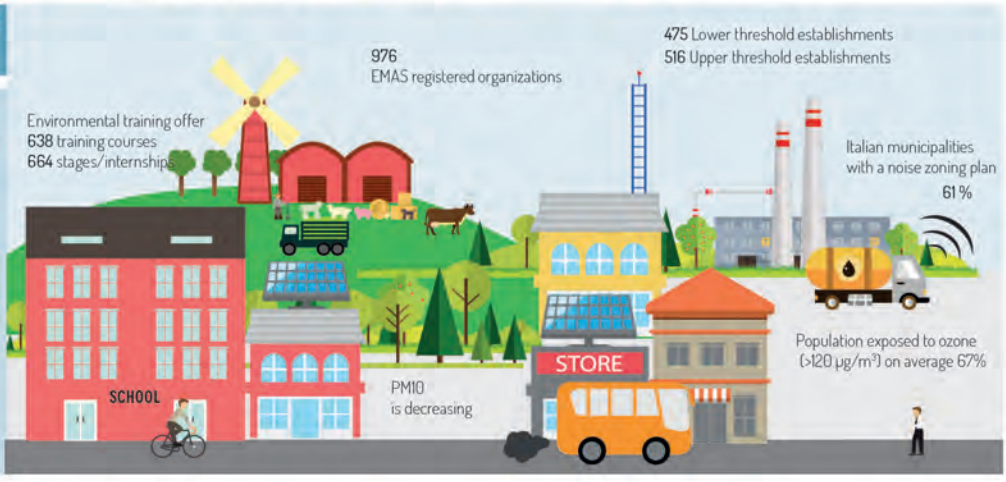
Environmental conditions

Atmosphere, Biosphere, Hydrosphere, Geosphere, Waste and material flow, Non-Ionizing Radiations, Noise, Natural hazards



Protection and prevention

Environment & wellbeing, Chemicals agents, Environmental planning measures, Environmental assessment and authorizations, Environmental culture promoting and spreading, Environmental certifications



BIODIVERSITY

60,000 animal species
8,195 vascular plants
3,873 non-vascular plants
Italy is one of the richest European countries in terms of biodiversity

Threatened categories:
23% of mammals
19% of reptiles
36% of amphibians
21% of cartilaginous fish
48% of freshwater bony-fish
2% of marine bony-fish

42% of the 202 policy species (vascular plants)

BIODIVERSITY:
could be defined as the richness of life on Earth: millions of plants, animals and micro-organisms, the genes they hold, the complex ecosystem they give place in the Biosphere

3,182 Allochthonous species
the introduction of potentially invasive allochthonous species represents a serious risk for the biodiversity

843 Terrestrial Protected Areas (including terrestrial areas with a marine portion)
10.5% del territorio nazionale

29 Marine Protected Areas

2,613 Natura 2000 Network sites
19.3% of the National territory

65 RAMSAR Areas

CLIMATE CHANGE

+1.71 °C average temperature anomaly
the Italian average temperature anomaly (+1.71 °C) exceeded the on-land global one (+0.98 °C) in 2018

+18% annual cumulated precipitations' increase
in 2018 compared to the average reference value (1961-1990)

CLIMATE CHANGE:
direct / indirect changes caused by human activities which alter the atmosphere composition, adding up to the natural climatic variation observed during the same time ranges

-17.4% GHGs emissions
total GHGs decrease in Italy (1990-2017)

From 517.7 to 427.7 MT CO_2 eq
GHGs decrease (1990- 2017). 81% comes from the energy process improvement

Adaptation strategy to climate change
Italy implemented its own Adaptation Strategy to Climate Change setting out the actions to front the short-term (2020) and long-term (2020 on) climate change impact. In 2017 the Environmental Ministry launched the "National Plan for Climate Change Adaptation" (currently under approval)

AIR POLLUTION

PM10 (2018):
18% of the measuring stations exceed the daily threshold
(50 µg/m³ not to be exceeded more than 35 times a calendar year)

75% of the measuring stations exceed the WHO daily limit value
(50 µg/m³ not to be exceeded more than 3 days/year)

PM2.5 (2018):
2% of the measuring stations exceed the annual limit value
(25 µg/m³)

88% of the measuring stations exceed the WHO annual limit value
(10 µg/m³)

AIR POLLUTION:
the alteration of the atmosphere composition due to any chemical, physical or biological agent with harmful effects on the human health and on the environment

Ozone (2018):
91% of the measuring stations exceed the long-term objective for human health protection
(120 µg/m³ maximum daily 8h mean)

Benzo(a)pyrene in PM10 (2018): 6% of the measuring stations exceed the target value (1.0 ng/m³)

NO_2 (2018): of the measuring stations exceed the annual limit value
(40 µg/m³ as the annual average of the WHO reference value)

-67.6% SOx, NOx, NH_3 emissions
decreasing trend (1990-2017) of sulphur oxides, nitrogen oxides, and ammonia

-32.8% PM10 emission
decreasing trend (1990-2017) of the national emission of particulate matter (PM10)

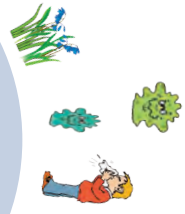
ALLERGENIC POLLEN INDEX (API)

The API local variation mainly depends on weather conditions observed throughout the year

Cupressaceae-Taxaceae:
nation-wide conifer family which includes ornamental plants such as cypresses.

This kind of plants produces a large amount of high allergenic pollen

ALLERGENIC POLLEN INDEX (API):
depends on the amount of air-spread allergenic pollen in the monitoring area.
The API allows to estimate the allergenic pollen load in a given place, making comparisons and studying the variation through space and time



Air-spread pollen in Italy
The wide Italian biodiversity is the reason for a great number of plant species secreting allergenic pollen and blooming in different periods of the year

Risk assessment
The API allows the health risk assessment related to allergies and a first survey of the mitigation actions to be engaged

INLAND WATER QUALITY

7,493 rivers

43% of rivers achieve the ecological status quality target

75% of rivers achieve the chemical status quality target

347 lakes

20% of lakes achieve the ecological status quality target

48% of lakes achieve the chemical status quality target

INLAND WATER:
all of the surface water (flowing or still) and groundwater within the base line used as a benchmark to define the territorial waters borders

Regional rivers

Quality target: "good"
Bolzano Province (94%), Aosta Valley (88%), Trento Province (86%), Liguria (75%)

Chemical status: "good"
More than 90% of rivers in Molise, Piedmont, Aosta Valley, Liguria, Emilia-Romagna, Umbria, The Marches, Lazio, Abruzzo and the Autonomous Province of Trento and Bolzano

Regional lakes:

Quality target: "good"in Valle d'Aosta (100%), Provincia di Bolzano (89%), Emilia-Romagna (60%)

Chemical status: "good"
100% of the lakeside water bodies in Aosta Valley, Liguria, Emilia-Romagna, Abruzzo, Molise and Bolzano Province

Groundwater:

Quantitative status: "good" → 61%

Chemical status: "good" → 58%

COASTAL-MARINE ENVIRONMENT

90% of the bathing coastal waters is "Excellent" (2015-2018)
The 2018 quality status of the bathing coastal waters (health-care standards) is: "Excellent" 90%, "Good" 5.2%, "Adequate" 2.1%, "Inadequate" 1.6%

***Ostreoptis cf. ovata* has been found in 11 coastal regions**
2018 the toxic kelp Ostreoptis cf. ovata has been found in 11 coastal regions; not present in Emilia-Romagna and Veneto

COASTAL-MARINE ENVIRONMENT:
coastal-marine habitats have a great ecological and landscaping relevance. But at the same time, they are extremely vulnerable and threatened

62% of the Padanian district lagoons have an "inadequate" or "bad" ecological status

92% of the coastal marine water bodies in Sardinia have a "good" ecological status

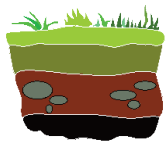
More than the 50% of the transitional waters in Northern and Central Apennines, Eastern Alps and Padanian districts have a "good" chemical status
90% of the coastal marine waters in Sardinia have a "good" chemical status

Washed up waste (2015-2017):
disposable plastic is the most often found typology
in the Adriatic Sea (170 parts/100 m of shore),
in the Western Mediterranean Sea (133 parts/100 m of shore),
in the Central Mediterranean Sea and in the Ionian Sea
(91 parts /100 m of shore)

SOIL

7.64% of land-take
land-take increases in Italy from 2.7% during the 50's to 7.64% in 2018

23,000 km² - 2 m²/sec.
As of 2018, 23,000 km² of soil has been consumed at a transformation speed of almost 2m²/sec. (2017-2018)



SOIL:
The thin top layer of the Earth's surface consisting of rock and mineral particles mixed with decayed organic matter, living organisms and having the capability of retaining water. It's an "interface" with air and water, hosting the most part of the biosphere

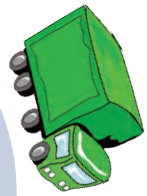
High land-take in coastal areas
23.4% on the coast within 300 m; 19.7%, between 300 and 1,000 m; over 45% within 300 m in Liguria and The Marches

Soil loss caused by water erosion decreases due to the adopted policies, but rainfall erosion still increases
Best agricultural practices adopted by Rural Development Policies, suggests a decreasing erosion.
But at the same time, the increasing of high intensity weather events causes the loss of a large volume of soil in a very short time

WASTE

Municipal waste: 30.2 million tonnes
+2% in 2018 compared to 2017

Increasing per capita generation
From 489 kg in 2017 to 500 kg in 2018



WASTE:
Substances or objects coming from human activity or natural cycles, disposed by their owners

58.1% separate waste collection
in 2018 more than a half of the waste comes from separate collection but 2011 target (60%) and 2012 target (65%) have not yet been achieved

50.8% re-use and recycling of municipal waste
40.8% consists in organic fraction, 25.9% consists in paper

22% landfilled waste
6.5 million tonnes, 22% of municipal waste, -6.4% (2017-2018)

PHYSICAL AGENTS

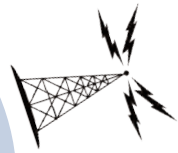
672 exceedances of the regulatory limits in RTB (Radio Television Broadcasting) plants

136 exceedances of the regulatory limits in RBS (Radio Base Station) plants
Total RBS plants' power in Italy amounts to 13,778 kW, more than RTB plants (9,243 kW)

The number of RTB plants in 2018 is the same as in 2017
Slight increase in the number of sites while the number of plants is basically the same

RBS sites and plants decrease
Both RBS plants and sites slightly decrease in 2018 compared to 2017

PHYSICAL AGENTS:
Electromagnetic fields, noise, vibrations, ultraviolet radiations, light pollution, potentially harmful to health



43.5 % of the noise sources at least once exceed the regulatory limits stressing a noise pollution issue

61% of the municipalities approved a noise zoning plans
A noise zoning plan comes from the territorial breakdown in consistent acoustic areas

In 2018 the northern regions show the higher percentage of zoned municipalities (>90%)
Aosta Valley (100%), Lombardy, Tuscany The Marches (96%), Veneto (92%)

NATURAL HAZARD

2,433 seismic events with Magnitude ≥ 2 recorded by the National Seismic Network in 2018;
16 earthquakes with Magnitude ≥ 4);
1 earthquake with Magnitude > 5

The 6.4% the of large dams and the 8% of the small dams are situated in Seismic Zone #1

Just one Etna's paroxysmal episode in 2018 combined with seismic activity, led to a 5 km surface faulting along the eastern flank

3,367 cultural assets (1.6% of total) are vulnerable to a high volcanic hazard

NATURAL HAZARD:

Hazardous natural phenomena could be distinguished in: endogenous phenomena (volcanic eruptions, earthquakes, tectonic subsidence) related to the Earth's inner dynamics, and exogenous phenomena (flood, landslides, sinkholes, consolidation subsidence) which take place on the Earth's surface

Rainfall: 19 paroxysmal episodes, defined by a high amount of rain often fallen in just one day, caused flash floods in urban and rural contexts (2018)

Over 6 million inhabitants are situated in medium hydraulic hazard areas (return period: 100 - 200 years)

157 main landslides in 2018 caused on the whole: 12 casualties, 29 injured, road network damages

Over 1.2 million inhabitants are situated in high and very high landslides hazard areas

CHEMICAL AGENTS

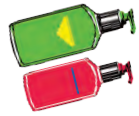
Italy is the 3rd producer of chemicals
in Europe, after Germany and France and 10th in the world

2,800 chemical companies in Italy, about 110,000 highly-qualified workers
Chemicals' use concerns all of economic sectors

22,191 REACH' substances registered
the REACH regulation concerns: registration, evaluation, approval and restriction of chemicals.
22,191 substances have been registered and 264 priority substances were launched for evaluation until 2018

Restrictions increase
33 restriction proposals concerning substances with unacceptable risks under certain use conditions

CHEMICAL AGENTS:
Chemical elements or compounds, alone or mixed, in their natural state or lab-synthetized, used or disposed, as well as waste, by whatever activity, intentionally or unintentionally produced, placed on market or not



Pesticides in surface water: limits are exceeded in 419 monitored points
24.4% of total

Gradual spread of pesticides contamination
From 2003 to 2017 a gradual spread of territorial contamination has been recognized. However, the entity and the spread of pesticides' pollution are not enough known at the moment

Italy is one of the first EU countries as for Seveso plants' number

Control activities' empowerment
Due to the new Seveso regulation (Legislative decree No 105/2015) the on-plant control activities increased

Inspectors' training
Together with the control activities' empowerment, the auditors' training/follow-up has begun

ENVIRONMENTAL ASSESSMENT, AUTHORIZATIONS & CERTIFICATIONS

EIA process positively ends in 84% of instances in 2018
18 out of 25 EIA (Environmental Impact Assessment) decrees were positive, 7 out of 25 were negative

74% of the Strategic Environmental Assessments (SEA) concern Lombardy, Veneto, Piedmont, Friuli-Venezia Giulia, Tuscany, Emilia-Romagna in 2017
The number of finalised SEAs concerns the 90% of the municipal urban plans

ENVIRONMENTAL ASSESSMENTS, AUTHORIZATIONS & CERTIFICATIONS:
EIA, SEA and IEA are legally binding means which regulate different issues concerning human activities affecting the environment. EMAS & Ecolabel certifications are voluntary means aimed to prevent and improve the environmental condition

VIA VAS AIA

EMAS

Ecolabel EU www.ecolabel.eu

Oil refineries' IEAs reduce the SO_x emissions by 71% and the NO_x emissions by 49% in 2018;

Oil refineries' IEAs reduce the emissions into water of COD (Chemical Oxygen Demand) by 145%, of TSS (Total Suspended Solids) by 85% and phenols

1,950 EMAS certifications issued in Italy (June 2019)
The most proactive organizations deal with waste and materials recovery (295 registrations)

182 EU Ecolabel licences (June 2019)
concerning 8,859 certified products/services

ENVIRONMENTAL KNOWLEDGE

The on-line environmental information and communication increase
From 2014 to 2019 (31 of July) there is an improvement in the provision of information and communication tools on the SNPA and main Research Institutions' websites

Twitter Followers (2019):
86,400 SNPA (ISPRA + 15 Agencies +SNPAmbiente)
76,600 AEA
92,300 MATTM
91,000 Legambiente

Facebook "Like" (2019):
100,000 SNPA (ISPRA + 8 Agencies)
37,000 AEA
48,000 MATTM
140,000 Legambiente

ENVIRONMENTAL KNOWLEDGE:
the linkage between environmental information & communication

638 training courses (SNPA)
664 stages/internships
638 SNPA training courses
about environmental issues in 2018:
5,934 hours and 9,872 internal/external participants;
664 stages/internships enabled,
849 students involved
in the School-Work Alternation projects


FIG.7

BIODIVERSITY: RELEVANCE, THREATS, CONSERVATION

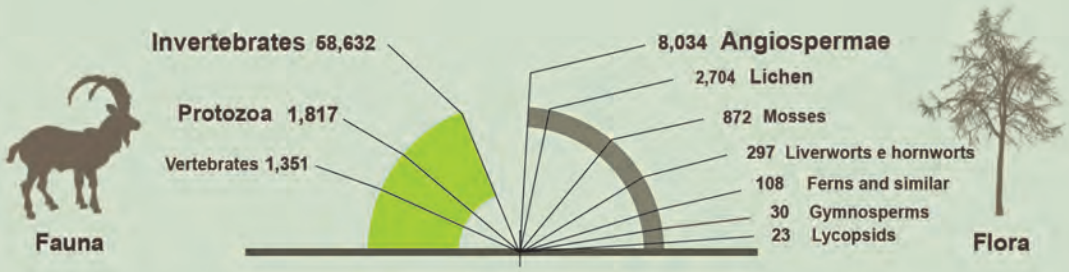
WHAT'S BIODIVERSITY?

It could be briefly defined as the variety of living forms in a given environment. The Biodiversity is usually examined with respect to genes, species and ecosystems.

BIODIVERSITY'S RELEVANCE

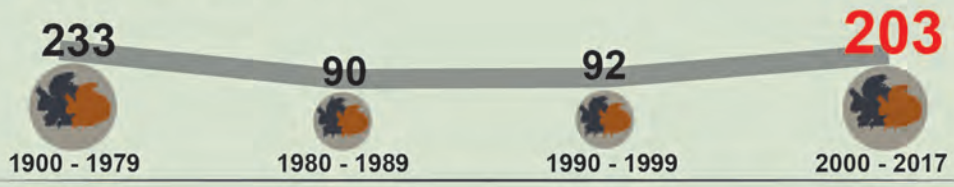
The Biodiversity has a great value, somehow comparable to cultural heritage or other human ingenuity works. That's should be enough to justify actions aimed to preserving it. But the Biodiversity is also important as a source of goods, natural resource and ecosystem services which are crucial for the human survival playing a key role in the nations' economies. Among the ecosystem services there are: food, fuel and building materials supply; air and water purification;climate stabilization and regulation; positive effects on flood, drought, extreme temperature changes, and wind power; pollinating plants; genetic resources reservoir (nutritional/health purposes); cultural and aestheticalbenefits, and so on.

SPECIES AND SUBSPECIES IN ITALY

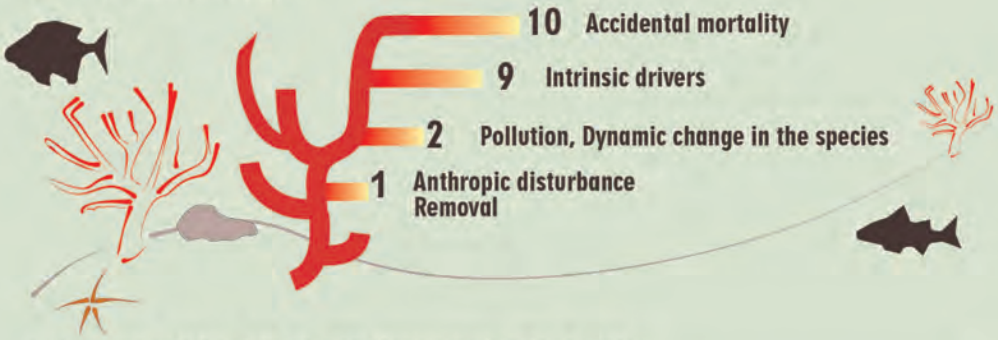


MAIN THREATENING FACTORS

INTRODUCED SPECIES



MAIN CORALS THREATS



ACTIVITIES AIMED TO THE BIODIVERSITY PROTECTION

Direct and indirect activities have been adopted both at national and international level to fight the biodiversity loss. Indirect activities: sources of pressure's mitigation by monitoring pollutant emission levels or retaining the water quality.

Italy adheres to several international conventions and agreements

Habitats Directive
Birds Directive

Natura 2000 Network (July 2019)

Convention on Biological Diversity

118
SCI
Site of Community Importance

2,217
SAC
Special Area of Conservation

613
SPA
Special Protection Area

MSa

CLIMATE CHANGE

THE CLIMATE CHANGE ISSUE

The climate change is a priority global emergency, increasingly present in the national and international institutions' political agendas.
Climate change are widely recognised as the most important challenge for humankind.
Several studies highlight how the emissions reduction commitments, even if fully implemented, should not be enough to meet the global warming threshold (2°C). And they are even less enough to meet the Paris agreement threshold (1.5°C). The climate change is the result of the interactions between natural and anthropic complex systems. While considering the natural phenomena effects such as the solar radiation, most of the scientific community believes that "the global warming of the past 50 years is primarily due to human activities." The IPCC Fifth Assessment Report (AR5) point out that the simultaneous increase of GHGs concentrations in atmosphere and of the surface temperatures since the mid-20th century, are most likely due to human activities.

CAUSES OF CLIMATE CHANGE

Fluorinated Gases

Cause an extremally potent greenhouse effect. EU legislation provide for a gradual reduction of these gases.

Greenhouse gases

Deforestation

Trees help to regulate the climate by capturing carbon dioxide (CO_2) from the atmosphere. The tree felling reduces this activity and the wood CO_2 content is released into the atmosphere.

Power consumption from fossil fuel

Coal, oil and gas combustion produces carbon dioxide (CO_2) and nitrogen oxide

Nitrogen fertilisers

Produce nitrogen oxide

Livestock farming

Produces a large amount of methane

-1.0%

GHGs emissions (CO_2-eq) decreases in Italy (2017)

518 428 million tonnes CO_2-eq

GHGs emissions decreases mostly due to CO_2 reduction in the energy sector (1990-2017).

81.6%

isthe CO_2 contribution by the energy sector (2016)

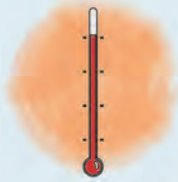
Summer days

Year	Days
2018	+24
2003	+31

2018-year ranks 2nd in the time-series and is the 22nd year in a row with a value exceeding the climatological average.

With "Summer days" it is meant the number of days recording a maximum temperature >25°C

Average temperature-Anomaly



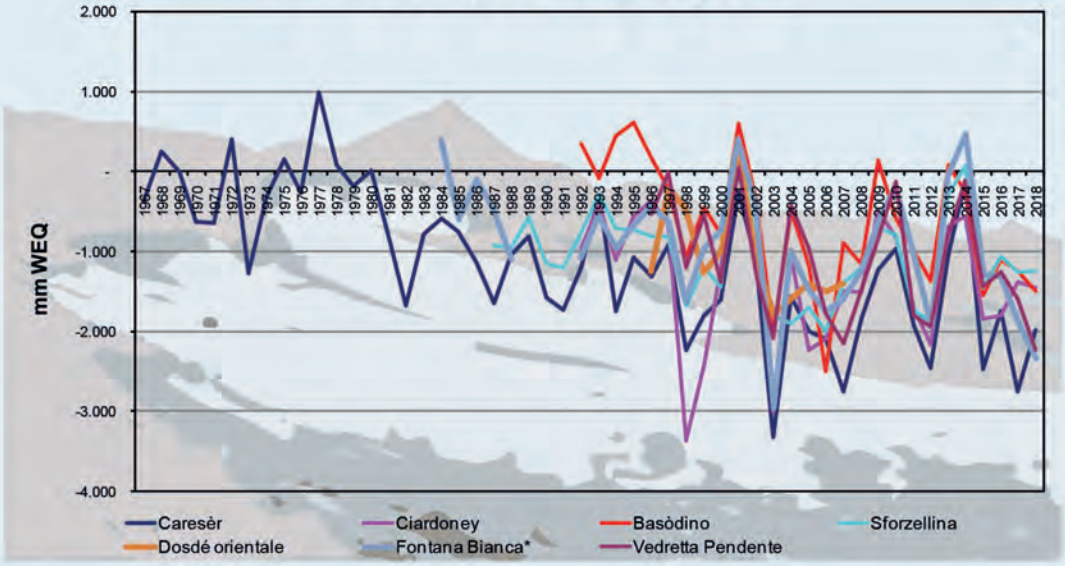
Italy

+1.71 °C

Global

+0.98 °C

Net mass balance of some Italian glaciers



MAIN RESPONSE MEASURES

Mitigation

GHGs emissions reduction

A mitigation example:

Decoupling

GHGs emissions in Europe (EU28 + Iceland) decrease in 2017 (-21.7% compared to 1990) while the GDP increases by about 50% in the same period.

Adaptation

To minimize the climate change potential consequences.

An adaptation exsample:

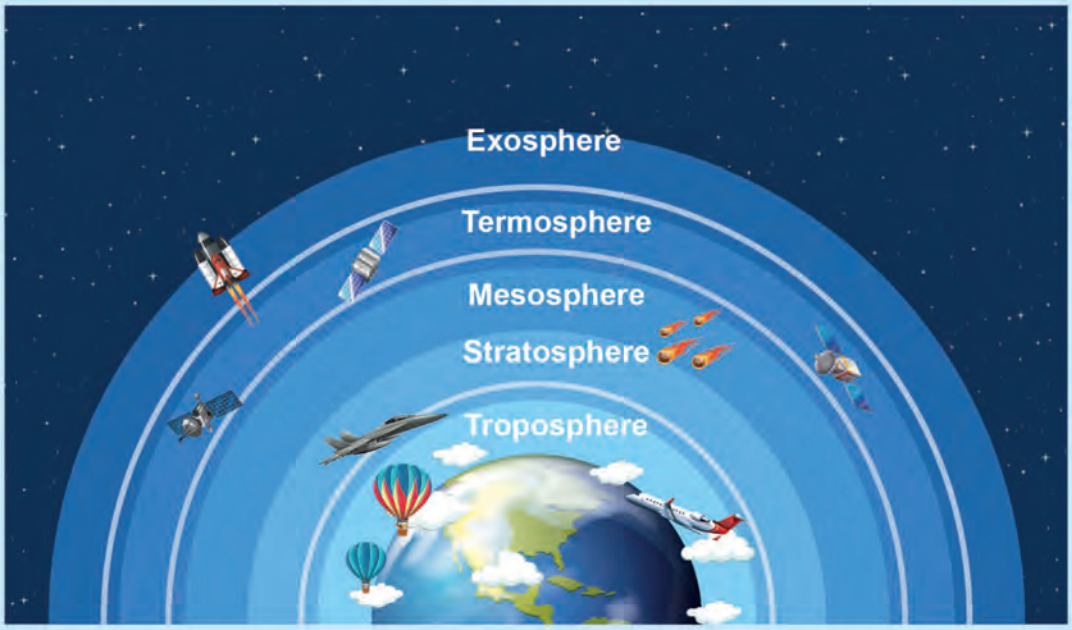
Italy approved and adopted the National Adaptation Strategy to Climate change (SNAC).

AIR POLLUTION

Several European Countries at date, exceed the limit values and the targets set out by the legislation about particulate matter, nitrogen dioxide, ozone, and benzo(a)pyrene. Moreover, the WHO's most sever requirements are far from being achieved. In the European context, Italy with its Padanian basin, is one of the most relevant areas for what concerns air pollution.

In Italy as in Europe a significant emissions decrease is observed in the mid-term, combined with a decreasing trend of the pollutants' concentration. From now to 2030, it will be necessary to implement additional measures to achieve the EU targets with the adoption of a "National air pollution control programme" as required by Directive (EU) 2016/2284, transposed by Legislative Decree No 81, 30 May 2018.

Earth's Atmosphere



SO_x, NO_x, NH_3

SO_x, NO_x, NH_3 emissions decrease by 67.6%(1990-2017)

PM10

The PM10 national emissions decrease by 32.8% (1990-2017)

PM10 (2018):

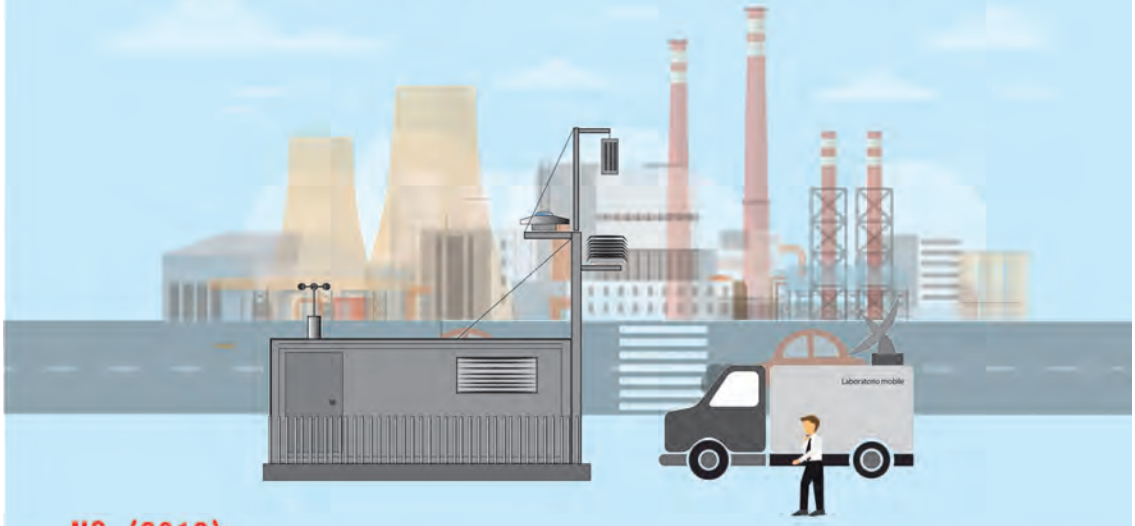
18% of the measuring stations exceed the daily limit value (50 µg/m^3, not to be exceeded more than 35 times a calendar year)

75% of the measuring stations exceed the WHO daily reference value (50 µg/m^3, not to be exceeded more than 3 days/year)

PM2.5 (2018):

2% of the measuring stations exceed the annual limit value (25 µg/m^3)

88% of the measuring stations exceed the WHO annual reference value (10 µg/m^3)



NO_2 (2018):

6% of the measuring stations exceed the annual limit value (40 µg/m^3 annual average, matching the WHO's long-term reference value)

Ozone (2018):

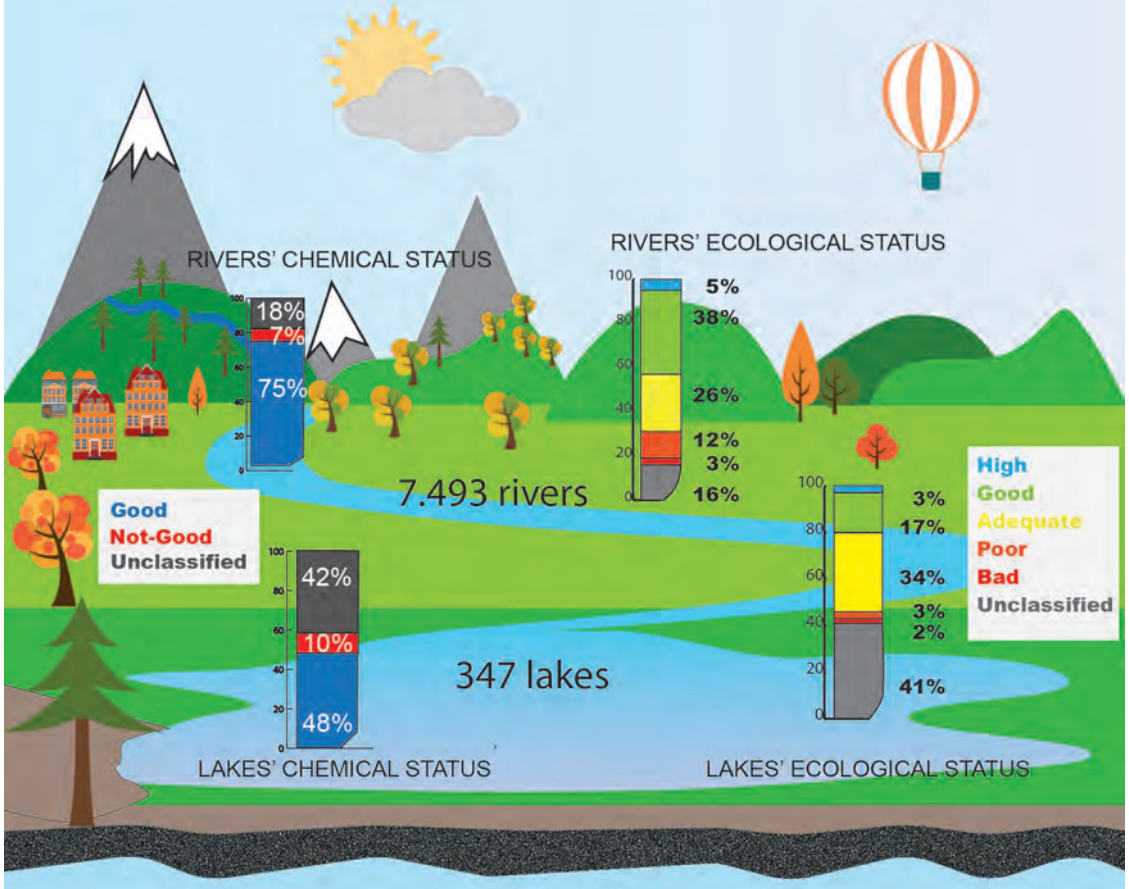
91% of the measuring stations exceed the long-term objective for human health protection (120 µg/m^3 maximum daily 8h mean)

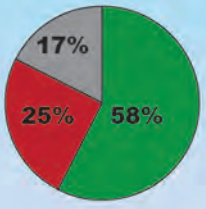
Benzo(a)pyrene nel PM10 (2018):

6% of the measuring stations exceed the objective for human health protection (1ng/m^3)

WATER QUALITY

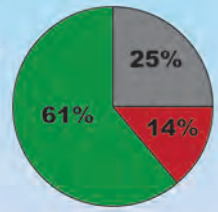
Two-thirds of the Earths' surface is covered by water, which allows the exchange of substances and energy through the ecosystem.
There are internal surface waters (rivers, lakes), transitional waters (river mouths, coastal lakes), coastal-marine waters, groundwaters. Each of them supports plants and animal species' life and results in a complex system which needs continuous exchange among water, sediment, soil, air to work properly.
Water resource could modify its composition due to natural or anthropic causes. The latter occur as increasingly relevant pollution phenomena, and sometimes they are irreversible. The water bodies' resilience allows to tolerate, up to a point, a certain amount of natural or synthetic chemicals, as well as changes in physical and morphological conditions, breaking down the changes and restoring a full recovery. However, beyond a certain point, this ability could be compromised irreversibly, bringing to a deterioration in the water body's quality, namely: less self-purification ability, decreasing or alteration in biodiversity. That means, lack of resources for human uses.



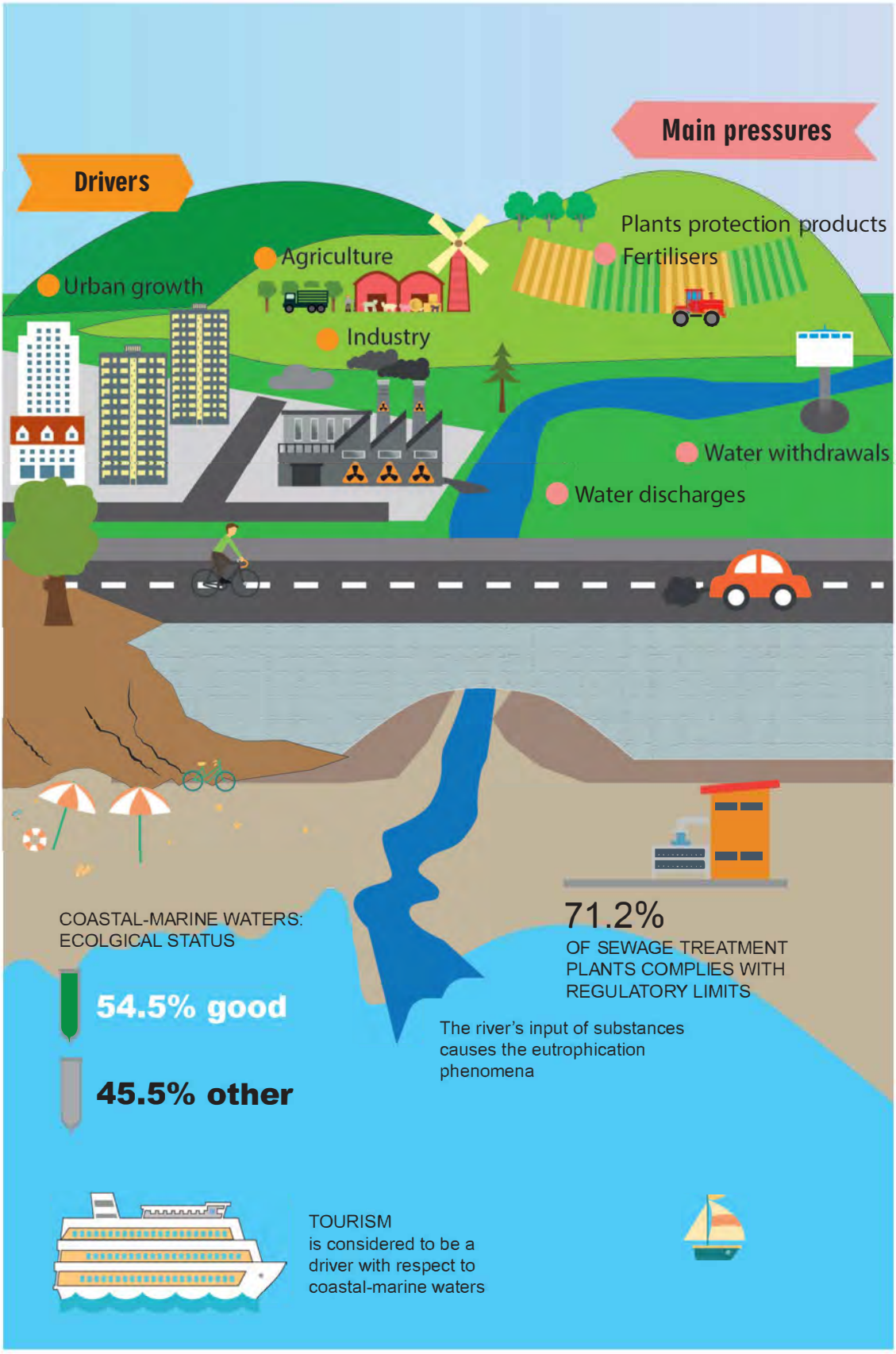


GROUNDWATER
CHEMICAL STATUS

GROUNDWATER
QUANTITATIVE STATUS



Good
Poor
Unclassified


Main pressures
Drivers
Urban growth
Agriculture
Industry
Plants protection products
Fertilisers
Water withdrawals
Water discharges
COASTAL-MARINE WATERS:
ECOLGICAL STATUS
54.5% good
45.5% other
71.2%
OF SEWAGE TREATMENT
PLANTS COMPLIES WITH
REGULATORY LIMITS
The river's input of substances
causes the eutrophication
phenomena
TOURISM
is considered to be a
driver with respect to
coastal-marine waters

THE SOIL: RELEVANCE, THREATS AND CONSERVATIONS

WHAT'S THE SOIL?

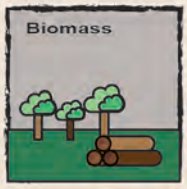
The thin top layer of the Earth's surface consisting of rock and mineral particles mixed with decayed organic matter, living organisms and having the capability of retaining water.
It's an "interface" with air and water, hosting the most part of the biosphere.

SOIL RELEVANCE

On the soil the human activities can be developed. Providing ecosystem services such as supply, setting and support, it is crucial with regard to the most important environmental issues (climate change adaptation/-mitigation, food safety, human health). The soil is a non-renewable resource: therefore, every soil deterioration process leads to an irreversible loss with consequences at global level.

SOIL'S SERVICES

Ecological services



Socio-economic services

THREATS' CAUSES

MAIN THREATS

HIGHLIGHTS

Water erosion causes a soil loss equal to

8.5t/ha per year

EU average = 2.46 t/ha per year

Soil sealing

7.64%

EU average = 4.2%

Desertification Vulnerability

10% high

42.9% medium

26% low

SOIL DEFENCE ACTIONS

CAP
Common Agricultural Policy

4 priority objectives in GAEC (Good Agricultural and Environmental Condition of the land):

- "preventing soil erosion"
- "maintaining soil organic matter"
- "maintaining soil structure"
- "ensuring a minimum level of ecosystem's maintenance and habitats' conservation"

Sustainable Development Goals (SDGs) to be achieved by 2030 (UN Global Agenda, 2015):

- Soil consumption doesn't exceed the population growth;
- "to provide universal access to safe, inclusive and accessible, green and public spaces";
- "land degradation neutral world" to ensure the ecosystem functions and services.

MSa

WASTE

Waste is defined as man-made or natural substances and objects that the owner decides (or is forced) to dispose.
They are categorized according to the origin as "municipal waste" and "generated from economic activities" or according to the properties as "hazardous" and "non-hazardous" waste. All of the EU regulations concerning the sustainable use of the resources relate this issue to the sustainable waste management. The aim is to guarantee that the resources use impact do not exceed the environment carrying capacity by considerably improving the use efficiency (economy "dematerialization", waste production prevention)

PEOPLE GENERATE WASTE

WHAT TO DO WITH SO MUCH WASTE?

1 RE-USING
New objects are not always necessary. Used objects could also be useful

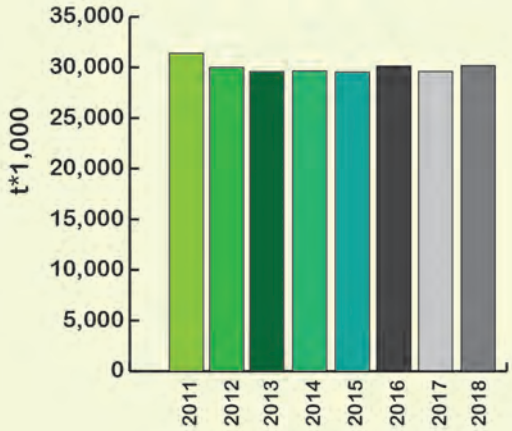
2 SEPARATING
To know what is recyclable in order to give a new life to waste

3 RECYCLING
Recycling process change a material (waste) into a new product

4 POWER GENERATION
Power generation is possible using a certain kind of waste

WHAT TO DO WITH SO MUCH WASTE?

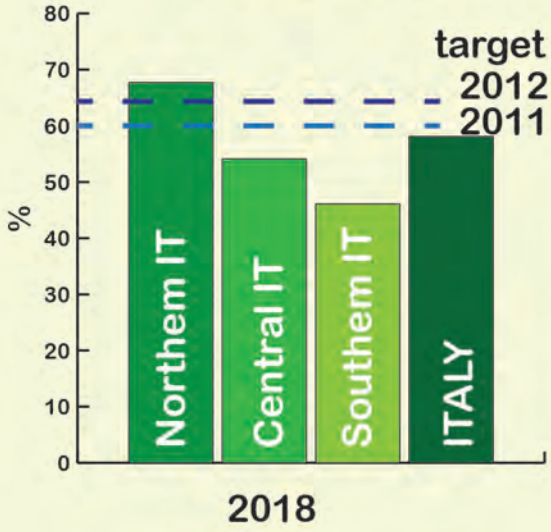
Municipal waste generation



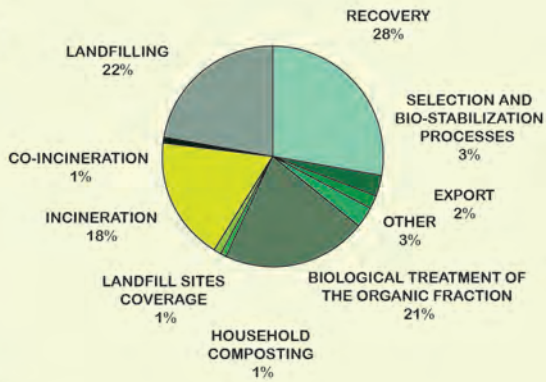
Municipal Waste

500 kg per capita

Separate collection



Municipal waste management, 2018



HOW MUCH MATERIAL HAS BEEN RECYCLED?

ORGANIC FRACTION	PAPER	GLASS	PLASTIC	WOOD	METAL	e-WASTE	TEXTILE WASTE
41%	26%	16%	5%	7%	2%	2%	1%

PHYSICAL AGENTS

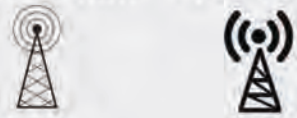
The Non-Ionizing Radiations (NIR) are electromagnetic radiations with enough energy to cause thermic, mechanical and bioelectrical mutations (bioeffects) into living organisms. If not compensated, these effects cause health damages (health effect). Italy has adopted protection policies with stronger standard than those internationally used. The risk associated with a long-term exposure to very low levels of radiations has been taken into account too, even without a proven cause-effect connexion between exposure and pathologies.

Several limit values have been set out: exposure limits to protect from proven health effects (severe affects), warning values or precautionary measures to be respected in long-term stay's spaces, as well as quality targets aimed to a further reduction of unduly exposures in crowded areas.

NON-IONIZING RADIATIONS

Services attendance

0.11 sites/km² 0.86 sites/km²

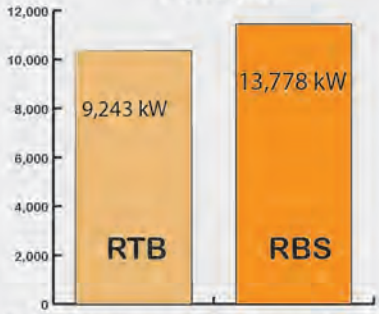


Monitoring

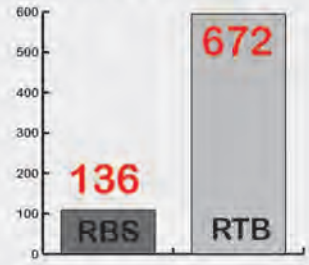
2,958* Experimental verification on RBS plants

481* Experimental verification on RTB plants

Potenza



Number of measured exceedances



*Figures refers to the regions with complete and updated data

NOISE
some drivers

Population concerned	Noise level (dBA)	Population concerned (%)	Noise level (dBA)	Population concerned (%)
14,204,327* Vehicle traffic noise	Lden≥70	7.8	Lnight≥65	1.9
	65≤Lden≤69	16.2	60≤Lnight≤64	9.2
	60≤Lden≤64	21.8	55≤Lnight≤59	16.8

Controlled sources with a noise pollution issue

43.5%

Municipalities with an approved noise zoning plan

61%

INONIZING RADIATIONS

Radioactive waste in Italy (activity):

74% Piedmont

12% Campania

9% Basilicata

Rn-222

High concentration of Radon gas in Lazio and Lombardy

*The study concerns data on vehicle traffic noiseestimated by municipalities which draw up a strategic acoustic map (2017), according to the Directive 49/2002/EC and the Legislative Decree No 194/2005: Piedmont, Lombardy, Bolzano Province, Veneto, Friuli-Venezia Giulia, Emilia-Romagna, Tuscany, Lazio, Puglia, Sicily, Sardinia.

NATURAL HAZARD

What's the natural hazard?

It is the "probability of occurrence, within a specific period of time in a given area, of a potentially damaging natural phenomenon" (UNDRO 1979). The natural hazard is the probability of occurrence of geological phenomena such as earthquakes, tsunami, volcanic eruptions, landslides, floods, sinkholes, subsidence, etc.
Because of its geodynamic, geological and geomorphological features, Italy undergoes several hazardous geological phenomena such as seismic and volcanic events (endogenous), landslides and floods (exogenous). The earthquakes cause the greatest damages, in terms of economic value and human lives. The low-magnitude seismic events occur daily in many parts of Italy without causing damages, while the events exceeding the damage threshold occur every 4 years (1997-2016); 3 years considering the period 2009-2016. The seismic risk is high in many parts of Italy such as Eastern Alps, Apennines, Calabria, Eastern Sicily, both in terms of destructive earthquakes rate and magnitude, since they could reach magnitude 7 and cause very serious damages (up to XI MCS)

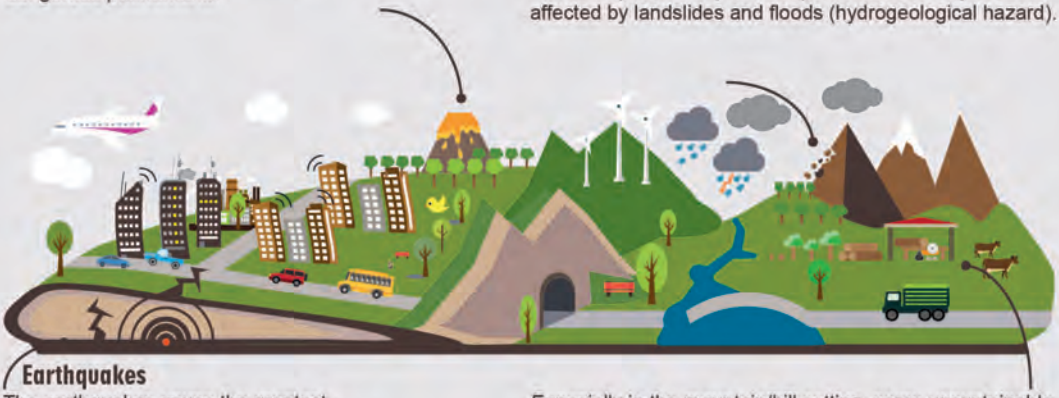
HAZARDOUS GEOLOGICAL PHENOMENA

Volcanism

Pyroclasts and ash, lava flows, pyroclastic flows and mudslides (lahars) along the volcanoes' flanks, are the most dangerous phenomena.

Landslides and flood

70% of the Italian territory is covered by mountains and hills. Such natural condition together with the serious and recurring meteo-climatic events, as well as the significant human impact, is why several portions of territory are affected by landslides and floods (hydrogeological hazard).



Earthquakes

The earthquakes cause the greatest damages, in terms of economic value and human lives. The Eastern Alps, Apennines, Calabria and Sicily are considered to be high risky areas.

Especially in the mountain/hill setting, some unsustainable farming practices and the drop out of hydro-forestry practices, together with the growing number of wildfires, contribute to the hydrogeological hazard.

1997-2016

The earthquakes causing damages occurred once every 4 years on average.

1688-1706

In this period, 14 earthquakes almost yearly took place. Similar sequences could happen again.

Mercalli earthquake intensity scale

HISTORICAL MOST DISTRUCTIVE EARTHQUAKES

Veronese, 3 January 1117 (IX MCS)

Messina-Calabria, 28 December 1908 (XI MCS)

Alta Irpinia, 23 July 1930 (X MCS)

Friuli, 6 maggio e 11 e 15 September 1976 (X MCS)

Abruzzo, 6 April 2009 (IX-X MCS)

Val di Noto, 11 January 1693 (XI MCS)

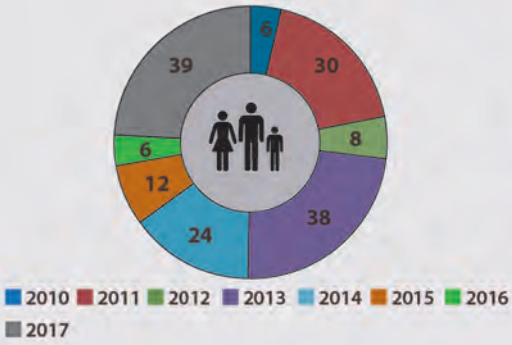
Fucino, 13 January 1915 (XI MCS)

Valle del Belice, 15 January 1968 (X MCS)

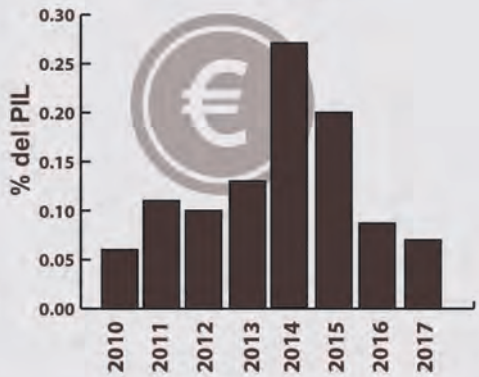
Irpinia, 23 November 1980 (X MCS)

Sequenza Centro Italia, August-October 2016 (X MCS)

MAIN FLOODS CASUALTIES



MAIN FLOODS TOTAL LOSS ESTIMATE



ENFORCEMENT ACTIONS AGAINST NATURAL HAZARDS

The knowledge is an essential mean of defence. Understanding how the geological phenomena took place in the past allows to assess potential future scenarios. The Seismic Hazard Map and the Seismic Classification include lot of knowledge about the seismic level of the Italian territory. The seismic micro-zoning studies offer valuable information about the local effects of earthquakes. As regards the hydrogeological instability (the 2nd cause of natural hazard in terms of casualties and damages in Italy), the implementation of enforcement actions could be structural or not.

Seismic Micro-zoning (SM)

The SM is the territory characterization in terms of local seismic response, on the basis of geological, lithological, geo morphological, tectonic, geotechnical and geophysical information. In 2015 the "Center for Seismic Microzonation and its applications" has been constituted.

Hydrogeological instability: preventive measures

Since 1999 the Ministry of the Environment has funded almost 5,000 structural interventions aimed at protectingthe soil in order to prevent-damages caused by landslides, floods and avalanches.

CHEMICAL AGENTS

Chemical elements or compounds, alone or mixed, in their natural state or lab-synthetized, Potentially hazardous chemicals are widely used in every productive sector.
The world-wide chemicals' production increased from 1 million tonnes in 1930 to several hundreds of millions nowadays. EU is the 2nd world producer of chemicals after China. 100,000 chemicals are estimated on European market. Italy is the 3rd European producer (10th at world level). 2,800 chemical companies employ 110,000 workers. The significant chemicals' production needed an appropriate regulation.
The REACH (Regulation (EC) No 1907/2006) is the EU integrated systemconcerning the registration, evaluation, authorisation and restriction of chemicals, based on the ongoing update of the information about existing or new chemicals placed on market. Establishments keeping chemicals are regulated by Legislative decree No 105/15 and classified in two different categories (upper threshold, lower threshold): with almost 1,000 establishments regulated by the Seveso Directive, Italy became one of the first EU countries in terms of plants together with Germany and UK.

REACH

Chemicals' regulatory process

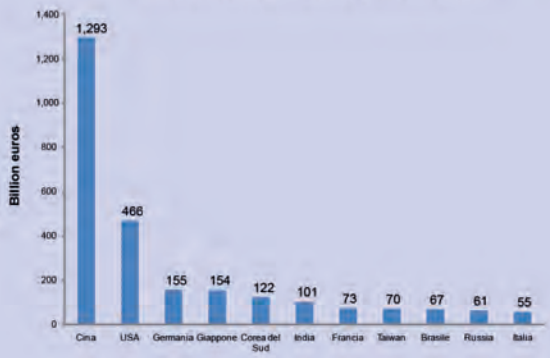
Registration:
Companies send to ECHA (European Chemicals Agency) a registration dossier

EU risk management measures:
harmonised classification, restriction, authorisation. At this stage a substance could be forbidden.

Substances evaluation:
ECHA clarifies if a given substance constitutes a risk to human health or the environment.

Dossier evaluation:
ECHA evaluates the information submitted by companies to examine the quality of the registration dossier.

World chemicals production



7,958

number of registrations made in Italy concerning 4,308 substances (31 December 2018)

Major accident hazard establishments (RIR)

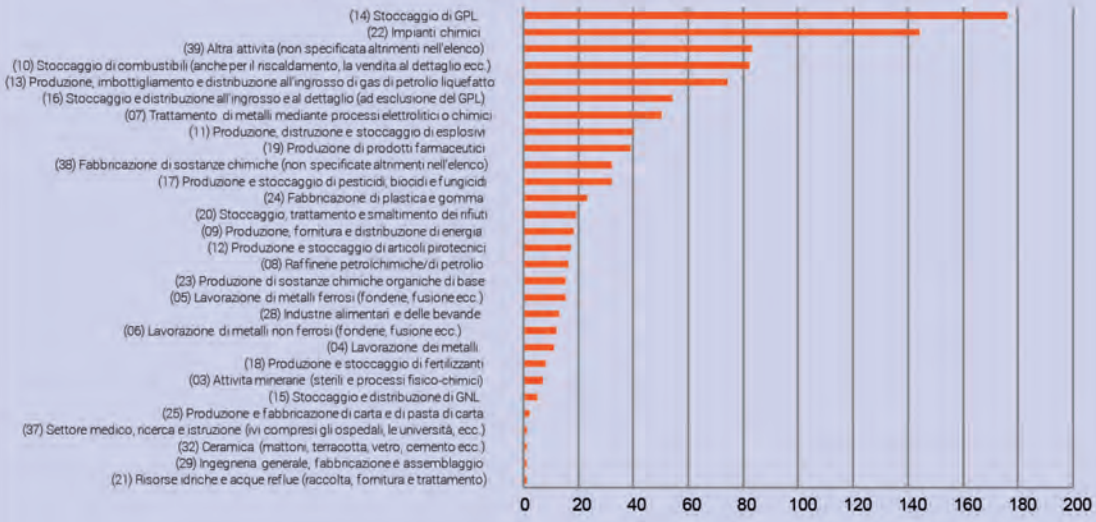
Legislative decree No 105, 26 June 2015
There are two different kinds of RIR industries due to quality and quantity of hazardous substances held. Therefore, different commitments are associated.

516
Upper threshold establishments

475
Lower threshold establishments

(30 June 2019)

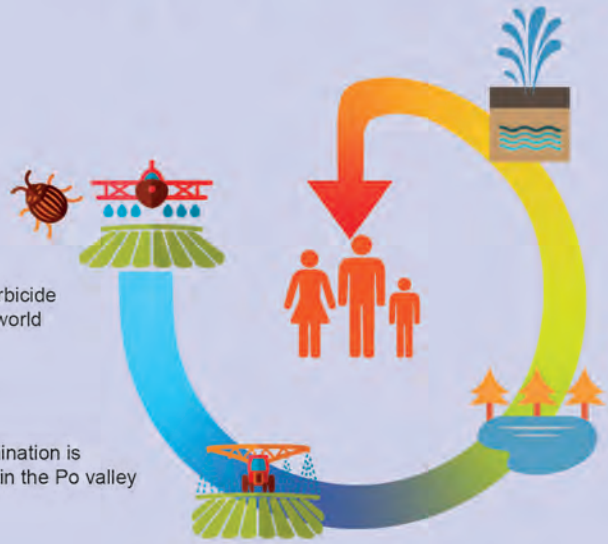
Supply breakdown by type of activity (new classification)



Water quality -Pesticides' pollution

Glyphosate:
The most used herbicide in Italy and in the world

Pesticides' contamination is the most common in the Po valley



195
Groundwater monitoring points exceeding the environmental quality limits

419
Surface water monitoring points exceeding the environmental quality limits