

WORKING GROUP ON ENVIRONMENTAL MONITORING AND ASSESSMENT

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Round Table on latest developments in environmental monitoring and assessment at the national, subnational and company levels

Submitted by the Italian National High Institute for the Environmental Protection and Research (ISPRA)

A. MODERNIZATION AND UPGRADING OF NATIONAL MONITORING NETWORKS

The Italian National Environmental Knowledge and Control System, started in 1988, is a task of ISPRA since 1998. ISPRA is still dealing with the development of the System. A description follows of main environmental issues that it includes.

Air quality. ISPRA has implemented the database BRACE, available on the website www.brace.sinanet.apat.it. In accordance with European Decisions 97/101 “Exchange of Information” and 2001/752/CE and Directive “Ozone” 92/72/CE, BRACE includes checked information (data and metadata) from the monitoring stations, distributed all in the Country and managed locally, that is transmitted on-line and updated yearly. Data of BRACE – provided by Regional Focal Points, Environmental Protection Agencies of the Regions and Autonomous Provinces (ARPA/APPAs), Regions and Provinces – deal with main pollutants: ozone (O₃); particulate matter (PM₁₀); nitrogen dioxide (NO₂); benzene (C₆H₆), sulphur dioxide (SO₂). Statistical parameters (mean, median and percentiles) and exceeding limits are calculated. In agreement with the Ministry of Environment, Territory and Sea, Regions and ARPAs, methodologies are harmonizing to identify monitoring stations. Work is in progress.

Air emission. ISPRA is responsible for the compilation of the National Air Emission Inventory through the collection, elaboration and diffusion of data, in the framework of the United Nation Convention on Climate Change (UNFCCC) and the UNECE Convention on Long-Range Transboundary Air Pollutant. Also ISPRA manages the National Registry of emission and emission quotas. To enforce the Directive n. 2003/87/EC (Emissions Trading), following the issuance of the Decree of the Ministry of the Environment, Territory and Sea (DEC/RAS/ 074/2006) containing the assigning and issuance of CO₂ quotas for the period 2005-2007, a National Registry was established. This registers all operations carried out (issuance of quotas, transfers, acquisitions and cancellations) and shows compliance with control obligations taken by operators (reconciliation between owned quotas and actual emissions of single operators).

The assessment of emissions is made through suitable processes of estimation, based on

activity data and emission factors. With regard to GHGs, the benchmark methodology is the one indicated by the Intergovernmental Panel on Climate Change (IPCC). In order to establish compliance with national and international commitments, the National GHG Emission Inventory is compiled and yearly communicated to the competent institutions through compilation of the Common Reporting Format (CRF), according to the guidelines provided by the UNFCCC and the European Union's Greenhouse Gas Monitoring Mechanism (EUGGMM).

National Inventory is yearly updated by a report, in order to reflect revisions and improvements in the methodology and availability of new information, according to the guidelines on reporting. It provides an analysis of the Italian GHG Emission Inventory communicated to the Secretariat of the UNFCCC and to the EUGGMM. Emission estimates deal with the 6 direct greenhouse gases under the Kyoto Protocol (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride) which contribute directly to climate change, owing to their positive radioactive forcing effect, and with 4 indirect greenhouse gases (nitrogen oxides, carbon monoxide, non-methane volatile organic compounds, sulphur dioxide).

The CRF files and other related documents are available on the website <http://nfp-it.eionet.eu.int:8980/Public/irc/circa-it/reportnet/home>.

Information related to provincial emissions of national Inventory (1990, 1995, 2000 and 2005) are available on website <http://www.sinanet.apat.it/it/inventaria>, based on the SNAP classification (*Selected Nomenclature for Air Pollution*). Final report on methodologies is under revision and will be launched on the same website.

For the other pollutants, the methodology used is the one indicated by the CORINAIR project (COoRdination-INformation-AIR) implemented by the European Environment Agency, according to the Selected Nomenclature for Air Pollution (SNAP97). Data are available on the website: <http://nfp-it.eionet.eu.int:8980/Public/irc/circa-it/reportnet/home>.

Climate. SCIA is the National System for gathering, elaborating and spreading environmental climate data. The project is developed in cooperation with General Office of Air Force (UGM), Central Office of Agricultural Ecology, ISPRA Mareographic Service and 8 ARPAs and Sicilian Agrometeorological Information Service. Input data are temporal series of observations from meteorological, hydro-meteorological or agri-meteorological stations according to World Meteorological Organization's (WMO) standards.

Waste. ISPRA – the National Reference Centre on Waste for the European Environment Agency – with ARPA/APPAs, has implemented the National Inventory System, an implementation tool of the Regulation 2150/2002/EC on waste statistics. It also provides assessment criteria and procedures for data validation, thus improving the waste accounting system through the definition of uniform standard procedures for all regional units.

A national database of the plants and undertakings involved in the waste recovery and disposal activities is updated yearly. It includes inventories of the following plant categories: landfills, incineration, physical/chemical treatment, composting and

biological treatment.

According to the specific European legislation, specific waste streams are currently being monitored by updating related inventory databases: packaging waste (dir. 2000/12/EC), end of life vehicles, (dir. 2000/53/EC), waste electrical and electronic equipment (dir. 2002/96/EC), polychlorinated biphenyls and polychlorinated terphenyls-PCBs/PCTs (dir. 96/59/EC), waste oil (dir. 75/439/EEC), batteries and accumulators (dir. 2006/66/EC).

A project on Waste Telematic Inventory has been elaborated. It is designed to be based on the use of digital data transfer for managing information on the waste management cycle. The inventory is structured on a distributed network system constituted by the National Section and the 21 Regional and Provincial Sections, hosted respectively by the ARPAs and by the APPAs of Trento and Bolzano. This network is connected to other subjects that share tasks and responsibilities on the management of information concerning the waste cycle and the whole waste management sector, such as the Chambers of Commerce, the National Register of waste management companies, local authorities, the National Observatory on Waste (NWO) and related regional units, the material Consortia (CONAI – National Packaging Consortium, COBAT – the Mandatory Consortium for spent lead acid batteries and lead waste, COUU - Mandatory Consortium for Used Oils and other for specific waste streams).

Water. ISPRA has developed a data base to gather and harmonize data and information that must be provided by Regions to the Ministry of the Environment Land and Sea, according to the Italian framework legislation on water. Besides data related to pressures and impacts for characterization of national, interregional and regional river basins, the database is designed in order to include data on the state and trend of inland (surface water and groundwater), transitional, marine and coastal waters. Data come from regional monitoring networks.

Moreover, according to the EU and national legislation, the database includes data on specific water destination, like bathing water quality, quality required for shellfish waters, quality of waters needing protection to support fish life and surface waters for drinking water production. It includes also data on waste water treatment and data related to the protection of waters from pollution due to nitrates coming from agricultural sources.

Data on water quality are elaborated into many indicators, according to the characteristics of the type of water body.

Most of data for rivers and lakes are collected also for artificial waters, like reservoirs and channels.

Water quality data, as requested by the national legislation, are also combined with water quantity data as discharges, in order to obtain a complete vision of the water resources.

ISPRA manages the National Wavemetric Network and the National Marigraphic Network. The first network monitors physical state of the sea, in particular wave-motion and temperature gathered at 14 observation points off the Italian coasts. Gathering began

in 1989 and is daily, every 3 hours. Initiatives aimed at improving the population process quality of databases are in progress, by means of information from data-logger at observation points. The National Marigraphic Network – that began to work in 1998 – monitors, at 26 seaports of Italian coasts, sea level varying for tides and global climate changes, wind speed and direction measured at 10 meters from the soil, atmospheric pressure, air and water temperature.

National hydrographic grid at scale 1:250,000 is used to realize topic layers referred to superficial waters, to national spreading of treatment systems for urban wastewater sewerage and to nitrates map.

In accordance with European Directive 2000/600/CE, Italian components of EU intercalibration network referred to methodologies using to define and classify ecological state of superficial waters and Official Register of intercalibration sites (managed by EU Joint Research Centre) were identified.

Environmental radioactivity. ISPRA collects data from the national RESORAD (REte di Sorveglianza sulla RADioattività) network for controlling environmental radioactivity, by means of specifically equipped facilities, bodies and institutions (under article 104 of Legislative Decree 230/95, as subsequently amended), based on a digital format developed at home. Data deal with measurements of activity concentration, relating to environmental and food matrixes. Data are grouped according to sampling location, pursuant to the Commission Recommendation 2000/473/Euratom. It recommends a model of national network suited to the present monitoring needs, based on an architecture broken down into high-sensitivity sampling locations within a “sparse monitoring network” (at least one for each of the macro-regions into which Italy has been divided) and ordinary sampling locations within a “dense monitoring network”. Data provide a snapshot of the situation, with respect to the absolute number of measurements carried out and the type of matrixes used.

Yearly, data are elaborated and sent to EC that inserts them in the European database REM. Data of food matrixes are provided to Ministry of the Health. The national database of environmental radioactivity (DBRad) started, with a data transfer system on web using the MIDRad form.

Noise. ISPRA is in charge with collecting data on environmental noise national situation: noise pollution sources, exceeding limits, state of law implementation, etc. In order to achieve this purpose, ISPRA and ARPA/APPAs developed the National Noise Observation System – a data bank including environmental national noise data, information related to noise issues and noise indicators – which allows analysis of the national situation about noise topics. In order to achieve a common understanding for the noise problems, the environmental noise system data base (next year available on ISPRA’s web site <http://www.isprambiente.it>) can be used to acquire information related to the impacts due to the main noise sources, the legislation state of the art, the activities of monitoring and control carried out by ARPA/APPAs, the adopted acoustical planning measures. Data are transmitted on-line by the Regional Environmental Protection Agencies and updated yearly.

In 2008 ISPRA has developed the National Electromagnetic Inventory (CEN), based on Regional Electromagnetic Inventories (CER), in close collaboration with the Regional

Agencies in order to supply information about the sources of electromagnetic fields on the national area.

B. IMPROVEMENT OF DATA MANAGEMENT AND USE OF DATA IN DECISION-MAKING

Improvement of data management in support of the policy decision-process is based on:

- harmonization function carried out by ISPRA to improve quality of data coming from monitoring and control activities within ARPA/APPAs Laboratory System;
- quality analysis of environmental data to populate indicators;
- inter-calibration techniques for ARPA/APPAs Laboratory System;
- measurement networks;
- statistical techniques to clean up data coming from sampling surveys and censuses;
- sector analysis to value indicators of waste productivity, air emission, etc.;
- development of indicators with high efficacy information to support decision-making.

C. PUBLICATION OF ENVIRONMENTAL INDICATORS AND INDICATOR-BASED ASSESSMENTS

ENVIRONMENTAL INDICATORS

ISPRA has continued to implement indicators set of the National Environmental Knowledge and Control System network, with the fundamental contribution of the ARPA/APPAs System.

ISPRA has realized a core set of indicators for Environmental Data Yearbook (EDY) in order to describe the environment state and trends in the Country. Since 2008 the core-set of indicators is on updating.

In 2008 indicators fact sheet has been used. The frame includes a large number of metadata to properly describe indicator characteristics. Focus is on data quality and information quality assessment of indicator, based mainly on relevancy as well as accuracy and comparability of data in space and time. The fact-sheet structure is the logical scheme of ISPRA Yearbook Database (YD), which many products come from (see further).

ISPRA has improved YD (<http://annuario.apat.it>) for the EDY. YD is a very versatile tool implemented to streamline and improve the processing of indicators data and metadata stored on a centralized database, updated on-line by authorised users (more than 200 experts from the ARPA/APPAs System and other institutions all over Italy), following the defined workflow. YD provides public users with search and navigation facilities on the available indicators. All data and metadata retrieved can be visualized and downloaded, including individual data tables and charts or maps for each selected indicator fact-sheet. If needed, users can access other information not contained in the final version of the Yearbook or contained in past editions. Combining different data

and information made available by the software application, a “customized version” of EDY, tailored on user’s needs, can be produced and downloaded.

In order to gather and to spread environmental information, ISPRA has continued to update statistical methodologies for indicators.

Finally, ISPRA deals with sustainable development indicators also. ISPRA takes part in the international Working Groups on Sustainable Development Indicators (SDI), in the framework of the EU Sustainable Development Strategy (Eurostat).

Yearly ISPRA send indicator-based information on sustainable development to the National Interdepartmental Economic Planning Committee (CIPE, under Prime Minister’s Office), in order to check the national Strategy for sustainable development. Indicators concern: fight against climate change, transport, public health, management of natural resources.

INDICATOR-BASED ASSESSMENTS

Main indicator-based assessment publications of ISPRA are: Environmental Data Yearbook, Waste Report, Urban areas Report, Climate Report.

A description follows of these publications.

Environmental Data Yearbook (EDY). EDY is the national reference for the environmental information in Italy. Every year we work to improve the previous release by producing both new tools to gather data and new environmental reporting mechanisms. The publication is the result of a synergic activity of Environment Agencies System.

EDY includes many products: an unabridged version (containing all the information forms filled out during the year, organised by production sectors, environmental conditions and responses), “Key Topics” (including a piece of information relevant to the priority environmental issues, subject matters of prevention and recovery intervention), Vademecum (a pocket handbook, including a short synthesis of “Key topics” evaluation), Multimedia version and the Yearbook Database (an instrument designed for telematic consultation of the indicator fact sheets and the production of reports). This tool, which has been implemented to streamline and improve the processing of the data and metadata, allows users to search the available indicators and to access, if need be, other information not contained in the final version of the Yearbook or contained in past editions. A very versatile tool, which allows the realization of customized abridged versions, according to users’ needs.

Edition 2008 of the unabridged version, “Key topics” (distributed for the last G8 Environment in Syracuse, 22-24 April 2009), Vademecum, Multimedia version and the Yearbook Database are available on the ISPRA website <http://annuario.apat.it/>. All of this products, except the unabridged version and the YD, are in Italian and English.

Some innovations in the 2008 edition. For the unabridged version:

- Section A: contains a new chapter on the core set revision criteria and a chapter dedicated to social-economic indicators (population, area, etc.);

- Section B: reorganization of chapters on Agriculture, Energy, Transport and implementation of ones on Tourism and Industry;
- Section C: revision of the section, in particular Hydrosphere and Geosphere;
- Section D: new chapter dedicated to territorial planning tools; development and implementation of chapters on Environment and health, Monitoring and control and Promoting and spreading an environmental culture.

In accordance with the ISPRA editorial plan, the unabridged version has been printing every three years (next 2009 edition will be printed).

With “Key Topics”, ISPRA promotes a possible mode of use of the information base of the Yearbook for evaluating contextual situations regarding the environmental topics that currently constitute the priority concerns of environmental policies. Indeed, in the case of many of the areas considered, the topics addressed are the same as those found in the EU’s Sixth Environmental Action Plan.

In 2008 ISPRA has published 2008 edition of “Key topics” (ITA-EN: it will include new themes, and soil will have a prominent position), Vademecum (ITA-EN) and Multimedia version (ITA-EN). A new release of the YD is in progress. Also a little book would be very likely launched on the main 10-15 indicators. With regard to the EDY’s formal aspects, a further effort are in progress in order to improve the level of harmonization and communication effectiveness of the instruments (graphs, tables, theme maps) used to represent the indicators.

Waste Report. The “Waste Report” (an annual publication) provides a “photograph”, as exhaustive as possible, of (municipal and hazardous and no hazardous) waste management cycle in Italy, from collection to disposal. Nowadays the Italian effective waste accounting system is the most developed in Europe, thanks to work of ISPRA and of the Waste National Authority. “Waste Report 2008” has been launched.

Urban areas Report. This annual Report is included among the multi-year project “Environmental quality of Italian urban areas”, with ARPA/APPAs and many qualified scientific and technical institutions.

“The Fifth Report on Quality of Urban Areas” has been launched in 2009. It deals with analysis of local planning tools, developed in cooperation with national and local authorities. The text is brief and it is accompanied by a “focus” titled “Il suolo, il sottosuolo e la città”. On the website <http://www.areeurbane.apat.it/site/it-IT/> all these documents are available with the information reports about cities with a population of more than 150,000.

Climate Report. Since 2006 ISPRA has carried out the “Indicators of climate in Italy ” report. It presents state and trends of climate in Italy and it’s based on SCIA, the National System for gathering, elaborating and spreading environmental climate data. “Indicators of climate in Italy 2007” has been published and it is available on the following website: http://www.sinanet.apat.it/it/strumenti/catalogo/dettagli_metadati?testo=clima&document_type=6&metadata_lookup=1001&docid=1058.

Italian Greenhouse Gas Inventory 1990-2006. National Inventory Report 2008. This report is compiled according to the guidelines on reporting as specified in the document

FCCC/SBSTA/2002/L.5. It provides an analysis of the Italian GHG emission inventory communicated to the Secretariat of the Climate Change Convention and to the European Commission in the framework of the Greenhouse Gas Monitoring Mechanism in the year 2007, including the update for the year 2005 and the revision of the entire time series 1990-2004.

Emission estimates comprise the six direct greenhouse gases under the Kyoto Protocol (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride) which contribute directly to climate change owing to their positive radiative forcing effect and four indirect greenhouse gases (nitrogen oxides, carbon monoxide, non-methane volatile organic compounds, sulphur dioxide).

This report, the CRF files and other related documents are available on website at the address http://www.sinanet.apat.it/it/sinanet/serie_storiche_emissioni.

ISPRA feeds many Series of publications also, a lot of these with indicators and indicator-based assessments: Handbooks and Guidelines – Reports – Proceedings – State of the Environment – Miscellany – Documents – Capacity building – Quaderni. In accordance with ISPRA's editorial plan, from 2008 onwards most of the publications will be published only in electronic version.

Since September 2008 ISPRA has published many products in these series (available on ISPRA website <http://www.isprambiente.it>). A list of the major environmental publications is following:

- ISPRA (2008), Il riutilizzo delle acque e dei fanghi prodotti da impianti di depurazione di reflui urbani: quadro conoscitivo generale ed aspetti specifici, Serie Rapporti
- ISPRA (2008), Il Suolo: la radice della vita, Serie Miscellanea
- ISPRA (2009), Rapporto sulla qualità dell'ambiente urbano – edizione 2008, Serie Miscellanea
- ISPRA (2008), I piani regionali di risanamento della qualità dell'aria – La banca dati ISPRA PRQA_Misure, Serie Miscellanea (on line www.isprambiente.it).
- ISPRA (2008), L'informazione sulla qualità dell'aria in Italia secondo la Decisione 2004/461/CE – Anno 2006, Serie Rapporti (on line www.isprambiente.it).
- ISPRA (2008), Valutazione della sostenibilità ambientale e integrazione di dati ambientali e territoriali, Serie Rapporti.

Main volumes published out the Series

- ISPRA (2008), Vademecum (from Annuario dei dati ambientali 2008) (ITA-EN).

Electronic products

- ISPRA (2009), V Rapporto annuale sulla qualità dell'ambiente urbano. (on line www.areeurbane.apat.gov.it).
- ISPRA (2009), Schede città. (on line www.areeurbane.apat.gov.it).
- ISPRA (2009), Focus su: Il suolo, il sottosuolo e la città (on line www.areeurbane.apat.gov.it).
- ISPRA (2009), CD-ROM Rapporto sulla qualità dell'ambiente urbano –

edizione 2008

- ISPRA (2008), CD Rapporto rifiuti 2008
- ISPRA (2008), Rapporto rifiuti 2007 – Estratto (on line www.isprambiente.it).
- ISPRA (2009), Key topics (on line www.isprambiente.it).
- ISPRA (2008), Carbon Dioxide Intensity Indicators (on line www.isprambiente.it).
- ISPRA (2008), Italian Greenhouse Gas Inventory 1990-2006. National Inventory Report 2008 (on line www.sinanet.apat.it/it/sinanet/sstoriche/).
- ISPRA(2008), Verso il reporting elettronico della direttiva quadro sulle acque – Requisiti utente (on line www.isprambiente.it).
- ISPRA (2008), Port Environmental Review System (PERS).
- Una metodologia per l’attuazione delle indicazioni contenute nel “Environmental Review” della European Sea Ports Organization (ESPO) (on line www.isprambiente.it).
- ISPRA (2008), Atti del workshop - Sindrome dello spopolamento degli alveari in Italia:approccio multidisciplinare per l’individuazione delle cause e delle strategie di contenimento del fenomeno (on line www.isprambiente.it).

Products published out the Series, since 2008.

- ISPRA (2008), Rapporto rifiuti 2008.
- ISPRA (2008), Rapporto rifiuti 2007 – Estratto.
- ISPRA (2009), Focus su Il suolo, il sottosuolo e la città.
- ISPRA (2008), Gli indicatori del clima in Italia nel 2007.
- ISPRA (2009), Annuario dei dati ambientali 2008.
- ISPRA (2009), Quinto Rapporto sulla qualità delle aree urbane.