

SEIS COOKBOOK

Second Edition: March 2015

DESIGNED FOR PRACTITIONERS IN
ENVIRONMENTAL
INFORMATION MANAGEMENT



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Table of Contents

SEIS Cookbook introduction	4
What is the SEIS Cookbook?	6
From Rio Principle 10 to the SEIS initiative	7
Understanding SEIS elements – a key to change	10
SEIS is happening now (in your backyard).....	11
The integration aspects of the SEIS pillars	13
How to use the Cookbook:	14
Case studies:.....	15
Table 1: Case studies and the SEIS principles.....	16
Table 2: Cookbook case studies according to the topics.....	19
SEIS for Lake Sevan - Armenia	25
Environmental Portal Austria	30
Environmental indicators - Belarus	32
Belgian Environmental Information System (BEIS)	37
Information System of Statistics and Reporting (ISSaR) – Czech Republic.....	39
Czech Environmental Metaportal.....	43
German PortalU – one-stop shop.....	46
Geographic System for the Environment (GSE) - Israel.....	51
Jorinfo database - Jordan	54
Water Information System (WIS) - Jordan	57
Inter-institutional cooperation in Moldova towards SEIS	60

POPs Database and Mapping - Moldova	63
Regional environmental information and monitoring systems - Morocco	67
Norway Digital (ND).....	75
Serbian EIONET Network (EIONET-RS)	80
Environmental indicators in Slovenia	84
Interactive Statistical Atlas of Slovenia	87
Distributed data collection system - Sweden.....	90
Integrated monitoring of Sochi National Park - Russian Federation.....	95
Technologies of Ecological Development - Russian Federation.....	97
Integrated regional information system - Ukraine.....	100
Black Sea SCENE.....	105
HELCOM – Baltic Sea data management system	107
Water Information System for Europe (WISE)	111
Reportnet - Distributed data collection and management system.....	114
E-PRTR – European Pollutant Release and Transfer Register.....	118
Centre on Emission Inventories and Projections (CEIP) emission database and information system.....	121
SENSE - Shared European and National State of the Environment information.....	125
Things to remember – a brief 'SEIS' checklist.....	128
Content.....	129
Infrastructure	130
Cooperation.....	133

SEIS Implementation	134
Ideas for SEIS implementation	135
1. Create an overall vision	135
2. Anchor SEIS to national legislation and IT strategies	136
3. Develop a strategic plan	136

SEIS Cookbook introduction

Timely, relevant and reliable environmental information is essential to tackle environmental challenges, to inform citizens about the quality of the environment in their neighbourhood and to support decision makers.

In 1992, at the World Summit on Environment and Development, the world leaders concluded that environmental issues are of public interest and consequently best handled with the participation of all concerned citizens at the relevant level. An open invitation was therefore launched to countries and information holders, to find appropriate ways and practical means to facilitate public access to environmental information as a practical tool for informed action. This invitation was captured in Principle 10 of the [Rio Declaration](#). *“Environmental issues are best handled with the participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities... States shall facilitate and encourage public awareness and participation by making information widely available...”*

The European response to the Rio declaration and the above mentioned environmental challenges was the development of the concept of the Shared Environmental Information System (SEIS). The SEIS concept is not just an IT system but rather a way to link the environmental information, the different stakeholders and the technical infrastructure into one coherent structure. It is described by [seven principles](#) to guide implementation procedures.

This ‘Cookbook’ is intended to be a guide to the understanding of these elements and principles. It uses examples of implemented Shared Environmental Information Systems (SEIS) from different regions and provides a list of potentially useful actions for implementation. There is not just one way of ‘implementing SEIS’. It needs to adapt and work with national institutions, take account of local culture, information needs, etc.

Therefore a good understanding of the underlying principles is important for the proper application of these principles.

The 'Cookbook' is thus a guide to understanding but not a rigid template for implementation. The following chapters will look at what the SEIS Cookbook is, how SEIS was initiated, what are the elements of SEIS, how SEIS is being implemented, what are the SEIS pillars and how to use the Cookbook. This will be followed by 25 examples representing systems compliant to one or more of the seven SEIS principles implemented at national, European or international level.



1

What is the SEIS Cookbook?

The present SEIS Cookbook is a response to the challenge set out in the declaration of the Rio summit in 1992, and a living demonstration that countries and organisations across Europe and beyond, are working together to develop creative solutions to achieve this goal.

The SEIS Cookbook was initiated under the auspices of a European Union (EU) funded project, implemented by the European Environment Agency (EEA) as part of the EU Neighbourhood Policy. It aims to gather, in a systematic way, the latest developments and initiatives in access to and sharing of environmental information taking place at both country and organisation (EU, EEA/European Environment Information and Observation Network (Eionet) countries and the two European Neighbourhood Policy Instrument (ENPI) regions) level. It also aims to disseminate best practice and share experience across different regions, and encourage progress, cooperation and partnerships for further development. The variety of case studies presented in the SEIS Cookbook demonstrates that there is no unique model to follow and that the sharing and access of information is already happening everywhere. In addition, the SEIS Cookbook aims to highlight the most important elements to be taken into account when planning SEIS implementation, by providing a list of potentially useful actions.

The document is a contribution to the future streamlining process, to ensure that progress is faster, consistent, and participatory.



2

From Rio Principle 10 to the SEIS initiative

A major challenge in Europe, and globally, is to organise the vast array of environmental data and information that has already been collected and to integrate it, where desirable, with existing social and economic data. This data should be made available together with tools that allow experts to do their own analyses and to communicate their results in ways which policy makers and the public can readily understand and use as a basis for their own actions. At the same time, countries and organisations (including EU institutions) need an efficient and modern reporting system to fulfil their legal obligations and mandates, thus avoiding double, overlapping, and redundant reporting efforts. The Shared Environmental Information System aims to address these challenges.

In 2007, the EEA was requested to conduct a series of country visits to EEA member and cooperating countries to open a process of implementing SEIS principles together with Eionet countries. By 2008 the first conclusions were drawn and some good practice examples were gathered following more than ten country visits conducted by the EEA. The Shared Environmental Information System (SEIS) was legally launched by a [communication](#) of the European Commission (EC) in 2008. The launch was a collaborative initiative of the EC, EEA and EU Member States to establish an integrated and shared EU-wide environmental information system. The initiative aims to tie in better all existing data gathering and information flows related to EU environmental policies and legislation with the support of modern technologies such as the internet and satellite systems. In many Member States it is seen as the key initiative to modernise environmental information systems.

The SEIS concept can be better defined and translated into concrete actions through its basic **'principles'**. In this context, information should be:

1. Managed as close as possible to its source.
2. Collected once, and shared with others for many purposes.
3. Readily available to easily fulfil reporting obligations.
4. Easily accessible to all users.
5. Accessible to enable comparisons at the appropriate geographical scale, and citizen participation.
6. Fully available to the general public, and at the national level in the relevant national language(s).
7. Supported through common, free open software standards.

The case studies in the SEIS Cookbook are selected taking into account these principles, each example highlighting the implementation of one or more principles.

Gradually, the SEIS concept (and principles) were embraced by countries and regions beyond the EU and recognised as a key driver in facilitating access to and sharing of environmental information at local and global levels. Expressions of broad political recognition of the SEIS objectives and guiding principles in action were recently provided by high political fora such as the UNECE Pan-European ministerial conference (Astana, 2011), the Eye on Earth Summit (Abu-Dhabi, 2011) and the UNEP Governing Council (February 2012). The issue of sharing environmental information also featured prominently on the Rio Summit agenda in June 2012.

The underlying aim of SEIS is also to move away from paper-based reporting to a system where information is managed as close as possible to its source, made available to users in an open and transparent way and for multiple uses and purposes.

According to the SEIS concept, environmentally-related data and information stored in electronic databases throughout Europe (EU and beyond) would be interconnected virtually and made compatible with each other. Consequently SEIS is:

- is a decentralised but integrated web-enabled information system;
- based on a network of information providers sharing environmental data and information; and

- builds upon existing e-infrastructure, systems and services available in the countries and organisations.

Control of the quality and timeliness of the information to be shared under SEIS is a crucial issue. If information is managed as close to its source as possible, accuracy tends to be better and updating of information is easier. On the other hand, since more responsibility lies with the information provider, the importance of adopting standards for environmental data and services is necessary.

Ownership of the information versus increased access to information is a key issue to be addressed and gradually resolved. The development and gradual implementation of SEIS addresses this challenge through a set of activities and processes such as:

- Development of data policy agreements and protocols for data exchange;
- Partnerships for building trust and confidence between institutions and other data stakeholders;
- Systematic communication campaigns promoting the benefits and added value of sharing environmental information for both decision-making and awareness raising; and
- Developing or amending existing legal frameworks (national, EU, others) to facilitate data and information sharing.



3

Understanding SEIS elements – a key to change

Aiming towards SEIS compliance implies identifying, assessing and acting upon three main pillars:

1. Content (environmental or other data and information related to: water; air, biodiversity, forest, waste, transport, energy etc.) available in countries and organisations at various levels and potentially used for policy-making and/or awareness raising.
2. Infrastructure and services – tools and instruments to facilitate the sharing of and access to data and information (technological platforms, software, standards and protocols for data exchange etc.).
3. Networking (cooperation) – including data and information holders at local, national or international levels, potentially involved in the access and sharing of environmental or related information.

The SEIS Cookbook looks at all these elements and how they really interact in practice. This is demonstrated by concrete examples gathered from countries and international organisations.



4

SEIS is happening now (in your backyard)

The EEA, alongside other partners (countries, EU), plays an important role in the implementation of SEIS. It plays a crucial role in collecting and disseminating environmental information and knowledge (through assessments, indicators, thematic reports and data bases, etc.) from a dedicated network of countries and related institutions: the European Information and Observation Network (Eionet). Examples of Eionet experiences in translating SEIS into practice are diverse (the Eionet infrastructure for supporting and improving data and information flows (Reportnet), Shared European National State of the Environment (SENSE) for reporting, indicator development and regular update etc.) and some of them are presented in the SEIS Cookbook to “inspire” and be used by other countries and regions.

The EEA has conducted around 50 “SEIS Country Visits” to member and cooperating countries, and to European neighbours, to explain SEIS and its benefits, and to encourage implementation and identify existing SEIS-compliant activities at the national or regional level. Relevant examples gathered at national or regional levels through these visits are also captured in the SEIS Cookbook.

In the area of reporting and assessment, SEIS was most recently applied in the preparation of two key EEA assessments: “*European State of the Environment Report 2010 - (SOER 2010)*” and “*Europe’s Environment Assessment of Assessments (EE-AoA)*”, facilitating the countries’ direct contributions to these processes by using the benefits of modern and openly available technological platforms. The benefits of SEIS for regular reporting and

assessment at all levels are consequently presented in the Cookbook as a basis for future regular reporting processes.

There are many on-going European and global initiatives contributing to the implementation of SEIS. The EEA, together with many countries and organisations, is involved in these activities, and many others could join once they are in a position to reap the benefits of such cooperation. The Cookbook highlights some of these activities and their SEIS-compliant relevance. Some significant initiatives at European and global level are:

- INSPIRE: INfrastructure for SPatial InfoRmation in Europe: aiming to improve the accessibility and interoperability of spatial data.
- WISE: Water Information System for Europe: integrating data flows from many water-related directives as well as water relevant statistical data.
- BISE: the Biodiversity Information System for Europe: similar to WISE but in the area of biodiversity.
- OzoneWeb, the EEA portal for sharing ozone information: linking national and regional ozone websites and providing users with real-time local air quality data. Particularly interesting is its success as a voluntary initiative, which involved a lot of partnership building.
- Copernicus, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation, aiming to provide information services based on Earth monitoring data from satellites and in situ observations on water, air and land.
- Eye on Earth: a “global public information service” for creating and sharing environmental information and good practices for implementing SEIS for Europe. Eye on Earth developments in particular show the need to combine networking and cooperation to promote new technical solutions. Eye on Earth uses social networking as a new way to engage citizens as stakeholders.
- The Group on Earth Observations (GEO) is a global partnership that includes the EU and its Member States. It aims to coordinate efforts to build a Global Earth Observation System of Systems (GEOSS). Amongst other elements, it includes agreements on data sharing principles.
- Open government and open data initiatives are growing substantially within Member States as well as internationally. The EEA, with its open data policy, is particularly keen to be a forerunner in the spread of good practice. On the technical side, the EEA is implementing linked open data technologies as a backbone for more dynamic generation of our “state of the environment” reports as well as for our future information sharing.



5

The integration aspects of the SEIS pillars

The success of the initiatives shown in the previous page often lies in the fact that they integrate activities on all three SEIS pillars. This way of introducing structure and enhancing relationships could be considered a model for SEIS “enterprise architecture” without entering into technical details. Some examples:

For a SEIS-compliant information system the cooperation issues have to be addressed by, for example, setting up working groups to discuss and prepare the demand side of the information system by identifying appropriate content. Often this is done through the selection of policy-relevant indicators. This process usually involves a lot of networking and cooperation. An agreed indicator selection then allows the appropriate data flows to be identified and established or refocused (WISE or BISE). In the context of European Neighbourhood Policy Instrument implementation, the importance of this SEIS pillar for capacity building cannot be overestimated.

Regarding content, the analysis of data availability generally enables information gaps to be detected. This can then trigger streamlining activities. Streamlining may identify new or updated data requirements and should lead to a better and more relevant description of the data needed. The outcomes of the INSPIRE work on data specifications provide a basis for this, with thematic details to be solved through domain-specific discussions.

On this basis, the existing infrastructure should be reviewed and the need for new IT tools identified. Re-use of existing tools, where possible, is an example of good practice that the

EEA applies to Reportnet, or to thematic map publishing via standardised web services. The adoption of technical standards has proved to be very useful in enhancing interoperability.



6

How to use the Cookbook

The SEIS Cookbook is designed to be used as any other guidance document, where many different case studies could be seen as possible ‘recipes’. To make it easier, the case studies have been mapped against the SEIS principles, showing which example is the most relevant to a given principle.

The Cookbook is equipped with

- An introduction to SEIS, to the Cookbook and to the structure.
- A set of case studies, collected from EU Member States, the Western Balkans and the EU neighbourhood countries.
- A SEIS checklist entailing a set of questions helping to assess the status of SEIS development and identify possible gaps and areas for further enhancement.
- Steps to be taken into account when planning SEIS implementation.

Case studies:

The bulk of the Cookbook is devoted to case studies which show national and international implementation of SEIS principles, including at the EEA. Many national examples evolved during and after the visits of the EEA experts to 52 different countries in the EU Member States, the Western Balkans and countries in the EU neighbourhood.

A 'SEIS case study' is a description of all or part of an Environmental Information System, at a national, regional or international level. It is partially or fully compatible with the SEIS principles and has a special feature that makes it relevant for anyone interested in building SEIS.

To have a relatively short, easy to read and comparable result, a template has been designed for the case studies. Based on the template, a case study covers information on all three pillars of SEIS and some additional useful information. Each case study is structured with a banner on the top to show the name of the system or process it refers to and to mark its relevance to each SEIS principle.

The Cookbook is an electronic document which will be updated over time as technology develops and new systems are introduced.

Table 1: Case studies and the SEIS principles

No.	Country or organisation - name of the case study	SEIS principles – Information is:						
		1. Managed as close as possible to its source	2. Collected once , and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public , in relevant national language(s) .	7. Supported through common, free open software standards
1.	SEIS for lake Sevan - Armeina	x	x	x	x		x	x
2.	Austria - Environmental Portal Austria	x	x	x	x	x	x	x
3.	Environmental indicators - Belarus		x	x	x	x	x	
4.	Belgium - Belgian Environmental Information System (BEIS)	x	x	x				
5.	Czech Republic - ISSaR Information System of Statistics and Reporting	x	x				x	
6.	Czech Republic - Czech Environmental Metaportal		x	x	x		x	
7.	Germany - Portal U – one stop shop	x	x		x		x	
8.	Israel - Geographic System for the Environment (GSE) GIS IS		x					
9.	Jordan - Jorinfo	x	x		x		x	
10.	Jordan - Water Information System	x	x				x	
11.	Moldova Inter-institutional cooperation in	x	x					

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	Moldova towards SEIS							
12.	Moldova - POPs Database and Mapping	x	x		x		x	
13.	Regional environmental information and monitoring systems - Morocco	x	x		x	x	x	
14.	Norway - Norway Digital (ND)	x	x	x	x	x	x	x
15.	Serbia - Serbian EIONET Network (EIONET-RS)	x		x			x	x
16.	Slovenia - Environmental indicators in Slovenia		x	x	x		x	
17.	Slovenia - Interactive statistical atlas of Slovenia	x		x	x	x	x	
18.	Sweden - Distributed data collection system	x	x	x			x	
19.	Russian Federation - Integrated monitoring of Sochi National Park	x	x		x			
20.	Russian Federation - Technologies of Ecological Development, Russian Federation		x		x			
21.	Ukraine - Integrated regional information system	x	x	x	x		x	
22.	Black Sea - Black Sea SCENE	x						x
23.	ORGANISATION: Helsinki Commission – Baltic Marine Environment Protection Commission -	x		x	x	x	x	

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

	HELCOM – Baltic Sea data management system							
24.	EUROPE - Water Information System for Europe (WISE)		x	x	x	x		x
25.	Organisation: EEA - Reportnet - Distributed data collection and management system		x	x	x	x		
26.	Countries: 27 EU Member States and Iceland, Liechtenstein, Norway, Serbia and Switzerland - E-PRTR – European Pollutant Release and Transfer Register	x	x	x	x		x	
27.	Organisation: UNECE (EMEP/CEIP) - Centre on Emission Inventories and Projections (CEIP) emission database and information system		x	x	x	x		x
28.	Organisation: EEA - SENSE - Shared European and National State of the Environment	x	x	x	x	x	x	x

Table 2: Cookbook case studies according to the topics

No.	Country/ Name of the case study	Why? Legislation	What? Environmental topics				Who? (number of institutions and a coordinating institution)	How?	Start year
			Air	Water	Waste	Other			
1.	SEIS for lake Sevan - Armenia	Support national policy	x	x	x	Agriculture, climate change, forestry, household consumption, industrial production, instruments of environmental policy, nature and biodiversity, soil and land use, socioeconomic development, transport	National Statistical Service, Ministry of Nature Protection, Ministry of Territorial Administration and Emergency Situations, Ministry of Energy and Natural Resources, Ministry of Agriculture	National Resolution	2014
2.	Austria - Environmental Portal Austria	Directive 2003/4/EC on Public Access to Environmental Information	x	x	x	Protected areas and biodiversity, noise, agriculture, climate change, forests, land use, natural resources, soil, waste, etc	All national/local and federal authorities	Process/legislation	2009
3.	Environmental indicators - Belarus	National legislation	x	x	x	Agriculture, climate change, energy, forestry, household consumption, human and ecosystem health, industrial production, instruments of environmental policy, nature and biodiversity,	Ministry of Natural Resources and Environmental Protection, National Statistical Committee, Ministry of Housing and Communal Services, Ministry of Energy,	Tools/IS/rules	Since 1990s with gradual improvements

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

						soil and land use, socioeconomic development, tourism, transport	Ministry of Agriculture and Food, and the State Property Committee.		
4.	Belgium - Belgian Environmental Information System (BEIS)	Reporting obligations to EU, MEAs, international organisations	x	x	x	biodiversity, transport, agriculture, energy, health, sustainable development, green economy etc.	21 providers and users of environmental information supported by secretariat NFP EEA	Network	1995; 2004
5.	Czech Republic - ISSaR Information System of Statistics and Reporting	Reporting obligations to EU, MEAs, international organisations, national	x	x	x	All environmental statistics	10 data providers, Czech Environmental Information Agency	Rules/IS	2005
6.	Czech Republic - Czech Environmental Metaportal	Reporting obligations to EU /INSPIRE directive	x	x	x	x	12 data providers, Czech Environmental Information Agency	Tool/ IS	2005
7.	Germany/ PortalU – one stop shop	Reporting obligations to EU - EEID, INSPIRE, MEAs - Aarhus Convention, National legislation- National Strategy on env. info.	x	x	x	Agriculture, climate, animal protection, construction, energy, economy, forestry, gene-technology, geology, health, nature and landscape, noise and agitation, radiation, soil and soil pollution, sustainable development, traffic, etc.	450 federal, state and local public authorities in 16 Länder (Federated States of Germany)	Process/ tools, rules/IS	2006
8.	Israel - Geographic System for the Environment (GSE) GIS IS	National legislation-	x	X	x	Sources of hazards, land-based pollution into marine environment	Most Israeli ministries, supervised by Ministry of	Legislation	2011

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		Freedom of Information Act					Environmental Protection		
9.	Jordan -Jorinfo	Reporting obligations to MEAs - Aarhus Convention	x	x	x	Environmental statistics and 15 other sectors, economy, demography, energy, transport, etc.	One information provider, Department of Statistics of Jordan	IS	n/a
10.	Jordan - Water Information System (WIS)	National legislation - Water Strategy for Jordan		x			Three information providers, Ministry of Water and Irrigation , Water Authority of Jordan and Jordan Valley Authority	IT	1993
11.	Moldova - Inter-institutional cooperation in Moldova towards SEIS	Reporting obligations to MEAs - Aarhus Convention	x	x	x	Weather conditions, National Protected Territories, scientific reserves, expenditures for environmental protection, geological data reporting.	Three information providers, Ministry of environment, National Statistical Service, State Environmental Inspectorate	Legislation, cooperation	2009
12.	Moldova - POPs Database and Mapping	Reporting obligations to MEAs - Stockholm Convention, 2004 National legislation – POP National implementation Plan				Toxic pollutants	One information provider, POPs office of the Ministry of environment, an NGO ECOS Moldova	Rules/IS	2010
13.	Regional environmental information and monitoring systems - Morocco	Framework law setting national guidelines for the environment and	x	x		climate change, biodiversity, coastal and marine environment, natural hazards, soil	Ministère Délégué Chargé de	Rules/network/IT/IS	2014

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

		sustainable development					l'Environnement (ONEM and OREDD), Various ministry departments (water, forestry, agriculture, industry, energy, fishing, etc.)		
14.	Norway - Norway Digital (ND)	European INSPIRE - directive, National legislation regarding spatial data	X	X	X	Demography, risks and risk management, protected sites, biodiversity and nature values, pollution, fisheries, geology, mineral resources, agricultural and forest resources, cultural heritage and outdoor recreation facilities	612 partners in 2011; Supervised by National Mapping Authority	Legislation/ cooperation/tool	2005
15.	Serbia - Serbian EIONET Network (EIONET-RS)	Reporting obligations to EU and MEAs covered by ROD	x	x	x	protected areas and biodiversity	11 main data providers, 11 other data providers, Serbian Environmental Protection Agency	Network	2011
16.	Slovenia - Environmental indicators in Slovenia	Reporting obligations to the EU, international conventions and national legislation. Providing high valued public environmental	x	x	x	Agriculture, climate change, energy, forestry, household consumption, human and ecosystem health, industrial production, instruments of environmental policy, nature and biodiversity, sea, soil and land use, socioeconomic	18 institutions Slovenian Environment Agency	Tool	2003

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

		publication (Aarhus Convention) Providing reliable source of information infrastructure for further analysis and assessment				development, tourism, transport			
17.	Slovenia - Interactive statistical atlas of Slovenia	Reporting obligations to MEAs - Aarhus convention		x		Municipal waste, water supply, natural disasters	Statistical Office of Republic of Slovenia	Rules/ process/ IS	2009
18.	Sweden - Distributed data collection system	Reporting obligations to EU, MEAs covered by ROD, national	x	x	x	Agricultural land, wetlands, toxic pollutants, environment and health, bathing water	Eight data hosts, Swedish Environment Protection Agency, multiple consultants	Rules, process, IS	1995
19.	Russian Federation - Integrated monitoring of Sochi National Park		x	x	x	Biodiversity	Sochi branch of Hydrometeorological service of Russian Federation	IT tool	2001
20.	Russian Federation - Technologies of Ecological Development, Russian Federation					Environmental technologies in different economic sectors	More than 110 partners, state authorities, research institutes, NGPOs	Cooperation/ tool	2011
21.	Ukraine - Integrated regional information system	National legislation:	x	x	x		Five authorities	IT	2011

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

		"Law of Ukraine on Ecological Protection" (article 20, 22) and others							
22.	Black Sea - Black Sea SCENE		x	x	x	x	More than 55 universities, research institutes and NGOs.	Network, IT	2005
23.	Helsinki Commission – Baltic Marine Environment Protection Commission - HELCOM – Baltic Sea data management system	Reporting obligations to MEAs - Helsinki Convention	x	x	x	Airborne Pollution Load Compilation (PLC-Air) Waterborne Pollution Load Compilation (PLC-Water) Cooperative Monitoring in the Baltic Environment (COMBINE) Monitoring of radioactivity (MORS) Surveillance of deliberate illegal oil spills	EU, DE, EE, FI, LY, LT, PL, RU, SE	Process/ tools/ IS	2004
24.	EUROPE - Water Information System for Europe (WISE)	All EU water directives and SoE reports		x		water: rivers, lakes, transitional and coastal waters, marine, ground water, bathing water, drinking water and wastewater	Group of four, EU member states, EEA member and cooperating countries	Cooperation/ legislation/ tool/ process/ rules	2007
25.	Organisation: EEA - Reportnet - Distributed data collection and management system	Reporting obligations to EU - EU Directive 2003/4 -Access to Environmental	x	x	x	Any environmental reporting obligation	EEA members and collaborating countries, ENP	Tool/IT	2002

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

		Information, EEA annual plans							
26.	Countries: 27 EU Member States and Iceland, Liechtenstein, Norway, Serbia and Switzerland - E-PRTR – European Pollutant Release and Transfer Register	Reporting obligations to EU - Regulation 166/2006	x	x	x		EU member states, CH, LI, NO, IS, RS	Rules	Since 2006
27.	UNECE (EMEP/CEIP) - Centre on Emission Inventories and Projections (CEIP) emission database and information system	Reporting obligations to MEAs - Aarhus convention, Declarations of the Environment for Europe process	x	x	x	Emissions on main pollutants (NOx, NMVOC, SOx, NH3, CO), heavy metals, POPs and PM Spatial distribution of emissions	51 Parties to the LRTAP Convention, EMEP centres	Process/ Rules/ Network	Since 2008 (at CEIP)
28.	EEA - SENSE - Shared European and National State of the Environment	Reporting obligations to EU - Directive on Public Access to Environmental Information and MEAs - Aarhus convention	x	x	x	Other SOER themes	13 countries, EEA	Process/ rules/IT	2010

COUNTRY: Armenia

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once, and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public, in relevant national language(s).	Supported through common, free open software standards
X	X	X	X		X	X

Shared Environmental Information System for Lake Sevan

Self-assessment

The Lake Sevan portal - currently being developed - will provide data on 16 environmental indicators for Lake Sevan, the largest lake in Armenia and the Caucasus region. It will include links to the indicators and the respective organizations providing data, and will visualise data on maps, diagrams and graphics. The portal will also present relevant international conventions and national legislation, a glossary of terms, and news and announcements.

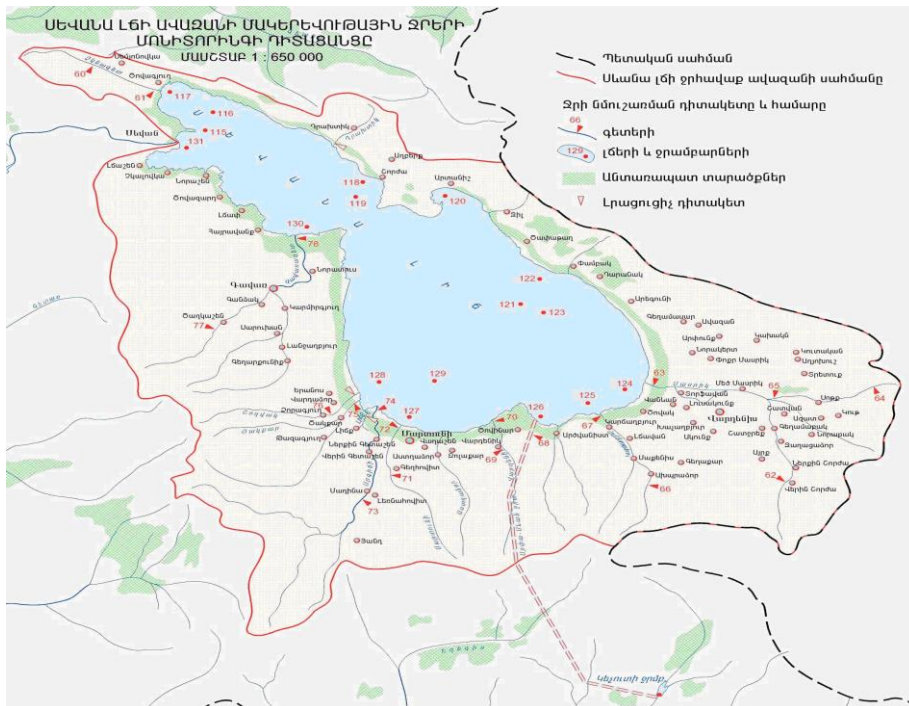


Figure 1. Lake Sevan watershed and monitoring network.

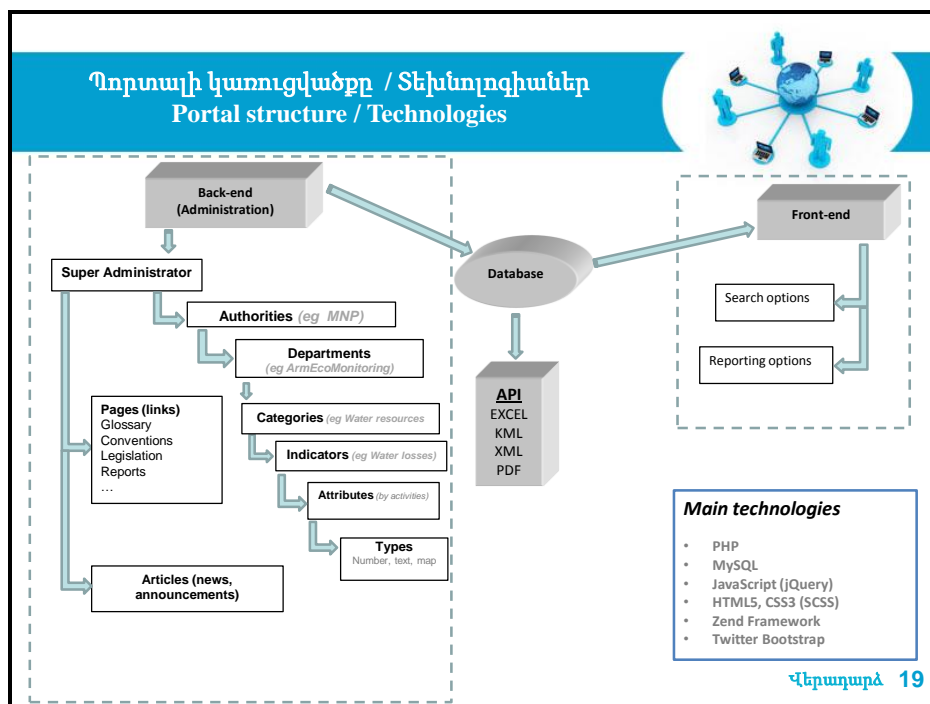


Figure 2. Structure of the Lake Sevan eco-portal.

Summary

The purpose of the Lake Sevan portal is to provide aggregated statistical information on 16 selected environmental indicators, and serve as a tool for improved decision-making on the Lake Sevan ecosystem. Development of the portal is managed by the National Statistical Service (NSS) of Armenia. After its completion, the portal will be transferred under the Sevan National Park (SNCO), managed by the Ministry of Nature Protection (MNP).

Content

The database of the Lake Sevan portal will be populated by specialists of the National Statistical Service based on information received from relevant institutions. The database will be connected to visualization programs (maps, diagrams, graphics)/map viewer, and updated automatically. Visual information will be available for download in XML, EXCEL, KML, PDF and JSON formats.

Cooperation

The National Statistical Service leads the development of the Lake Sevan portal in close cooperation with the Information Analysis Centre of the Ministry of Nature Protection. The Ministry of Territorial Administration and Emergency Situations, the Ministry of Energy and Natural Resources, the Ministry of Agriculture, the Environmental Impact Monitoring Centre of the MNP, and other data providers are part of the Lake Sevan SEIS and the cooperation in the production of data.

Infrastructure

The Lake Sevan portal will have one main interface that offers different options for general users, such as presenting indicators on maps, graphics, excel sheets and timelines; and the possibility for downloading data. On the other hand, the portal will also function as a database for data providers and holders of information, who will have access to the database on two access levels. The first level will be administrative; the second level will be accessible to relevant state institutions. The portal will be trilingual in Armenian, Russian and English, and it will include a search engine.

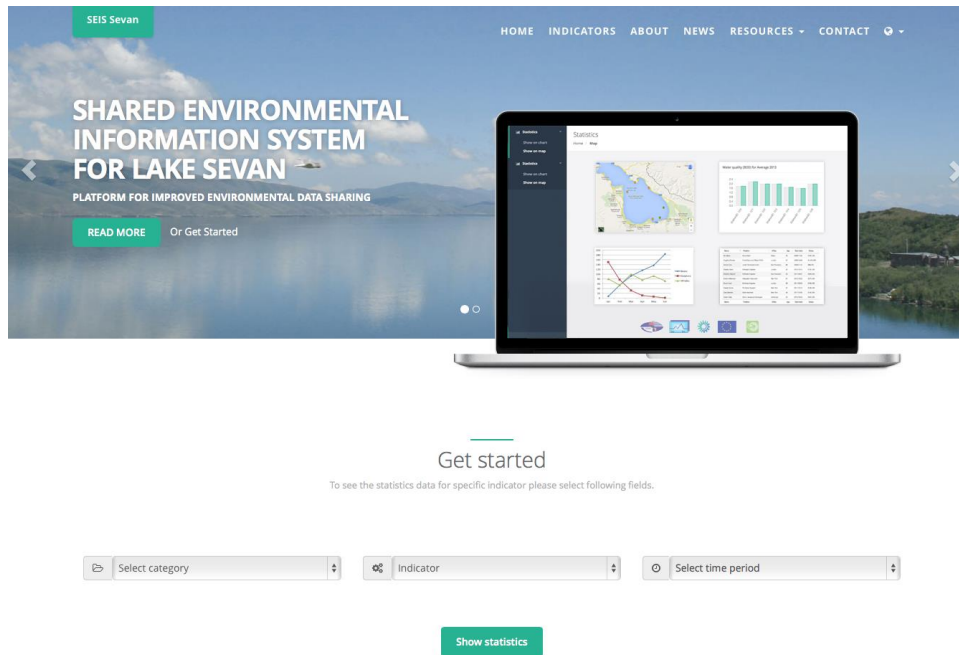


Figure 3. Preliminary version of the Lake Sevan portal.

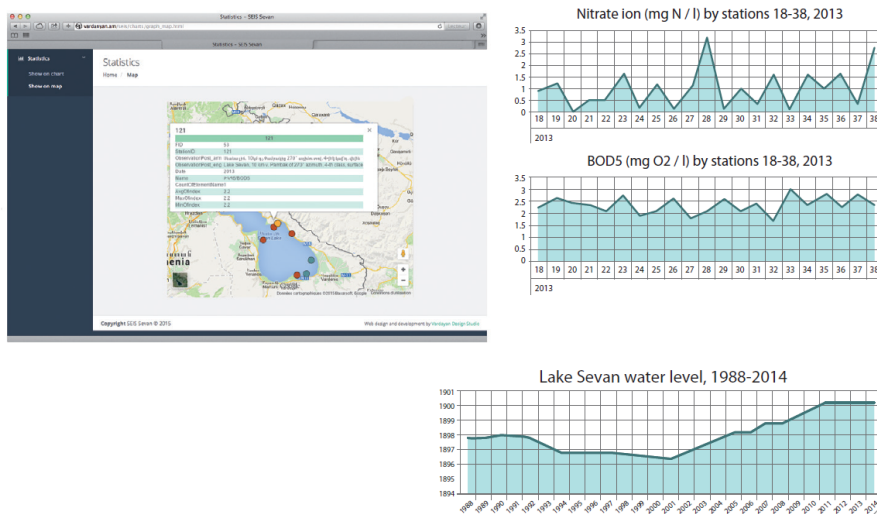


Figure 4. Example of indicator data to be available in the Lake Sevan portal.

Link to the system

Beta-version: <http://vardanyan.am/seis/index.html>

Primary National Contact:

reference persons: Yurik Poghosyan, Julieta Ghlichyan (ENPI-SEIS National Focal Points)

organisation: National Statistical Service; Ministry of Nature Protection

website: www.armstat.am , www.mnp.am

e-mail contact: yupoghosyan@armstat.am , julieta_ghlichyan@yahoo.com

Coordinates of developers

reference person: Gohar Harutyunyan (MNP RA), Naira Mandalyan (NSS RA)

organisation: Ministry of Nature Protection; National Statistical Service

website: www.mnp.am , www.armstat.am

e-mail contact: gohar-harutunyan@mail.ru , nairam67@gmail.com

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2014	Agriculture, air, climate change, forestry, household consumption, industrial production, instruments of environmental policy, nature and biodiversity, soil and land use, socioeconomic development, transport, waste and material flow, water	<p>International conventions and national legislation.</p> <p>Providing public environmental information (Aarhus Convention).</p> <p>Providing reliable source of information for statistical reporting</p>	<p>National Statistical Service</p> <p>Ministry of Nature Protection</p> <p>Ministry of Territorial Administration and Emergency Situations</p> <p>Ministry of Energy and Natural Resources</p> <p>Ministry of Agriculture</p>	Regional

COUNTRY: Austria

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x	x	x	x	x	x

Environmental Portal Austria

Self-assessment

All data is based on the agreed format for environmental data (UDK). Developed jointly between Germany, Austria and, in part, Switzerland this format is compatible with ISO 19115 and 19119 standards.

Summary

With the amendment to the Environmental Information Act (EIA) 2004, a directive became national law. The EIA sets high requirements for access to and dissemination of environmental information; these must be implemented by the federal government and the federal provinces, as well as towns, cities and municipalities. A new level of cooperation between these entities must be reached. An eGovernment working group on environmental information has been set up within the framework of the platform «digital Austria». One of its major objectives is to develop a central, SEIS-compatible information portal: Umweltportal.

Content

Agriculture, air, biodiversity, chemicals, climate change, forests, land use, natural resources, noise, soil, waste, water; multi-purpose management of environmental data, relevant themes of environmental information.

Cooperation

The Umweltportal is a cooperation between federal government, states and local authorities. It introduces a central system offering access to information held on their servers. Additional maintenance will thus not be required in individual areas, but will be limited to system functionality.

Guiding Principles

Like the German environment portal, PortalU, the Austrian portal focuses on the following ten guidelines:

1. Possible to search for all the latest information available on the internet from authorities at different levels.
2. Comparable information from all information-providing bodies presented in a standardised form.
3. Within the INSPIRE framework, provides an access point for Austrian spatial data infrastructure.
4. A centre of excellence for harmonisation of information at all levels.
5. A successful example of federalism and cooperation within Platform Digital Austria.
6. SEIS concepts included in the development process.
7. Represents the interests of Austrian environmental administrations within the European context of information management.
8. Supports the practical implementation of INSPIRE in the niche between the European Geoportal and Austrian spatial data infrastructure.
9. Supports compliance with national and European reporting obligations.
10. Helps to gather and provide information at low cost and with minimal effort.

Infrastructure

The portal accesses data and information from decentralised sources.

Open-source software is used: Java - Lucene Search - Jetspeed - MapServer - Hibernate - MySQL - PostgreSQL - Apache http server - Tomcat Application Server.

Web services and standards: SOAP, REST (Representational State Transfer), OGC (Open Geospatial Consortium) standards: WMS (Web Map Service), WFS (Web Feature Service), SWE (Sensor Web Enablement), Other: OGC CSW (Catalogue Service Web)

Key benefits

Key aspects of following national and international reporting obligations are addressed

- Reduced administrative burden, especially related to individual requests for information;
- Information is more easily available for reporting, public participation and policy development.
- Common barriers to information access are addressed:
 - The available environmental information is widely spread across different public authorities.
 - Information and data is managed very heterogeneously in different systems, especially technically.
 - The presentation of the information varies widely: on static web pages, via user interfaces of database systems etc.

- A standard Internet search that includes all sources is not possible.
- It can be difficult for the citizen to find out which authority holds what information, especially if not accessible via the Internet.
- Although users of public web portals are sometimes provided with complex information (e.g. geographical data), it is often not possible to combine this information to create a significant whole.
- Content of public databases is not always made available for financial or technical reasons.

Link to the system

The system is not yet live. Once active a link will become available at the Austrian Environmental Ministry site:

http://www.umweltbundesamt.at/umweltsituation/umweltinfo/ui_initiativen/seis/portalaustria/

Primary National Contact:

Reference person: Johannes Mayer (Eionet National Focal Point)

Organisation: Umweltbundesamt Austria <http://www.umweltbundesamt.at/en/>

Department: Department of International Cooperation

e-mail contact: johannes.mayer@umweltbundesamt.at

Coordinates of developers

Reference person: Rudolf Legat

Organisation: Umweltbundesamt Austria <http://www.umweltbundesamt.at/en/>

Department: Koordinierungsstelle für Umweltinformationen

e-mail contact: umweltinformation@umweltbundesamt.at;
rudolf.legat@umweltbundesamt.at

Source and extended case study:

<http://www.epractice.eu/files/Austria%20on%20the%20way%20to%20a%20European%20Shared%20Environmental%20Information%20System.PDF>

http://www.nesis.eu/index.php?option=com_wrapper&view=wrapper&Itemid=157

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
2009	Agriculture, air, biodiversity, chemicals, climate change, forests, land use, natural resources, noise, soil, waste, water; multi-purpose management of environmental data, relevant themes of environmental information	Directive 2003/4/EC on Public Access to Environmental Information	All national/local and federal authorities	National Management: Decentralised data collection and verification combined with centralised processing, distribution

COUNTRY: Belarus

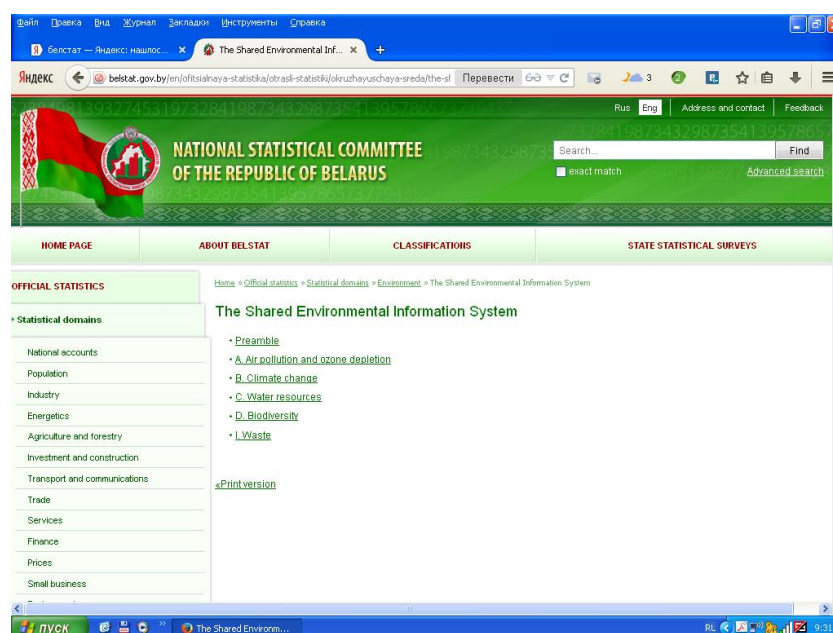
1. Managed as close as possible to its source	2. Collected once, and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public , in relevant national language(s)	7. Supported through common, free open software standards
	X	X	X	X	X	

Environmental indicators in Belarus

Self-assessment

The basic set of environmental indicators in the Republic of Belarus consists of 11 indicators, as per the guidelines set by the United Nations Economic Commission for Europe (UNECE). The indicators are available on national internet resources with an easy access through the website of the National Statistical Committee. Indicators are presented in yearly time-series.

The methodology used for compiling each indicator is explained and available on the website. It also lists data holders in Belarus and the sources of indicators. More recently, information on the procedures for ensuring data quality was added. Several indicators include links to further reading, or into a more detailed explanation of the indicator in question.



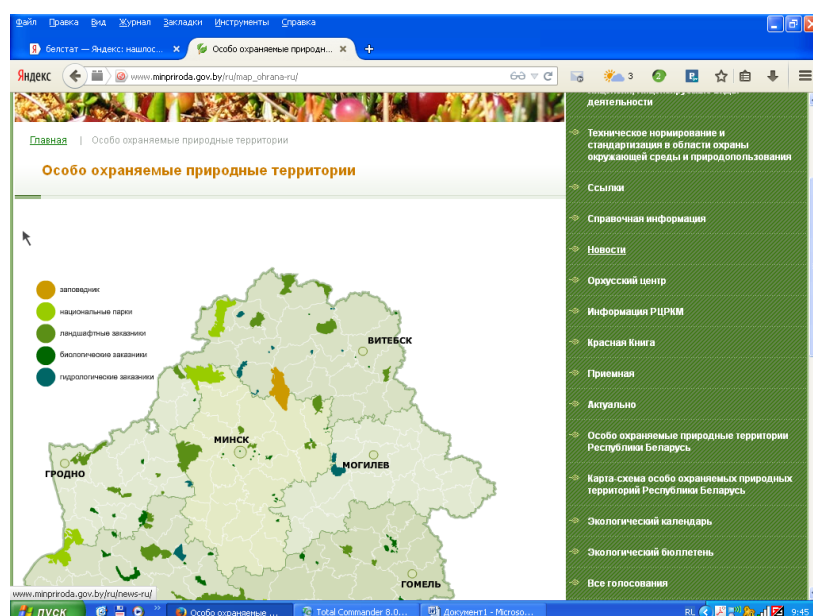


Figure 1-3. Environmental indicators and their visualisation on the website of the National Statistical Committee.

Summary

The principal holders of environmental data in the Republic of Belarus are the Ministry of Natural Resources and Environmental Protection (approximately 70% of the data), and the National Statistical Committee (30% of the data, together with other stakeholders). The National Statistical Committee also generates environmental indicators and uploads them on its website (together with the data obtained from the Ministry of Natural Resources and Environmental Protection). The National Statistical Committee receives environmental data for other entities based on an agreement on information exchange.

Content

Data, trends, methodology, formulation algorithms, definitions, methodology for quality control, links to further reading on statistics of air quality, climate change, status of water bodies, biodiversity, and waste. It is planned that as of 2015, further areas of environmental data will be covered on the website of the National Statistical Committee.

Cooperation

The Ministry of Natural Resources and Environmental Protection is the principal holder of environmental data in the Republic of Belarus. The second-largest authority in terms of collecting and processing environmental information is the National Statistical Committee. Collaboration on environmental data between the two organizations is established in a formal agreement on information exchange that describes the obligations of each institution on the content of the information, its structure and submission deadlines.

Additional holders of specific environmental information in the Republic of Belarus include the Ministry of Housing and Communal Services, the Ministry of Energy, the Ministry of Agriculture and Food, and the State Property Committee. They provide specific, environmentally relevant information to the Ministry of Natural Resources and Environmental Protection and the National Statistical Committee.

Infrastructure

Environmental indicators are presented on the website of the National Statistical Committee in Russian and English, in PDF format.

Key benefits

There is an increasing demand for environmental information and for more detailed data, and these trends are likely to continue in the future. Analysis of the national environmental situation, and adoption of balanced and effective solutions for the management of natural resources are difficult - if not impossible - without high-quality, free, timely and comprehensive environmental information.

In addition, the availability of environmental data the internet allows for the general public to better understand the state of the environment in the country.

Link to the system:

<http://www.belstat.gov.by/en/ofitsialnaya-statistika/otrasli-statistiki/okruzhayuschaya-sreda/the-shared-environmental-information-system/>

Key links

National Statistical Committee

<http://www.belstat.gov.by>

Ministry of Natural Resources and Environmental Protection

<http://www.minpriroda.gov.by>

Primary National Contact:

National Statistical Committee

intcoop@mail.ru

Ministry of Natural Resources and Environmental Protection

ecopolitika@minpriroda.gov.by

minproos@mail.belpak.by

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 1990s or earlier, with gradual improvements	Agriculture, air, climate change, energy, forestry, household consumption, human and ecosystem health, industrial production, instruments of environmental policy, nature and biodiversity, soil and land use, socioeconomic development, tourism, transport, waste and material flow, water	International conventions and national legislation	Cooperation between state bodies.	National

Country: Belgium

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
X	x	x				

Belgian Environmental Information System (BEIS)

Self-assessment

The system is to a very high degree distributed; data and information are mostly maintained at source. Streamlining, sharing and re-use of information is attempted for exchange. For [air data](#) a more integrated and automated national system exists.

For example, the Belgian contribution to SOER 2010 was prepared by the working group on indicators and assessments. The challenge was to bring together the wealth of information in the regional reports. The EEA Core set of Indicators was used.

Summary

BEIS is a collaborative framework for Belgian international environmental reporting and information exchange.

Belgium is a federation and the environment is a regional competence. For international exchange, collaboration agreements are signed at regional and federal level such as the 1995 agreement to create the Belgian National Focal Point for the EEA and Eionet. Since 2004 the BEIS initiative addresses information demands from, for example the EEA, Eurostat, DG Environment, the Joint Research Centre, the OECD, INSPIRE and GMES/Copernicus.

Content

All traditional environmental topics are covered, and the links with other sectors and themes. Potentially the whole environmental information chain can be addressed: monitoring-data-indicators-assessments-reporting-policy-communication.

Cooperation

All relevant ministries, agencies and institutions from the federation and regions are or can be part of the network (+/-250 experts). A steering group (15-20 people representing

partners) meets regularly. Working groups are either permanent or ad-hoc; they cover different topics (air, water, health, etc.) or focus on a single reporting obligation (Common Database on Designated Areas - CDDA), request or a process (i.e. indicators and assessments, GMES/Copernicus). They are supported by a secretariat that coordinates Belgian responses to international information requests (data flows, indicators, reports, meeting participation etc.).

Infrastructure

Electronic tools are used to support cooperation between the diverse national experts. For example, since 1998 Belgium has been implementing and using the EEA/EIONET tools, such as CIRCA and the new [Forum](#) tools for exchanging documents.

Key benefits

Information is managed as close as possible to its source.

Information is collected once and shared with others.

One goal was to make use of existing information, keeping in mind the proposed future regular updates of SOER2010. The result was diversified menu of Belgian information - for certain themes very streamlined and integrated, for others reflecting national diversity.

Link to the system

<http://nfp-be.eionet.eu.int/NFPn.html>

<http://www.irceline.be/>

Primary National Contact:

Reference person: Voet Jan Hendrik, ,(Eionet National Focal Point) - Belgian EIONET

Organisation: [Interregional Cell for the Environment](#)

Department: [Belgian](#) National Focal point

e-mail contact: voet@irceline.be

Phone number: 00 32 (0)2 227 56 76

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
1995;2004	Air, fresh water, bathing water quality, waste, biodiversity, transport, agriculture, energy, health, sustainable development, green economy, other	Reporting obligations to EU, MEAs, international organisations	21 providers and users of environmental information supported by secretariat NFP EEA	National (Interregional) Management: Decentralised data collection and verification combined with centralised processing, distribution, etc.

COUNTRY: Czech Republic

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x				x	

Information System of Statistics and Reporting (ISSaR) – Czech Republic

Self-assessment

When developing a national set of environmental indicators, Czech Information Agency for the Environment (CENIA) used the EEA core set of indicators and a Sustainable Development set. CENIA indicators differ, however, because the aim of the national core set is to reflect aspects of the national environment, feed the national SOER and support compliance with national legislation.

Preparation of local state of the environment reports is centralised in CENIA ensuring harmonisation of information from local, national to international.

ISSaR is a communication node, offering data access to all partners using a general communication interface. ISSaR allows the creation of web pages presenting data online, updated automatically using SQL. The web services use WSDL and SOAP. The system uses OGC standards in WMS applications.

Summary

ISSaR was set up by CENIA in 2005 and is a single national reporting tool for all statistics and environmental information relevant to SOER. Through a single information service provider; data and information are accessible immediately after validation and aggregation. Currently, ISSaR offers data access to partners on all levels but not yet to non-specialists. CENIA builds ISSaR as a national gate to Czech environmental information.

Content

39 indicators (in English) for SOER 2010 as a subset of 45 national environmental indicators, statistical and state of environmental reports, maps and graphs.

Cooperation

Organisations involved in monitoring and reporting are responsible for the collection, management and quality assurance of their data. CENIA developed and runs the system and coordinates 65 national data producers. The most important are the Hydrometeorological Institute, Statistical Office, Cadastral Office, CENIA, Water Research Institute, Agency for Nature Conservation and Landscape Protection and the Ministries of Transport, Industry and Trade, Health and Agriculture.

CENIA has been established as a service organisation of the Ministry of the Environment (MoE) and coordinates data collection. The MoE-based suppliers provide data to ISSaR and to each other without any restrictions. Other organisations also provide data for national and international purposes (e.g. SOER, Statistical Environmental Yearbook, Sustainable Development Indicators etc.).

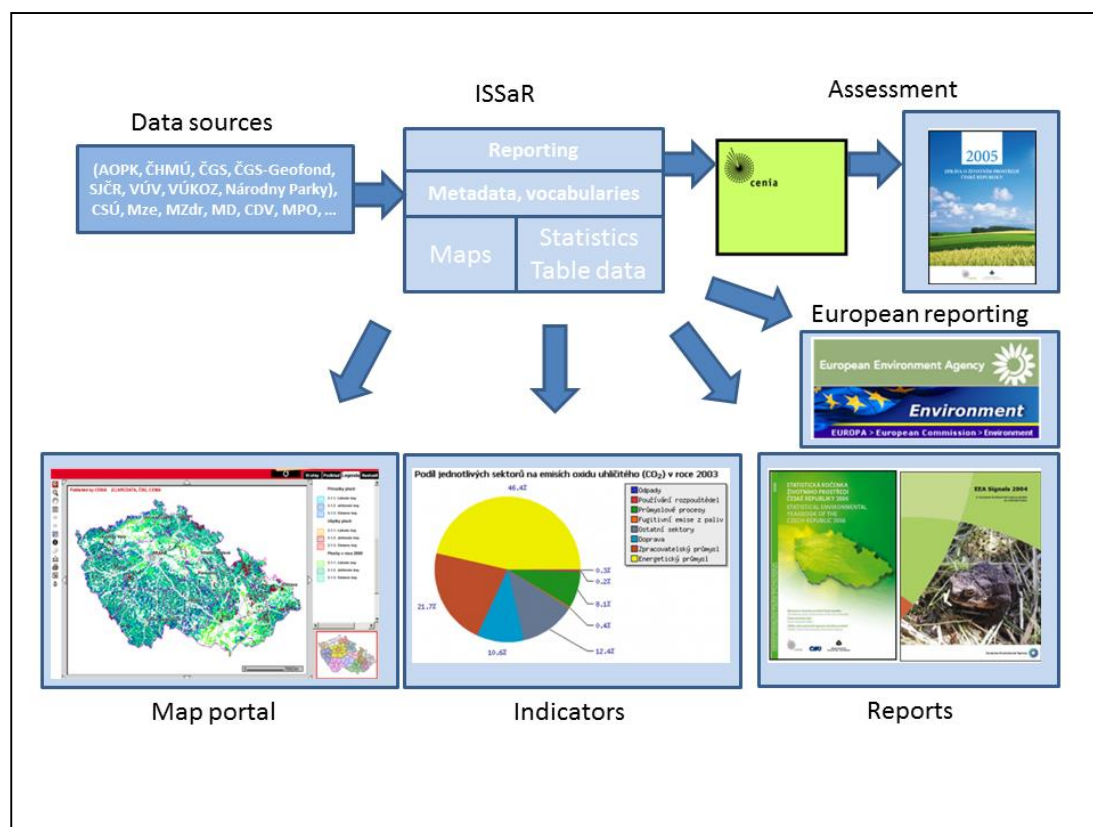


Figure 1. Czech Information Systems for Statistical Reporting

Note: Information sources: AOPK - Agency for Nature Conservation and Landscape Protection; ČHMÚ - Czech Hydrometeorological Institute; ČGS - Czech Geological Survey; ČGS - GEOFOND - Czech Geological Survey - GEOFOND; SJČR - Cave Administration; VÚV - Water Research Institute; VÚKOZ - Silva Tarouca Research Institute for Landscape and Ornamental Gardening; Národní parky - National Parks; ČSÚ - Czech Statistical Office; Mze - Ministry of Agriculture; MZdr - Ministry of Health; MD - Ministry of Transport; CDV - Transport Research Centre; MPO - Ministry of Industry and Trade

Infrastructure

Thematic systems handling primary monitoring data are maintained by different providers that send the data to ISSaR in specific data formats (aggregations, statistics). The aggregated outputs are used and managed by ISSaR. Thus, the ISSaR system provides horizontal data management between thematic information systems.

ISSaR is a modular web-based tool developed by CENIA using its own software. The modules cover metadata, data storage, mapping, indicator generation and presentation interface. There is an application for metadata-driven access to the stored data. ISSaR is able to communicate on line with data storage and allows for the creation of web pages with tables, graphs, maps, etc. The ISSaR API is an interface providing predefined datasets as xml tables and all parts of the web presentation in html.

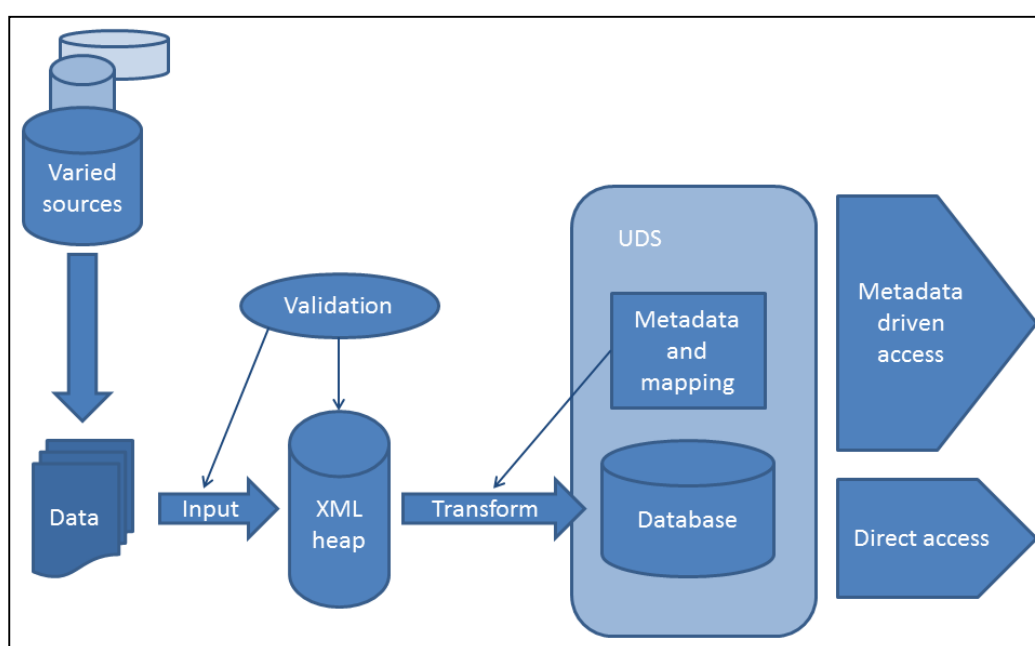


Figure 2. ISSaR Data flow

Note: UDS – Universal data structure

Key benefits

More efficient data presentation and reporting

- Information is managed as close as possible to its source
- Information collected once, and shared with others

Reduction in administrative burden and costs

Link to the system

<http://issar.cenia.cz>

Primary National Contact:

Reference person: Jirí Hradec (Eionet National Focal Point)

Organisation: Czech Environmental Information Agency (CENIA)

Department: Director

e-mail contact: jiri.hradec@cenia.cz

*Coordinates of developers***Reference person:** [Jarmila Cikánková](#), [Jirí Roubínek](#)**Organisation:** Czech Environmental Information Agency for the Environmentwww.cenia.cz**Department:** Data Services Department, LabGIS**e-mail contact:** jarmila.cikankova@cenia.cz; jiuri.roubinek@cenia.cz**Phone number:** +420 267 225 281, +420 565 650 033*Source*

Jarmila Cikánková

NESIS good practices:

http://www.nesis.eu/index.php?option=com_wrapper&view=wrapper&Itemid=147*Summary table:*

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2005	All environmental statistical outputs (SOER, Statistical environmental yearbook, regional statistical environmental yearbooks and others). Climate, air pollution and atmosphere, water management and water quality, biodiversity, forests and the landscape, transportation, waste and material flows, financing,	Reporting obligations to the EU, international conventions, national legislation: Act No. 17/1992 Coll., on the environment. Act No. 123/1998 Coll., on the right to information of the environment. Act No. 106/2000 Coll. on free public access to information.	The system is provided by CENIA and collects data from various statistical sources, ca. 10 main partners.	National Management: National centralised system with distributed data providers

COUNTRY: Czech Republic

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
	x	x	x		x	

Czech Environmental Metaportal

Self-assessment

The metaportal collects all available metadata and shares it with others using Open Geospatial Consortium (OGC) standards; and supports ISO 19115, 19119, 19139.

Summary

The Metaportal set up by CENIA in 2005 shares information stored in different places, using web technologies. The aim was to create an integrated metadata system across the environmental sector (52 organizations involved according to the INSPIRE Directive). This allows the metadata sets to be managed close to datasets, helps implement metadata standards, and provides common, direct access to all available metadata using a simple web client.

Content

The system provides information on data availability (metadata) across the environmental sector in the Czech Republic. The meta-information systems run by different data and web service providers are merged and standardised in this portal. Today there are 1537 metadata sets as defined in ISO 19115 Standard for all INSPIRE themes.

Cooperation

Twelve institutions create datasets and provide web services, each responsible for their metadata systems: Hydrometeorological Institute, Statistical Office, Cadastral Office, CENIA, Water Research Institute, Agency for Nature Conservation and Landscape Protection, Ministries of Transport, Industry and Trade, Health, and Agriculture. CENIA developed and runs the system to collect and share all meta-information in a common platform.

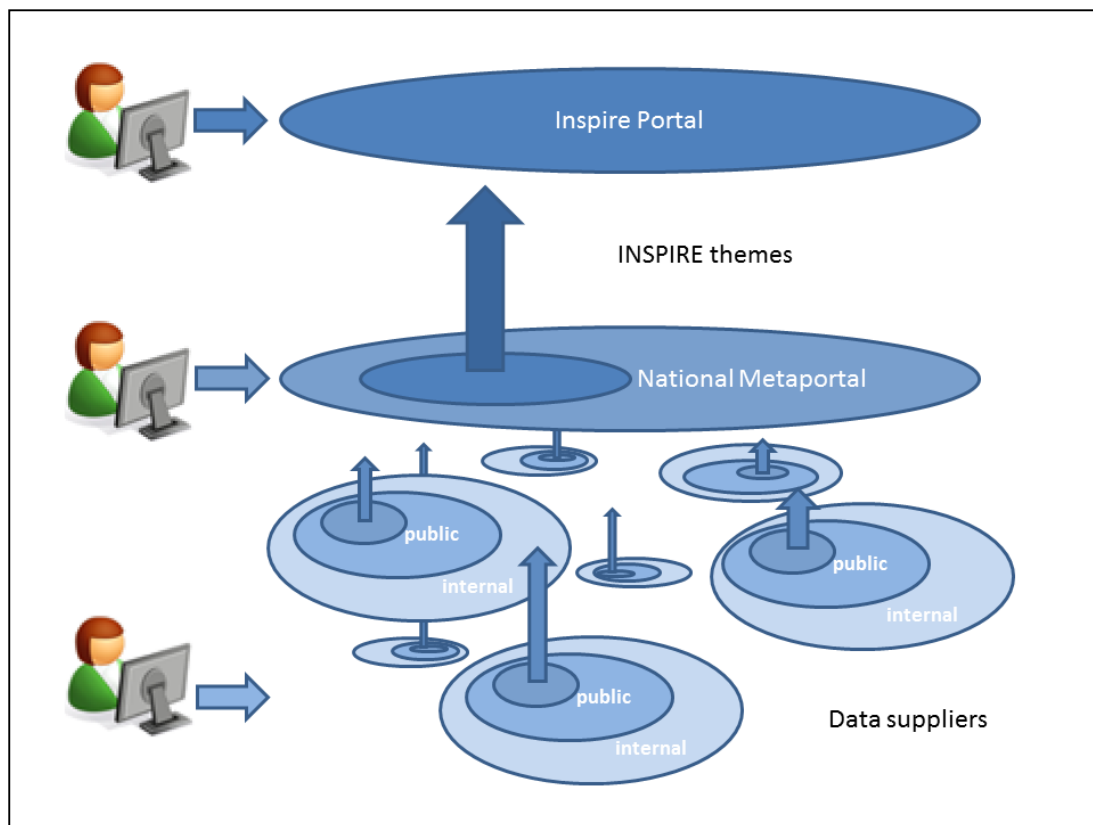


Figure 1. The Metaportal: systematic metadata collection and sharing

Infrastructure

The metaportal builds on several metainformation systems (MIS) operated by data and web service providers. These MISs are connected to the metaportal using the OGC Cataloguing Service for the Web (CSW) standard.

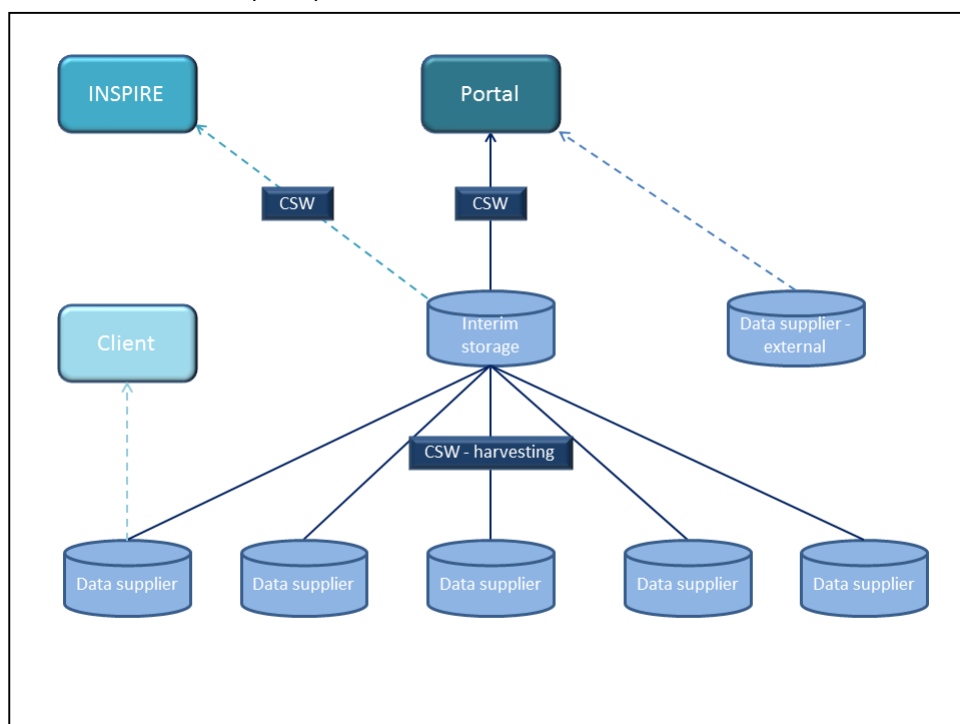


Figure 2. The Metaportal – System Data Flow

Key benefits

- More efficient data search;
- Information is readily available and easily accessible. The portal provides direct access to all metadata available using simple web client and/or direct access to the data;
- Information is collected once, and shared with others;
- Information is harmonised using metadata standards by different providers; and
- Reduction in administrative burden and costs by more efficient information management.

Link to the system

<http://mis.cenia.cz>

Primary National Contact:

Reference person: Jirí Hradec (Eionet National Focal Point)

Organisation: Czech Environmental Information Agency (CENIA)

Department: Director

e-mail contact: jiri.hradec@cenia.cz

Coordinates of developers

Reference person: [Jarmila Cikánková](#)

Organisation: Czech Environmental Information Agency for the Environment

www.cenia.cz

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e-mail contact: jarmila.cikankova@cenia.cz

Phone number: +420 267 225 281, +420 565 650 033

Source

Jarmila Cikánková

<http://mis.cenia.cz>

NESIS good practices

http://www.nesis.eu/index.php?option=com_wrapper&view=wrapper&Itemid=149

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2005	Cross cutting – multiple environmental data	INSPIRE Directive (2007/2/EC of the European Parliament and of the Council)	12 data providers, supervised by CENIA	National Management: A combination of decentralised data creation, verification and centralised distribution

COUNTRY: Germany

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public , in relevant language/s.	Uses free open software standards
x	x		x		x	

German PortalU – one-stop shop

Self-assessment

All data is based on the agreed format for environmental data (UDK, IGC) developed jointly between Germany, Austria and, in part, Switzerland. This format is compatible with ISO 19115 and 19119 standards.

A complex environmental thesaurus is used to enable semantic query expansion and automatic semantic annotation of textual content. The thesaurus is encapsulated in a web service (Semantic Network Service – SNS) provided by one of the partner organisations, the German Federal Environmental Agency (Umweltbundesamt)

Metadata can be entered directly through the InGrid-Editor into the portal. There is a common data model for all cooperating partners. Guidelines to enter and maintain metadata were approved by the partners in the respective committees. A Catalogue Service Web (CSW) interface is used to provide the metadata to national metadata portals and to the European INSPIRE portal.

Websites can be easily integrated into the PortalU infrastructure. There are guidelines - agreed by all partners of the administrative agreement - available.

The portal's map viewer is maintained directly and centrally by the coordination centre PortalU. Integrated maps are supplied by the data providers using INSPIRE compliant OGC Web Map Service (WMS) interfaces.

Summary

PortalU is the central online information portal of the environmental administration in Germany. The portal offers access to nearly 3,000,000 web pages and about 500,000 database entries from over 450 public organisations. The portal is the result of long-term cooperation by the 16 federal states and the federal government. For citizens, PortalU provides a highly-accessible, user-friendly, central access point to publicly-held environmental information and data.

In the spirit of the Aarhus Convention and the EU Environmental Information Directive, PortalU offers information services intended to make government more transparent, to educate the public about environmental issues, and to enable and enhance public participation in decision processes.

Active dissemination of environmental information is facilitated through metadata. All metadata from the environmental data catalogues on federal and state level are bundled in PortalU and transferred to the central German INSPIRE organisation GDI-DE thus contributing to the spatial data infrastructure for Europe.

Content

Web sites, databases, metadata, data, reports, research results, indicators, maps and graphs on the following topics: Agriculture, air and climate, animal protection, chemicals, construction, energy, environment, economy, forestry, gene-technology, geology, health, nature and landscape, noise and agitation, radiation, soil and soil pollution, sustainable development, traffic, waste, and water.

Cooperation

28 databases from public agencies are available, including 17 environment data catalogues with about 5,000 INSPIRE-relevant metadata entries. Each environmental data catalogue is updated by the relevant public agency, using a web application – the InGrid Editor – that is an integral part of PortalU.

A list of 450+ information providers is provided at:

<http://www.portalu.de/informationsanbieter>

Legal and institutional organisation

As Germany is a federation of states (16 Länder) some groundwork was necessary to get all the federal, regional and local authorities and information providers under one umbrella.

Cooperation is based on an official [administrative agreement](#) that came into force on 1 January 2003. This agreement provides a basis for bridging the environmental data catalogue (UDK – UmweltDatenKatalog) and the German Environmental Information Network (GEIN), in order to implement a common metainformation system. It also guarantees continuous funding for the project.

Funding

The costs for development, operation and maintenance are shared in an “all for all” approach. The federal government is the main financial contributor (> 60%) and the financial obligations of the others are proportional to population and economic power. In this framework, in particular the smaller federal states have an advantage. For them, the use of PortalU and/or the PortalU software can result in cost savings of hundreds of thousands of Euros annually.

Governance

PortalU activity is organised and managed through several bodies:

- A governing council (Lenkungsausschuss) makes decisions about the strategic development of PortalU and allocation of funds. Each partner of the agreement has a vote.
- A working group for content and technological development supports the governing council in technical questions.
- A coordinating centre acts as the executive body of the governing council, supervising the development, operation and maintenance of PortalU, service and further development of the environmental data catalogue (IGC = InGrid-Catalogue).
- The parties to the agreement have established centres to support development of the content.

Infrastructure

With PortalU, the user has access not only to online data and information but also to data sources that are not yet online, or hidden behind the firewalls of an intranet. Through this feature, PortalU is able to make data available that are invisible to the general public (and to other search engines). This is particularly important in an environment with various level of users and access levels.

PortalU fully integrates the well-established catalogue Umweltdatenkatalog, UDK. This catalogue has been used for more than 15 years to reference and manage documents, projects, geospatial data, services and other environmental information. A considerable part of these data are offline and/or available only as hard copy.

Through PortalU and the UDK, information describing the content of such data is available, as well as references to the data sources and contact persons; in a user-friendly, highly accessible way.

Technically, PortalU is a distributed system that leaves information with the providers but offers a single access point to users. It supports all current interfaces; and complies with all requirements of the INSPIRE directive and with ISO or OGC geographical standards.

The InGrid software package developed for PortalU has modular and flexible system architecture based on licence-free open source products, so that the technical structure of the environment information network can be adapted to changing organisational specifications. Thus, if needed, regional environment portals can easily be created.

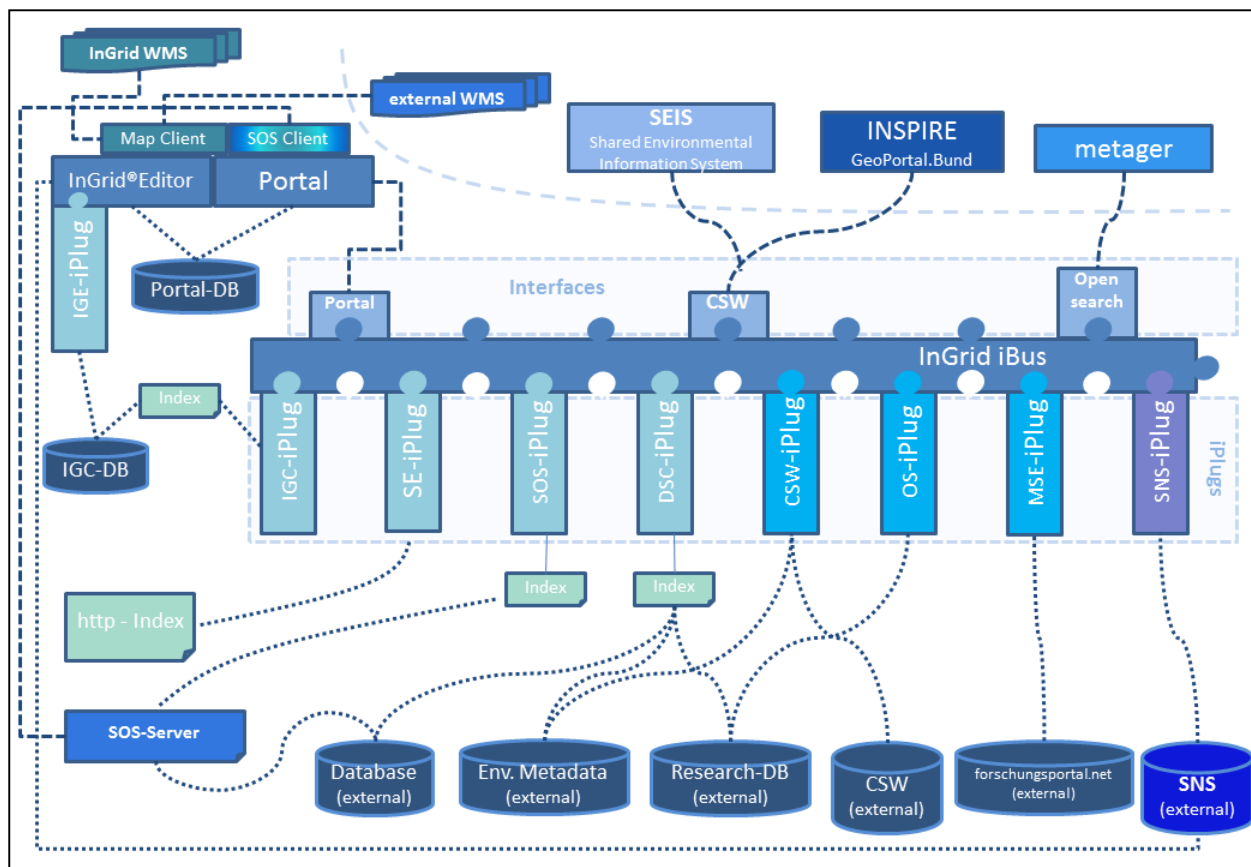


Figure 1. InGRID® Architecture

Abbreviations:

IGC	InGrid-Catalogue	CSW	Catalogue Service Web
SE	Search Engine (Web crawler)	OS	Open Search
SOS	Sensor Observation Service	MSE	Meta Search Engine
DSC	Data Source Client	SNS	Semantic Network Service

Key benefits

Major benefits:

- Centralised and standardised data collection
- Fulfilment of reporting obligations
- Easy public access to all information sources available (electronic or on paper)

Additional benefits:

- Modular system architecture enables customised information portals on different administrative levels.
- Provides one-stop access to distributed data sources, avoiding redundant data storage. An innovative communication infrastructure based on peer-to-peer concepts enables each information portal to use all data sources in the network.
- Provides access not only to web content, but also to databases, expert systems and data catalogues, using a specially-developed, highly configurable database-connector.
- Interfaces based on international standards ensure interoperability.
- The Semantic Network Service is used to geo-reference textual content of documents indexed by PortalU. The spatial search function thus has access not only to geospatial data and metadata, but also to web pages and other documents.

Link to the system

<http://www.portalu.de>

Primary National Contact:

Reference person: Christina Pykonen

Organisation: Umweltbundesamt (UBA) / Federal Environment Agency – Germany

Department: Internationaler Umweltschutz

e-mail contact: christina.pykonen@uba.de

Coordinates of developers

Reference person: [Dr. Fred Kruse](#), [Stefanie Konstantinidis](#)

Organisation: Niedersächsisches Ministerium für Umwelt, Energie und Klimaschutz

<http://www.portalu.de>

Department: Koordinierungsstelle PortalU

e-mail contact: kst@portalu.de

Fax number: +49 511 120-3480

Sources

Umweltbundesamt (UBA) / Federal Environment Agency – Germany

<http://www.umweltbundesamt.de/en/portal/portalu-german-environmental-information-portal>

Information about PortalU and access to the site itself:

<http://www.portalu.de/hintergrundinformationen>

Agreement between Federal Government and Länder (in German)

http://www.kst.portalu.de/verwaltungskooperation/VVGEIN_endg.PDF

PortalU – Case study at the EC website:

http://ec.europa.eu/environment/seis/case_portalu.htm

Summary table:

Date	Themes covered	Policy addressed	Participation	Geographical scope
Since 2006	Agriculture, air and climate, animal protection, chemicals, construction, energy, environment, economy, forestry, gene-technology, geology, health, nature and landscape, noise and agitation, radiation, soil and soil pollution, sustainable development, traffic, waste and water	National and regional legislation on distribution/access to environmental information, “Aktionsplan Deutschland” a major eGovernment initiative Reporting obligations to the EU and MEAs INSPIRE	450 federal, state and local public authorities in 16 Länder	National <u>Management:</u> A combination of decentralised data collection and management, and centralised data access

COUNTRY: Israel

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x					

Geographic System for the Environment (GSE) - Israel

Self-assessment

The data is collected only once, by the agency responsible for it.

Summary

The Geographic System for the Environment (GSE) was launched in 2011, within the Ministry of Environmental Protection, and combines data from several national sources. A subset of the data is automatically produced for public access through the national geographical hub, currently under construction. The main feature of the system is its ability to show data on maps through its geographical location.

Content

Environmental data and information: Sources of hazards, waste disposal sites, urban wastewater/sources of river contamination, land-based pollution of marine environment, industrial emissions to air. Data extracted from different thematic data and information systems in the organisation are available in real-time. The data is in ESRI's [shapefiles](#) format.

Cooperation

The Ministry is responsible for maintaining the datasets. With GSE, data can easily be transformed to GIS datasets even by untrained staff. Additional datasets are incorporated from other sources, including the Survey of Israel and the Geographic Information fora of most government and public institutions.

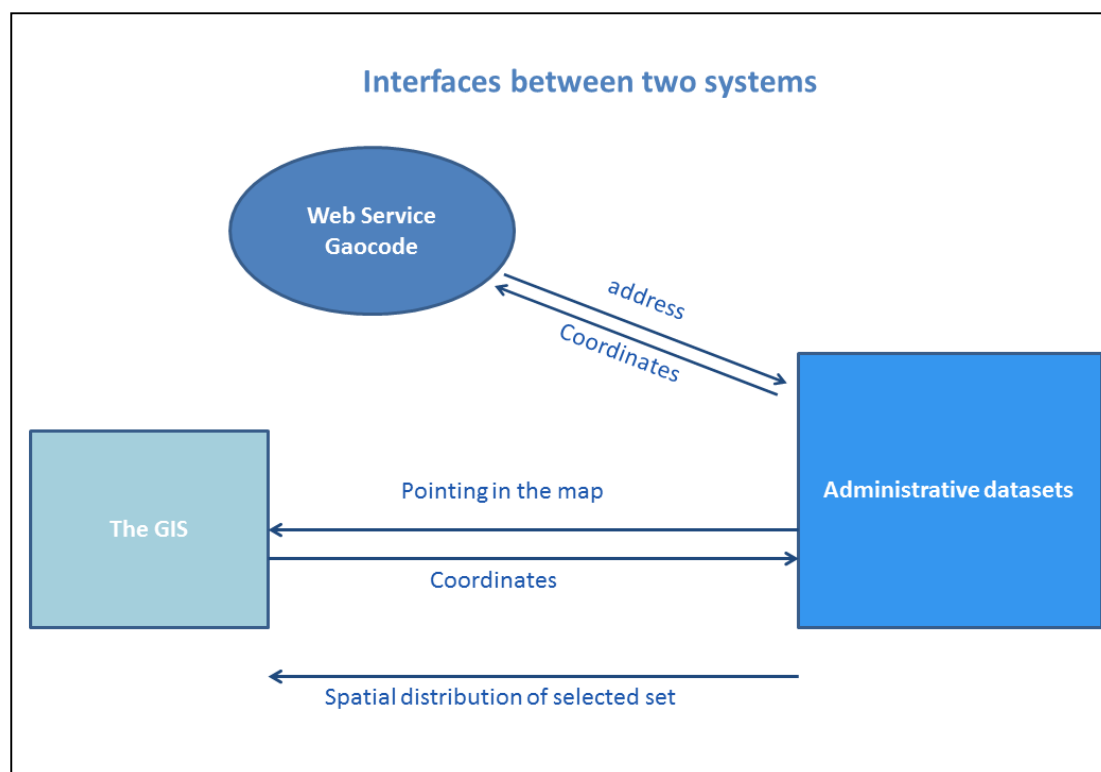


Figure 1. Interfaces between systems

Note to the figure: *There are three types of interface between systems: A geocode service, addition of location for a new object via pointing, and a query of subset of data which is drawn in a map.*

Infrastructure

GSE is a web-based tool to support ministerial reporting both internally and for dissemination to the public. Main functions include on-line data importing, enabling quality assurance, and exporting the results to a national level. An authorised user can create maps and reports as well as generate data using either the administrative tools or the GIS tools. Different thematic aspects and geographical levels can be reviewed. GSE also includes tools for geospatial analysis. GSE is based on ArcGIS Server and Oracle.

Key benefits

- More efficient data collection and reporting: a geographical parameter enables further spatial analysis to be added to raw data.
- Information is managed from its source.
- Information is collected once, and shared with others.
- The quality of the data is expected to improve with increased use.

Links to the system

Intranet: <http://moe-map/env/loader.aspx> (not accessible through Internet)

Internet (under construction): <http://beta.govmap.gov.il/>

Primary National Contact:

Reference person: Orna Matzner (ENPI-SEIS National Focal Point)

Organisation: Ministry of Environmental Protection – Israel

Department: Chief Scientist's Bureau

e-mail contact: orna@sviva.gov.il

Coordinates of developers

Reference person: Mr. Yari Ginott

Organisation: Ministry of Environmental Protection

Website:

http://sviva.gov.il/bin/en.jsp?enPage=e_homePageandenDisplay=viewandenDispWhat=Zoneand

Department: GIS Unit

e-mail contact: ginott@environment.gov.il

Phone: + 972-50-6233379

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2000	Sources of hazards, waste disposal sites, urban wastewater/sources of contamination to rivers, land-based pollution of marine environment, industrial emissions to air	National legislation (Freedom of Information Act)	Most of the government ministries in Israel, supervising organisation: Ministry of Environmental Protection	National <u>Management:</u> A combination of decentralised data collection and centralised processing

COUNTRY: Jordan

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x		x		x	

Jorinfo database - Jordan

Self-assessment

The Jordanian Department of Statistics (DOS) is proud of the quality of its statistics. Jorinfo is designed to produce and disseminate timely and high-quality data that meets the users' evolving needs, contributing to the national development process; a quick analytical report can be produced directly with Jorinfo.

Summary

Jorinfo was developed for the Department of Statistics (DOS) and launched in 2010. It includes comprehensive statistical information from 2000. It builds on statistical indicators: 222 main indicators for 16 main sectors, in both Arabic and English, at national and local levels. Annual surveys and reports produced by DOS were used as main sources. Jorinfo helps to visualise the statistical tables in easily understandable and geographically connected maps and graphs; and to produce quick analytical reviews.

Content

Jorinfo covers 16 sectors: agriculture, construction, demographics, economy, education, energy, environment, information and telecommunications, health, housing, justice, nutrition, security, social security, societies and associations, tourism and travel, and women. The information is presented as maps, diagrams, indicators and assessments, which can be downloaded from the [web site](#).

Cooperation

DOS has the sole responsibility for data collection, entry, auditing, dissemination and updating. Sources include annual statistical and survey reports produced by DOS, as well as data collected by DOS from different governmental and non-governmental institutions such as:

Ministries of

- [Agriculture](#)
- Environment
- [Education](#)
- [Energy and Mineral Resources](#)
- [Communications and IT](#)
- [Tourism and Antiquities](#)
- [Water and Irrigation](#)
- Higher Education and Scientific Research
- Labour

- Central Bank of Jordan
- Social Security Corporation
- Societies and Associations
- National Geographical Centre
- [Ecclesiastical Courts](#)
- Public Security Department
- Civil Status and Passport Department
- Supreme Judge Department
- National Electric Power Company

Infrastructure

The Jorinfo database uses Devinfo to import information with excel and other formats described in the figure below. The resulting maps, diagrams, tables and other information can be exported into excel or PDF format.

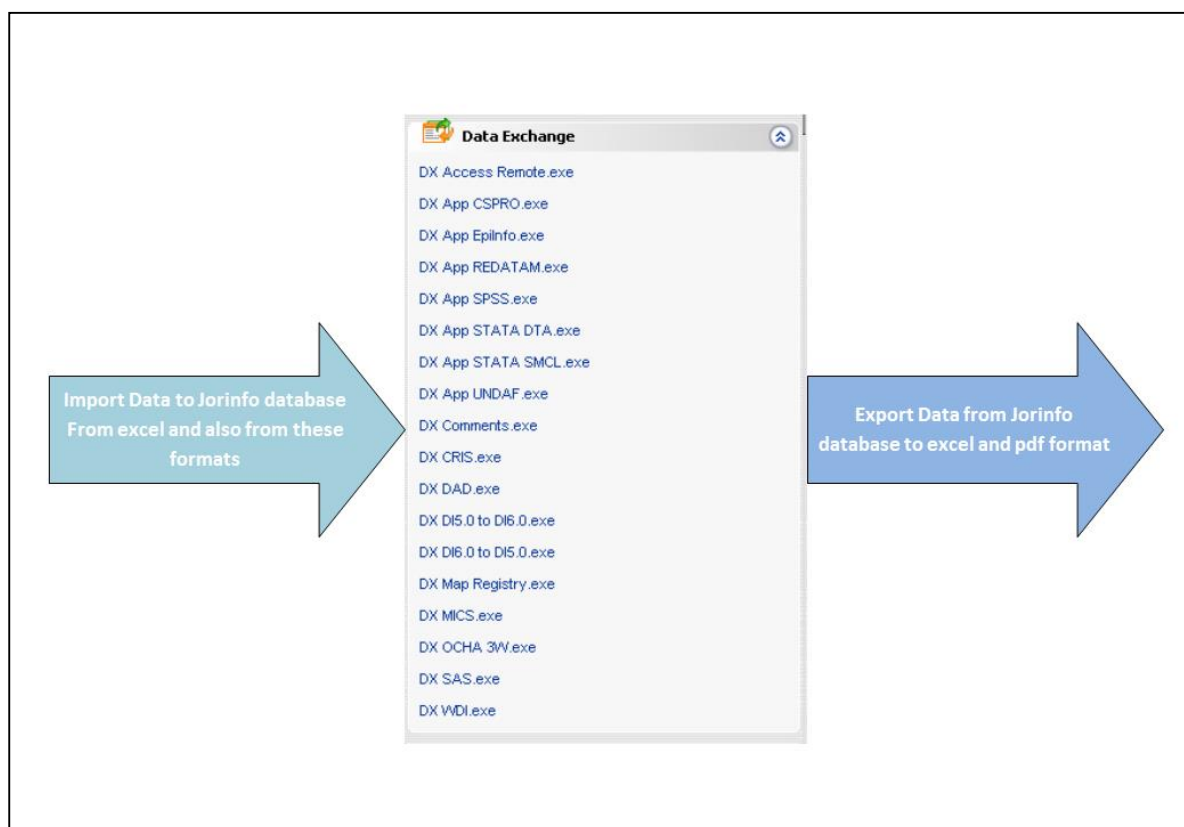


Figure 1. Import-export functions of Jorinfo database

Key benefits

Jorinfo allows efficient data visualisation, and the information is managed as close as possible to its source. It is compatible with SEIS principle 2: information collected once, and shared with others. In addition, it reduces the administrative burden and costs.

COUNTRY: Jordan

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x				x	

Water Information System (WIS) - Jordan

Self-assessment

Standard reports are produced through the DEVA Oracle application.

Summary

The Water Information System (WIS) is an in-house development by the Ministry of Water and Irrigation (MWI) that holds all water resource information in Jordan from 1998 and is intended to support information management of water resources at all levels. The data has been integrated with other data collected in other water operation systems, such that WIS has become an authorised data and information source for national committees and media, universities, research institutes, education and awareness programmes, international donors and consultants.

Content

WIS compiles and manages data from various sources for water quality and quantity monitoring, management and planning. It stores water resource profiles, groundwater abstraction levels, wastewater treatment effluent quantity and quality, well and spring water use, well water level and basic data for the National Water Master Plan, as well as climate data.

Cooperation

The MWI is responsible for collecting and storing the basic data and time-series data such as the monthly production of wells and springs, well static water levels, rainfall and evaporation, and well and spring water quality monitoring data. The wastewater treatment plants' effluent data are collected and stored by the Water Authority of Jordan (WAJ).

Data collected by the MWI is stored directly in the WIS Database and quality data from the Land Information Management System (LIMS) is linked directly to WIS. Other well and spring production data is collected and compiled by water companies and administrations in the WAJ and transferred to WIS as Excel files.

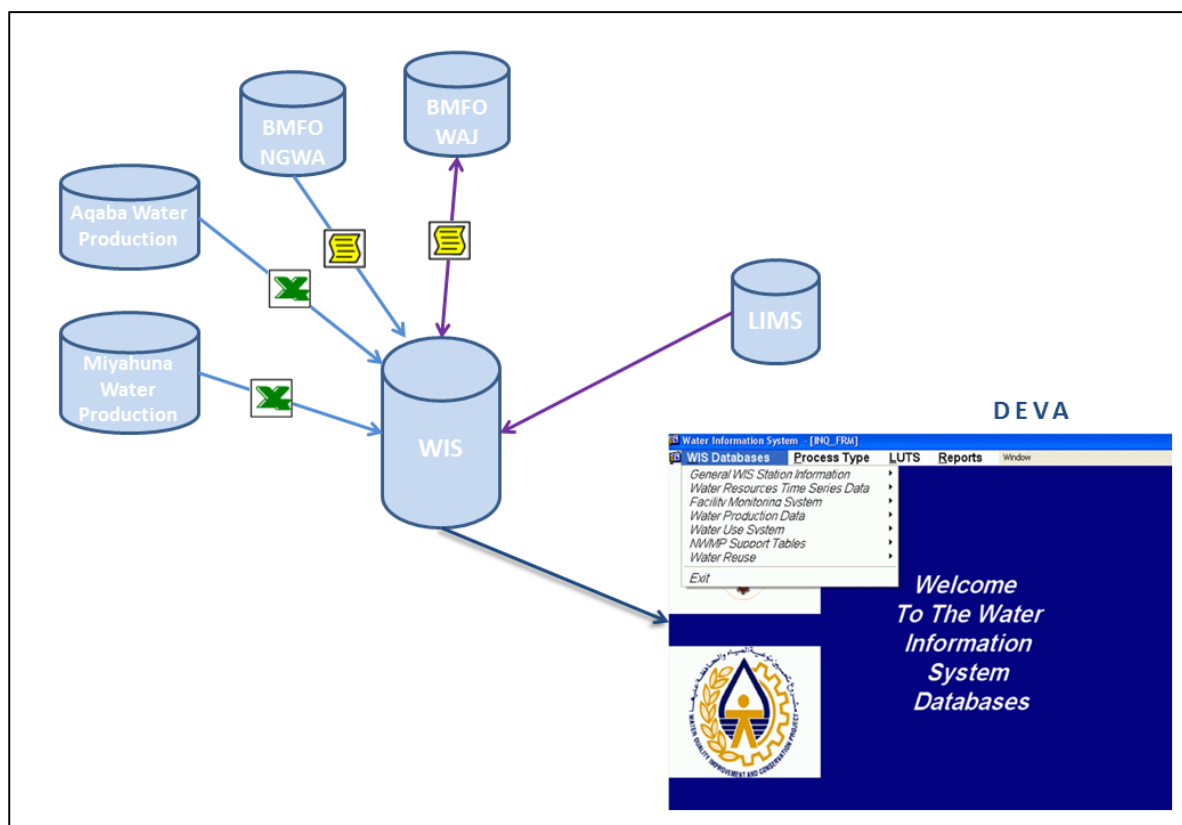


Figure 1. WIS data collection and management system

Infrastructure

The DEVA is a web-based Oracle application. It provides users with entry screens, stores and validates the collected data and provides information through query screens that can export the data to Excel files or through standard reports that can be printed or stored in PDF files. The database is linked directly to a Laboratory Information Management System (LIMS) Oracle database to retrieve quality data and also to water meter readings from a Bulk Meter Flow Operation (BMFO) Oracle database.

Key benefits

- More efficient data collection and reporting
- Information collected once, and shared with others

Primary National Contact:

Reference person: Khaled Suleiman Ragheb Alshatarat (ENPI-SEIS National Focal Point)

Organisation: Department of Statistics of Jordan

Department:

e-mail contact: khaleds@dos.gov.jo

Coordinates of developers

Reference person: Ibtisaam A. Alsaleh

Organisation: Ministry of Water and Irrigation-Jordan

Website: <http://www.mwi.gov.jo/Dashboard.aspx>

e-mail contact:

Project manager: assaf@dos.gov.jo

Focal point: amrj@dos.gov.jo

Database administrator: abeerr@dos.gov.jo

Source

Ministry of Water and Irrigation-Jordan

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 1998	Water	Water Strategy for Jordan	Ministry of Water and Irrigation, Water Authority of Jordan and Jordan Valley Authority	National <u>Management:</u> A combination of decentralised data collection and verification, and centralised processing, distribution.

COUNTRY: Republic of Moldova

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	X					

Inter-institutional cooperation in Moldova towards SEIS

Self-assessment

The National Bureau of Statistics (NBS) and Ministry of the Environment (MoE) of Moldova signed an administrative agreement to jointly improve the:

- Methods for information collection, organisation and processing;
- Collection of the data on the state of the environment;
- Development of the environmental indicators system, including developing and improving methodologies for calculation of indicators;
- Dissemination of information to the general public;
- Carrying out joint activities in dedicated working groups created within the Ministry of Environment.

The cooperation between the two institutions has proved to be mutually beneficial and has brought several crucial changes.

Summary

In 2009, the NBS and the MoE began to establish a new system for the collection of environmental statistics. The system improves data quality and the process of data collection and information sharing between the two organizations, by introducing three innovations:

1. Adoption of six new templates on environmental data reporting
2. Allocating responsibility for data provision to the State Environmental Inspectorate and local departments of the MoE: organisations with relevant competence collect and verify the data while the NBS processes and aggregates it.
3. Changing the status of some templates from statistical (which falls under a confidentiality clause) to administrative, thus making previously closed environmental information open to the public

Content

The NBS and MoE share data on air temperature, precipitation, wind speed, sunlight hours, air quality, number and size of state protected natural areas, environmental protection expenditure, reporting, water use, toxic waste, municipal waste, etc.

Cooperation

The cooperation was initiated to improve the national system of statistical indicators on the one hand, and the collection of data for the environmental reports on the other. Developing the environmental indicators required the data and capacities of both organisations. There was also a legal obstacle to free information sharing, since in Moldova statistical data is confidential. Since the NBS could not share the data freely, the MoE could not process the data and share it with the public.

In 2009 a working group was established to work with environmental indicators in the framework of the UNECE methodological guide for the development of indicators. One outcome was the legal approval of a new conceptual system for collecting and managing environmental data. The system defines the data collection responsibilities of regional institutions within the MoE, and the processing responsibilities of the NBS. It was also decided to develop six new templates for data collection, of which two have statistical and four have administrative status.

Information sharing and cooperation with international organisations

In 2010, the partners issued a first joint publication *Natural resources and environment in Moldova*, including demographics and population health in the country, main economic indicators, violations of environmental legislation, etc. The MoE also regularly supplies the NBS with information for publication and dissemination to a wider public.

The partners cooperate to provide data to international organisations, including:

1. UN Statistics Division (UNSD) on capture and use of aquatic resources, waste generation and management; and
2. CIS Statistics Committee on state natural reserves, use of water resources and waste management.

Future perspectives of cooperation

Future cooperation will focus on further improvement of environmental reporting (primarily on waste, with support from Norway); development of new software; methods to develop environmental indicators, etc.

Key benefits

The new system for information collection allows for:

- Improved data quality;
- Systematised information flows, avoiding duplication of data and ensuring compatibility of indicators.

Primary National Contact:

Reference person: Elena Orlova, Head of Agriculture and Environment Statistics Division (ENPI-SEIS National Focal Point)

Organisation: National Bureau of Statistics of Moldova, <http://www.statistica.md/index.php?l=en>

Department: Agriculture and Environment Statistics Division

Phone : +373 22 403022 **Fax :** +373 22 22 6146

Email : elena.orlov@statistica.md

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
<i>Since 2009</i>	Weather conditions, air quality, number and area of state protected natural areas, scientific reserves, expenditures for environmental protection, geological data reporting, water-use, toxic waste, municipal waste	Aarhus Convention	<ul style="list-style-type: none"> • National Bureau of Statistics • Ministry of Environment of Moldova • State Environmental Inspectorate 	National Management: Centralised

Country: Republic of Moldova

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public , in relevant language/s .	Uses free open software standards
x	x		x		x	

Persistent Organic Pollutants Database and Mapping - Moldova

Self-assessment

The system is in line with the 2004 National Implementation Plan of the Stockholm Convention. The destruction of stocks of obsolete pesticides and PCBs (Polychlorinated biphenyls) and the inventory and subsequent remediation of contaminated land are of first importance to prevent uncontrolled emissions of POPs into the environment and ecologically safe development of the area.

Summary

The [Persistent Organic Pollutants \(POP\) Management and Destruction Project](#) funded by the Global Environmental Facility and the World Bank in Moldova has resulted in an electronic tool, the [Inventory of Persistent Organic Pollutants \(POPs\) contaminated sites](#), and three manuals; these tools were developed in 2008-2010 by an environmental NGO called ECOS and Trimetrica Ltd. and are used by local environmental authorities and other stakeholders. About 1,600 potentially contaminated areas were studied. Results are presented in a database and reflected on a map, accessible to policy-makers, experts and the general public.

The database allows government bodies to significantly improve the management of contaminated land. The system allows the accumulation, processing, storage and presentation of geographic information on the location of such land, the degree of soil contamination and other associated data and a quantitative assessment of the danger posed by them. It serves the public administrative bodies and landowners affected in their management decisions and remedial measures.

Content

The system includes data and information about all suspected POPs sites; a risk assessment tool and locations in the natural and built environment that could be affected, e.g. water, agricultural land, wetlands, houses. The resulting maps, diagrams, indicators and assessments can be downloaded from <http://pops.mediu.gov.md>.

Cooperation

The database is managed by the central government body for environmental protection and is periodically updated. The following needs to be done on a constant basis:

- Annually update the state land control results, e.g. via questionnaires, collection of new soil samples, laboratory analysis; and
- Identify, investigate and document new areas not entered in the original list

The update is done on request by the State Ecological Inspectorate.

12 local environmental inspectors were contracted for the field work. They have been trained to ensure comparability of results.

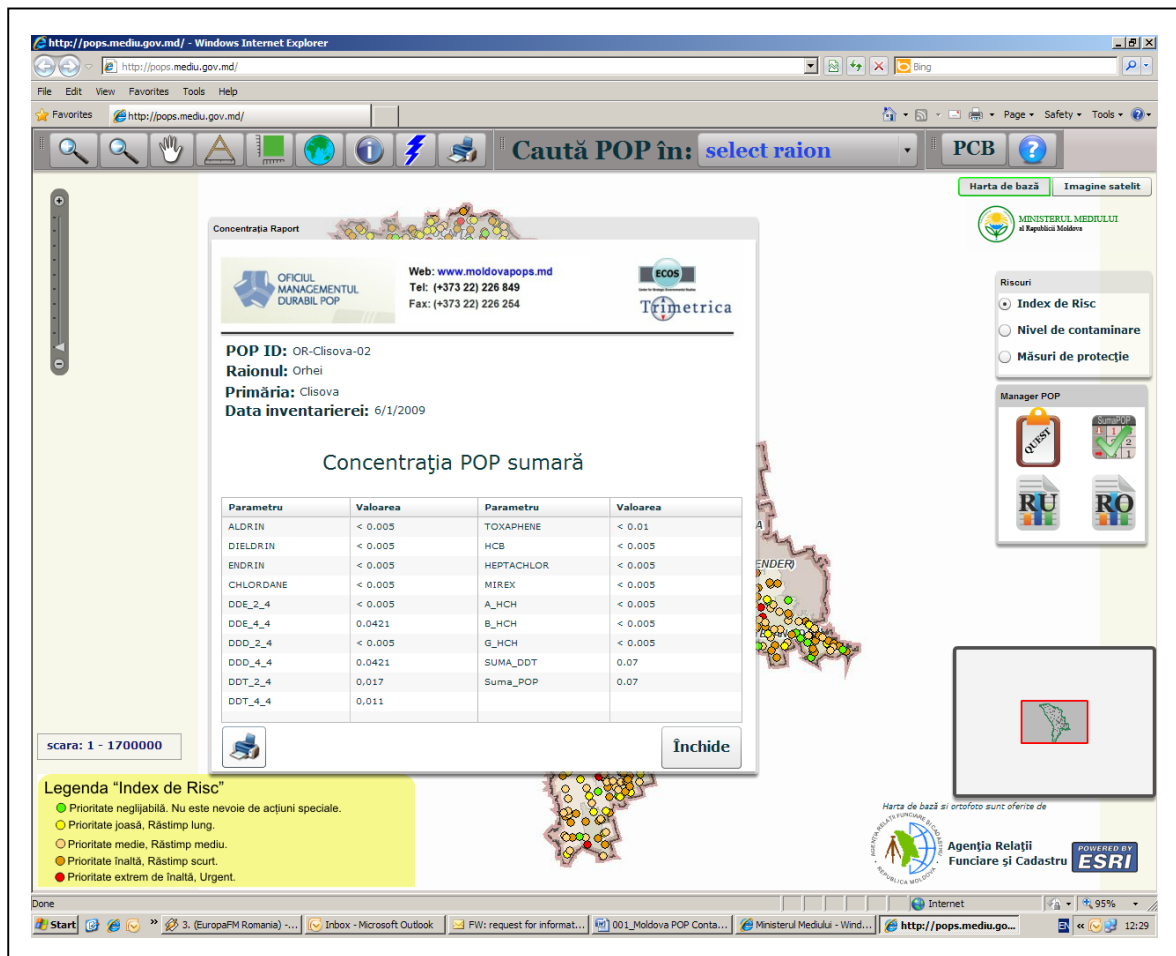


Figure 1. Screenshot of the system

Infrastructure

The web application uses ESRI ArcGIS technology (ArcGIS Desktop, ArcGIS Server), which enables the compilation of an integrated Geodatabase of the locations and associated information, including risk and contamination models. The deliverables of the desktop application were GIS projects (.mxd), maps, datasets and attribute data. ArcGIS Server is used to develop and serve the web-based GIS POPs application with cache-tiled maps on the Internet with free access. Imbedded in the ArcGIS Server, ArcSDE technology is used to store GIS data in an MSSQL database. ArcGIS uses the REST

format for serving web application requests. An OGC-compliant format of WMS is used to share information.

Key benefits

- National data collection and reporting procedure established related to POPs-contaminated sites
- Access to information related to the potential risks caused by POPs-contaminated sites, by both the public and stakeholders in specific sites
- Important tool for central and local government for planning land parcelling and reducing potential risks to human health and the environment

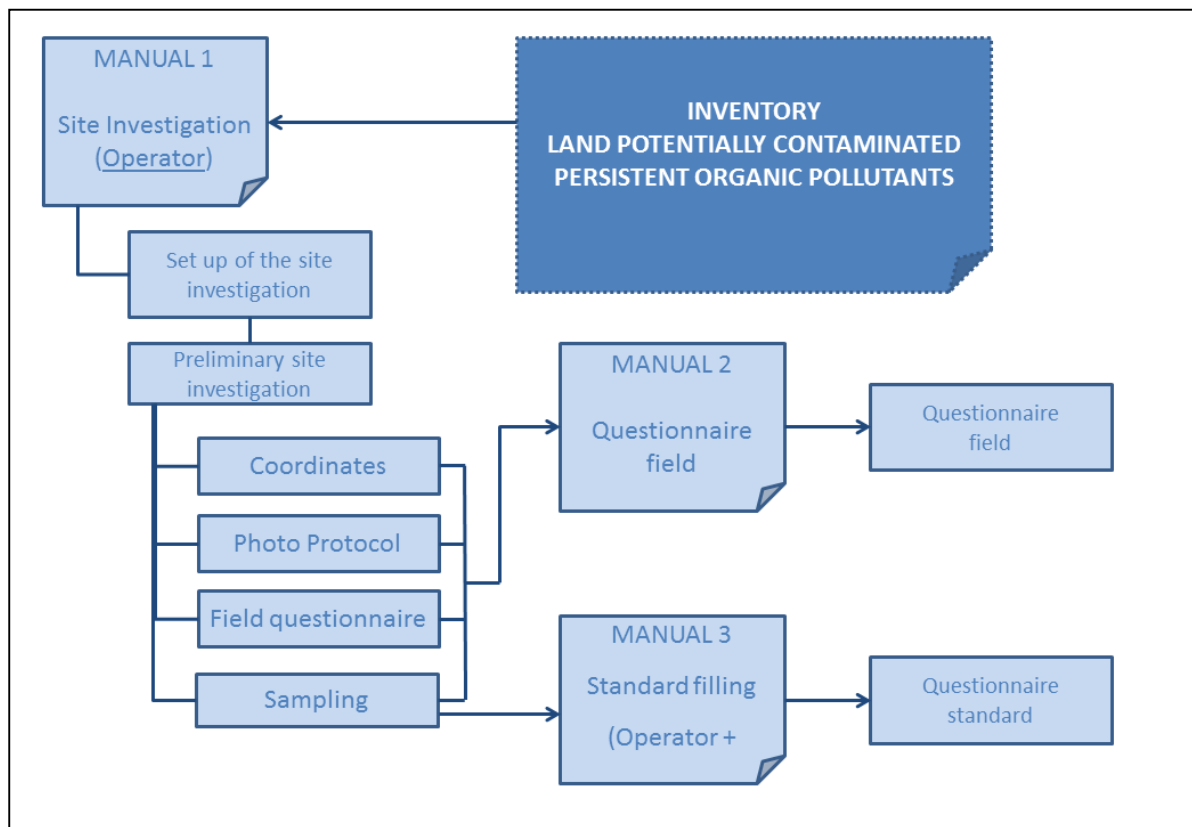


Figure 2. Inventory of POPs contaminated sites, steps and procedures

Link to the system

<http://pops.mediu.gov.md>

Primary National Contact:

Reference person: Maria Nagornii (ENPI-SEIS National Focal Point)

Organisation: Ministry of Environment Moldova

Department:

e-mail contact: policy@mediu.gov.md

Coordinates of developers

Reference person: Mr. Valentin Plesca, Project Manager

Organisation: POPs Sustainable Management Office within the Ministry of Environment, the Republic of Moldova

Address: Cosmonautilor str., office 614a, MD-2005, Chisinau

e-mail contact: vplesca@moldovapops.md

Phone: +373 22 22 62 54

Source

The case study provided by Mr. Ion Barbarasa, Assistant Project Manager, POPs Sustainable Management Office.

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2010	Toxic pollutants	Stockholm Convention, 2004 National Implementation Plan	Ministry of Environment, NGO ECOS Moldova	National <u>Management: National</u>

COUNTRY: Morocco

1. Managed as close as possible to its source	2. Collected once, and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public, in relevant national language(s).	7. Supported through common, free open software standards
X	X		X	X	X	

Regional environmental information and monitoring systems (EIMS)

Self-assessment

In order to decentralise the management of environmental information, Morocco's various regions will need Environmental Information and Monitoring Systems (EIMS). Ten EIMS are currently being set up.

They are collaborative tools for collecting, sharing and disseminating alphanumerical, geographic and documentary information to assist regional decision-makers, public and private actors, research organisations and civil society. They will also act as platforms to support reporting on environmental and sustainable development at regional level. Ultimately the regional EIMS will be interconnected and interoperable, contributing directly to the national EIMS.

Summary

Regional EIMS are destined to yield strategic intelligence on environmental management and protection, and on sustainable development at regional level. They should facilitate and amplify the flow of environmental information between various regional and local actors. They are supervised by the Observatoire National de l'Environnement du Maroc (ONEM) in close collaboration with their regional equivalent, the Observatoires Régionaux de l'Environnement et du Développement Durable (OREDD).

The monitoring systems provide secure and comprehensive access to the various partners who are producing and/or using environmental information, access for the general public to a range of public data and information, and a management chart mapping key environmental stakes in each region to assist regional decision-makers.

The monitoring systems are organised around: (1) an environmental information portal, (2) an alphanumerical database and indicators, (3) a geographical information system, (4) a management chart, and (5) a repository of documents.

Content

Environmental information portal

The home page of the portal provides access to all the functionalities and services available in each regional EIMS, depending on the profile of the connected user. Users may access, in addition to the modules presented below, a presentation of the relevant region, of the regional observatory (OREDD), the network directory and available documentation.



Figure 1: Portal home page

Data and alphanumeric indicators

Depending on individual regions, between 200 and 700 datasets and indicators have been compiled in regional EIMS databases, with filters on domains, topics and sub-topics. Each indicator is described by specific attributes: definition, date of creation and DPSIR category.

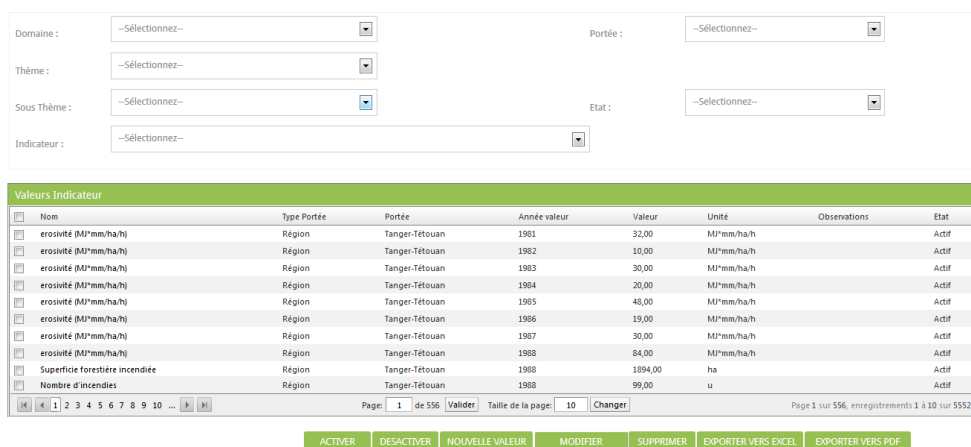


Figure 2: Examples of environmental status indicators

The various indicators can be viewed as graphs, either by range or indicator. Viewing by 'range' enables several indicators in the same range to be compared, whereas viewing by 'indicator' compares several items in the range for a specific indicator.

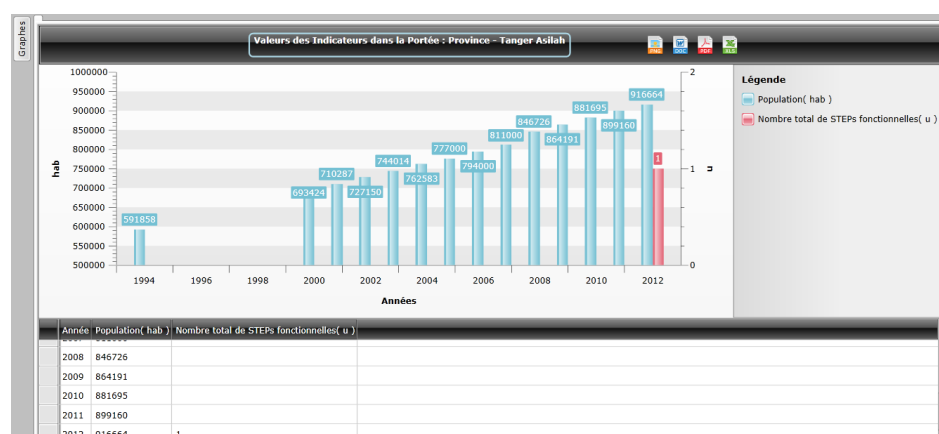


Figure 3: Example of results obtained from viewing data and indicators

Geographical information system

The geographical information systems (GIS) integrated in the regional EIMS enable users to consult maps of each region and overlay layers (geographical view), while consulting the source table linked to the relevant layer (table view). GIS can also be used to enter spatial queries using alphanumeric and/or geographical criteria.

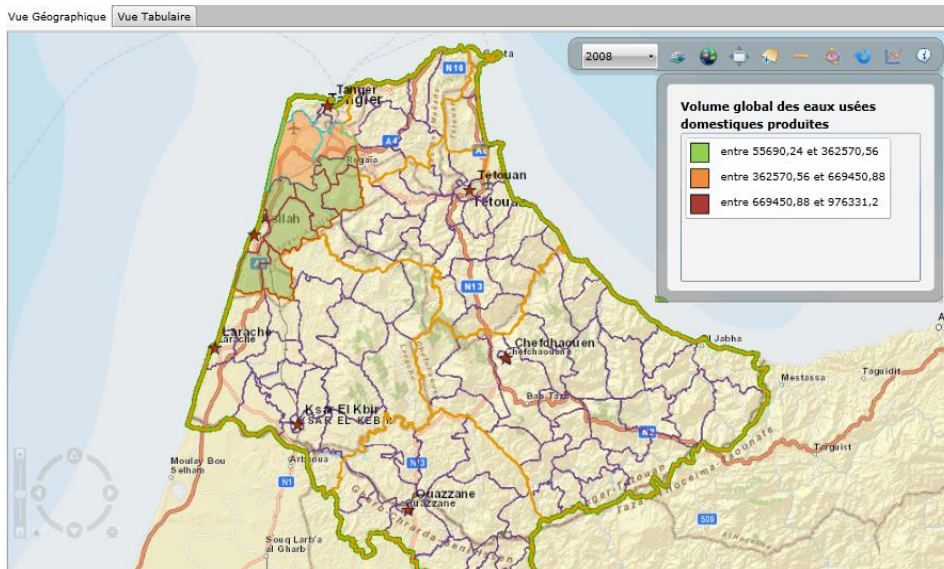


Figure 4: Example of results obtained from a multiple query

Management chart

A management chart provides regional decision-makers with an instrument for monitoring the state of the environment, as an aid to decision-making. It features a limited range of key alphanumeric or geographical indicators for the region, enabling the state of the environment to be checked periodically (generally once a year).

A management chart comprises:

A general map of the region providing an overall view, as well as highlighting its main socio-economic indicators;

Data and indicators in the form of a map, graph or table. The indicators are organised by natural habitats, environmental issues and the targets set for each issue.



Figure 5: Structure of the management chart

Cooperation

A direct mode of exchange has been adopted for sharing information at regional level. The regional environment and sustainable development observatories (OREDD) play a central role in sharing. The advantage of this mode is to let the observatories establish and customise their links with the various sources of environmental information and, in principle, streamline the reception of data, make producers of information feel responsible for the quality and reliability of the what they provide, and set up a real platform for exchange and concerted action between sectors.

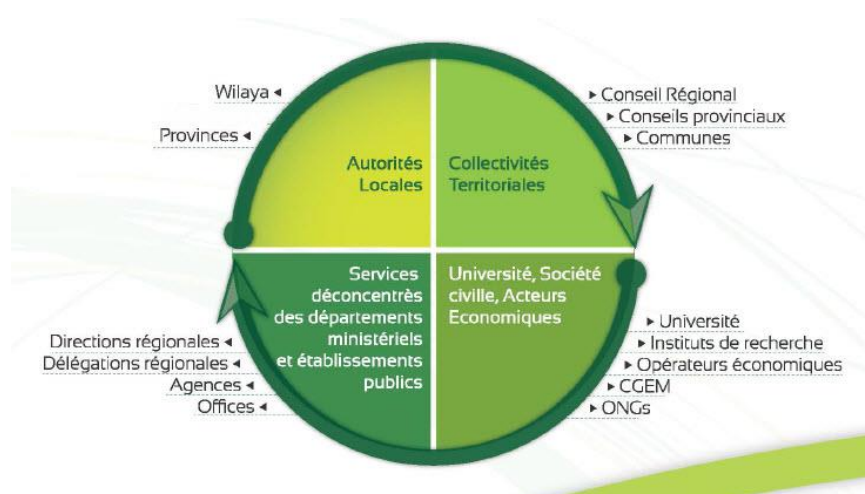


Figure 6: Diagram of information flows

To make this mode of information exchange durable, guidelines have been set for collecting and exchanging environmental data and indicators between members of the networks formed by regional observatories, and decrees issued by some regional governors.

Infrastructure

The environmental information and monitoring systems (EIMS) were originally developed to suit an architecture with an unlimited number of third parties. In terms of technology, the EIMS differ substantially. However a number of common features have been maintained, in particular regarding web server (IIS) for the portal, the mapping server (ArcGIS Server), and the metadata manager (GeoNetwork).

This array makes it possible to set up a fully web-based centralised system, to which access is possible from the internet or intranet with a standard web browser, for both members of the general public, authenticated partners and administrators.

The deployed functionalities cover:

- Portal functionalities: broadcasting of regional information, newsletters, documentation, photograph and map library, etc.;
- Functionalities related to the exploitation of regional environmental data and indicators;
- Functionalities related to the integrated exploitation of data and the GIS through queries and the output of topical maps;
- Functionalities related to defining and generating management charts;

- Functionalities related to access to, and the nature and quality of geographical data sources, through a geocatalogue.

In terms of their functional architecture, EIMS are organised around four main functions described in the following figure:

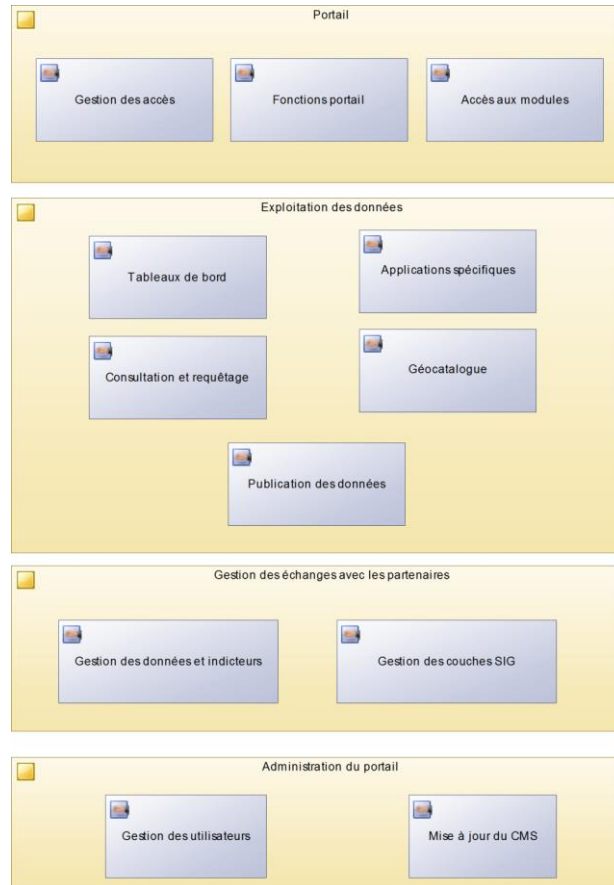


Figure 7: Functional architecture

The application architecture is built around five main blocks:

- Authentication and access control;
- Administration and back office;
- Data and indicator management;
- GIS exploitation;
- Management chart exploitation.

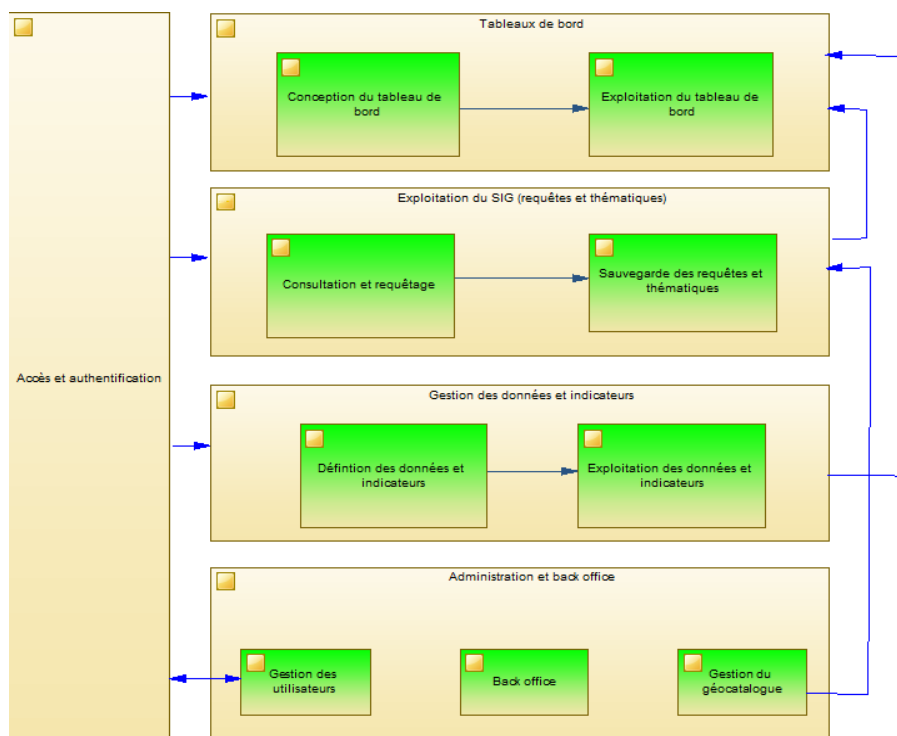


Figure 8: Application architecture

Key benefits

- Each EIMS provides the various users with a platform for viewing, analysing and combining data which differ in source, topic and nature;
- Thanks to a collaborative space restricted to partners producing information, the latter can manage (updating, consulting, changing, etc.) remotely the data for which they are responsible;
- Information is easily available and accessible to the general public;
- The geographical information system enables spatial analysis enhancing interpretation and understanding of the environmental issues in each region.
- The EIMS facilitates the drafting of reports on the state of the environment in each region.
- The EIMS provides the various uses with value-added data-analysis services tailored to their specific needs.
- There is no limit on the number of topics, indicators or programmes which can be handled by the EIMS; data processing and functional administrators can add new components as needs change, securing greater autonomy in their exploitation.

Link to the system

The EIMS developed so far are currently undergoing trials. Once operational, they will be accessible via the website of the Ministry of Environment: www.environnement.gov.ma

Primary national contact

Reference person: Mrs Fatiha El Mahdaoui

Organisation: Ministère Délégué Chargé de l'Environnement

Department: Division de l'Observatoire National de l'Environnement du Maroc

Email contact: fatihaelmahdaoui@yahoo.fr

Coordinates of developers

Reference person: Mrs Saida Bourous

Organisation: Ministère Délégué Chargé de l'Environnement

Department: Division de l'Observatoire National de l'Environnement du Maroc

Email contact: bourousaida1960@gmail.com

Source:

Observatoire National de l'Environnement du Maroc (ONEM).

Summary table

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2014	<p>Natural environment: water, air and climate change, biodiversity, coastal and marine environment, natural hazards, soil</p> <p>Economic environment</p> <p>Social and human environment</p> <p>Landscapes and territories</p>	<p>Framework law setting national guidelines for the environment and sustainable development</p>	<p>Ministère Délégué Chargé de l'Environnement (ONEM and OREDD),</p> <p>Various ministry departments (water, forestry, agriculture, industry, energy, fishing, etc.)</p>	<p>Regional</p> <p><u>Management:</u> combination of decentralised collection, processing and checking (OREDD) and centralised hosting, administration and dissemination of EIMS (ONEM).</p>

COUNTRY: Norway

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x	x	x	x	x	x

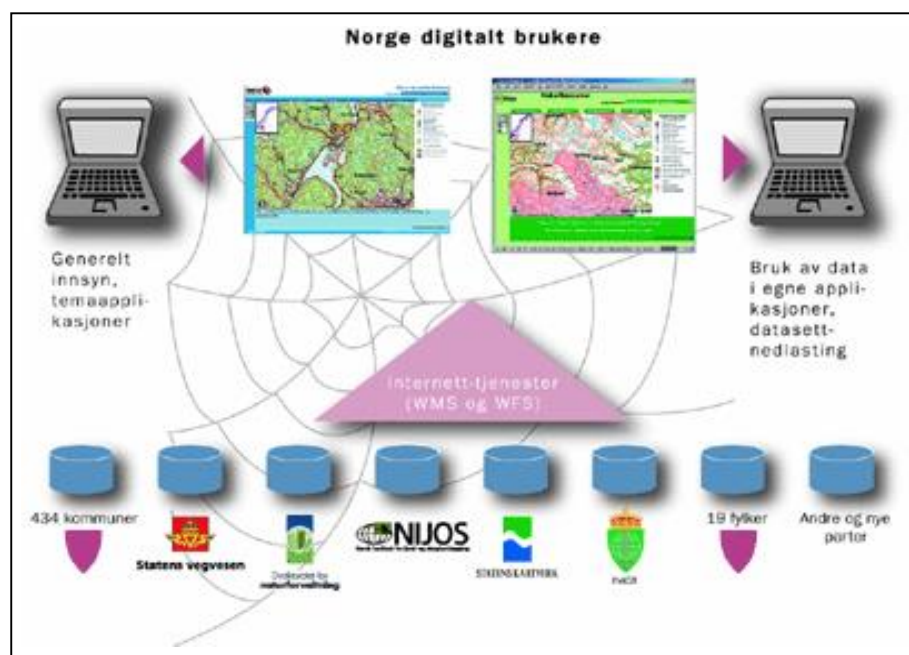
Norway Digital (ND)

Self-assessment

Norway Digital (ND) is based on new technologies for Internet distribution, and on international standards (ISO and OGC). Partners are increasingly interested in disseminating data as web map services (WMS). Downloadable data are available in standard formats. Metadata is delivered together with the data. A national portal provides information about the status of available data and web map services.

Summary

ND is a nation-wide program for co-operation, started in 2005 and operational in 2011, to supply digital geographic data. The aim is to enhance the availability and use of quality geographic information among a broad range of users, primarily in the public sector. A broad representation of Norwegian public bodies participate in this programme: national level ministries and their directorates at local and regional level, all Norwegian municipalities and different regional public bodies; in total more than 600 entities.



Lessons learned:

One main lesson is that national data systems can indeed form a basis for delivering useful integrated data services. There is a need for:

- Political support for a shared eGovernment architecture;
- Cooperation and involvement from the user community;
- A clear strategy; and
- A technology based upon standards

Content

ND provides all kinds of geographical data from the partners, each of which bring their own reference data and/or thematic data. All dataservices are web view services (WMS) available through the portal at www.geonorge.no.

Reference data includes topographical data, hydrography, roads and other infrastructure, land use, buildings and cadastral information, elevation and bathymetry and orthophotos.

Thematic data includes a broad range produced by national and local institutions on, for example, demography, risks and risk management, protected sites, biodiversity and nature values, pollution, fisheries, geology, mineral resources, agricultural and forest resources, cultural heritage and outdoor recreation facilities.

Cooperation

The National Mapping Authority, acts as both coordinator and host to the national secretariat.

Partners: 41 national, 429 municipalities, 18 counties, 122 electricity companies and the Sami Parliament. There are fora for thematic data and technology as a basis for developing products and sharing data and knowledge.

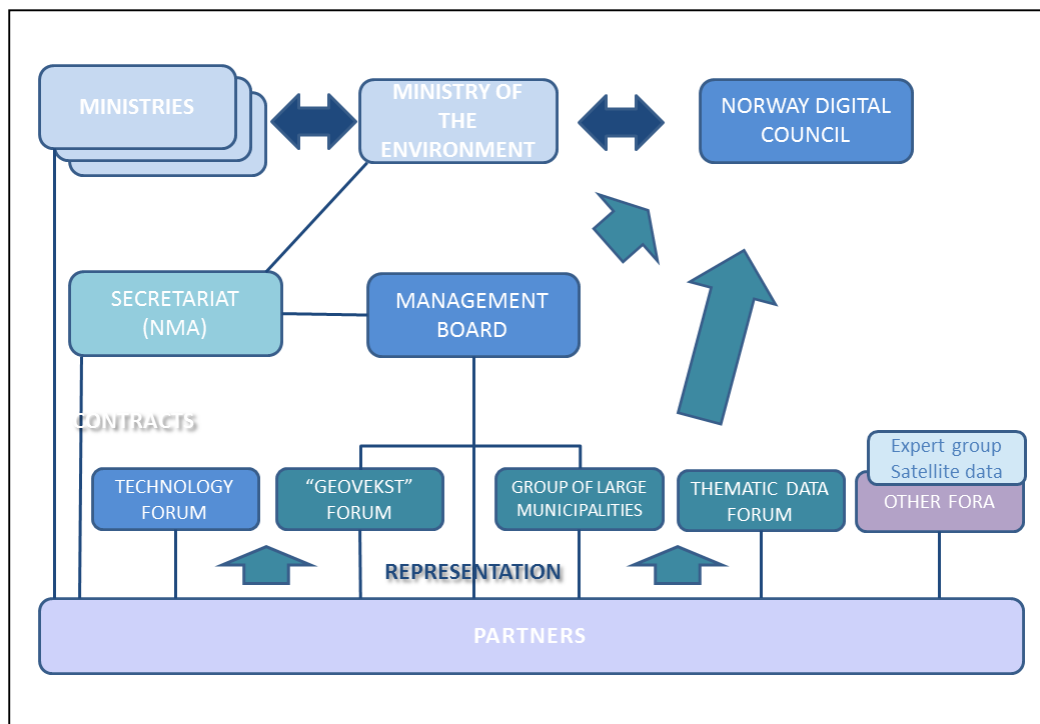


Figure 1. Norway Digital Organisation

Infrastructure

Developing specifications of geographic and thematic datasets has been a major task. They are based on the national *de facto* standard for geographic information (SOSI), including Arealis and Geovekst. These consensual documents, with other specifications and harmonised systems on cartography, metadata, joint distribution systems and internet web map services, are used in developing ND. Portal services are based on Open Source SW GeoNetworks.

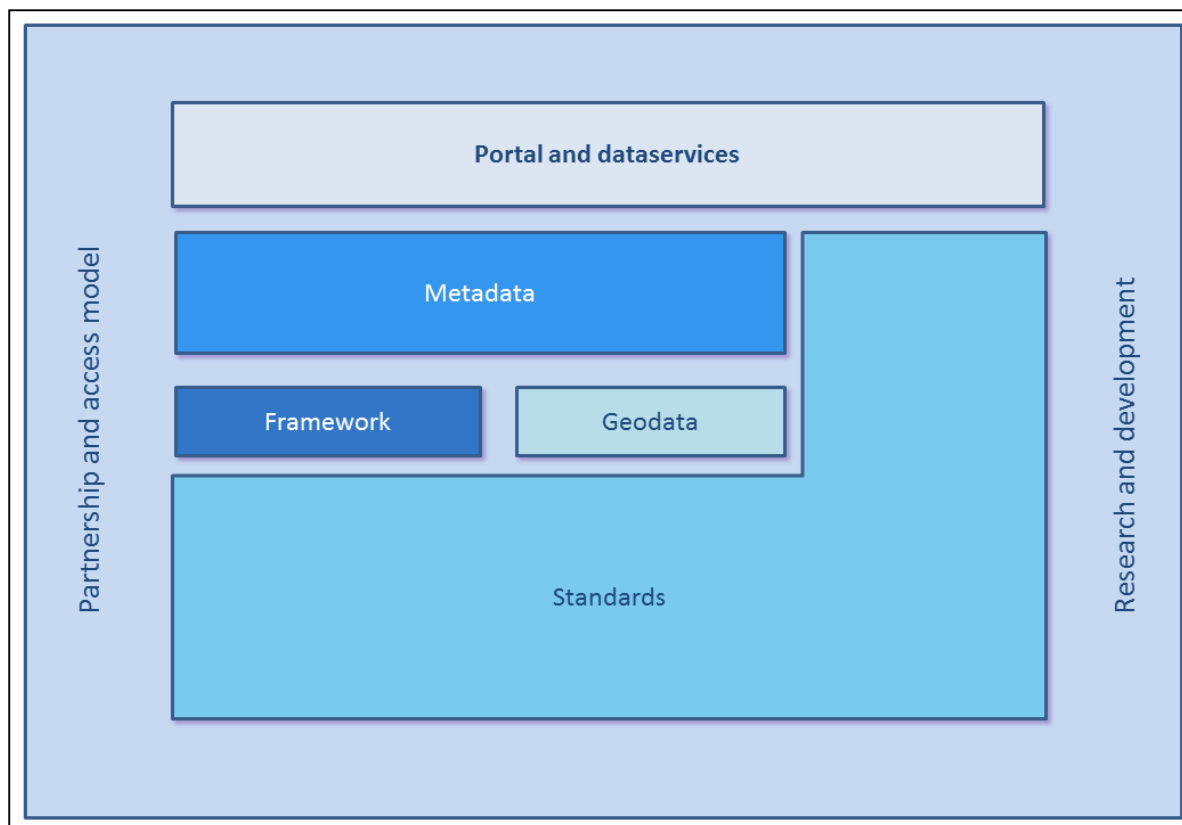


Figure 2. Core elements

Key benefits

ND offers more than 200 operational web map, geoportal and other services.

The main purpose, in line with INSPIRE, was to migrate from individual solutions to a national management concept with more coordinated and accessible digital services across sectors and levels of administration; and thus to better exploit common basic spatial data in a cost-efficient way.

Link to the system

www.geonorge.no

Primary National Contact:

Reference person: Rebekka Borsch (Eionet National Focal Point)

Organisation: Climate and Pollution Agency

Department:

e-mail contact: rebekka.borsch@klif.no

Coordinates of developers

Reference person: Karsten Lien (Karsten.Lien@statkart.no), Erik Perstuen (Erik.Perstuen@statkart.no)

Organisation: National secretariat at National Mapping Authority

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
2005	Demography, risks and risk management, protected sites, biodiversity and nature values, pollution, fisheries, geology, mineral resources, agricultural and forest resources, cultural heritage and outdoor recreation facilities	European Inspire-directive, National legislation regarding spatial data	612 partners in 2011; Supervising by National Mapping Authority	National <u>Management</u> National, regional, Centralised management De-centralised data collection and data services Centralised portal service with catalogue services

COUNTRY: Serbia

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x		x			x	x

Serbian EIONET Network (EIONET-RS)

Self-assessment

Legal basis

A general Memorandum of Understanding has been signed between the Serbian Environmental Protection Agency (SEPA) and the data providers. Further detailed procedures and formal agreements are envisaged.

Guidelines and tools

- 1) Eionet software standards document;
- 2) Central Data Repository and data specifications for the data providers;
- 3) Reporting Obligation Database for overview of international obligations; and
- 4) EEA indicator specifications for content development

Summary

The Serbian Eionet is strengthening inter-institutional cooperation in order to set up a fully functional National Environmental Information and Observation Network that will improve operational reporting to the EEA and other organisations. It is managed by SEPA. The main goal is to improve data collection and establish online services allowing all relevant information sources and products to be linked in a distributed system of systems.

This is accomplished by the development of an effective infrastructure for data input, validation, exchange and analysis, and the dissemination of information products for operational reporting. Initial funding came from the European Union's IPA 2009 Programme; the project lasted for two years, after which the system was technically fully operational: the hardware and accompanying software is in place. However, time and training are needed for users to master the system.

Content

The system includes basic and specialised geographic information system (GIS) layers, raster layers and environmental monitoring data in the six main themes (Figure 1).

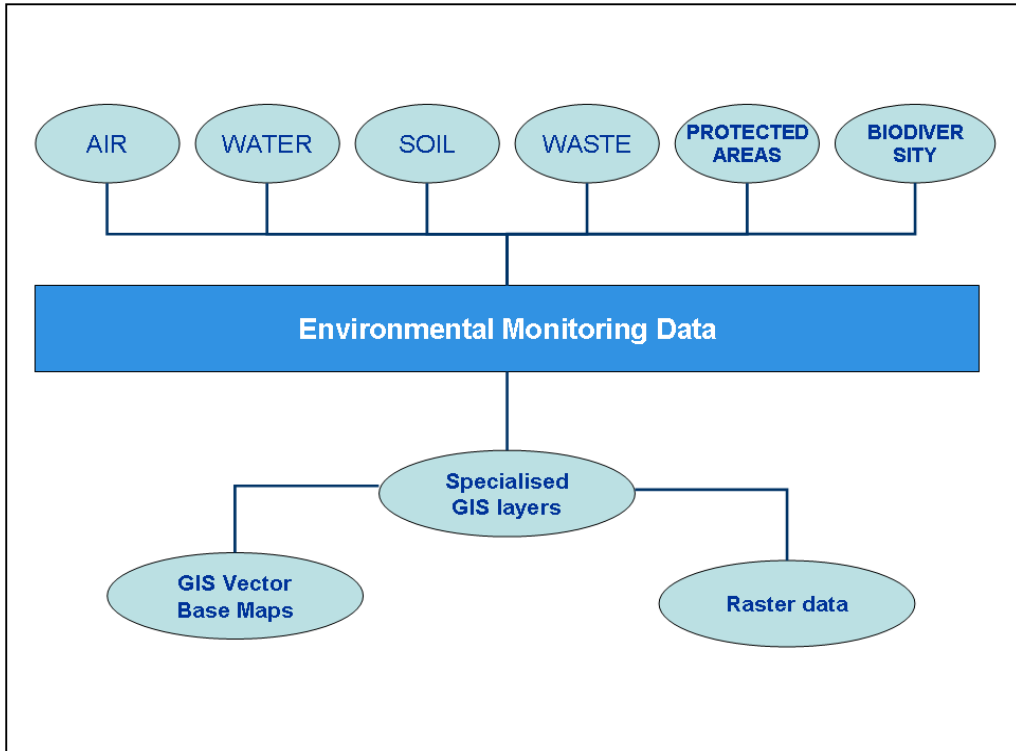


Figure 1. EIONET-RS Informational Scope

Cooperation

There are several main groups or “layers” of participants, as shown in Figure 2.

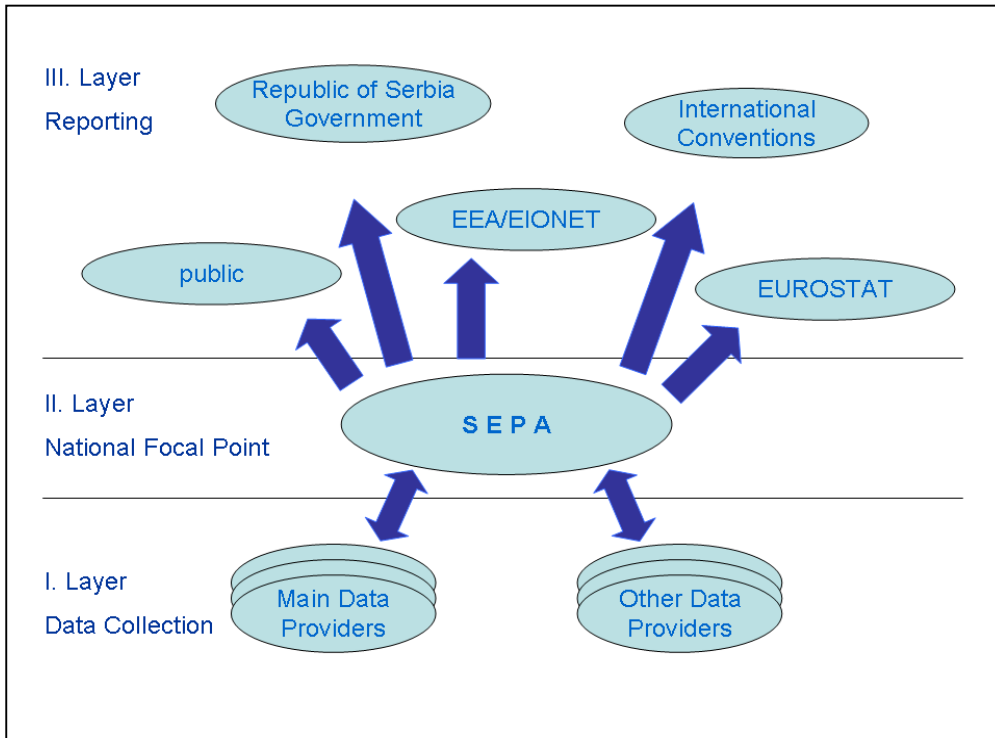


Figure 2. EIONET-RS Organisational Scope

Environmental data is collected and managed by 22 institutions. They can be involved in either data collection, data management or reporting or in all three processes.

Infrastructure

Data flow is “bottom-up”: a classical distributed database system. It is significantly enhancing the overall performance, diminishes the risks of miscommunication, is viable and flexible, and reduces the costs.

Key benefits

EIONET-RS is necessary mainly in order to:

- Support collaborative integrated analysis for the SoE, consultations, and reporting.
- Optimise technical solutions to link to data providers.
- Improve national and international data and information flows.
- Reduce duplication and unnecessary manual work from information gathering, processing and exchange.
- Provide a repository for harmonised national indicator data.
- Facilitate browsing and visualisation of environmental data
- Ensure interoperability of the national and international systems.
- Improve the effectiveness and the availability of services; make them accessible independently of time and place to different user groups.

Link to the system

<http://eionet.sepa.gov.rs/>

Primary National Contact:

Reference person: Dejan Lekic, Assistant Director (Eionet National Focal Point)

Organisation: Serbian Environment Protection Agency

Department: Information System Department

e-mail contact: dejan.lekic@sepa.gov.rs

Coordinates of developers

Reference person: Elizabeta Radulovic, Head of Information System Department

Organisation: Serbian Environment Protection Agency

Department: Information System Department

e-mail contact: elizabeta.radulovic@sepa.gov.rs

Reference person: Nikola Pajcin, IT adviser

Organisation: Serbian Environment Protection Agency

Department: Information System Department

e-mail contact: nikola.pajcin@sepa.gov.rs

website: http://epanet.ew.eea.europa.eu/european_epas/countries/cs

Summary table:

Date	Themes covered	Policy addressed	Participation	Geographical scope

Towards a Shared Environmental Information System (SEIS) in the European Neighbourhood

2011	Air, water, soil, waste, protected areas and biodiversity	Reporting obligations to the EU, international conventions, national legislation.	11 main data providers, 11 other data providers, Serbian Environmental Protection Agency	National, Sub-national Management: National EIONET-RS can be considered as distributed with centralised functions, based on the central database in SEPA and distributed nodes at the main data providers
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COUNTRY: SLOVENIA

1. Managed as close as possible to its source	2. Collected once , and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public , in relevant national language(s) .	7. Supported through common, free open software standards
	X	X	X		X	

Environmental indicators in Slovenia

Self-assessment

Standardised table and text templates were developed based on the EEA core set of indicators. For each indicator there is a description of the methodology used for collecting and processing data, including references to standards.

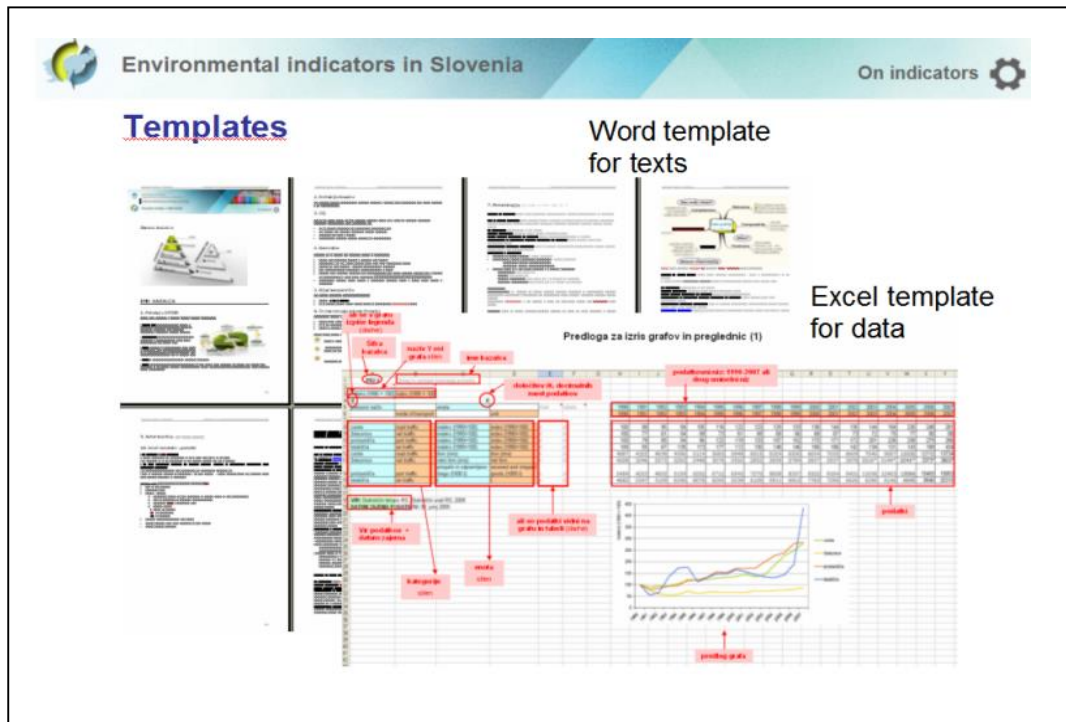


Figure 1. Screenshots

Summary

The web-based system of environmental indicators in Slovenia is managed by the Slovenian Environment Agency (SEA). All selected indicators are published together with historical data. The purpose is to provide common, scientifically approved statistical building blocks.

Content

Data, graphs and trends, key messages, assessments, definitions, methodology and related links are published for indicators covering agriculture, air, climate change, energy, forestry, household consumption, human and ecosystem health, industrial production, instruments of environmental policy, nature and biodiversity, sea, soil and land use, socioeconomic development, tourism, transport, waste and material flows and water.

Cooperation

SEA is responsible for monitoring, analysis, assessment, and reporting; and for management of the Slovenian EIONET. The Statistical Office, National Institute of Public Health, National Agricultural Institute, *Jozef Stefan* Research Institute and other data providers are part of the EIONET structure and ensure a stable cooperation in the production of indicators.

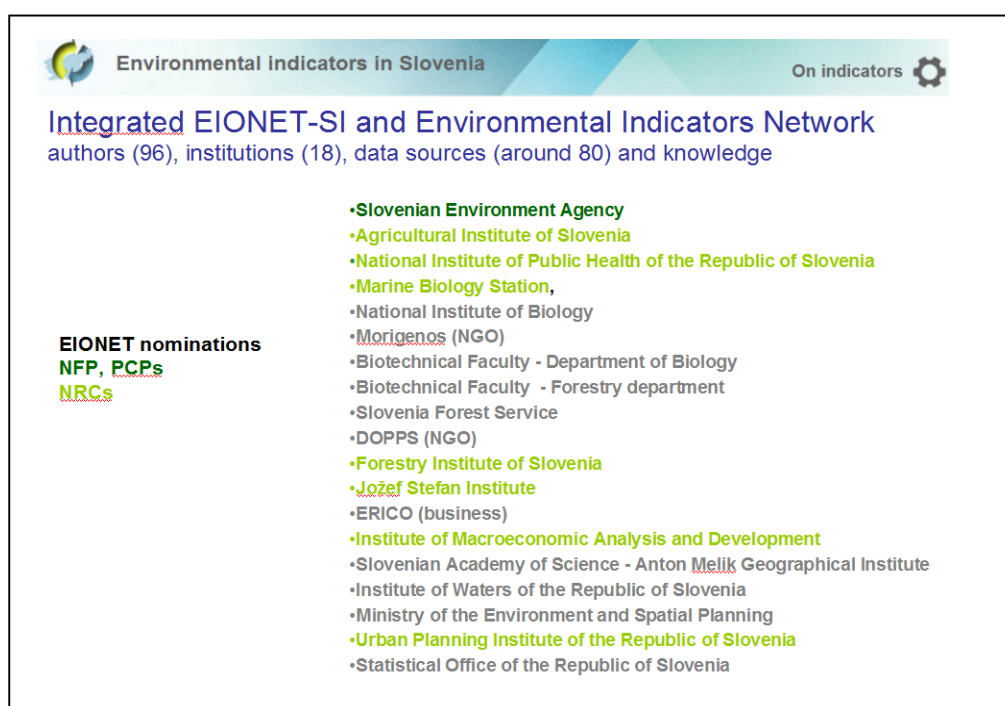


Figure 2. Partner organisations

Infrastructure

The web application uses a Zope application server, Python programming language, and PostgreSQL. The indicators are described in MS Word and copied into web format. Numeric data are prepared in a bilingual spreadsheet, and via xml format transferred to the web application, which allows for the automatic generation of graphs and tables in both Slovenian and English on the web.

The application offers three levels of rights for content managers and administrators.

Key benefits

- More efficient assessment and reporting;
- Common scientifically based building blocks made once and used many times for further analysis, assessments and reports;
- Reliable source of quality public information;
- Reduction of administrative burden and costs; and

- Stable network of relevant institutions and experts.

Link to the system

<http://kazalci.arso.gov.si/>

Primary National Contact:

Reference person: Jelko Urbančič (Eionet National Focal Point)

Organisation: Environment Agency of the Republic of Slovenia

website: <http://www.arso.gov.si>

Department:

e-mail contact: jelko.urbancic@gov.si

Coordinates of developers

Reference person:

Organisation: Slovenian Environment Agency

website: <http://www.arso.gov.si>

Department: Information System Department

e-mail contact: eionet.arso@gov.si

Source

Slovenian Environment Agency (Agencija Republike Slovenije za okolje - ARSO)

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2003	Agriculture, air, climate change, energy, forestry, household consumption, human and ecosystem health, industrial production, instruments of environmental policy, nature and biodiversity, sea, soil and land use, socioeconomic development, tourism, transport, waste and material flow, water	Reporting obligations to the EU, international conventions and national legislation. Providing high valued public environmental publication (Aarhus Convention).	18 institutions Slovenian Environment Agency	National Management: National A combination of decentralised data collection and centralised processing, verification and distribution.

COUNTRY: SLOVENIA

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x		x	x	x	x	

Interactive Statistical Atlas of Slovenia

Self-assessment

The Slovenian National Statistics Office (SORS) is the provider of all data in the Interactive Statistical Atlas of Slovenia (ISAS). Different tools are used for data collection (mostly statistical surveys, statistical and administrative registers).

Summary

ISAS is a web tool launched by the SORS in 2009, to offer an overview of selected statistical indicators on local maps. It is designed for users who are less skilled in using statistical data, as well as for more demanding users applying it, for example, as database support in strategic decision-making. The main extra feature compared to classic thematic maps is the availability of time series.

Content

Different statistical data and metadata for regions and municipalities are available on environment, population, labour market, education, business entities, construction, transport, agriculture and territorial units. These are presented on maps and charts. ISAS can be embedded; all data for indicators can be downloaded as a map or chart.

Cooperation

SORS developed ISAS in cooperation with the company Monolit d.o.o., with some key tasks performed by the company Mapping Worlds. SORS is responsible for collection, management and dissemination of all data. The tool is hosted on the servers of Monolit d.o.o., which is also responsible for technical support.

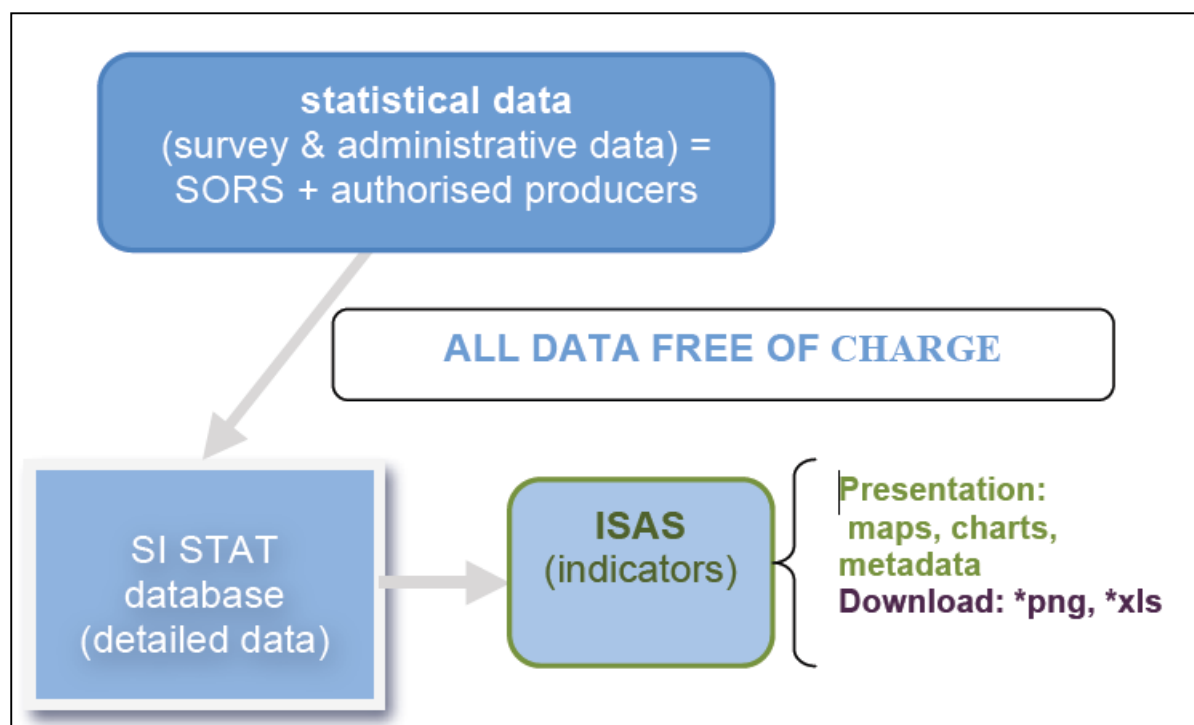


Figure 1. Data collection and management system at SORS

Infrastructure

The tool is intended for use in a web browser. It was tested with Internet Explorer and Mozilla Firefox. The user needs Adobe Flash Player.

Key benefits

The basic policy when producing ISAS was:

- Make it as simple as possible: and
- Ensure flexibility and adaptation to national needs.

Consequently, ISAS facilitates the addition of new content, the display of the number and boundaries of municipalities, presentation of data in various time series.

Link to the system

<http://www.stat.si/eng/iatlas.asp>

Primary National Contact:

Reference person: Jelko Urbančič (Eionet National Focal Point)

Organisation: Environment Agency of the Republic of Slovenia

website: <http://www.arso.gov.si>

e-mail contact: jelko.urbancic@gov.si

Coordinates of developers

Monolit d.o.o. <http://www.monolit.si/?tip=intandlang=eng>

Mapping Worlds: <http://www.mappingworlds.com/>

Source

Statistical Office of the Republic of Slovenia (SORS)

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2009	Collected municipal waste (2002 - annual update of data) Water supply (only 2007 and 2008 data) Natural disasters – damage caused (only 2007 and 2008 data)		SORS Monolit d.o.o., Mapping Worlds	Regional, Municipal Management: SORS

COUNTRIES: Sweden

1. Managed as close as possible to its source	2. Collected once , and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public , in relevant national language(s) .	7. Supported through common, free open software standards
x	x	x			x	

Distributed data collection system - Sweden

Self-assessment

After quality checking, the data is formatted for national and international reporting. Mandatory reporting to the EU and other international bodies is done directly by the data hosts who upload the files on **Reportnet**. Primary data and all analytical reports are published on the data hosts' websites and can be viewed or downloaded free of charge (Figure 1).

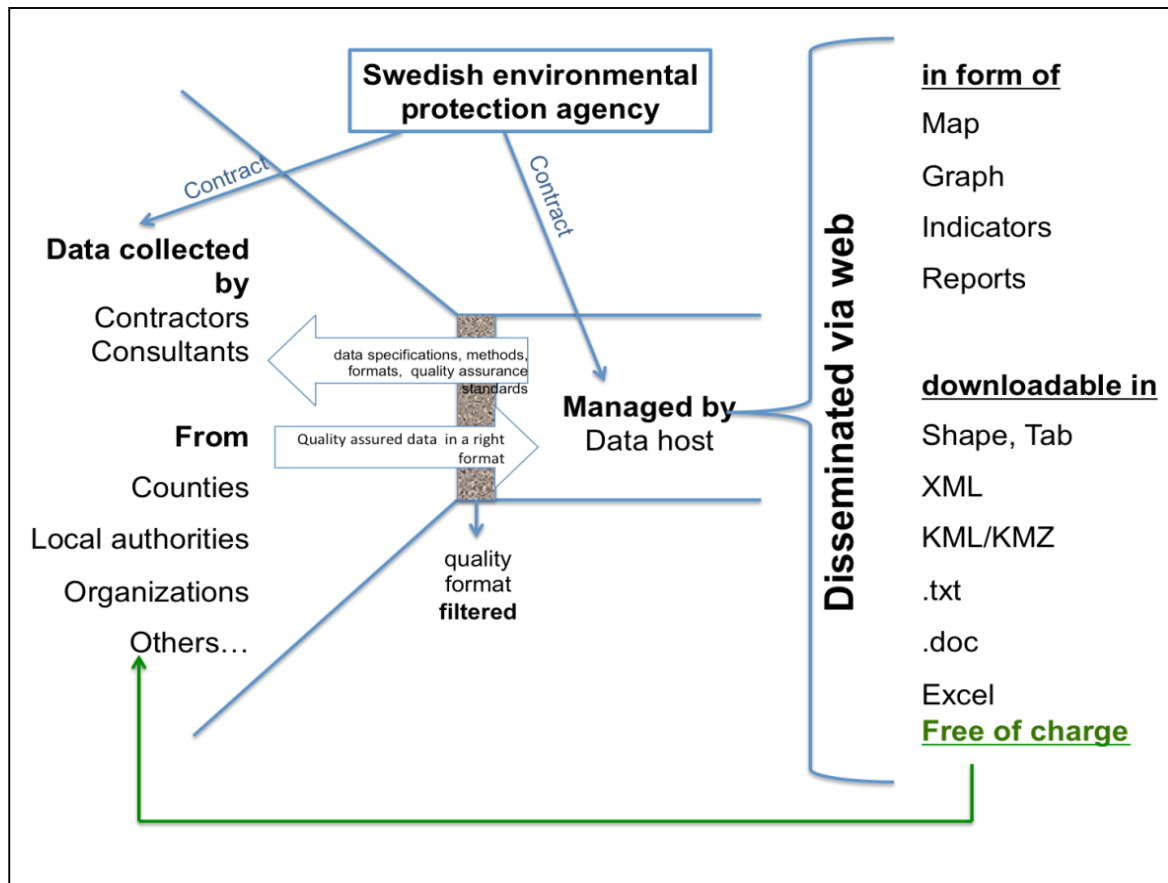


Figure 1. Data collection, management and dissemination

Summary

The system of decentralised data hosts was introduced in 1995 in order to replace a centralised data collection system that had been malfunctioning. Information is collected and managed by eight data hosts responsible for specific themes, and supervised by the Swedish Environmental Protection Agency (SEPA). The main lesson learned has been that data should be stored as close to its source as possible to reduce costs, and be managed by people who know and understand it well to improve information quality.

Content

Data and information are collected and managed by topic-dedicated data hosts (Figure 2).

Cooperation

Data hosts (Figure 2) have a mandate from SEPA and collect data from government agencies, regional and local authorities and contractors. Contractors help the data hosts to process and compile the data according to SEPA's specifications, methods, formats and quality assurance standards. SEPA supervises these activities based on specific contracts with each data host and the contractors (Figure 1).

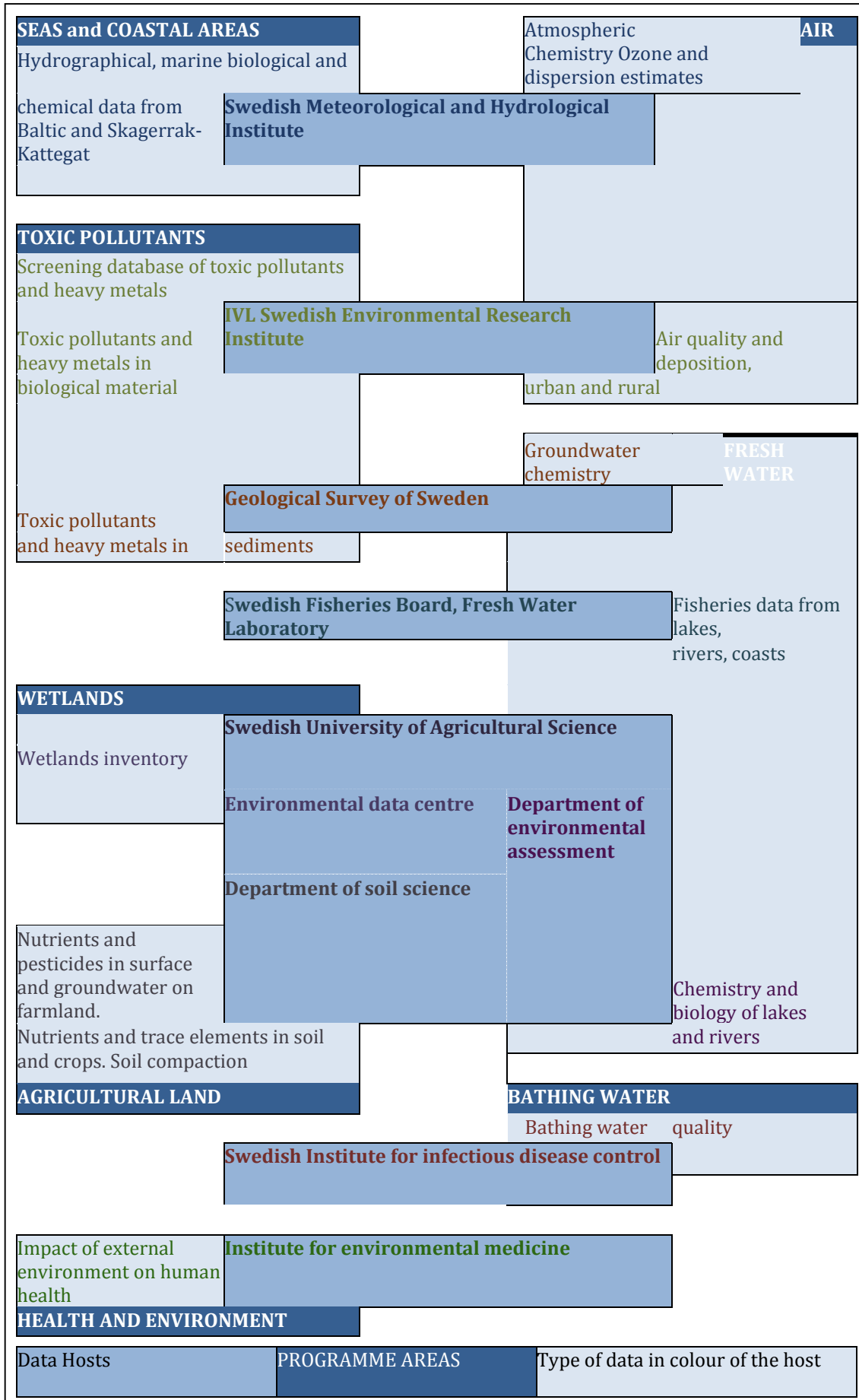


Figure 2. Decentralised data hosts and type of data for which they are responsible

Infrastructure

Technical Production Support (TPS) is a web-based tool supporting international reporting in the areas of climate, air pollution, water and waste. It is Linux-based and uses Oracle and Apache (see Figure 3). An authorised user can generate import/export templates, create different versions of documents and reports, and review them. Reviewing can cover different subjects and aggregation levels by components, subjects and geographical area.

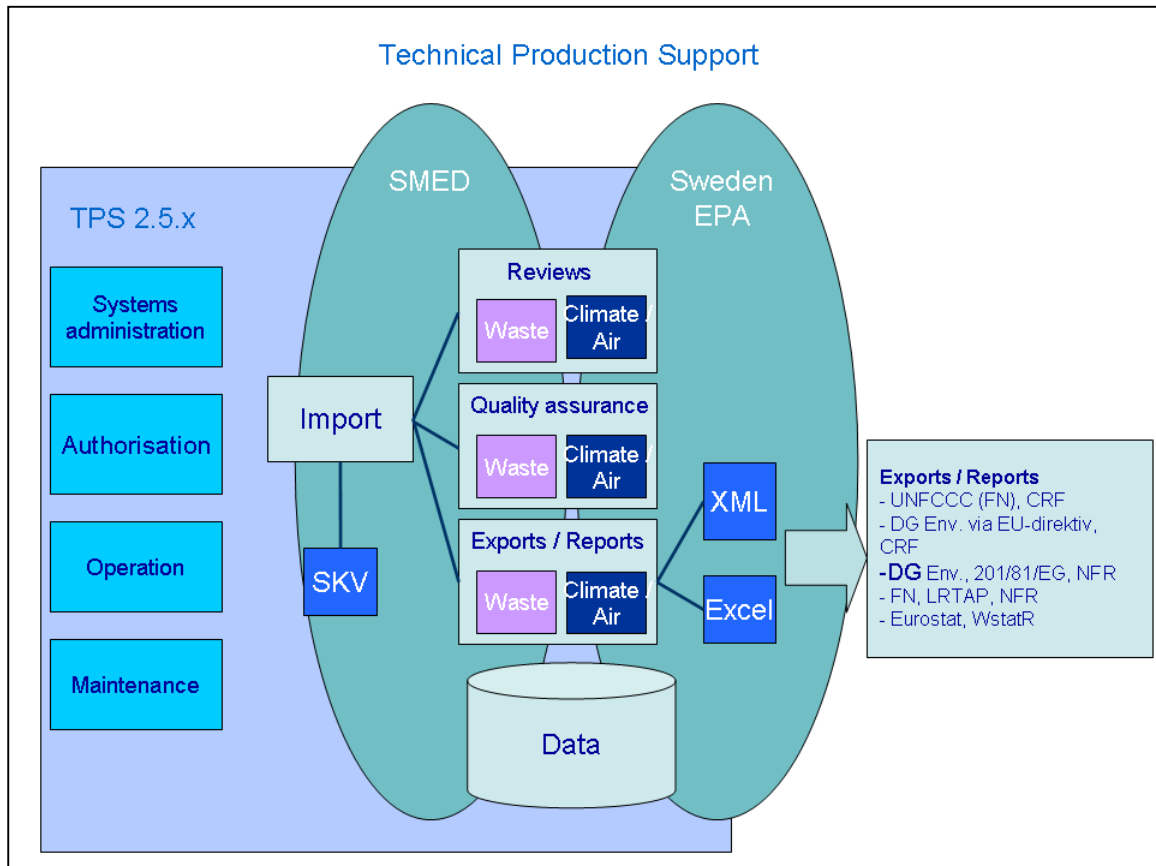


Figure 3. Overview of the Technical Production Support Tool

Key benefits

More efficient data collection and reporting

- Information is managed as close as possible to its source
- Information is collected once and shared with others

Reduction of the administrative burden and costs

Primary National Contact:

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Department: Environmental Assessment Department

e-mail contact: ninni.boren@naturvardsverket.se

Coordinates of developers

Reference person: Anders Foureau

Organisation: Swedish Environmental Protection Agency

e-mail contact:

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
1995	Air, fresh water, bathing water quality, toxic pollutants, agricultural land, etc.	Reporting obligations to the EU, international conventions, national legislation.	Eight data hosts, Swedish EPA	National Management: Decentralised data collection and verification

COUNTRY: Russian Federation

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x		x			

Integrated monitoring of Sochi National Park - Russian Federation

Self-assessment

The system includes Sochi National Park, adjacent territories, the UNESCO World Heritage Site “Western Caucasus”, and the coastal sea area. Sochi, a major resort area, will host the 2014 Winter Olympic and Paralympic Games. The system is linked to the preparation for the games: to ensure ecological safety in Sochi during and after the games and to provide information about the state of the environment to all interested parties.

The system will provide:

- Automated measurements of air pollutants and water quality;
- Collection of air, surface water and precipitation samples;
- Predictions of pollution levels from all sources; and
- Presentation of data on the state of the environment in the Olympic Games area.

Summary

The Integrated Environmental Monitoring System of Sochi National Park (and adjacent areas) is a pilot project of the Sochi Centre of Hydrometeorology and Monitoring of the Black and Azov Seas. The main purpose is to improve the quality and reliability of data about air, surface waters, and soils, radioactive and chemical pollution; and to provide easy access to information about the state of the environment for residents and visitors. It is currently experimental, intended to be an example for similar systems in other regions of Russia.

Content

The following topics are covered: meteorology, air pollution, surface waters, sea waters. Multiple indicators are used: nitrogen oxide, nitrogen dioxide, carbon oxides, sulphur dioxide, particulate matter and formaldehyde in the air. Dissolved oxygen, chlorides, sulphates, calcium ions, magnesium ions, iron, zinc, copper, oil products, pH, and chemical oxygen demand are reported for surface water. In coastal seawater, oil hydrocarbons, lead, mercury and iron, dissolved oxygen, pH are monitored.

Cooperation

The Sochi Centre is a state body providing meteorological data, storm warnings, weather predictions as well as information on pollution; it is part of a national monitoring system. Satellite monitoring is done by a scientific research centre, Planeta, responsible both for national space monitoring and for managing data from foreign systems.

Infrastructure

The system presents information from different sources on one website.

- Air: data is received from stationary non-automatic control points, automatic control stations, automatic control points and mobile ecological laboratories. They are calibrated according to ISO standards.
- Surface water: monitoring covers five water bodies, via six control points; quality can be analysed against 41 parameters.
- Coastal seawaters: eight control stations supply data that is analysed against 20-30 parameters.

These data are combined with data from satellites; satellite monitoring has been carried out since 2003. The satellites provide 12 different types of images, for example, maps of oil pollution, phytoplankton distribution and water temperature. The combined data is used as a basis for assessments, for reporting and for public information.

Key benefits

The system:

- Collects, stores and presents data in a structured way;
- Is equipped with automatic control stations, reducing costs;
- Provides free access to information for scientists, policy makers, residents and visitors;
- Serves as a prototype for replication; and
- Ensures the environmental safety of the region for the Olympic and Paralympic games.

Primary National Contacts:

Reference person: Igor Anatolievich Shumakov (ENPI-SEIS National Focal Point [environment])

Organisation: Federal Service for Hydrometeorology and Environmental Monitoring

e-mail contact: shumakov@hydromet.ru

Reference person: Vyacheslav Igorevich Shpinkov (ENPI-SEIS National Focal Point [environment])

Organisation: Federal Service for Hydrometeorology and Environmental Monitoring

e-mail contact: shpinkov@mcc.mecom.ru

Reference person: Natalia Shashlova

Organisation: Federal State Statistics Service

e-mail contact: shashlova@gks.ru

Coordinates of developers

Website: http://www.feerc.obninsk.org/monit_data/

Phone: (8622) 61-41-91

E-mail: pogoda@sochi.com

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system

Since 2011	Air pollution control, surface waters, coastal sea waters, soil biota		<ul style="list-style-type: none"> • Sochi Center of Hydrometeorology and Monitoring of Black and Azov Sea • Scientific Research Center of Space Hydrometeorolog "Planeta" 	Regional
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COUNTRY: Russian Federation

1. Managed as close as possible to its source	2. Collected once , and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public , in relevant national language(s) .	7. Supported through common, free open software standards
	x		x			

Technologies of Ecological Development - Russian Federation

Self-assessment

The technological platform is active in four major focus areas:

- Analytical work includes forecasting, monitoring, analytical evaluation, strategic planning of research on development of ecologically friendly technologies.
- Education including updating educational programmes and studies; professional development and additional training of specialists; support to talented students and young specialists.
- Information work includes dissemination of information, links with European technical platforms, organisation of conferences, seminars, trainings.
- Finance including engaging private and public funding, ensuring stable financing.

Summary

This technical platform was initiated to coordinate the efforts of the state authorities, scientists, business sector and citizens to solve environmental problems in Russia, to improve ecological safety, and to promote new eco-friendly and energy-efficient technologies. Its main purpose is to involve a wide range of participants in solving the ecological, social and economic problems of the country.

To date the participants are nine state and municipal bodies, 28 business representatives, five financial institutions, funds and state development organisations, three consulting and engineering companies, 23 educational institutions, 12 establishments of the National Academy of Science, 15 scientific and research institutions, 17 public organisations and societies, and one international organisation. There is a strong governance mechanism for managing the participation of such a broad and diverse community of actors.

Content

The platform includes environmental aspects related to the following sectors:

Mechanical engineering, metalworking	Air traffic control
Military-defense complex	Fuel and energy, renewable energy
Agriculture, hunting and forestry	Textile industry
Transport	Electronic and optical equipment
Chemical industry	Extraction of minerals
Science and education	Production of airplanes, ships, vehicles
Instrumentation technology	Medical and health care
Construction	Biotechnology

The technical platform has a focus on:

- Monitoring and forecasting atmosphere and hydrosphere;
- Resource assessment and forecasting of lithosphere and biosphere;
- Processing and using industrial waste;
- Reducing risk and consequences of natural and other disasters;
- Agriculture and foodstuffs: environmentally sound and resource efficient production and recycling;
- Environmentally sound mining and mineral extraction;
- Safe handling of radioactive waste and nuclear fuel;
- Protection of people from terrorist activity; and
- Protection of hazardous sites from terrorist activity.

Cooperation

The platform was the initiative of three research institutions:

- Russian State University of Hydrometeorology
- Lomonosov Moscow State University
- National Research University Higher School of Economics

In July 2011 the platform was officially established, not as a legal body but as a Commission under a working group of the State Commission on High Technology and Innovations.

The structure is based on a network approach, incorporating existing networks and creating new ones. Membership is open to all interested parties, and cooperation with non-members is also possible.

There are several managing bodies:

- The Observation Council gives recommendations concerning strategic development, represents the platform in state bodies, controls the work of the governing and working bodies, and assesses compliance with strategic goals and effectiveness of the results.
- The Governing Committee is responsible for planning, steering and coordinating the work.
- The Scientific Research Council is a consulting body and assists, for example, with collecting, processing and exchanging information.
- The Investment Council organizes and implements investment projects and helps members to assess the investment potential of projects and to connect with financial institutions, funds, investment organisations and state development institutions.

The main funding sources are expected to be:

- Regular and one-off payments by members;
- Donations;
- Investment companies; and
- Any other legal contributions, including from international sources.

Infrastructure

The platform shall employ the most advanced technology, both nationally and regionally. It also includes equipment for the monitoring of Sochi National Park (see Sochi case study).

Key benefits

Some key benefits include:

- Improved monitoring and forecasting;
- Well-structured and easily accessible data;
- Improved inter-institutional and science-policy interaction;
- Improved government – business co-operation; and
- Support for the development of new environmental technologies, environmentally sound and resource efficient production and recycling of agricultural products and foodstuffs.

Primary National Contacts:

Reference person: Igor Anatolievich Shumakov (ENPI-SEIS National Focal Point [environment])

Organisation: Federal Service for Hydrometeorology and Environmental Monitoring

e-mail contact: shumakov@hydromet.ru

Reference person: Vyacheslav Igorevich Shpinkov (ENPI-SEIS National Focal Point [environment])

Organisation: Federal Service for Hydrometeorology and Environmental Monitoring

e-mail contact: shpinkov@mcc.mecom.ru

Reference person: Natalia Shashlova

Organisation: Federal State Statistics Service

e-mail contact: shashlova@gks.ru

Sources:

<http://ige.rshu.ru/content/techplatform/participant>

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2011	Environmental technologies in different economic sectors		Open to anyone interested, so far: nine State and municipal government bodies, 28 representatives of business sectors, including private and State owned companies, five financing institutions, funds and State	<i>National</i>

			development organizations, three consulting and engineering companies, 23 educational institutions, 12 establishments of National Academy of Science, 15 scientific and research institutions, 17 public organisations and societies and one international organisation.	Management: Central with distributed data collection systems
--	--	--	--	--

COUNTRY: Ukraine

1. Managed as close as possible to its source	2. Collected once, and shared with others for many purposes	3. Readily available to easily fulfil reporting obligations	4. Easily accessible to all users	5. Enabling comparisons at appropriate geographical scale, and citizen participation	6. Fully available to the public, in relevant national language(s).	7. Supported through common, free open software standards
x	x	x	x		x	

Integrated regional information system (OMOS) - Ukraine

Self-assessment

Data providers send the qualitative and quantitative data and selected environmental indicators to the central servers. The Regional Environmental Monitoring System (OMOS) automatically updates the database, where the data is processed using OMOS's own software, and interested parties can access the information via Internet. OMOS provides added value for many regional organisations involved in environmental monitoring activities by combining data automatically and providing a range of data management functions. OMOS is developing modelling algorithms for automatic tracing of pollution sources. For example, when the rapid increase of a pollutant's concentration in the environment is detected, the system calculates the possible pollution source based on wind speed and direction and alerts the responsible authority.

Summary

A regional need for a shared monitoring information system has resulted in a project in Donetsk known as OMOS. Launched in 2007, the project represents a first attempt to combine data from five different sources and make it openly accessible for authorities and decision-makers as well as for the public.

Content

OMOS covers air pollution and quality of surface waters, integrating data from 96 monitoring stations for water quality and 50 stations for air quality (two of which are automated). Information from automated stations is transmitted every ten minutes. Data is collected on sulphur dioxide, carbon oxides, ozone, nitrogen dioxide and ammonia as well as temperature, wind, humidity, precipitation and atmospheric pressure.

Institutions and people

OMOS is hosted by the regional Environmental Protection Administration, and collects and processes data from four regional agencies as well as from the monitoring stations (see Figure 1).

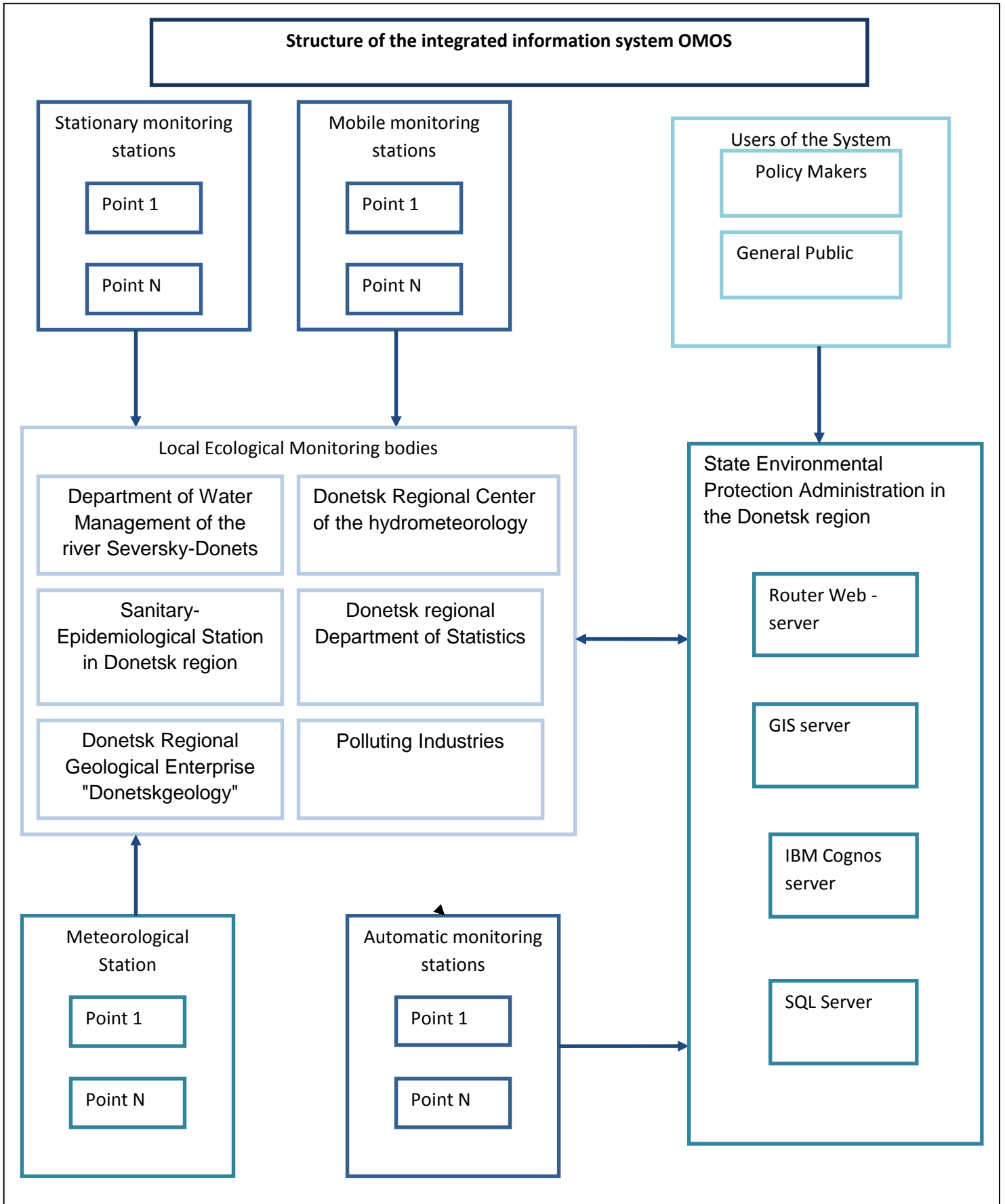


Figure 1. OMOS organisational structure

Infrastructure

- OMOS uses an Apache server, compatible with both Linux/Unix and Windows.
- It is compatible with the national monitoring system, which is currently under development. OMOS verifies collected data and exports it into the national monitoring system in an agreed format.
- OMOS is modular - new modules for soil, forest and groundwater monitoring are being developed.

See Figure 2, below:

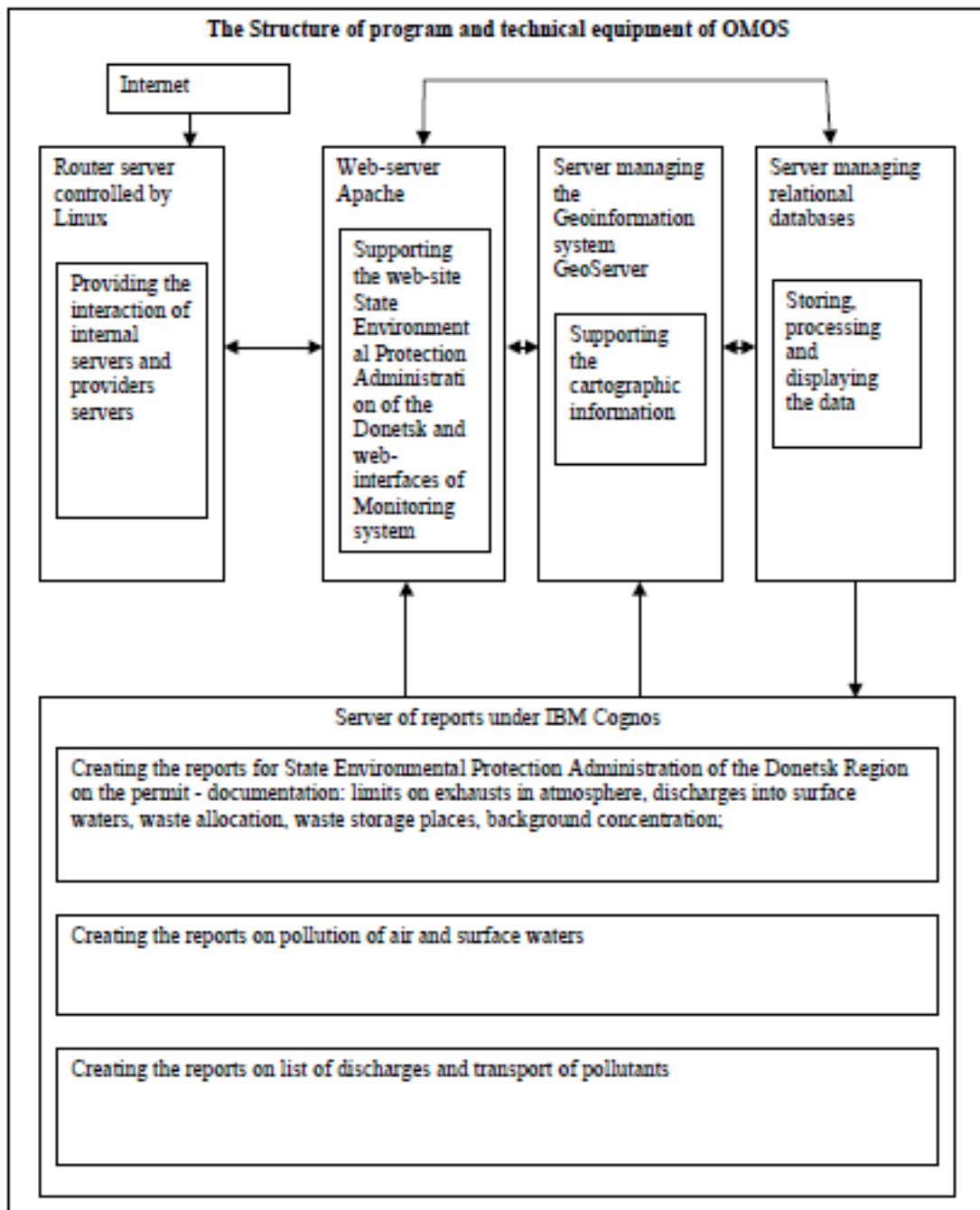


Figure 2. Technical structure of OMOS

Key benefits

The system:

- collects, stores and presents data in an organised form;
- is automatic and consequently reduces the administrative burden and costs;
- provides free access to information for scientists, policy makers and public;
- uses formats compatible with the national monitoring system;
- enables users to see the concentration of pollutants, providing a sound basis for decisions on limits and permits of polluting substances for industries; and
- can help predict and prevent further deterioration of the environment.

Primary National Contact:

Reference person: Averin Dmitro Genadiyovych Head of department (ENPI-SEIS National Focal Point)

Organisation: Ministry of Environment and Natural Resources of Ukraine

Department: State Environmental Monitoring Department

e-mail contact: averin@menr.gov.ua

Telephone: +3 8 044 206-31-67

Fax: +3 8 044 206-31-30

Sources:

State of environment report for Donetsk region, 2009

Personal interview with D. Averin, Head of the State Environmental Monitoring Department

Summary table:

Date	Themes covered	Policy addressed	Participation	Geographical scope
Since 2007	Air Pollution control, surface water control	National legislation: "Law of Ukraine on Ecological Protection" (article 20, 22) Decree of Ministry of Environment of Ukraine N 218 "On providing Ecological Information" Decree of Cabinet of ministers of Ukraine N391 'Procedures for state environmental monitoring system: the main principles' (30.03.1998)	<ul style="list-style-type: none"> • The State Environmental Protection Administration of the Donetsk region • Department of Water Management of the river Seversky Donets • Regional Sanitary-Epidemiological Station • Donetsk Regional Geological Enterprise "Donetskgeology", • Donetsk Regional Center of Hydrometeorology • Automated and stationary pollution control points of city councils 	Regional Management: A combination of decentralised data collection and management with centralised data access

COUNTRIES: Black Sea riparian states

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public, in relevant language/s.	Uses free open software standards
x						x

Black Sea SCENE

Self-assessment

For standardisation and international exchange, the ISO19115 metadata standard has been adopted. The Common Data Index (CDI) format is defined as a dedicated subset of this standard, and it is International Standards Organisation (ISO) compliant. A CDI XML format supports the exchange between CDI-partners and the central CDI manager, and ensures interoperability with other systems and networks.

Summary

The Black Sea SCENE research infrastructure stimulates scientific cooperation and exchange of knowledge and expertise; strengthens regional capacities and performance of marine environmental data and information management; underpins harmonisation with European marine data quality control and assessment procedures, and adoption of international meta-data standards and data-management practices; provides improved data and information delivery services for the Black Sea region at European level.

Content

Currently, the Black Sea CDI V2 meta-database contains more than 104,000 individual data entries from eleven Data Holding Centres from the six Black Sea countries. It covers a broad scope and range of data held by these organisations on data quality and quantity, pollution, biodiversity, geological formations, etc. Additional data centres from the BlackSeaScene network are expected to further populate the CDI meta-database, and other institutes in their countries are encouraged to participate.

Cooperation

More than [55 organisations](#) cooperate including universities, research institutes and NGOs in the Black Sea region and beyond.

Infrastructure

CDI XML entries are generated by the participating data centres (i.e. CDI-partners) directly from their databases. CDI-partners can make use of a dedicated Java Tool - MIKADO – in order to generate CDI XML files automatically, following a properties file, which defines the mapping between CDI-format and partner database fields and the required local queries. CDI updates are produced and transferred at regular intervals. The file format is ODV for data profiles and NetCDF-CF for grid data.

Key benefits

- More efficient data collection and reporting through extended infrastructure;
- Improved online access; and
- Standardised methodologies.

Link to the system

<http://www.blackseascene.net>

Coordinates of developers

Currently only through a web-form:

http://www.blackseascene.net/content/contact.asp?menu=0310000_000000

Sources:

<http://www.blackseascene.net>

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	<u>Geographical scope of the system</u>
Since 2005	Water quality and quantity, release of pollutants, sediments, marine biodiversity etc.		More than 55 universities, research institutes and NGOs.	Black sea region Management: A combination of decentralised data collection and verification, and centralised processing, dissemination.

ORGANISATION: Helsinki Commission – Baltic Marine Environment Protection Commission

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public, in relevant language/s.	Uses free open software standards
	X	X	X	X	X	X

HELCOM – Baltic Sea data management system

Self-assessment

The Helsinki Commission (HELCOM) leads and coordinates marine-related emission, input and environmental monitoring and assessment activities in the Baltic Sea Area.

The monitoring programmes rely on data derived from publicly funded monitoring programmes by the contracting parties (Denmark, Estonia, the European Union, Finland, Germany, Latvia, Lithuania, Poland, Russian Federation and Sweden). HELCOM follows and influences relevant international marine-related monitoring and assessment programmes at European and global levels.

The HELCOM databases are managed by independent data centre(s), mostly thematic data centres, working under contract with HELCOM. Metadata information is available through the map service itself by clicking on a symbol next to a dataset. HELCOM recommends the use of Internet Explorer to view metadata. *(Note: at the time of preparing this report, metadata does not display well with any mainstream browser).*

Help to the users is provided in the [‘frequently asked questions about the HELCOM map and data service’](#).

Summary

One of the main roles of HELCOM is to act as a regional environmental focal point providing information about the state of/trends in the marine environment and the efficiency of measures to protect the Baltic Sea. In recent years HELCOM has increasingly been using geographic information systems (GIS) for analysing data and for visualising complex scientific information on both static maps and interactive internet-based maps.

The HELCOM map and data service allows users to access a wide range of data on activities and pollution loads affecting the Baltic Sea marine environment, including information related to monitoring activities and regional preparedness for emergency response. Users can view, create and

save/print their own maps, download datasets, and create live links to the HELCOM GIS website via the HELCOM map and data service.

Content

HELCOM itself has the following data monitoring programmes:

- Airborne Pollution Load Compilation (PLC-Air)
- Waterborne Pollution Load Compilation (PLC-Water)
- Cooperative Monitoring in the Baltic Environment (COMBINE)
- Monitoring of radioactivity (MORS)
- Surveillance of deliberate illegal oil spills

According to the [HELCOM data and information strategy](#), the HELCOM data and information activities should make it possible to produce assessments of pollution loads and their effects on the Baltic Sea marine environment, facilitate decision making by the Contracting Parties in environmental management, and make environmental information available to the general public.

Data from other organisations is also included in the HELCOM Map and Data service. For example, data on concentrations of radioactive substances in water, sediments and biota, compiled by the [HELCOM Monitoring of radioactive substance project \(HELCOM MORS\)](#), can be downloaded via the International Atomic Energy Agency's [Marine Information System](#).

Cooperation

The data available through the HELCOM map and data service is compiled from various sources. Much work carried out by different HELCOM groups, experts, projects as well as HELCOM secretariat staff contributes to the broad selection of data available. Also data produced by other organisations and projects is displayed via the map service.

Infrastructure

Standards

Standards used for the data are ISO19115, Geographic Information Metadata, and OGC WMS standard protocol for the access layers for the map and data service.

Output

The map service builds on ESRI's ArcGIS Server and Flex, an Adobe development platform based on the Adobe Flash Player client. Building a map service with Flex has several advantages as:

- The development process is relatively straight forward
- It is easy to deploy applications
- It is well integrated with ArcGIS Server

Clients only need to have Adobe Flash installed on their system, which is the case for 99% of web-connected computers.

Key benefits

Baltic Sea data is collected, visualised and downloadable in one place for:

- Pollution:
- Monitoring: and
- Surveillance (oil spills).

Link to the system

www.helcom.fi/baltic-sea-trends/data-maps/

<http://maps.helcom.fi/website/mapservice/index.html>

Coordinates of developers

Project Researcher

(Data/Geographic information)

Mr. Manuel Frias Vega

Phone: +358 46 850 9209

Fax: +358 (0)207 412 645

Assisting Professional Secretary

Ms. Minna Pyhälä

Phone: +358 46 850 9205

Fax: +358 (60)207 412 645

Source:

www.helcom.fi/baltic-sea-trends/data-maps/helcom-map-and-data-service/

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	<u>Geographical scope of the system</u>
Since 2004	Airborne Pollution Load Compilation (PLC-Air) Waterborne Pollution Load Compilation (PLC-Water) Cooperative Monitoring in the Baltic Environment (COMBINE) Monitoring of radioactivity (MORS) Surveillance of	HELCOM data and information strategy	Belarus, Estonia, Finland, Latvia, Lithuania, Poland, Russian Federation, Sweden	Baltic sea Management: A combination of decentralised data collection and verification, and centralised processing, dissemination.

	deliberate illegal oil spills			
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COUNTRIES: 27 Member States of the European Union

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
	x	x	x	x		x

Water Information System for Europe (WISE)

Self-assessment

The standards used for reporting are embedded in Reportnet by using common data formats. The harmonisation of data contents is ensured through the use of guidance reporting documents and specific schemas for each data flow.

Summary

WISE was launched for public use as a web-based service on 22 March 2007 (Annual World Water day) providing a web-portal entry to water related information ranging from inland waters to marine. The WISE portal provides reporting tools for Member States through Reportnet with the aim to phase out paper reporting and to streamline reporting needs. WISE provides an integrated portal to access information related to water at EU level, ranging from policy/legal documents, interactive maps, documents and datasets to download, present and forecasting services based on modelling, as well as an inventory of relevant research projects.

Content

The system contains data and information related to EU directives, implementation reports and supporting activities, reported datasets, interactive maps, statistics, indicators, on past, present and forecasting services across Europe and an inventory of links to recently completed and/or on-going water related projects and research activities. The data, diagrams, indicators and assessments can be downloaded from the web.

Cooperation

The Water Information System for Europe (WISE) is a partnership between the European Commission (DG Environment, Joint Research Centre and Eurostat) and the European Environment Agency. At the core of the system is the data collected and provided by the countries.

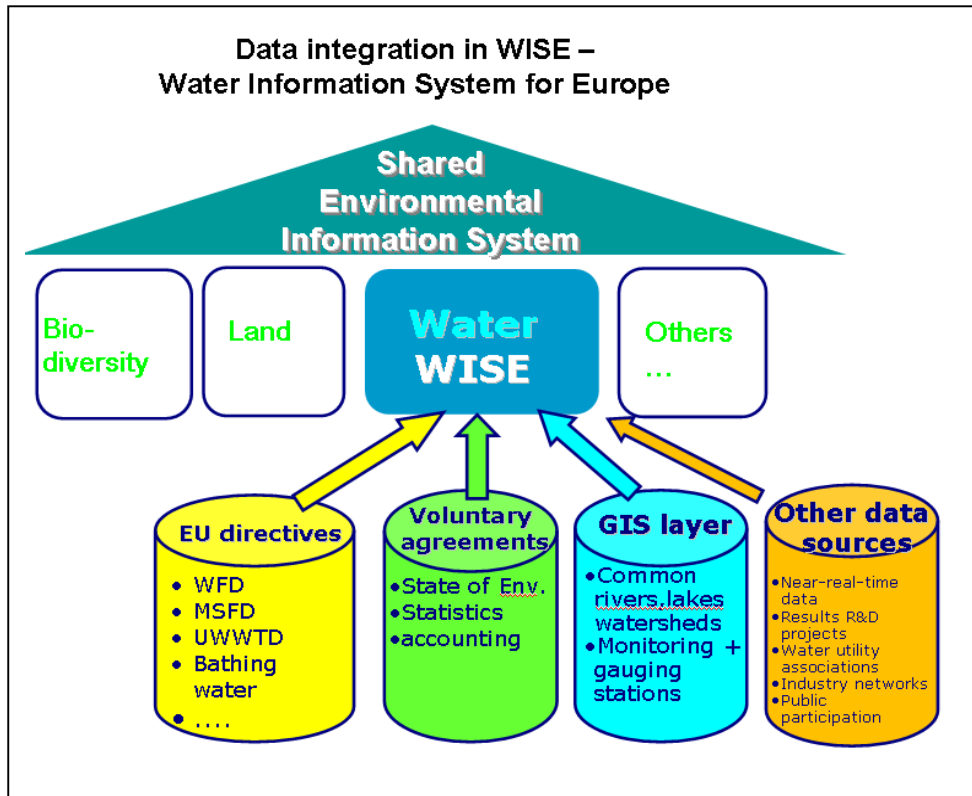


Figure 1. Data integration in WISE

Infrastructure

WISE “serves” data and information to a set of different water related directives and other reporting obligations according to the “menu” listed in the Reporting Obligations Database (ROD) which is part of Reportnet. The necessary data from national databases is reported in various formats (e.g. MS Access or Excel) and then converted into XML files (defined in XML schemas) enabling quality assessment.

Part of this quality assessment is automated by a programmed validation against defined criteria and provides an instant feedback to the data providers after uploading to the Central Data Repository (CDR) of Reportnet. Another part of the quality assessment is manual, subject to expert review.

The quality assured data are then combined into a centralised European dataset for each dataflow. Based on these European datasets, various output “dishes” are prepared in the form of map and data viewers, downloadable datasets, and indicators for the public user.

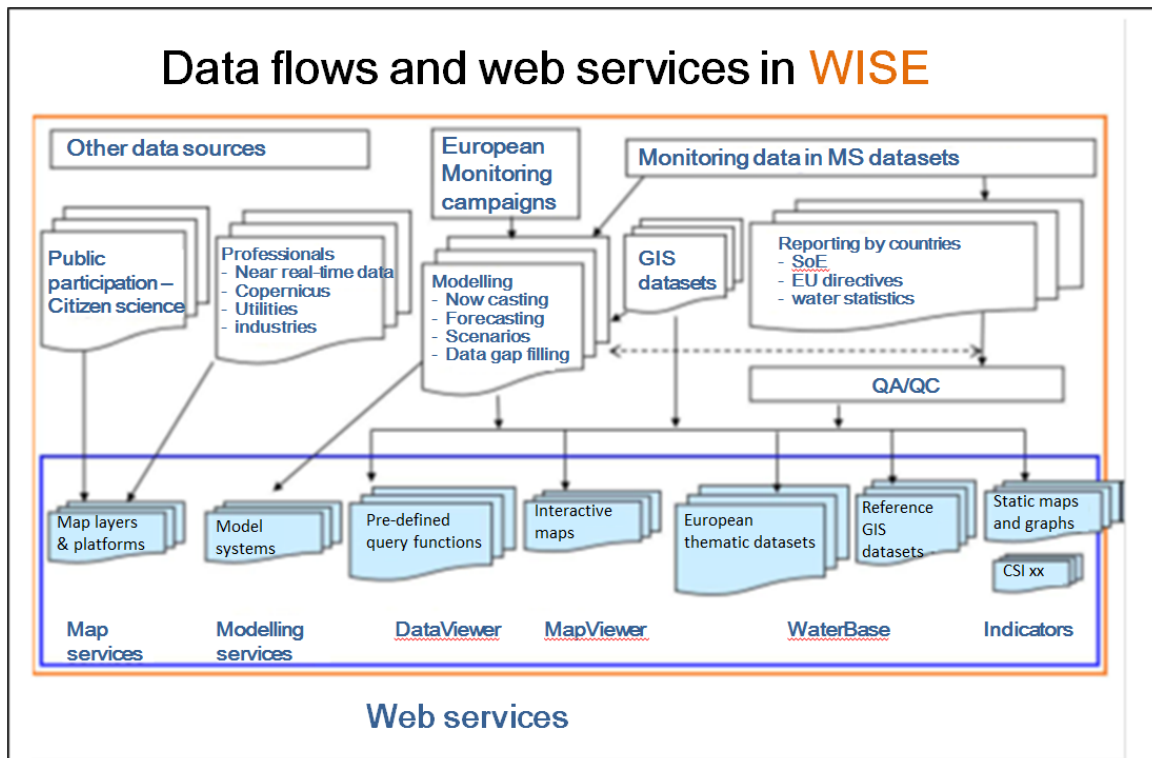


Figure 2. Data flows and web services in WISE

Key benefits

Harmonised data collection and reporting:

- information is managed as close as possible to its source;
- information is collected once, and is shared and used for many purposes; and
- Reduction of administrative burden and costs.

Link to the system

<http://water.europa.eu/>

Contacts for developers

Reference person: Bo Jacobsen – Manager of Water Data Centre

Organisation: European Environment Agency

Department: Natural Systems and Vulnerability

e-mail contact: Bo.Jacobsen@eea.europa.eu

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2007	Water: rivers, lakes, transitional and coastal waters, marine, ground water, bathing water, drinking water and wastewater.	All EU water directives and SOE reporting	EU Member States, EEA member and cooperating countries, EC services, EEA.	European Management: National decentralised data collection, centralised EU level data storage.

Organisation: EEA

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public , in relevant language/s.	Uses free open software standards
	x	x	x	x		

Reportnet - Distributed data collection and management system

Self-assessment

Reportnet consists of a number of modules designed to support the different stages of the Eionet reporting process.

Summary

Reportnet is a system of integrated IT tools and business processes creating a shared information infrastructure optimised to support European environmental reporting. It consists of a suite of software tools that help Eionet members to produce quality environmental data and information with minimal effort. Reporting obligations agreed between EU or international bodies and countries provide the basic framework for data/information flows inside the Eionet network.

Within the Eionet there are dozens of different reporting obligations and corresponding data flows. The Reportnet tools are intended to harmonise and standardise these data flows from beginning to end: from the definition of the data to be produced, to the generation of the end products such as EEA published reports and the core set of environmental indicators.

Content

Builds on the Eionet Reporting Obligations Database (ROD): ROD is a database of all national reporting obligations to European Commission/DG Environment and international organisations.

Cooperation

Data is provided through the National Reference Centres (NRCs) in coordination with the National Focus Points (NFPs) - the country's main contact point for the EEA. The data is then processed by the European Topic Centres (ETCs) which, after the quality of the data has been assured, delivers it to the EEA for use and dissemination.

Infrastructure

The Reportnet IT system is made up of a number of independent software components optimised to support the business processes of the European Environmental Information System (Figure 1). These components are independent in the sense that each one performs its own function independently of how the others are operating, under the condition that interaction between them is necessary. See more details about Reportnet architecture [here](http://www.eionet.europa.eu/reportnet/Reportnet%20architecture.PDF) (<http://www.eionet.europa.eu/reportnet/Reportnet%20architecture.PDF>).

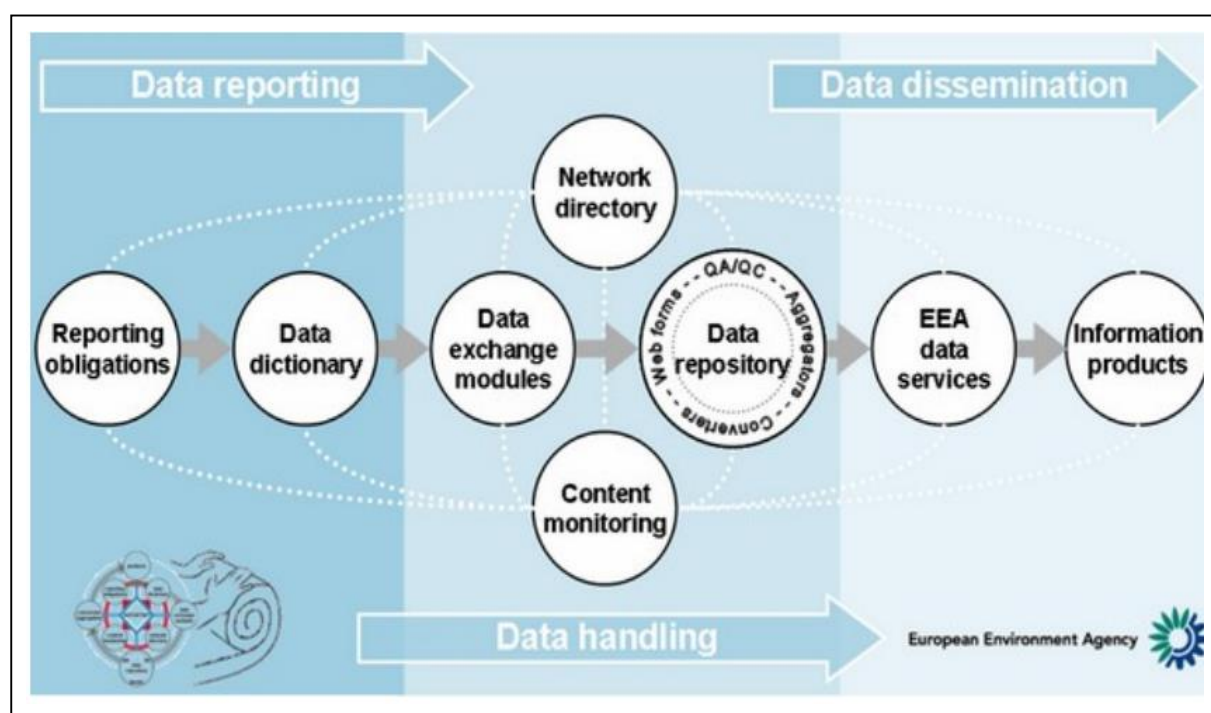


Figure 1. Sequential view of Reportnet processes

Key benefits

More efficient data collection and reporting from the countries to the EEA and international organisations:

- Information collected once, and is shared and used for many purposes
- Reduction in administrative burden and costs.

Link to the system

<http://www.eionet.europa.eu/reportnet>

Contacts for developers

Reference person: Søren Roug

Organisation: European Environment Agency, <http://www.eea.europa.eu/>

Department: Operational Services, IT networking and public systems

e-mail contact: Soren.Roug@eea.europa.eu

phone: +45 3336 7100

Sources:

<http://www.eionet.europa.eu/reportnet/reportnet2003.PDF>

<http://www.eionet.europa.eu/reportnet/Reportnet%20architecture.PDF>

<http://www.eionet.europa.eu/reportnet/reportnet2003.PDF>

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
2002		All EU and International reporting obligations.	EU Member States, EEA member and cooperating countries, EEA.	International, European <u>Management:</u> National decentralised data management, centralised EU level data storage.

COUNTRIES: 27 EU Member States and Iceland, Liechtenstein, Norway, Serbia and Switzerland

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public, in relevant language/s.	Uses free open software standards
x	x	x	x		x	

E-PRTR – European Pollutant Release and Transfer Register

Self-assessment

Data are reported annually from individual sites to the national authorities. The authorities compile and check the quality of the reported data. The data are then provided to the European Commission and the EEA for compilation and publication on the European-Pollutant Release and Transfer Register (E-PRTR) website.

The [E-PRTR guiding document](#) with detailed information on the reporting procedures and content is available for the national authorities to help them throughout the process.

Summary

E-PRTR is a Europe-wide register of pollutants providing accessible key environmental data from industries. It replaces the European Pollutant Emission Register and contains data reported annually by some 28,000 industrial sites covering 65 economic activities across Europe. For each site, information covers 91 key pollutants released into air, water and land as well as off-site transfers of waste and pollutants in wastewater. The register contributes to transparency and public information and participation in environmental decision-making.

Content

Releases to air, water or land of any of 91 pollutants of the following groups:

- Greenhouse gases;
- Other gases;
- Heavy metals;
- Pesticides;
- Chlorinated organic substances;
- Other organic substances; and
- Inorganic substances.

Cooperation

In accordance with the provisions of the European Commission Regulation ([Regulation \(EC\) No 166/2006](#)), facility operators to whom the Regulation applies are to report specific data to the competent authority in the Member State (European Union Member States, Iceland, Liechtenstein, Norway, Serbia and Switzerland) in which they are based. The authorities then transmit the data to the European Commission, which in turn, assisted by the European Environment Agency (EEA), has the obligation to make the data publicly available in an electronic database.

Key benefits

Benefits for the state and government authorities:

- Enabling governments to assemble data and information concerning the quantity of a pollutant released and into which media, the facility that is generating the pollutant, as well as the total amount released and the geographic distribution of releases and transfers.
- Possibilities for bilateral assistance, guidance, and support from UNITAR, UNECE, and Parties to the PRTR Protocol;
- The register reveals progress in enforcement of environmental policy and regulations, and supports priority-setting for risk reduction (by providing information on the pollution burden).
- The PRTR could provide policymakers with key indicators for measuring progress in advancing sustainability, eco-innovation and shift towards a green economy. Governments, academia, research institutions, the public, and business driving eco-innovation can use the PRTR for strategic planning. PRTR systems can thus act as a mechanism for fostering eco-innovation designed to: reduce carbon emissions and pollution; enhance energy and resource efficiency; prevent the loss of biodiversity and degradation of ecosystem services.
- The Norwegian example of centralisation of national environmental data into a single PRTR and the encompassing of environmental release legislation into a single Pollution Control Act is a good example of how it is possible to reduce overheads and avoid duplication and overlap between various databases and different pieces of legislation. Available at http://www.unece.org/fileadmin/DAM/env/pp/prtr/docs/2011/Session_2_Mr._Øyvind_Hetl_and_-_The_Norwegian_PRTR_-_Setting_up_an_appropriate_institutional_structure.ppt

Benefits for business

- PRTRs are potentially part of a wider system of business environmental management, helping to better control emissions, reduce waste and increase recycling, thereby reducing costs.
- The register gives companies the opportunity to provide information to the public and show that they are environmentally pro-active while monitoring the pollution records of their sector.
- Most sites reporting under PRTR carry out activities which also fall under the scope of the IPPC Directive (Directive 2008/1/EC concerning integrated pollutant prevention and control).

Benefits for citizens

- Local residents/members of the public can access annual emissions and transfer data for all PRTR activities via the internet.
- By monitoring and publishing data on pollutant releases and transfers, the Protocol is expected to exert a significant downward pressure on **the pollution levels**, as no company

will want to be **ranked** among the biggest polluters. Simply **by** making release and transfer register information **publicly** accessible **the company are stimulated** to take pollution prevention actions.

- Such access provides citizens with important information on environmental and health protection **status**, and promotes actions to reduce pollution impacts.

Link to the system

<http://prtr.ec.europa.eu/>

Coordinates of developers

ENV-PRTRCOMMUNITY@ec.europa.eu

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	<u>Geographical scope of the system</u>
Since 2006	91 pollutants in seven categories: Greenhouse gases, other gases, heavy metals, pesticides, chlorinated organic substances, other organic substances and inorganic substances.	UNECE (United Nations Economic Commission for Europe) PRTR Protocol to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.	33 European Countries, 28,000 industrial sites.	<i>National</i> Management: A combination of decentralised data collection and verification, and centralised processing, dissemination.

ORGANISATION: United Nations Economic Commission for Europe - UNECE (Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe - EMEP/ Centre on Emission Inventories and Projections - CEIP)

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to source	Collected once, shared for many purposes	Readily available to meet reporting obligations	Easily accessible to all users	Enabling comparisons and citizen participation	Fully available to the public, in relevant language/s.	Uses free open software standards
	x	x	x	x		x

Centre on Emission Inventories and Projections (CEIP) emission database and information system

Self-assessment

Parties to the Long Range Transboundary of Air Pollution (LRTAP) Convention prepare data in the requested format, in this case Excel templates, and send the files via e-mail to the Centre on Emission Inventories and Projections (CEIP) or uploading them to the EEA Central Data Repository (Reportnet CDR). The CEIP checks the submitted files, imports data to WebDab and updates the information system accordingly.

Summary

EMEP is cooperative programme for the monitoring and evaluation of long range transmission of air pollutants in Europe. The Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) Centre on Emission Inventories and Projections (CEIP), hosted by the Austrian Environment Agency, Umweltbundesamt, began life on 15 January 2008. The new centre builds on the current air emissions related work within EMEP and provides support to the Parties to the LRTAP Convention and modellers. The main task of the CEIP is to collect air emissions and projections from Parties to the LRTAP Convention, and prepare data sets as input for long-range transport models as well as reviewing the submitted emissions to assist the Parties improving the quality of national inventories.

The CEIP database has been further developed and is also including its predecessor - the WebDab database for emissions reported to EMEP, which was implemented by the Norwegian Meteorological Institute. On the CEIP website all data stored in the database and information system is accessible via search services, where information can be retrieved via a step by step selection process.

Content

Data about air emissions on the main pollutants from Parties to the LRTAP Convention: acidifying air pollutants, heavy metals, particulate matter and photochemical oxidants as national totals, sector emissions as well as gridded emissions for officially reported data and gap-filled emissions as used in EMEP models. Activity data and data on reported large point sources are accessible as well. The system also provides information on reporting requirements, reporting formats, the review system and review results.

Cooperation

51 Parties to the LRTAP Convention report annually to the EMEP the air emission inventories. CEIP is responsible for the collection, review and management of the inventories as well as for the gap-filling and for the spatial disaggregation (gridding) of emissions as used in EMEP models.

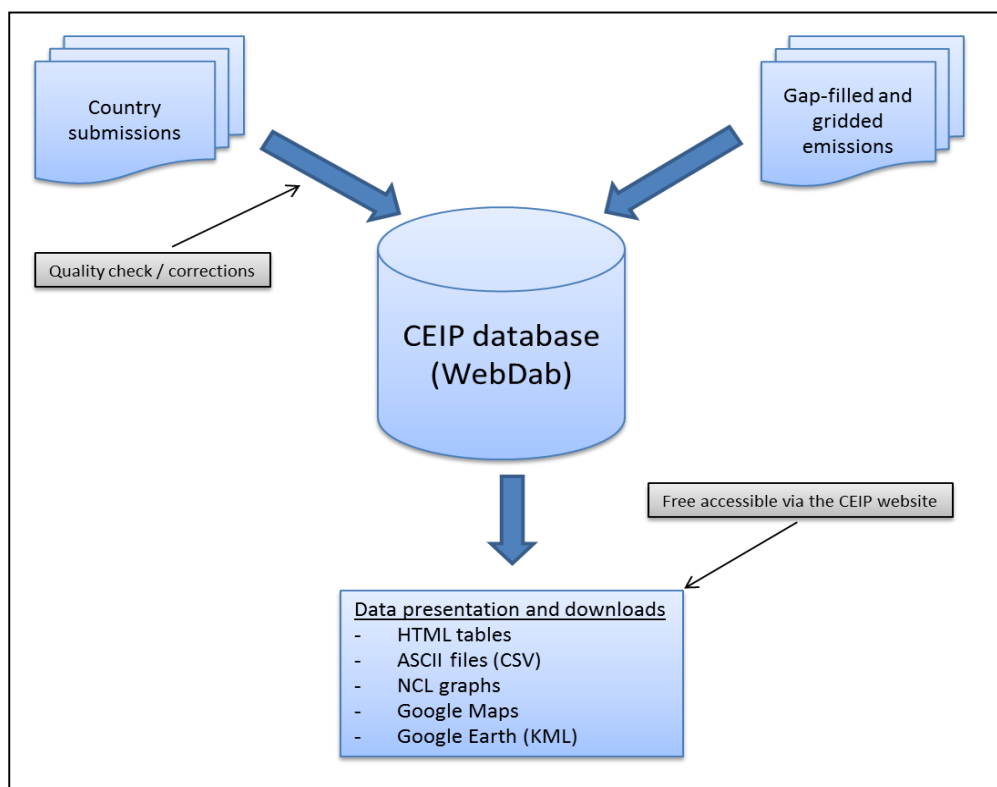


Figure 1

Note to the picture: Countries submit emission inventories annually in Excel templates. The data is checked and corrected by CEIP and uploaded into the CEIP emission database (WebDab). The gap-filling and gridding of emissions is also done annually by CEIP. Data from the process is also stored in the WebDab database. All data stored in WebDab is publicly available in different formats via the CEIP website.

Infrastructure

The CEIP emission database and information system were developed to support the international reporting obligation to the Long-range Transboundary Air Pollution Convention (CLRTAP). The main functions include an automated submission check (RepDab check), data import and storage and data export in different formats. With the RepDab check, also available on the CEIP website, submissions can be checked on completeness, consistency and format before the import of the database in order

to avoid errors during the import. Data can be visualised and downloaded as HTML tables, CSV files, NCL graphs and Google Earth KML files. The system is Linux based, and uses PostgreSQL and Apache.

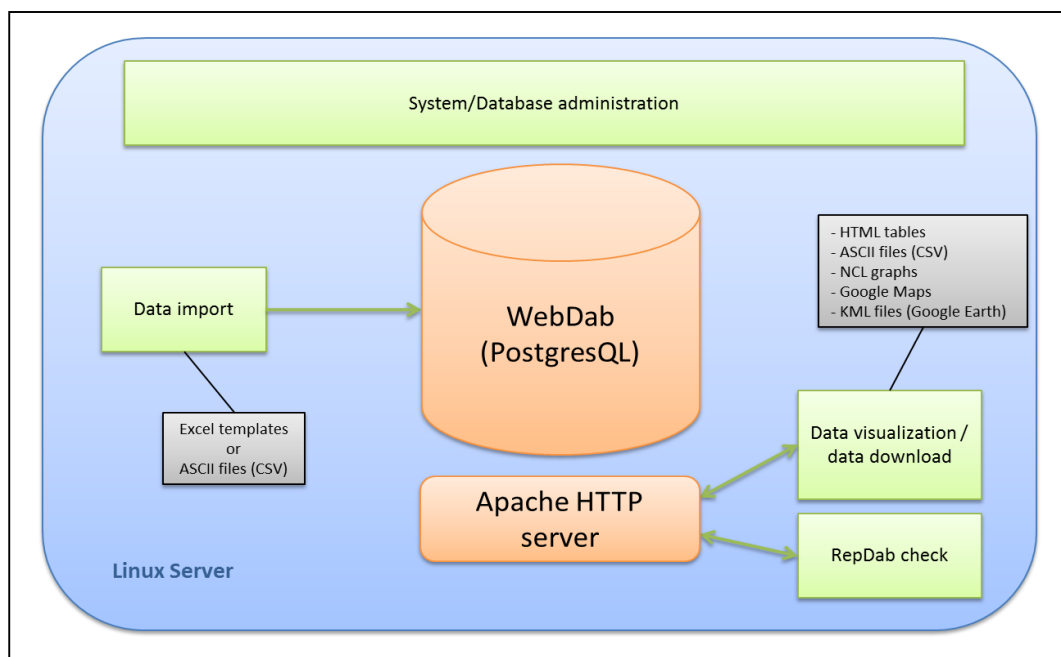


Figure 2

Key benefits

EMEP emission data is stored in a central system, i.e. data from different countries is processed in a consistent way.

- Data can be accessed in real time by the public;
- Country submissions can be checked automatically for completeness, consistency and format;
- Easy data access for experts and the public via search assistants on the CEIP website; and
- Data can be exported in different formats (expandable).

Link to the system:

<http://www.ceip.at/webdab-emission-database/>

Contacts:

E-mail: emep.emissions@umweltbundesamt.at

Source:

Wankmueller Rober, CEIP at [Austrian Environmental Protection Agency](#).

Summary table:

Date	Environmental themes covered by the system	Policy addressed by the system	Participation	Geographical scope of the system
Since 2008 (at CEIP)	Emissions on main pollutants (NO _x , NMVOC, SO _x , NH ₃ , CO), heavy metals, POPs and PM. Spatial distribution of emissions.	UNECE Convention on Long-range Transboundary Air Pollution (CLRTAP).	51 Parties to the LRTAP Convention, EMEP centres.	Northern hemisphere focus on Europe Management: A combination of decentralised data collection and verification and centralised processing and dissemination.

ORGANISATION: European Environment Agency

1.	2.	3.	4.	5.	6.	7.
Managed as close as possible to its source	Collected once , and shared with others for many purposes	Readily available to easily fulfil reporting obligations	Easily accessible to all users	Enabling comparisons at appropriate geographical scale, and citizen participation	Fully available to the public , in relevant national language(s) .	Supported through common, free open software standards
x	x	x	x	x	x	X

SENSE - Shared European and National State of the Environment information

The SENSE project is a part of the stepwise implementation of SEIS, initiated in 2009. In 2010, 13 countries delivered their SOER country assessments online through SENSE. See Figure 1 for an indicative overview.

Phase 1 (2009–10) focused on the transfer of information from countries to the EEA in support of SOER 2010 and was implemented by EEA and the National Reference Centre for SOE with the support of the National Reference Centre for Environmental Information Systems.

SENSE Phase 1 focus

- To move towards a shared environmental information system for national assessments on the environment.
- To have as many countries as possible reporting SOER information in a systematic, consistent and structured way, reducing manual intervention and mistakes.
- To achieve a trustworthy and transparent reporting mechanism for countries contributing to the periodical European SOER reporting.
- To be technologically future-proof by gaining knowledge in semantic web technology and be prepared for the shift to Web 3.0 technologies.

Phase 2 (2011–12) focuses on the further development of the enabling infrastructure established in phase 1, by opening it for a broader applicability.

SENSE Phase 2 focus

- National-level to European-level information exchange: Identify countries willing to share high-value datasets, which are publicly available and not already delivered through Reportnet. The

EEA will support the countries in creating Resource Description Framework (RDF) output of those datasets.

- European-level to National-level information exchange: The EEA has made several databases available in RDF and the SPARQL API: Natura 2000 and CDDA sites, EUNIS species, Indicator assessments etc. The EEA supports interested countries to download or query those datasets, with priority given to indicators.
- National-level to National-level information exchange: Given the two goals above, the EEA is assisting interested countries to do the same on a bilateral basis.

Phase 3 (tentative, 2013–14) may focus on using the infrastructure to facilitate the sharing of various content pieces needed for the preparation of SOER 2015 at EU level and/or the development of national SOE reports.




	SENSE - Phase 1 2009–10	SENSE - Phase 2 2011–12	SENSE - Phase 3 2013–14
<p>National to European</p> 	<ul style="list-style-type: none"> • Thematic focus: SOER 2010 'Part C' • Vehicle: EEA defined template • Technology: RDF feeds • EEA: Receive feed • Country: Provide information in a specific template 	<ul style="list-style-type: none"> • Thematic focus: Indicators (any) • Vehicle: Generic Interface • Technology: RDF feeds, 'SPARQL' database • EEA: Receive feed • Country: Provide information in generic format 	<ul style="list-style-type: none"> • <i>Thematic focus: selected indicators and assessments for SOER 2015</i>
<p>European to National</p> 	<ul style="list-style-type: none"> • Not explicitly addressed 	<ul style="list-style-type: none"> • Thematic focus: Indicators (any) • Vehicle: Generic Interface • Technology: RDF feeds, 'SPARQL' database • EEA: Provide database • Country: Build 'clients' 	<ul style="list-style-type: none"> • <i>Thematic focus: selected indicators and assessments as needed for national SOERs</i>
<p>National to National</p> 	<ul style="list-style-type: none"> • Not explicitly addressed 	<ul style="list-style-type: none"> • <i>Pilot study between subset of countries</i> • <i>Thematic focus: A selection of harmonised indicators</i> 	<ul style="list-style-type: none"> • <i>Possibility for full access to country-level indicators</i>

Figure 1 – Indicative overview of activities under SENSE

Things to remember – a brief 'SEIS' checklist

Why a checklist?

The checklist is a self-assessment tool for measuring the status of SEIS development and identifying possible gaps and areas for further enhancement.

What is in the checklist?

The checklist includes all three pillars of SEIS - content, infrastructure and cooperation - and incorporates different contextual functions of SEIS – process – as a set of rules and tools, and technical solutions.

Where possible, links to the SEIS case studies are provided as tips for existing approaches to unaddressed issues.

Content

International reporting requirements

Do you have an overview of all your reporting obligations to international organisations?

- Yes No

What is the share of international reporting in the overall environmental reporting conducted in your country?

- Very little About half Most

What system do you use for the monitoring and management of your international reporting obligations?

- National database for compliance to MEAs
 EEA [Reporting Obligations Database](#) (ROD)
 No system, each National Focal Point is responsible for relevant reporting to the MEA

Is there an overview of the overlapping data and information required for international reporting?

- No
 In progress
 Yes
 Yes, and we are developing guidelines for the harmonised collection, storage and sharing of data and information for international reporting working together in inter-regional programmes (including MEAs, and relevant EU institutions).

Assessments reports

Indicators

Is an indicator based reporting system established for the production of:

- | | | |
|-----------------------|------------------------------|-----------------------------|
| National SOER reports | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| National report | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| National web-portals | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

Are internationally agreed indicators incorporated into the national set of environmental indicators?

- Yes No

If 'yes', which?

- EEA core set of indicators
 EEA thematic indicators
 UNECE environmental indicators
 OECD environmental indicators
 UN Indicators for Sustainable Development
 WHO/Europe

[Case: [Slovenian Indicators](#)]

The environment is a complex system that cannot be contained within man-made borders. Do you have or use common indicators (cross-border, regional)?

Air	<input type="checkbox"/> yes	<input type="checkbox"/> no
Transboundary water management	<input type="checkbox"/> yes	<input type="checkbox"/> no
Biodiversity	<input type="checkbox"/> yes	<input type="checkbox"/> no
Industrial accidents	<input type="checkbox"/> yes	<input type="checkbox"/> no

[Case: [HELCOM indicators](#)]

Data formats

Digital information is essential for SEIS.

What proportion of environmental data and information is available in electronic formats?

Very little About half Most

What is the format of electronic data and information:

- Excel tables
- Word documents
- Relational databases
- Other, specify:

How would you describe the accessibility of environmental data and information?

- On the internet free and open
- On the internet with fee
- On the internet – needs registration
- Upon request
- Difficult to access

What is the share of information described by metadata?

Very little About half Most

On what themes:

water air waste spatial data only statistical data

Infrastructure

Organisational aspects

Is there a Spatial Data Infrastructure in the country?

Yes No

Are there specific technical bodies to discuss, follow up and carry out the technical implementation of SEIS?

Yes No

[case: [Germany](#), [Czech Republic](#)]

Is there a technical plan to develop and implement SEIS?

- Yes No

If 'yes'

Which main SEIS IT components are incorporated in the plan?

- Metadata
 Data Specifications
 Network Services

[Case: [WISE Implementation Plan](#)]

Information provision

Is there a unique portal for environmental information?

- Yes, for all themes there is one portal
 Portals exist for different environmental topics (e.g. water, biodiversity)
 Connected to each other Use common components Not connected
 No, environmental themes are covered by independent websites

Current IT solutions for data storage and management

Do you have an IT system for sharing environmental data at the national level?

- No
 As a pilot
 Yes, though only for some themes
 Yes, functional for all environmental information

[case: [Portal U](#)]

What is the management structure of the system to share environmental information?

- Centralised
 Decentralised
 Combination of decentralised data collection and centralised processing

Are data being stored according to the same standard for each of the following?

- | | | |
|-----------------|------------------------------|-----------------------------|
| Data management | <input type="checkbox"/> yes | <input type="checkbox"/> no |
| Spatial data | <input type="checkbox"/> yes | <input type="checkbox"/> no |
| Data exchange | <input type="checkbox"/> yes | <input type="checkbox"/> no |

If 'no':

Is communication between datasets or systems using different standards currently being accommodated?

- yes no

Are data management infrastructures being developed in order to integrate data in different standards? (only for geo-spatial data)

- yes no

To what degree are information flows automated for monitoring and reporting?

Automatic aggregation of data for indicator generation

Very little About half Most

[case: [Slovenian Atlas](#)]

Automatic report generation

Very little About half Most

[case: [Sweden](#), [PortalU](#)]

Current visualisation techniques

Are data provided in tables and graphs? Yes No

Is GIS used to visualise data and information? Yes No

If 'Yes'

What are the base maps' scales?

1:10 000 1:25 000 1:50 000 1:100 000 Other, please specify

Are the same visualisation techniques used for all themes? Yes No

Cooperation

Data Sharing

The basis for data and information sharing:

- Legally binding procedures
- Specific intra-institutional agreements or procedures for information exchange
- No provisions for sharing of environmental information

Are procedures for data sharing among information suppliers and users in place?

At national level Yes No

At national/sub-national/local level Yes No

At national/international level Yes No

[case: [Austria](#), [Belgium EIONET](#), [Germany](#)]

If 'Yes'

Are these procedures well known to all information suppliers and users?

- No
- Yes, through working groups in national SEIS project
- Yes, through dedicated capacity-building activities
- Yes, through publishing the data sharing procedures and data policy on the web

[Case: [Belgium](#)]

Are ICT tools for data and document sharing in use?

- National community platform for national SEIS
- Reportnet (EEA system for data sharing)
- Eionet Forum (EEA system for document sharing)
- ENVIROWINDOWS
- Other

Is your country participating in any initiative or working group on information sharing practices at the international level?

- No
- Yes, metadata standards and portals for Statistical Services
- Yes, indicators development EEA, EECCA, OECD
- Yes, special data standards

SEIS Implementation

Do you have an overall vision underpinning your strategy on development of the IT infrastructure in line with SEIS principles?

- Yes
- No

[Case: [PortalU](#)]

Have you carried out user requirements analysis regarding data/information and technical functionalities of the system?

- For the whole system
- Only for selected themes
- No

Are you reviewing monitoring and reporting mechanisms to reduce duplication and overlaps, and update for policy relevance?

- In a systematic way
- Occasionally, for selected themes in pilot projects
- No

Ideas for SEIS implementation

Building SEIS is a long-term journey, with many (inter)national `fellow travellers` and a lot of coordination and technical arrangements. There is no ideal template or perfect technical solution. From a management point of view, SEIS is a step-by-step, long-term process, building on existing structures and international standards. Better sharing of experience can help committed organisations in their journey.

The step-by-step process includes:

1. Create an overall vision;
2. Anchor SEIS to national legislation and IT strategies; and
3. Develop a strategic plan

It is important to develop a vision that is realistic within the mandates of the organisations involved, and at the same time to ensure that SEIS development does not become a purely technical project. It should be clear that the first priority is to improve the quality of information and logical integration of different systems in order to provide a better basis for informed policy and decision-making. If possible, include cost estimates for the different steps, and tangible benefits resulting from these investments.

From the beginning of the project, try to involve stakeholders and build cooperation as much as possible. SEIS is a joint venture between environmental information managers, governmental officials and IT specialists. It is thus important to reach a common understanding and establish a good conceptual grounding. Involving stakeholders will bring everyone up to date, ensure engagement and commitment, and allow identification of the pioneers who may have resources and be inspired to build demonstration projects and further the case for SEIS development.

SEIS development may link a number of data providers and information producers with a broad audience of information users. Data providers could have different approaches to information production, data formats, standards, or to data accessibility, legal protection of copyrights, security of information and pricing. This could hinder the integration of information, and could also raise doubts about participating in SEIS and sharing information. Cooperation and involvement from the start will help.

1. Create an overall vision

Creating a coherent and realistic vision for SEIS at national level is important. It helps to grasp long-term ambitions. Without it, there may be a lack of coordination among data and information providers, causing inconsistencies, extra work and sub-optimal system performance.

The overall ambition for SEIS depends largely on the mandate. It can be as broad as establishing a comprehensive national shared environmental information system, developing a one-stop shop for environmental information in Germany or setting up a system to support a multilateral environmental agreement secretariat such as InfoMAP. A more modest ambition could be to build a

pilot IT system for harmonising existing data flows at a (sub-) national level for several specific topics (e.g. air, water, waste, ecosystem) like, for example, in [Ukraine](#).

2. Anchor SEIS to national legislation and IT strategies

Once a vision of SEIS development has been created it has to be anchored to national legislation and national information infrastructure strategies to guarantee national commitment and safeguard implementation.

The identification of legal requirements at national and international level is not only a technical necessity; it will also provide a solid ground for strengthening inter-institutional cooperation and justify human and financial investments in SEIS infrastructure.

One key question to answer is: What is the current legislation that demands environmental information? This could include several types of documents such as laws, acts and procedures for environmental monitoring and information, national IT strategies, or the provision of eGovernment services. A second question is: What are the international reporting obligations related to the environment (e.g. water, air, waste, climate change)? The Reporting Obligation Data (ROD) database, developed by the EEA as part of Reportnet, makes it easy to answer this question.

If a legal background to build the IT infrastructure necessary to fulfil the above legal requirements is missing, then amendments to national legislation, which demand the development of a National Environmental Information System supplying the requested environmental information based on SEIS principles, should be included in the vision.

3. Develop a strategic plan

As case studies in this cookbook show, the journey from initial vision to fully operational systems may take several years. A strategic plan keeps the journey on track. It reflects the ambitions and desired functions, and should give visibility, clarity and stability to development efforts, making it possible to adapt to new circumstances as problems or opportunities arise.

Identify SEIS services and users

Developing a strategic plan begins with answering the question: What services should SEIS provide and to whom – in order to supply the right information to the right people at the right time in the right way? The answers here should be fully consistent with the vision made earlier in the first step.

In technical terms, this means formulating high-level **information, functional, and non-functional requirements**. This is also sometimes referred to as the **‘technical specification’** of the system.

Information requirements: describe what information is needed, in what format and quality (e.g. analytical reports on the ecological health of lakes). Assess the available national, regional and international indicators and select the ones that are best fit for purpose, taking into account the

comparability aspects. Then determine what data and information already exist - SEIS-related projects aim to use existing data and information where possible. Once existing resources have been mapped, they can be compared with the vision and the legal and user requirements to produce a data gap analysis. From this analysis a prioritisation is made, identifying the most urgent aspects to develop as a first or next step. For example, Europe's Environment Assessment of Assessments provides a replicable methodology for assessment of information gaps and quality of existing information.

Functional requirements describe specific functionalities and processes within the system (what the system must do). For example: the system only accepts data uploads from users who are logged on, otherwise data can be downloaded directly from the data viewer.

Non-functional requirements represent characteristics that need to be considered when designing the system (how the system behaves). For example, compliance with INSPIRE principles, use of open standards, characteristics of the user interface and output/reporting requirements.

The **process** for specifying user requirements involves identifying stakeholders (data and information providers and users), establishing a dialogue with them and surveying their information needs and systems requirements. Formulation should not be left to 'experts'; it should be a participatory exercise where each stakeholder's unique voice is heard. Some stakeholders may need support to identify their needs.

Other points to consider when making a plan

Assess and evaluate risks: Identifying potential barriers and risks, and appropriate risk mitigation actions, are an important part of the management and governance of SEIS development projects. These can include:

- Technical, for example, delays in prototype development due to uncoordinated standards and protocols;
- Organisational, for example, lack of inter-institutional trust and underestimated resources allocated to system development; and
- Human, for example participation in the SEIS project is considered as 'taking time' away from regular work.

Funding: Building SEIS may require substantial funding, depending on the number of existing building blocks available. It may be possible to implement some or much of the work within existing national budgets for environmental monitoring and assessment, compliance with MEAs, eGovernment programmes, infrastructure development, or professional education. Additional funding may however be desirable or necessary. Streamlining existing SEIS related activities can enhance results using the same resources. Sources do exist that could be used to fund a well-developed project proposal with clear objectives. They might include international development agencies, twinning programmes or bilateral cooperation. One lesson from the case studies is that it can be accomplished in stages. Streamline existing SEIS related activities to enhance results, using the same resources, and also consider that SEIS goes beyond public authorities, therefore public-private partnerships are essential.