Dissemination of environmental information

Draft country maturity report: Azerbaijan

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Contents

Table of Figures

List of Tables

List of Acronyms

Acronym	Meaning
AIWM OJSC	Azerbaijan Irrigation and Water Management Open Joint Stock Company
EaP countries	Eastern Partnership countries: Republic of Armenia, Republic of Azerbaijan, Belarus, Georgia, Republic of Moldova, Ukraine
EEA	European Environmental Agency
EU	European Union
ICT	Information and communications technologies
MENR	Ministry of Ecology and Natural Resources
MES	Ministry of Emergency Situations
MoA	Ministry of Agriculture
MoE	Ministry of Economy
MoEn	Ministry of Energy
MoH	Ministry of Health
MoTCHT	Ministry of Transport, Communications and High Technologies
NGO	Non-governmental organisation
REC Caucasus	Regional Environmental Centre for the Caucasus
SAARES	State Agency for Alternative and Renewable Energy Sources
SSC	State Statistical Committee

Note

The current draft report was built on publicly available information up to October 2018. This draft version will be reviewed during the year 2019. It is not intended to be a comprehensive analysis of environmental information, open data and e-government in the country but a collection of the main elements shaping the national environmental information landscape.

This report contains information obtained or derived from a variety of publicly available sources described within the report in more detail.

This draft report was produced by PricewaterhouseCoopers as part of the EEA service contract No. 3437/R0-ENIE/EEA.57335 for 'developing a roadmap and identify feasible and practical means for integrating environmental information in national e-governance/Open Data processes and platforms. This action is done in the context of the ENI SEIS II East project 2016-2020.

It is expected that during the 2019 the draft report will be reviewed by the national authorities involved in the environmental information management and use at national level and enriched with more specific, up to date information available.

1   Executive summary

Azerbaijan showed significant improvements in the past decade to ensure freedom of information, the application of legislation related to freedom of information, and facilitating the access of information to citizens. The country is now ranked 70th in the world E-government Development Index (EGDI, 2018), and ranked 50th according to the Open Data Inventory (ODIN) score (2017). In that regard, Azerbaijan implemented successful e-government and Open Data portals and provides a very good statistical platform for visualising statistics. It is also to be noted that Azerbaijan has now around 77% of Households with Internet access at home[1].

A key challenge for Azerbaijan is now to leverage on e-government and Open Data initiatives and to foster collaboration between environmental information holders to improve environmental information sharing and dissemination.

E-government

The latest "National Strategy for 2014-2020 on the development of the information society in the Republic of Azerbaijan" has been approved by the Decree of the President of the Republic of Azerbaijan dated of 2nd April 2014[2]. It sets concrete actions and duties for the development Information Society up to 2020, focusing primarily on ICT development and the digitalisation of public administrations.

The e-government portal provides access to more than 400 e-services to citizens and the business sector; services provided by 40 state institutions. In this context, the Ministry of Ecology and Natural Resources provides 21 e-services related to the environment. These services are accessible both via the Ministry's web page[3] or the electronic government portal[4]. The e-service portal also appears to be popular, with over 6 million use of online services.

Open Data

In 2017, the Ministry of Transport, Communication and High Technologies developed the Open data portal[5]. The portal contains a description of the data collected by the public authorities, including environmental data. However, the portal struggles from lack of content, and searchability of datasets remains basic. The portal also provides an external API for accessing the data, but its documentation, as well as the metadata standard used are poorly documented. Furthermore, institutions lack standard procedures, tools, methods, resources and incentives to publish public information on the Open Data portal. There is no standard licence for the publication of public information on portals.

The State Statistical Committee's website[6] is the main portal for the dissemination of statistics and providing information on statistical activities, including environmental statistics. The website contains databases, metadata and publications, also it has an advanced portal[7] for data visualisation and analysis. Metadata is prepared in accordance with DCMI (Dublin Core Metadata Initiative) and ESMS (Euro-SDMX Metadata Structure) standards.

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[1] https://www.itu.int/net4/itu-d/icteye/CountryProfileReport.aspx?countryID=25

[2] http://www.e-qanun.az/framework/27456

[3] http://eco.gov.az/az/687-elektron-xidmetler

[4] https://www.e-gov.az/az/services

[5] opendata.az

[6] https://www.stat.gov.az/source/environment/?lang=en

[7] https://www.azstat.org/portal/

Environmental information

Azerbaijan ratified the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention) on 23 March 2000. Environmental data are collected by several institutions and shared mainly to the Ministry of Ecology and Natural Resources, and then shared to State Statistical Committee for the publication of environmental statistics. To do so, there are 13 official statistical reporting forms approved by the State Statistical Committee and relevant authorities. State institutions must submit these reports annually to the State Statistical Committee after approval by the relevant authority[8].

The State Statistical Committee publishes environmental statistics in the yearbook "Environment in Azerbaijan", the yearbook "Statistical indicators of Azerbaijan", "Regions of Azerbaijan" which can be accessed on the website. In addition, it publishes data in its data visualisation platform for the public use.

The Ministry of Ecology and Natural Resources provides information on the measures taken in the field of environmental protection, environment (air, water, soil, etc.), protected areas, biodiversity and other fields of activity of the Ministry. Information dissemination is done through periodic bulletins, publicly available data in near-real time from automated stations, mass media press releases, distribution of booklets and brochures, radiological station data, direct video footage and hydrometeorological services. The main platform for disseminating information is the official web-page of the Ministry (eco.gov.az), however, most of it is presented as a text, thus complicating the reuse of information.

Main challenges

The development of e-government in Azerbaijan still faces several challenges. The lack of IT knowledge and the absence of a well-developed IT sector[9] creates difficulties for the development and use of e-government services. State institutions are also not fully adapted to publish their services in the e-government gateway. The descriptions of public services are not standardised, neither categorised into life events (e.g. birth of a child, change in employment status, a serious injury or illness), rendering their search difficult. The lack of relevant ICT infrastructure, lack of common standards, privacy and security are also hampering the development of e-government. Besides, it is well-known that access to the internet is difficult in regions with relatively poor coverage of telecommunications and internet networks. As such, the digitalisation of public administrations will require changing the "habits of work", the development of the ICT ecosystem and skills, and the implementation of organisational, technical and semantic interoperability standards.

Legal assistance mechanisms for accessing information, implementation of specialised training and awareness raising activities are being established slowly, thus resulting in challenges in the implementation of open data policy. Now, the absence of standard procedures, tools, methodology and resources refrain "Public Information Holders" from providing information in an accessible and disposable form (i.e. machine-readable on the Open Data portal). In addition, there is no Open Data national policy/guidelines to which authorities have legally to conform to, thus the number of datasets published to Open data portal is low (few hundreds). Besides, the national open portal still requires ameliorations, such as the provision of advanced search functionalities, and a well-documented API and metadata standard. Last, the increase of public information publicly available will require the development of a specific licenses for sharing and re-use of public information.

Environmental information among state institutions is often shared using paper documents instead of using databases and/or e-files. Besides, emissions from stationary sources should be calculated using a common

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8 The organisation ultimately responsible for the activity.
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http://www.academia.edu/29399499/IT_SECTOR_AND_IT_SKILLS_IN_AZERBAIJAN_CHALLENGES_AND_OPPORTUNITIES_JUNE_2016_ WORLD_BANK_TRANSPORT_AND_INFORMATION_AND_COMMUNICATION_TECHNOLOGIES_GLOBAL_PRACTICE

approach / methodology to improve comparison and validation of provided data. Official statistic reporting forms need to be aligned with international requirements, and list of pollutants should be expanded.

As such, the development of e-government infrastructures, the amelioration of the Open Data portal - and its associated procedures, tools, and methodologies - and the standardisation of the means of calculation and the interoperability for sharing environmental information – taking into consideration international standards and norms – are therefore crucial aspects to develop in Azerbaijan.

2 Environmental information readiness

2.1 *E-government, Open Data and environmental information legal framework and institutional framework*

This section contains a summary of the national documents on legal policy and institutional framework in terms of e-government, open data and environmental information.

2.1.1 National policy and legal framework

2.1.1.1 E-government

This section presents the main legislation shaping the e-government landscape in Azerbaijan.

Decree No. 1885 of the President of the Republic of Azerbaijan of 14th March 2018 on the development of electronic government and transition to digital government[10].
The main goal of the Decree is the application of a uniform approach and standards in the formulation, management and integration of State information resources and systems. The Decree also aims to speed up the transition to a "digital government", which provides transparent, operative and resource-saving services to citizens, analyses the State information resources, and create opportunities for public and private sectors. This Decree also obliges the Cabinet of Ministers - including the Minister of Ecology and Natural resources - to submit proposals and normative legal acts that would allow to accelerate the transition to digital government.

"Strategic Road Map on Development of Telecommunication and Information Technologies in the Republic of Azerbaijan" approved by the Decree No. 1138 of the President of the Republic of Azerbaijan of 6th December 2018[11].

The Strategic Roadmap aim to increase the capacity of ICT in the country, improve the ICT infrastructure for digitising the economy, effectively meet the demand for ICT services with internal sources, and increase the effectiveness of ICT applications in the public sector whilst considering the new challenges and opportunities facing the telecommunication sector.

The Strategic Roadmap includes a strategic vision and action plan until 2020, a long-term vision for the period up to 2025, and a target view of the post-2025 period, covering short, medium and long-term actions. Strategic Road Map has identified 3 strategic targets and 10 priorities to achieve the targets up to 2020.

Order No. 359 of the President of the Republic of Azerbaijan of 2nd April 2014 on approval of "National Strategy for the Development of Information Society in the Republic of Azerbaijan for 2014-2020"[12].
The "National Strategy for 2014-2020 on the development of the information society in the Republic of Azerbaijan" has been approved by the Decree of the President of the Republic of Azerbaijan dated of 2nd April 2014. It sets concrete actions and duties for the development Information Society up to 2020. The main areas for improvement identified in the National Strategy are:

- the establishment of an information society in the country
- the effective use of the opportunities created by it for citizens, the society and the state

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[10] http://www.e-qanun.az/framework/38229
[11] https://mida.gov.az/documents/Telekommunikasiya_v%C9%99_informasiya_texnologiyalar%C4%B1n%C4%B1n_inki%C5%9Faf%C4%B1na_dair_strateji_yol_x%C9%99rit%C9%99si.pdf
[12] http://www.e-qanun.az/framework/27456

- the sustainable development of the country
- the comprehensive application of ICT in public administration
- the development of ICT as the economic sector that promoting development of socio-economic and cultural fields

Decree No. 118 of the Cabinet of Ministers of the Republic of Azerbaijan of 1 May 2014 on Approval of "List of Information Systems and Resources to be connected to the E-Government Portal" and "Technical Requirements for Connecting Information Systems and Resources, Electronic Services to the E-Government Portal"[13].
This Decree specifies the state information systems that must be linked to the e-government portal and establish technical requirements and administrative procedures for joining the portal.

Decree No. 263 of the President of the Republic of Azerbaijan of 12 September 2018 on approval of "Rules for the Formation, Implementation, Integration and Archiving of State Information Resources and Systems" and some measures related to e-Government[14].

Decree No. 813 of the President of the Republic of Azerbaijan of 5 February 2013 on approval of Statue of the "Electronic Government Portal" and measures to expand electronic services[15].
The main goal of the Decree is the improvement of the e-government portal for fostering electronic services usage by public authorities and legal entities created by the President of the Republic of Azerbaijan.

Decision No. 191 of the Cabinet of Ministers of the Republic of Azerbaijan dated November 24, 2011, on approval of "Rules of the provision of electronic services in specific areas by central executive bodies and public-legal entities established by the President of the Republic of Azerbaijan" and "List of types of electronic services"[16].
This decision approved a list of more than 400 e-services to be provided to citizens and the business sector by 40 state institutions. Ministry of Ecology and Natural Resources provides e-service in 21 different areas related to the environment. The list can be accessed via the Ministry's web page (http://eco.gov.az/az/687-elektron-xidmetler) and via the e-government portal (https://www.e-gov.az/az/services).

2.1.1.2 Open Data

Law on Information Access[17]
This Law was passed on 30th September 2005. The purpose of the Law is to establish the legal framework for ensuring free, unrestricted and equal access to information. It allows citizens of Azerbaijan to request and receive information from any public institution. It also states that information owners are obliged to disclose information, including information on the State of the environment, damages to the environment and dangerous impact on the environment.

Law on Information, Informatisation and Protection of Information[18]
This Law was passed in April 1998. It regulates the usage of information resources in information collection, processing, storage, search and dissemination. It regulates information systems, technologies, creation and use of tools for the provision of information. It also regulates the rights of the people participating in the information processes. The amendments - passed in March 2017 - allow the authorities to block access to a website if it contains prohibited information posing a danger to the State or society.

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[13] http://www.e-qanun.az/framework/27667

[14] http://www.e-qanun.az/framework/40020

[15] http://www.e-qanun.az/framework/25215

[16] http://www.e-qanun.az/framework/22639

[17] https://www.stat.gov.az/menu/3/Legislatio n/information_rules_en.pdf

[18] http://www.e-imza.az/downloads/qanunlar/Information%20Security/Information%20Security.pdf

Order No. 1993 of the President of the Republic of Azerbaijan of 27 April 2016 on approval of the National Action Plan for the Promotion of Open Government for 2016-2018[19].

By this Order, the "National Action Plan for the Promotion of Open Government for 2016-2018" has been approved. Each authority submits annual reports to the Cabinet of Ministers of the Republic of Azerbaijan and the Anti-Corruption Commission of the Republic of Azerbaijan on the implementation of the measures envisaged in the Action Plan. The action plan is available online at ogp.org.az[20], and the Open Government Partnership website (opengovpartnership.org) summarises the main milestones[21] of the e-government action plan.

As a central executive authority, the Ministry of Ecology and Natural Resources has been assigned tasks for the implementation of means to improve access to information and diminish risks of corruption.

Decision No. 93 of the Cabinet of Ministers of the Republic of Azerbaijan of 25 July 2003 on Approval of Regulation on Increasing Public Information on the Environment in the Electronic Data Bank Through Common Communication Instruments[22]. Under this Regulation, state authorities and local self-governing bodies are obliged to share the environmental information with the public.

2.1.1.3 Environmental information

Law of the Republic of Azerbaijan on the Protection of Environment[23]

The Law was passed in June 1999 and identifies the legal, economic and social bases of environment protection. The objective of the Law is to protect environmental balance, thus ensuring environmental safety, prevent the hazardous impact of industry and other activities to natural ecosystems, preservation of biological diversity and sustainable use of natural resources.

Law on Access to Environmental Information[24]

The Law was passed in 2002. This Law defines environmental information as the information on the nature of water, soil, atmosphere, living organisms, environmental and human health effects, changes that occur in environmental components, their assessment, environmental protection and information on measures and expenditures used in the process of environmental monitoring.

The Law regulates the classification of "accessible" and "restricted" information, and states that every person has the right to access environmental information, in exception with restricted one. In that regard, State institutions are obliged to provide access to information on requests from individuals and to publish national reports at least once in three years. The Law regulates the publication of complete and reliable information on the state of the environment and on the use of natural resources. This Law was significantly reviewed in 2010.

Rules of internal procedures for freedom of information in the Ministry of Ecology and Natural Resources[25]

These rules define the principles of access to information resources of the Ministry of Ecology and Natural Resources.

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[19] http://www.e-qanun.az/framework/32647

[20] http://ogp.org.az/wp-content/uploads/2017/02/Action-Plan-final-version-1.pdf

[21] https://www.opengovpartnership.org/sites/default/files/Azerbaijan_Government-progress-update_25June2018.pdf

[22] http://www.e-qanun.az/framework/1376

[23] http://www.cawater-info.net/library/eng/az_prot_env.pdf

[24] https://www.ecolex.org/details/legislation/Law-on-access-to-environmental-information-2002-lex-faoc047310/

[25] http://eco.gov.az/en/28-etsn-de-informasiya-azadligi-ile-bagli-daxili-icraat-qaydalari

"Classification of types of information on the environment limited to obtaining" and to "Classification of public authorities in which the address or request of information on the environment which is rather limited to obtaining is sent"[26] approved by the Resolution No. 26 of the Cabinet of Ministers of the Republic of Azerbaijan of 15 February 2003[27].

This Resolution restricts access to information related to some activities of public authorities. In particular: internal correspondence, State security matters, confidential material, and judicial matters in case of preliminary investigation.

"Procedure for the conclusion of contract with person wishing to obtain information on the environment" and "Rules for analysis, storage, update of information on the environment; list and registry of environmental information sources" approved by the Resolution No. 60 of the Cabinet of Ministers of the Republic of Azerbaijan of 13 May 2003[28].

The Rules provide insights on the general terms of the contract. If the contracting person wishes to receive the paid information then, he must pay for specific information according to the "Rates and rules for use of hydrometeorology and environmental monitoring data"[29].

Decision of the Cabinet of the Ministries on normative legal acts on hydrometeorology and monitoring of natural environment (14 December 1998)[30]

According to the Guideline approved by the above decision, legal and physical persons engaged in hydrometeorological activities - irrespective of their ownership and organisational and legal form - are responsible for the registration of forecasts, findings, references, survey data, maps and bulletins prepared as a result of the analysis of observations and surveys on hydrometeorology and natural pollution done by the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan. The Guideline also specify the requirement for a certificate about the source of information registered.

Other major environment-related legislation is provided in the table below

Table 1 List of environment-related legislation

№	Title of the document	Date
1.	The Forest Code of the Republic of Azerbaijan	1997, last revision in 2017
2.	The Water Code of the Republic of Azerbaijan	1997, last revision in 2017
3.	The Land Code of the Republic of Azerbaijan	1997, last revision in 2018
4.	The Law of the Republic of Azerbaijan on Production and Household Waste	1998, last revision in 2018
5.	The Law of the Republic of Azerbaijan on Hydrometeorological Activities	1998, last revision in 2018
6.	The Law of the Republic of Azerbaijan on Fishery	1998, last revision in 2014
7.	The Law of the Republic of Azerbaijan on Subsoil	1998, last revision in 2018
8.	The Law of the Republic of Azerbaijan on Environmental Safety	1999, last revision in 2013
9.	The Law of the Republic of Azerbaijan on Water Supply and Sewage	1999, last revision in 2013
10.	The Law of the Republic of Azerbaijan on Soil Fertility	1999, last revision in 2017
11.	The Law of the Republic of Azerbaijan on the Wildlife	1999, last revision in 2017

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[26] Literal translation.

[27] http://www.e-qanun.az/framework/10302

[28] http://www.e-qanun.az/framework/1306

[29] http://www.e-qanun.az/framework/4876

[30] http://www.e-qanun.az/framework/3507

№	Title of the document	Date
12.	The Law of the Republic of Azerbaijan on Specially Protected Nature Territories and Objects	2000, last revision in 2017
13.	The Law of the Republic of Azerbaijan on the Protection of Atmospheric Air	2001
14.	The Law of the Republic of Azerbaijan on Environmental Education and Training of Population	2002
15.	The Law of the Republic of Azerbaijan on the Protection of Greenery	2014, last revision in 2018
16.	The Law of the Republic of Azerbaijan on Environmental Impact Assessment	2018

2.1.2 Main international policies and agreements

2.1.2.1 Multilateral Environmental Agreements with public access to information and reporting obligations

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention)[31]
Azerbaijan ratified the Aarhus convention on 23 March 2000. The Convention set out obligations to provide effective public access to environmental information within its broad scope hold by various public authorities, public participation in decision-making and access to justice in environmental matters. The progress of its implementation by Azerbaijan is reflected in national implementation reports for the Convention.[32]

Aarhus Public Environmental Information Centre was established with the assistance of OSCE by Ministry of Ecology and Natural Resources in Baku, Ganja and Gazakh to accomplish the clauses of the Convention. The main idea is to ensure the use of environmental information, public participation in decision-making, establishing transparent public environment in environmental matters and assisting to establish good governance. In this regard NGOs, Public Authorities, representatives of international organizations and each person interested in environmental matters can use opportunities of the Centre.

Agreement between the states-participants of the Commonwealth of Independent States on free access to open scientific and technical information and the exchange of this information[33]. Azerbaijan ratified the Agreement in 2007. The Agreement is a legally binding instruments for facilitation to the access to scientific data available in the countries of Commonwealth of Independent States.

Under the Framework Convention for the Protection of the Marine Environment of the Caspian Sea[34], the Caspian littoral countries consider establishing common mechanism and standards for environmental monitoring of the Caspian Sea to enable comparison of the results. Therefore, the relevant Working Group was established to carry out these works. Besides these, the draft Protocol on Monitoring, Assessment and Information Exchange to the Tehran Convention was prepared for legalising this process.

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[31] http://www.unece.org/env/pp/welcome.html
[32] https://aarhusclearinghouse.unece.org/national-reports
[33] http://www.e-qanun.az/framework/14075
[34] https://www.ecolex.org/details/treaty/framework-convention-for-the-protection-of-the-marine-environment-of-the-caspian-sea-tre-001396/

Other multilateral international environmental conventions ratified by the Republic of Azerbaijan are provided in the table below.

Table 2 Multilateral international environmental conventions ratified by the Republic of Azerbaijan

№	International environmental convention	Year of ratification
1.	Convention Concerning the Protection of the World Cultural and Natural Heritage	1993
2.	Convention of the World Meteorological Organization	1993
3.	United Nations Framework Convention on Climate Change	1995
4.	Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)	1998
5.	United Nations Convention to Combat Desertification	1998
6.	Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention)	1999
7.	Bern Convention on the Conservation of European Wildlife and Natural Habitats	2000
8.	The Montreal Protocol on Substances that Deplete the Ozone Layer	1996
9.	Convention on Biological Diversity	2000
10.	Convention on the Protection and Use of Transboundary Watercourses and International Lakes	2000
11.	Convention on Wetlands of International Importance especially as Waterfowl Habitat (Ramsar Convention)	2001
12.	Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)	2001
13.	Convention on Long-Range Transboundary Air Pollution	2002
14.	The Stockholm Convention on Persistent Organic Pollutants	2004
15.	The Convention on the Transboundary Effects of Industrial Accidents	2004
16.	European Landscape Convention	2011

2.1.2.2   Other international forums promoting sharing and accessibility of environmental information

Open Government Partnership Initiative[35]

Azerbaijan joined the Open Government Partnership Initiative in 2011. In accordance with its obligations, the country has adopted the "National Action Plan on Promotion of Open Government for 2012-2015" and the "National Action Plan on Fight against Corruption for 2012-2015." Azerbaijan adopted on April 27th, 2016, the "National Action Plan on Promotion of Open Government for 2016-2018." Now, Azerbaijan has 0 commitments ongoing and 50 commitments post implementation.

In Azerbaijan, findings from the Independent Reporting Mechanism staff under the supervision of the International Experts' Panel (IEP), are summarized below:

"During the course of Azerbaijan's first action plan (2012-2015), the ability of civil society to work in the country deteriorated due to restrictive government legislation and actions. Few of the OGP commitments significantly opened government, and their potential impact was further weakened by the prevailing operating environment that limits civil society participation."

The evaluation for the Action Plan 2016-2018 is still not available. Nonetheless, the Action Plan 2016-2018 does not include Open Data nor the environment.

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[35] https://www.opengovpartnership.org/countries/azerbaijan

UNECE Environmental Performance Reviews[36]

To ensure sustainable development and monitoring progress in achieving sustainable development goals, a global 'data revolution' is necessary: to produce and share environmental data. United Nations Economic Commission for Europe (UNECE) together with its partners has been working with target countries to produce and share environmental data for 8 indicators:

- Emissions of pollutants into the atmospheric air
- Ambient air quality
- Consumption of ozone-depleting substances (ODS)
- Greenhouse gas (GHG) emissions
- Biochemical oxygen demand (BOD) and concentration of ammonium in rivers
- Nutrients in freshwater
- Protected areas
- Waste generation

This publication is addressing the progress of this initiative and celebrates majority of the target countries producing indicators that are compliant with the international standards.

Data sharing is happening more fluently than data production, latter requiring bigger effort. Azerbaijan is doing well with data production; however it still needs to improve on meeting Indicator Guidelines on data structure.

Eighth Environment for Europe Ministerial Conference Batumi, Georgia

The Eighth Environment for Europe Ministerial Conference (Batumi, Georgia, 8-10 June 2016) adopted the Ministerial Declaration inviting countries to continue their efforts and to further develop their national information systems to have shared environmental information system in place in the countries of Europe and Central Asia by 2021.

2.1.2.3   Cooperation with the European Union

Declaration on Cooperation on Environment and Climate Change in Eastern Partnership[37]

In 2016, The European Union (EU) and Eastern Partnership (EaP) countries adopted the Declaration on Cooperation on Environment and Climate Change. The declaration aims to strengthen regional cooperation on environment, climate action and sustainable development in the Eastern Partnership framework, through implementing relevant international agreements such 2030 Agenda for Sustainable Development and Paris Agreement on Climate Change, raising awareness among and cooperate with relevant stakeholders, supporting the involvement of civil society in decision-making, strategic planning and implementation, and results' monitoring of environmental policy, programmes and plans, and other commitments.

At present, the cooperation under the European Union programs is carried out within the framework of the following projects:

- European Union Water Initiative Plus for the Eastern Partnership countries (EUWI+) (2016-2020)

- Shared Environmental Information System principles and practices in the Eastern Partnership countries (ENI SEIS II East) (2016-2020)

- "Upgrading the National Environmental Monitoring System (NEMS) of Azerbaijan on the base of EU best practices" (2016-2019, 27 months)

Negotiations are underway with the European Union on the new Bilateral Agreement between the Republic of Azerbaijan and the European Union that aimed to enhance the bilateral cooperation.

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[36] https://www.unece.org/env/epr.html

[37] http://ec.europa.eu/environment/international_issues/pdf/declaration_on_cooperation_eastern_partnership.pdf

2.1.3 National standards, interoperability and quality control

2.1.3.1 Metadata standards

The State Statistical Committee has been assigned responsibility to produce statistical data and metadata for the Sustainable Development Goals indicators[38]; developing the indicators, including environmental indicators; defining new data sources; sharing information, and quality control and data checking.

Some methodological documents are prepared and serve as metadata: Statistical Metadata in a Corporate Context, Metadata Concepts, Standards, Models and Registries, Standards for quality reports, etc. They are made available to the public on the website of the State Statistical Committee.

Starting from 2013, the metadata according to ESMS 1.0 (http://www.azstat.org/MetaDataG/), as well as reports on statistical surveys and indicators are prepared and published on the website of the State Statistical Committee (http://www.stat.gov.az/menu/2/quality/index.php?mode=desktop).

All metadata are divided into 2 groups – metadata by indicators and metadata by questionnaires. Metadata by questionnaires contain information on periodicity, the deadline for the submission of the questionnaire, the groups of statistical units for which this questionnaire is relevant, etc. A total of 21 metadata on environmental indicators are prepared[39]. In addition, metadata of 13 official statistical report forms for the environment information are available on the State Statistical Committee website[40].

The following table presents the list of metadata standards used in Azerbaijan.

Table 3 Metadata standards in Azerbaijan

Component	Metadata standards
Open Data	The portal provides an overview of the API available for retrieving data, nonetheless no metadata standard is published.
Spatial	Unknown. Multiple dedicated geoportals exist, but no metadata standards seem to be applicable for all of them.
Environmental information	The system of environmental indicators was developed in accordance with the UNECE Guidelines for the Application of Environmental Indicators in Eastern Europe, Caucasus and Central Asia.
Statistical metadata	The State Statistical Committee provided Metadata are prepared in accordance with DCMI (Dublin Core Metadata Initiative) and ESMS (Euro-SDMX Metadata Structure) standards. Since 2012 the GSBPM (the Generic Statistical Business Process Model) is used as a basis for standardising processes. A unified classification system, harmonised with relevant European classifications, is used: Classification of types of economic activity; Classification of waste; Classification of types of activity on environmental protection and expenditures and others.

2.1.3.2 Quality control

Quality control mechanism for environmental data monitoring

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[38] https://unstats.un.org/sdgs/indicators/indicators-list/
[39] https://www.azstat.org/MetaDataG/
[40] https://www.azstat.org/MetaDataW/

To ensure the quality of the measurements of the environment, all the equipment and devices went through the quality check and calibration procedures to ensure the quality of data produced. Besides, within the National Environmental Monitoring Department and Central Laboratory, along with the data verification tools, there are quality managers responsible for the quality of the data produced.

Quality control for statistics publications

Based on the European Statistics Code of Practice, a Code of Practice for the State statistics bodies of the Azerbaijan Republic was developed and approved by the Statistical Council of the State Statistical Committee. The activity "Production and dissemination of official statistics" was certified according to the requirements of international standards ISO 9001:2008 "Quality Management Systems. Requirements" in August 2013 and according to ISO 9001:2015 in April 2017.

In 2010, the State Statistical Committee adopted a Quality policy and its Quality objectives, which are reviewed annually. The Quality manual (QMS 01-16), was approved by order of the State Statistical Committee No 07/07s, dated of 25th May 2016. It should be noted that this document was prepared for the first time in 2010 and is updated regularly, as needed. The final version of the document considered the requirements of ISO 9001:2015.

Internet-based questionnaires are used to implement quality checks of input data. Data obtained from the questionnaires are compared with the existing data to identify discrepancies and, if necessary, to bring them to conformity.

2.1.4 Institutional framework for environmental information managements and stakeholders' involvement

The following diagram illustrates the main environmental information, open data and e-governance stakeholders.
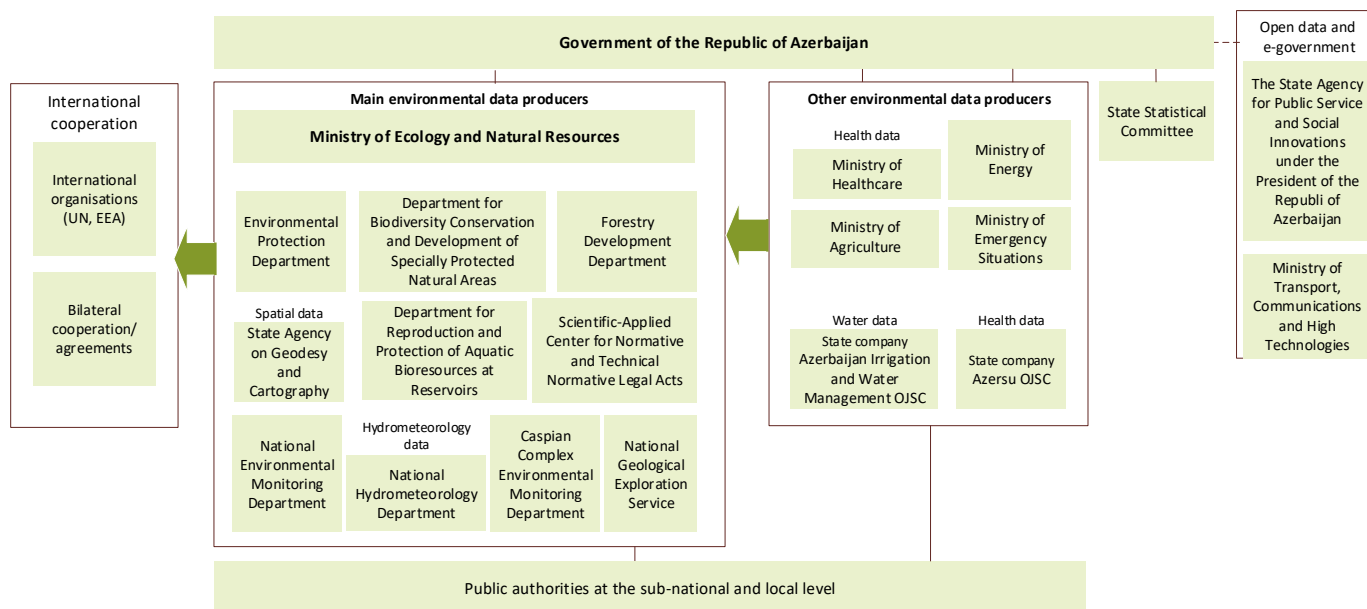

Figure 1 Main environmental information stakeholders

Ministry of Ecology and Natural Resources - http://eco.gov.az

The Ministry of Ecology and Natural Resources was established on 23 May 2001. The Ministry is responsible for formulating and implementing environmental policy, developing environmental protection measures, screening projects for potential adverse environmental impacts, monitoring implementation of environmental legislation and imposing sanctions, and administering a pollution permit system.

The Ministry is performing the monitoring of quality of air, precipitation, soil, surface and ground water, biological resources, radioactive pollution of the environment, assessment and forecast of environmental processes under the anthropogenic impact, as well as the creation of the state-of-environment database and data distribution (including via internet – http://eco.gov.az).

Moreover, the Information and Archives Foundation is functioning under the Ministry of Ecology and Natural Resources, which is a State-owned company responsible for the formation, restoration, management, protection of the unified information system of the Environment and Natural Resources, and the creation of the State information fund.

State Statistical Committee - www.stat.gov.az/index.php

The State Statistical Committee is a governmental institution that was established in 1994. It oversees collection, processing and disseminating statistical data on the economy, demographics and other sectors of activity in Azerbaijan Republic.

Its website contains an information describing environmental situation, availability of natural resources and their use. Information about air, water installations, land and forest resources protection, reserves, availability of toxic wastes and their use, extraction of different minerals, expenditures for environmental protection was reflected. Information published is based on the official statistics of the SCC, and of ministries and departments which are engaged in nature use and control over environment and environmental protection.

Ministry of Healthcare - www.sehiyye.gov.az

The Ministry of Healthcare is responsible for regulating the healthcare system in Azerbaijan. One of its duties is to collect, summarise and exchange data with relevant public authorities. In the context of the environment, the Ministry of Health provides the data about the drinking water quality.

Ministry of Agriculture -Error! Hyperlink reference not valid.

The Ministry of Agriculture is implementing the State policy on the development of production and processing of the agricultural products; provision of necessary services and information to the farmers; implementation of scientific-technical policy, ensuring food supply security; and regional development of the rural areas. The Ministry collects various data related to agriculture, e.g. data about land use, plant cultivation, cattle, etc.

Ministry of Energy - www.minenergy.gov.az

The Ministry of Energy of the Republic of Azerbaijan is the central executive authority implementing State policy and Regulation in the fuel and energy sector. The Ministry publishes annual reports and collects data about energy sector.

Ministry of Emergency Situations - www.fhn.gov.az

The Ministry of Emergency Situations is in charge of the implementation of the government policy in fields of civil defence, protection of population and property from emergency situations, fire security, individual protection in water areas, safety measures in industry, mining and construction, prevention of emergency situations and consequence management in cases of spills of crude oil and oil products as a result of incidents, and formation of the state reserve funds (stocks). In its website, the Ministry provides statistics on natural disasters, fires in the forests.

Non-governmental organisations

There are around 3000 registered non-governmental organisations (NGOs) in Azerbaijan and it is estimated that around 300 NGOs are carrying out their activities [41]. The most important among them, which deal with environmental issues are:

- Ecological Society "Ruzgar" is non-governmental, non-political and non-profit organisation that was established in April 1996 by the group of scientists, engineers, doctors, sociologist, Lawyers, economists and journalists, working in various fields of Environment protection.

- The Aarhus Centre[42] operates since 2003 and focuses primarily on supporting the access to environmental information for the public.

- The Regional Environmental Centre for the Caucasus (REC Caucasus) is an independent, non-for-profit organisation, founded in 1999. In March 2000 REC Caucasus was officially registered as an independent, not-for-profit, non-advocacy foundation in Tbilisi, Georgia. It is established to assist in solving environmental problems as well as development of the civic society in the countries of the South Caucasus, Armenia, Azerbaijan and Georgia. The mission of the REC Caucasus is determined as "to assist in solving of environmental problems in the Caucasus region through the promotion of co-operation at national and regional level among NGOs, governments, business, local communities, and all other environmental stakeholders, in order to develop a free exchange of information, in line with the principles of the Aarhus Convention; offer assistance to all environmental NGOs and other stakeholders; and increase public participation in the decision-making process, thereby assisting the states of the Caucasus in the further development of a democratic civil society".

In addition, in 2010, Public Environmental Council was established under the Ministry of Ecology and Natural Resources which mainly comprises of NGOs and public representatives. The main objective of the Council is to corporate with NGOs which operate in Azerbaijan as well as increase efficiency of the implementation of clauses of the Aarhus Convention to enhance capacity in preparation of projects, proposals, programs and other

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[41] http://www.icnl.org/research/monitor/azerbaijan.html
[42] https://aarhus.osce.org/azerbaijan/baku

measures towards environmental protection and revitalization, ecological security and efficient use of natural resource.

Other institutions involved in environmental monitoring

Institutions provide environmental information to the State Statistical Committee based on agreed reporting, and within their sphere of activity. The following table maps the different organisations with their respective "environmental data ownership".

Open data and e-government stakeholders

The Ministry of Transport, Communications and High Technologies is responsible for the country's policies on related to information society. The Ministry is also maintaining the open data portal.

After the establishment of the State Agency for Public Service and Social Innovations under the President of the Republic of Azerbaijan (ASAN Service) by the Decree No. 685 of the President of the Republic of Azerbaijan of 13 July 2012, all the responsibilities of the State Agency for Electronic Government under the Ministry of Communications and Information Technologies were passed to the ASAN Service. Currently, the ASAN Service is the responsible organisation for the electronic government in Azerbaijan and provides e-services through its "ASAN Service" Centres serving throughout the country.

Table 4 Collection and storage of environmental information: responsibility of Ministries and other agencies

| Thematic	Indicators	MENR	AIWM OJSC	Azersu OJSC	MoH	Azerbaijan National Academy of Sciences	State Committee on Property Issues	MoA	MoE	SAARAS	MoTCHT	Municipalities and local authorities/Ministry of Economy	MoES
Air	Air pollutant emissions	▪											
	Ambient air quality in urban areas	▪											
	Consumption of ozone-depleting substances	▪											
	Greenhouse gas emissions	▪											
Water	Renewable freshwater resources	▪											
	Freshwater abstraction		▪										
	Household water use per capita			▪									
	Water losses		▪										
	Reuse and recycling of fresh waters		▪										
	Drinking water quality				▪								
	Biochemical oxygen demand and concentration of ammonium in rivers	▪											
	Nutrients in fresh water	▪											
	Polluted (non-treated) wastewaters		▪										
Land and soil	Protected areas	▪											
	Forests and another wooded land	▪											
	The area affected by salinization and soil erosion						▪						
	Mineral and organic fertilizer consumption							▪					
	Pesticide consumption							▪					
Biodiversity	Threatened and protect-ted spices, included in Red Book of the Republic of Azerbaijan	▪				▪							
Energy	Total energy consumption:								▪				
	Final energy consumption								▪				
	Renewable energy consumption									▪			
Transport	The average age of the road motor vehicle fleet										▪		
Waste	Waste generation											▪	
	Waste reuse and recycling											▪	
	Final waste disposal											▪	
	Transboundary movements of hazardous wastes	▪											▪

2.2 *Environmental data flows*
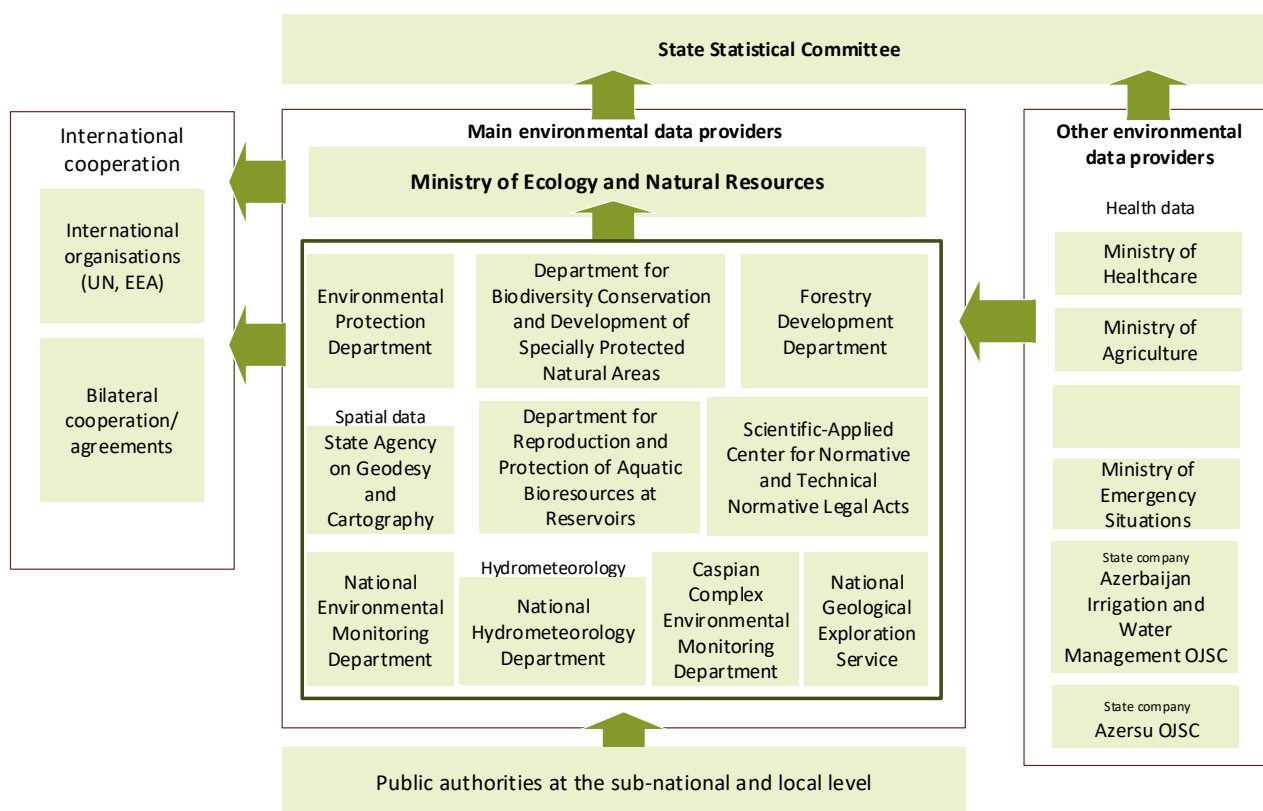
Figure 2 Main environmental information flows

The Ministry of Ecology and Natural Resources provides information on the measures taken in the field of environmental protection. It encompasses the current state of environmental (air, water, soil etc.), general information on protected areas, biodiversity and other fields of activities of the Ministry through periodic bulletins on publicly available data (in near-real time) from automated stations, mass media press releases, distribution of booklets and brochures, radiological station data, direct video footage and hydrometeorological services (Actual radiation conditions of the natural environment in the Republic; Pollution of Kura and Aras transboundary rivers; Monthly hydro-chemical information about surface water bodies; Atmosphere air pollution monitoring; Soil Pollution Monitoring; Monitoring of the Caspian Sea sector of Azerbaijan and its coastline; Geodynamic conditions of the territory of the Republic; Dynamics of exogenous geological processes; Chemical composition of atmospheric precipitation; Hydrometeorological forecasts). The main platform for disseminating information is the official web-page of the Ministry (eco.gov.az), and it is possible to request more information.

Environment Statistics are produced by using statistical reports that are submitted by the Ministry of Ecology and Natural Resources as well as by using administrative data from other ministries and departments. Together with the 13 reporting forms, approved by the State Statistical Committee, the following data are collected:

- Protection of atmosphere: pollutant emission from stationary sources, their disposal (utilisation), greenhouse gas emissions – broken down by regions and by types of economic activity

- Generation, utilisation, maintenance and disposal of waste – in the regional breakdown, by type of economic activity

- Geological exploration measures

- Environment protection expenditure

- Air pollution - as well as the total amount of pollutant emissions by motor vehicle

- Protected areas. These areas include reserves, national parks and game reserves

- The volume of wastes is comprised of wastes generated during economic activity (production, energy, works and services), by-products and related mining and mineral processing

- The amount of municipal solid wastes, including municipal solid waste generated by population and by legal entities, and diverted for the disposal of solid municipal waste treatment plants

- Hazardous wastes include waste that is controlled under the Basel Convention

- Forest land - defined as the land covered by forest (forest stands) or not covered by forest (cleared areas, perished stands, forest meadows, nurseries, seed-plots, seed orchards and raw shrubbery and plantations). Forest land may be designated for forestry or conservation purposes

- Water resources including reserves of surface and underground waters bodies, which are used or may be used

Data from administrative sources support the following data on:

- Abstraction and use of water resources by different users (drinking and household, industrial, irrigation and agricultural needs), discharge of sewage waters by treatment categories, losses – from the Amelioration and Water Economy OJSC broke down by regions and by types of economic activity;

- Pollutant emission from a motor vehicle into the atmosphere by regions – from the Ministry of Ecology and Natural Resources;

- Environmental control – from the Ministry of Ecology and Natural Resources;

- Meteorological stations data – form the Ministry of Ecology and Natural Resources; by stations;

- Sanitary Control of state of the atmosphere, water resources, land – from the Ministry of Health; Medical waste – from the Ministry of Health.

2.2.1 Environmental administrative information, statistics and assessment reports

2.2.1.1 Statistics and reports

Environmental assessment

The ENI SEIS II East page[43] summarises the environmental assessment reports published in Azerbaijan. Reports are published by the Ministry of Ecology and Natural Resources, the State Statistical Committee and international organisations such as the United Nations. The following table presents the environmental reports available in Azerbaijan.

Table 5 Environmental assessment report summary

Type of Report	Report	Institution publishing the report
National environmental reports	Yes / Last 2008-2012	Ministry of Ecology and Natural resources Of Azerbaijan Republic: http://eco.gov.az/uploads/hesabat/Jurnal-1.pdf (2013)
Specialized reports - climate (national communications to UNFCCC)	Yes	United Nations Climate Change: https://unfccc.int/resource/docs/natc/azenc3.pdf (2016)
Specialized reports - air	Yes	The Ministry of Ecology and Natural Resources, through Convention on Long-range Transboundary Air Pollution http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/2018_submissions/ (2018)
Specialized reports - water	Yes	Ministry of Ecology and Natural Resources of Azerbaijan Republic: http://eco.gov.az/en/798-vehsi-tebietde-epizootik-veziyyetin-tehliline-dair-bulleten (2017)
Specialized reports - biodiversity	Yes	Ministry of Ecology and Natural Resources, through Convention on biodiversity https://www.cbd.int/countries/?country=az (2014)
Specialized reports - waste	No	
Indicator-based reports	No	
National Statistical Yearbook	Yes	The State Statistical Committee of Republic of Azerbaijan https://www.stat.gov.az/menu/6/statistical_yearbooks/?lang=en (2018)
National Statistical Yearbook on the environment	Yes	The State Statistical Committee of Republic of Azerbaijan https://www.stat.gov.az/menu/6/statistical_yearbooks/?lang=en (2018)
Report on sustainable development	Yes	United Nations https://sustainabledevelopment.un.org/content/documents/14974Azerbaijan.pdf (2017)
State of environment report	Yes	Ministry of Ecology and Natural Resources of Azerbaijan Republic http://eco.gov.az/en/805-illik-hesabat (2017)
Hydrometeorological reports/bulletin	Yes	Ministry of Ecology and Natural Resources of Azerbaijan Republic http://eco.gov.az/en/798-vehsi-tebietde-epizootik-veziyyetin-tehliline-dair-bulleten

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[43] https://eni-seis.eionet.europa.eu/east/countries/azerbaijan

2.2.1.2   Indicators

The "Environmental indicators system of the Republic of Azerbaijan" has been confirmed by the Decree of the President dated 21 December 2012, № 2621 according to the "State Program on development of official statistics during 2013-2017" based on Guidelines on the Application of Environmental Indicators in the countries of Eastern Europe, Caucasus, Central Asia (EECCA) prepared by UN ECE Committee on Environmental Policy in collaboration of the European Environment Agency.

The key environmental indicators are based on data that is provided in the official report forms and ecological monitoring, environmental management and protection.

The following tables provide details about the indicators measured per institution and exchanged with the State Statistical Committee. The information and data on environmental indicators are available on the official webpage of the State Statistical Committee and are updated regularly. In total, 44 of 49 UNECE indicators are available; Azerbaijan is a leader among Eastern Partnership countries.

Table 6 Environmental indicators system of the Republic of Azerbaijan[44]

Indicators	Executor	Importance of figures from the standpoint of ecological policy
Air pollutant emissions	Ministry of Ecology and Natural Resources	The indicator provides a measure of existing and expected pressure on the environment regarding emissions of harmful substances into the atmospheric air
Ambient air quality in urban areas	Ministry of Ecology and Natural Resources	The indicator provides a measure of the state of the environment regarding air quality and the impact of air pollution on the population.
Consumption of ozone-depleting substances	Ministry of Ecology and Natural Resources	The indicator is a measure of the pressure on the environment of substances that deplete the ozone layer.
Greenhouse gas emissions	Ministry of Ecology and Natural Resources	The indicator provides a measure of the existing and future pressure on the environment regarding emissions of GHG into the atmosphere.
Renewable freshwater resources	Ministry of Ecology and Natural Resources	The development of this indicator over time provides a measure of the state of renewable freshwater resources in a country.
Freshwater abstraction	AIWM OJSC	The indicator provides, out of total resources available for abstraction, a measure of the pressure on the environment regarding the abstraction of freshwater resources. It can reflect the extent of water resource scarcity and the distribution of abstracted water among different economic activities.
Household water use per capita	Azersu OJSC	The indicator provides a measure of the efficiency of activities directed to the improvement of the water industry system
Water losses	AIWM OJSC, Azersu OJSC	The indicator provides a measure of response to the efficiency of the water management system in the country
Reuse and recycling of fresh waters	AIWM OJSC	The indicator provides a measure of the response to national measures to improve or rationalise water management systems in production sectors.

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[44] https://www.stat.gov.az/menu/7/?lang=en

Indicators	Executor	Importance of figures from the standpoint of ecological policy
Drinking water quality	Ministry of Health, Azersu OJSC	The indicator provides a measure of the risk of negative impacts of poor drinking water quality on human health and shows the extent to which the drinking water supply conforms to sanitary requirements and standards.
Biochemical oxygen demand and concentration of ammonium in rivers	Ministry of Ecology and Natural Resources	The indicator provides a measure of the state of rivers regarding biodegradable organic load and ammonium.
Nutrients in fresh water	Ministry of Ecology and Natural Resources	The indicator provides a measure of the state of freshwater (rivers, lakes and groundwater) regarding nutrient concentration.
Polluted (non-treated) wastewaters	AIWM OJSC	The indicator defines the level and nature of the pressure on natural water, makes it possible to obtain information necessary for developing nature conservation arrangements, and helps assess measures taken to increase the efficiency of the wastewater management system.
Protected areas	Ministry of Ecology and Natural Resources	The indicator provides the extent to which areas important for conserving biodiversity, cultural heritage, scientific research (including baseline monitoring of processes in the ecosystems), recreation, natural resource maintenance and other environmental values are protected from incompatible uses.
Forests and another wooded land	Ministry of Ecology and Natural Resources	The indicator provides a measure of the state of forests and other wooded lands in a country and shows the trends in use for environmental purposes.
Threatened and protected spices, included in Red Book of the Republic of Azerbaijan	Azerbaijan National Academy of Sciences, Ministry of Ecology and Natural Resources	The indicator provides a measure of the state of biodiversity regarding the number of threatened species and the relative effectiveness of national response measures to maintain national-level and global biodiversity.
The area affected by salinization and soil erosion	State Committee on Property Issues	The indicator provides a measure of the state of land regarding the degree to which it is affected by wind and water soil erosion.
Mineral and organic fertilizer consumption	Ministry of Agriculture	The indicator makes it possible to assess the fertilizer pressure on the environment (the accumulation of nutrients in the soil, the resulting pollution of surface and ground-water, and the movement of nutrients through trophic chains and other parts of the environment).
Pesticide consumption	Ministry of Agriculture	The indicator provides a measure of the pressure on the environment regarding intensity of pesticide consumption.
Total energy consumption	Ministry of Energy	Total energy consumption, total and by fuel, is a driving force indicator describing the development of the energy sector and the corresponding levels of energy consumption.

Indicators	Executor	Importance of figures from the standpoint of ecological policy
Final energy consumption	Ministry of Energy	Final energy consumption represents a driving force indicator and shows trends in final energy consumption.
Renewable energy consumption	SAARAS	Renewable energy consumption characterizes the development of renewable energy sources in total national energy consumption
The average age of the road motor vehicle fleet	Ministry of Transport, Communication and High Technology	The indicator on the average age of the vehicle fleet shows the technical status of the fleet through its age.
Waste generation	Municipalities and local authorities/ Ministry of Economy	The indicator provides a measure of the pressure on the environment of the total amount of generated waste and waste by category (hazardous, industrial and municipal solid waste).
Waste reuse and recycling	Municipalities and local authorities/ Ministry of Economy	The indicator provides a measure of the level of the waste use and efficiency of activities against pollution of the environment.
Final waste disposal	Municipalities and local authorities/ Ministry of Economy	The indicator provides a measure of the pressure on the environment and the response to the efficiency of the waste management system.
Transboundary movements of hazardous wastes	Ministry of Ecology and Natural Resources, Ministry of Emergency Situations	The transboundary movement of hazardous waste represents a driving force indicator.

2.2.2 Environmental data sharing arrangements

Data is shared both through the provision of environmental information on the web-sites of State agencies and as a response to certain written requests. The types of environmental information that are available on state agencies websites is defined by the Aarhus Convention. There is no exhaustive mechanism provided by the Law for environmental data exchange. The following table describes how data is collected in the Ministry of Ecology and Natural Resources and the State Statistical Committee.

Table 7. Inter-institutional cooperation for environmental data exchange

Institution	Component of the environment	Inter-institutional cooperation for data exchange
Ministry of Ecology and Natural Resources http://www.eco.gov.az	Natural Resources Waters Fauna Flora Soils and lands Waste Climate Forests Aquatic Bioresources Caspian Sea Geology Minerals	As a governmental agency, the Ministry of Ecology and Natural Resources shares all the available data, where applicable, with the other agencies. There are no specific arrangements between institutions. The main principles of data exchange are defined in the Law on Access to Environmental information. The Ministry of Ecology and Natural Resources collects data from industrial companies, as they have obligation to fill and provide reporting forms. These forms are approved and sent to the State Statistical Committee in paper format.
State Statistical Committee https://www.stat.gov.az/	Natural Resources Waters Fauna Flora Soils and lands Waste Climate Forests Aquatic Bioresources Caspian Sea Geology Minerals	Environmental data for the State Statistical Committee is submitted by legal entities. They provide official reporting forms to the State Statistical Committee as a hard copy or electronically at www.stat.gov.az. The resulting environmental statistics are published in the yearbook "Environment in Azerbaijan", the yearbook "Statistical indicators of Azerbaijan", "Regions of Azerbaijan", as well as in annual Statistical bulletins and are posted on the website. There are 13 such of official reporting forms approved by the State Statistical Committee.

2.2.3 Licensing norms

Overall, there are no copyright licencing norms defined for environmental data. The following table describes the licences available on the main environmental portals.

Table 8 Copyright licencing norms

Institution and portal	Copyright licensing
Open data portal	The portal does not provide any specific licence for data usage; however, it is stated that data can be reused for creating new products or services.
Environmental reports **(all portals)**	No indication regarding copyrights and/or reuse of information.
State Statistical Committee	There is indication on the website that when data is used, the reference to the website should be provided. However, there are no specific licence that would define the terms of use.

2.3 Progress so far

2.3.1 Main initiatives

AzDATACOM[45]

This is a joint project of the Ministry of Communications and Information Technologies of the Republic of Azerbaijan and the United Nations Development Program. Under the project launched in 2004, the DATACOM network was built in four stages. At the first and second stages, the segment of the network covering Baku, Sumgait cities and Absheron was put into use. Baku-Ganja, Yevlakh-Shirvan, Baku-Astara and surrounding regions of the country were joined to the network in the 3rd and the 4th stages. The expected results of the project include:

- High-speed connection between Baku and other regions
- Development of Internet and increased opportunities for the use of ICT in all regions
- Supporting realization of the "Financial Services Development" project (connection of post offices to "AzDATACOM")
- Development of NGN technology and IP-telephony services
- Creating the enabling environment for implementation of distance education, e-commerce, distance business management and other types of progressive activities to meet world standards

The project is currently running and is providing various services to both government agencies and citizens, such Internet services.

Development of an open data portal[46]

The current Open Government Data Portal (www.opendata.az) developed by Data Processing Centre of the Ministry of Transport, Communications and High Technologies was released in 2017. The portal is currently in an update process (URL transferred to https://www.opendata.az).

Establishment of Shared Environmental Information Systems (SEIS)

Since the 7th Environment for Europe Ministerial Conference (Astana, 2011) and the decision made therein on the establishment of the Environmental Information Systems (SEIS) and the following Batumi Conference in 2016 Azerbaijan has been making a significant progress in creating and implementing SEIS in Azerbaijan.

Progress has also been made in ensuring the accessibility of UNECE environmental indicators, which are increasingly being published in compliance with the UNECE requirements on the websites of national environmental authorities, statistical agencies and open data portals. To achieve this, Azerbaijan actively participates in the UNECE Working Group on Environmental Monitoring and Assessment (WGEMA) and the UNECE Joint Task Force (JTF) on Environmental Statistics and Indicators which support countries in Europe and Central Asia to establish SEIS by 2021.

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[45] http://www.rabita.az/en/c-projects/AzDataCom-en/

[46] https://data.e-gov.az/

UNECE environmental indicators

Currently, 44 out of 49 UNECE environmental indicators which can provide a practical and economical way to assess the state-of-the-environment are available in the State Statistical Committee's web page[47].

Out of 49 UNECE environmental indicators, 23 selected indicators were assessed in detail within a 2017-2018 UNECE study on the state of production, sharing and use of UNECE environmental indicators in the EU Eastern Partnership countries. Other 26 indicators were covered in smaller details and less rigorous criteria were applied.

- 23 assessed UNECE environmental indicators and data sets of Azerbaijan (2018)
- 15 indicators showed the organization responsible for indicator production
- 17 indicators included the time of the update
- indicators contained references to their conformity with international standards
- indicators included graphics or diagrams

"**Upgrading the National Environmental Monitoring System (NEMS) of Azerbaijan on the base of EU best practices"[48]** (2016-2019)

The overall objective of the project is to contribute to the improvement of environmental performance of Azerbaijan, especially regarding the air quality.

This project is funded by EU and implemented by the consortium of the UE member states' bodies: The Finish Meteorological Institute (FMI), in cooperation with Latvian Environment, Geology and Meteorology Centre (LEGMC), Umweltbundesamt GmbH (Environment Agency Austria UBA) and Finnish Environment Institute (SYKE).

The project consists of 4 components:

1. Institutional framework. Results: roles and responsibilities within the Ministry of Ecology and Natural Resources regarding environment data collection, processing and reporting were revised and streamlined, organisational changes were elaborated and endorsed by the Ministry of Ecology and Natural Resources.

2. Development of technical systems for environmental monitoring. Results: environmental monitoring system was modernised with an enhanced data collection, processing and reporting.

3. Capacity building and training. Results: capacity of the Ministry of Ecology and Natural Resources regarding environmental data collection, processing, analysis, reporting and communication was increased.

4. Practical implementation of the modernised systems by real case studies. Results: environmental data collection, processing, analysis tested in real cases and environmental information communicated.

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[47] https://www.stat.gov.az/?lang=en
[48] https://www.euneighbours.eu/en/east/stay-informed/opportunities/upgrading-national-environmental-monitoring-system-nems-azerbaijan

ENI SEIS II East project[49]

The main objective of the project is to continue to implement the principles and practices of the Shared Environmental information System (SEIS).

Expected results include:

- Improved implementation of regional and international commitments on environmental reporting

- Improved capacity to manage and use environmental information to support decision-making

- Regular 'state of environment' reports and indicator-based assessments in line with EU and EEA methodologies.

During the review in 2017, it was found that all counties produce environmental reports, however, in Azerbaijan, among other EaP countries, these reports are not published regularly. Moreover, all EaP countries publish specialised environmental bulletins regularly. Finally, the review showed that the application of UNECE environmental indicators is progressing towards a final stage in most target countries and certain indicators are used to report to conventions.

Water Information System

Within the - Shared Environmental Information System principles and practices in the Eastern Partnership countries (ENI SEIS II East), it is planned to establish a Water Information System – web portal to increase capacity in meeting the commitments towards the regional/international reporting obligations. The national pilot will focus on the experimental implementation of online data sharing among those institutions responsible either for monitoring of water quality or managing the water resources. The portal will be developed based on the EEA experience and include the development of two water quality indicators (C-10 and C-11) as testing the implementation of standard data dictionaries of the State of Environment Reporting of the Water Information System for Europe. In addition, it will support developing and making operational a data exchange protocol among the related national institutions for online data collection and processing.

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[49] https://eni-seis.eionet.europa.eu/east

2.3.2 International rankings

E-government development index (EGDI)[50]

As a composite indicator, the EGDI is used to measure the readiness and capacity of national institutions to use ICTs to deliver public services. Its components include Online Service Index, Telecommunication Infrastructure Index and Human Capital Index.

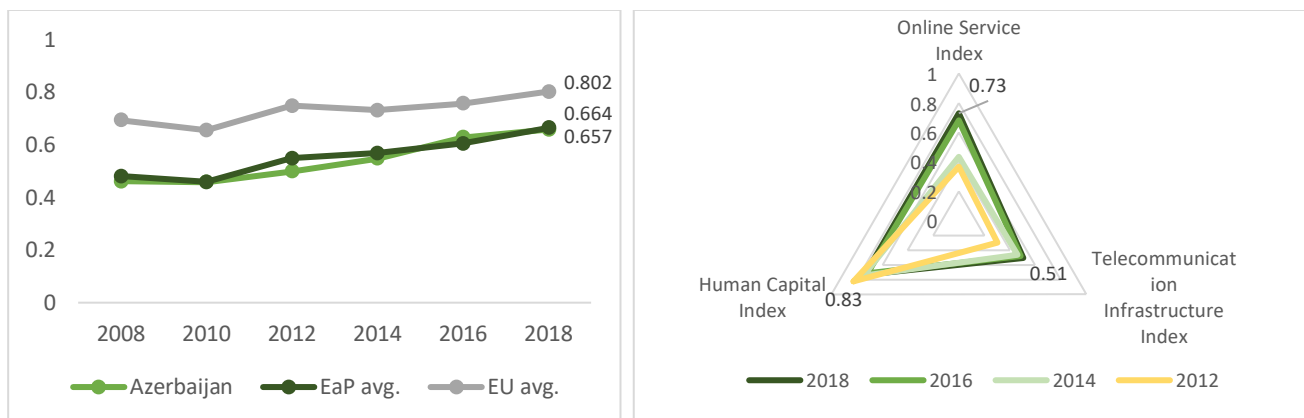In 2018, Azerbaijan scored 0.6574 and was ranked in #70 out of 193 countries. The figure below shows the change of EGDI throughout period 2003-2018.

Figure 3 EGDI of Azerbaijan

The figure above shows the change in value of EGDI components between 2012 and 2018. The values indicated in the graph show the highest value of a given indicator in 2012-2018. Online Service Index (OSI) has increased significantly in the last two years to the level of 0.73 (23.08% increase). The Human Capital Index (HCI) has seen a decrease between 2012 and 2014 (7.79% decrease) and has remained stable at around 0.72 since then. Telecommunication Infrastructure Index (TII) has the lowest score out of these 3 categories, but it has been experiencing steady growth in recent years and is currently at the level of 0,5062.

The increase in e-government is explained largely by:

- Development of AzDATACOM that aims in building high speed connection and improve access to the Internet
- Development of e-government portal, that provides around 450 e-services from 50 institutions. In 2nd quarter of 2017, citizens applied for e-services 6.6 million times[51]

Regarding the development of ICT, Azerbaijan is one of the leaders in CIS region in terms of mobile-broadband penetration and coverage[52]. Fixed-broadband market is also above region average. The prices for mobile and fixed telecommunication services are relatively low and continue to decline which positively influences an access to the telecommunication services.

Open Data Barometer

The Open Data Barometer is produced by the World Wide Web Foundation with the support of the Omidyar Network, and aims to uncover the readiness, implementation status and impact of open data initiatives around the world. It analyses global trends and provides comparative data on governments and regions using an in-depth methodology that combines contextual data, technical assessments and secondary indicators.

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[50] https://publicadministration.un.org/egovkb/en-us/Data/Country-Information/id/11-Azerbaijan/dataYear/2018
[51] Electronic government bulletin, 2017, https://www.e-gov.az/home/getfile/1890
[52] https://www.itu.int/en/ITU-D/LDCs/Documents/2017/Country%20Profiles/Country%20Profile_Azerbaijan.pdf

Azerbaijan is not evaluated in the Open Data Barometer as it is not yet advanced at open data.

Global Open Data Index

The Global Open Data Index (GODI) is the annual global benchmark for publication of open government data, run by the Open Knowledge Network. The survey is designed to assess the openness of specific government datasets according to the Open Definition in 16 different areas including Government budget, spending and procurement, access to information about land ownership, election results at all levels and national statistics.

Azerbaijan is not evaluated in the Global Open Data Index as it is not yet advanced in open data.

The Open Data Inventory (ODIN) score[53]

The Open Data Inventory (ODIN) assesses the coverage and openness of official statistics to help identify gaps, promote open data policies, improve access, and encourage dialogue between national statistical offices (NSOs) and data users.

Azerbaijan ranks #50 in the Open Data Inventory 2017 with an overall score of 51%. The overall score is a combination of a data coverage sub-score of 59% and a data openness sub-score of 43%.

Table 9 ODIN scores by EaP countries

ODIN scores	Armenia	Azerbaijan	Belarus	Georgia	Republic of Moldova	Ukraine	*Average*
Overall	53	**51**	48	55	67	42	*52.7*
Coverage	51	**59**	58	53	54	47	*53.7*
Openness	56	**43**	40	57	80	37	*52.2*

Azerbaijan scores are higher than the regional average for social and environmental statistics. Within the country, the highest levels of coverage and openness are on environmental statistics, and the lowest levels are on social statistics. The environment coverage sub-score is 72%, and the openness sub-score is 40%.

To improve coverage openness of statistics, Azerbaijan is recommended to collect and publish more data disaggregated across all data categories, create a clear and open terms of use policy for all websites publishing official statistics and publish more data in non-proprietary formats such as XLSX, CVS or JSON[54].
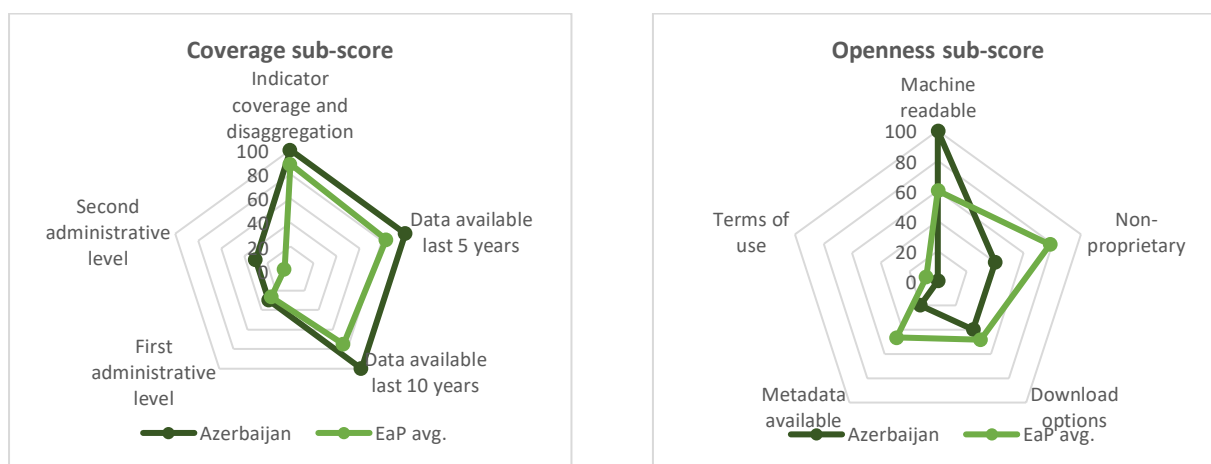

Figure 4 Coverage sub-score and Openness sub-score of Environment Statistics

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[53] http://odin.opendatawatch.com/Report/countryProfile/AZE?appConfigId=4
[54] http://odin.opendatawatch.com/ReportCreator/ExportCountryReport/AZE/2017

Environmental Performance Index[55]

The Environmental Performance Index (EPI) ranks countries on 24 performance indicators across ten issue categories covering environmental health and ecosystem vitality. These metrics provide a gauge at a national scale of how close countries are established environmental policy goals.

In 2018, Azerbaijan ranked #59 out of 180 countries with a score 62.33 out of 100.

Table 10 EPI scores of EaP countries

	Armenia	Azerbaijan	Belarus	Georgia	Republic of Moldova	Ukraine	*Average*
EPI score	62.07	**62.33**	64.98	55.69	51.97	52.87	*58.32*
Environmental health	56.85	**48.55**	69.55	57.10	60.29	64.44	*59.46*
Ecosystem vitality	65.56	**71.52**	61.94	54.75	46.42	45.16	*57.56*
Rank	63	**59**	44	94	112	109	

The figure below shows the main sub-indicators of the Environmental Performance Index by Azerbaijan.

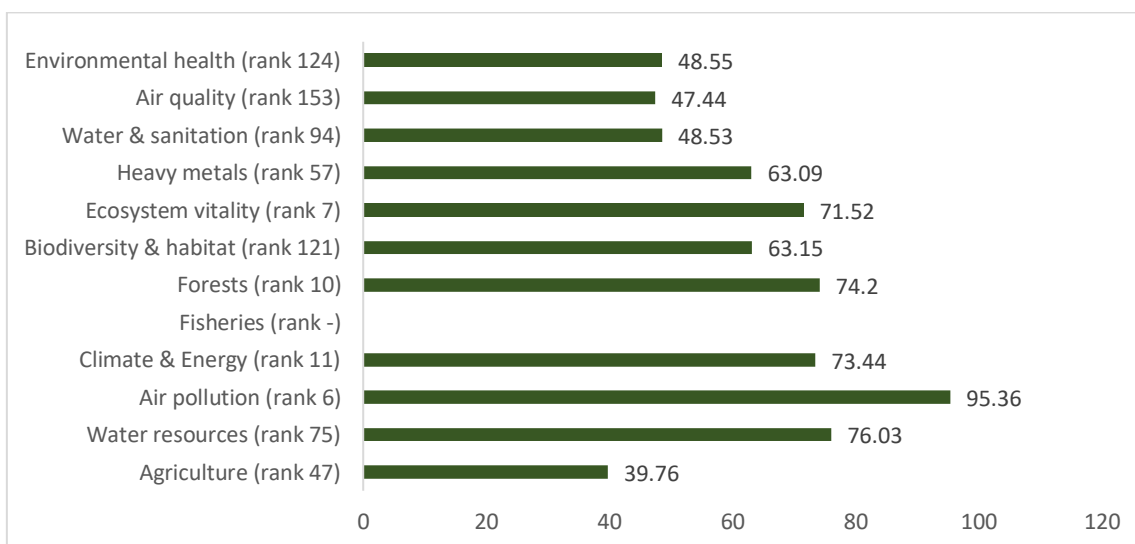| Indicator	Value
Environmental health (rank 124)	48.55
Air quality (rank 153)	47.44
Water & sanitation (rank 94)	48.53
Heavy metals (rank 57)	63.09
Ecosystem vitality (rank 7)	71.52
Biodiversity & habitat (rank 121)	63.15
Forests (rank 10)	74.2
Fisheries (rank -)	
Climate & Energy (rank 11)	73.44
Air pollution (rank 6)	95.36
Water resources (rank 75)	76.03
Agriculture (rank 47)	39.76

Figure 5 Indicators of EPI of Azerbaijan

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[55] https://epi.envirocenter.yale.edu/epi-country-report/GEO

2.3.3 ICT related statistics

Information and communications technology are one of the crucial areas for the further development of the economy and an integral part of the economic and political reforms which are currently implemented in Azerbaijan. The ICT sector has intensively developed in the country over the past years. Creating and developing the e-government system, expanding the broadband internet services, launching the telecommunication and low-orbit satellites, are factors of ICT improvement.[56]

International Telecommunication Union

According to the latest statistics from the International Telecommunication Union provides, the Republic of Azerbaijan has[57]:

- Fixed-telephone subscriptions per 100 inhabitants: 17.2

- Mobile-cellular subscriptions per 100 inhabitants: 103

- Fixed (wired)-broadband subscriptions per 100 inhabitants: 20

- Mobile-broadband subscriptions per 100 inhabitants: 56.8

- Households with a computer (%): 63.8

- Households with Internet access at home (%): 77.6

- Individuals using the Internet (%): 79

Public using the Internet[58]
The following figures illustrate the increase in Internet users since 2005. This increase was influenced by the result of the implementation of public policies regarding the development of ICT sector in the country, the expansion of e-government projects, increasing the role of the Internet in the rendering of services.
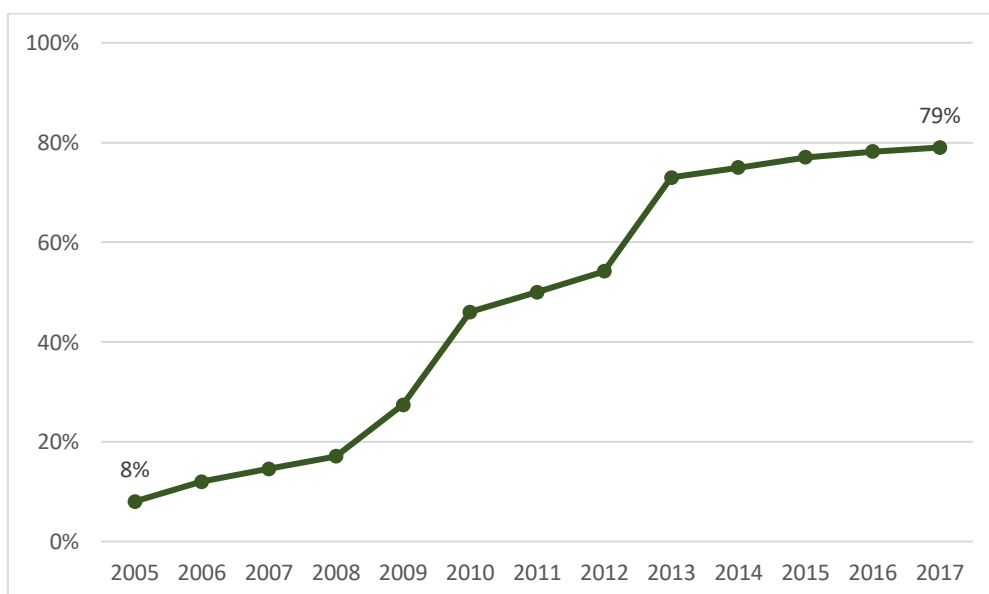

Figure 6 - Internet usage in Azerbaijan

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[56] http://cbc.az/en/en/news/azerbaijan-65th-on-itus-ict-development-index-20171510989742
[57] https://www.itu.int/net4/itu-d/icteye/CountryProfileReport.aspx?countryID=25
[58] https://www.stat.gov.az/source/communication/?lang=en

3 Technology enablers for environmental information sharing

3.1 *Portals*

This section provides insights on the platforms available for the publication of environmental information at a national and international level.

3.1.1 Open Data portal

OPENDATA.AZ[59] is developed and maintained by the Ministry of Transport, Communications and High technologies of the Republic of Azerbaijan. The portal contains a description of the data collection of government agencies, including information to find access to the data collection of government agencies and additional tools. The main objective of the portal is to create conditions for the public to participate in the public administration and carry out comprehensive analyses and researches using data and development of applications on their basis.
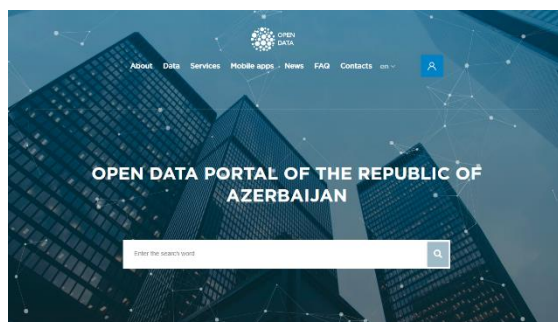
Figure 7 - opendata.az

Currently, the portal is under changes. Only 11 datasets related to the environment and 15 datasets related to agriculture. The portal has 655 datasets published. The portal is available in English. Datasets statistics are not published.
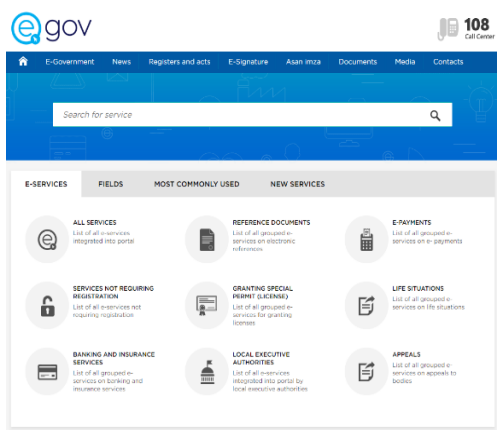
3.1.2 E-government portal

Figure 8 - www.e-gov.az

The e-government portal (https://www.e-gov.az/en) contains the public e-services available in Azerbaijan. The portal is available in English and local language (not in Russian). The portal is connected to the "State Register of Public Information Resources and Personal Data Information Systems". It was designed for the inclusion of new data on the state information resources and personal data information systems in registers, sending e-appeals for making changes or cancellation in the data available in the register, conducting clerical work, execution of appeals and informing the owners in appropriate manner. In general, the portal contains 450 approved services and 335 services in integrated in the portal, while a typical mature e-service portal contains more than a thousand services. The actual portal hosts around 20 e-services in the field of environment.

During the 2nd quarter of 2017, the Ministry of Communications and High Technologies reported[60]: 762 337 unique users who on average spent 5:35 min on the portal, 6 674 558 application to e-services.

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[59] https://data.e-gov.az/en
[60]Electronic government bulletin, 2017, https://www.e-gov.az/home/getfile/1890

Finally, the portal also uses e-signature services that are provided by the National certificate service centre[61] . The Ministry of Ecology and Natural Resources provides e-service of "Providing information on environment and natural resources" through the portal.

3.1.3 Environmental portals

The table below presents main national platforms that are used to publish environmental data.

Table 11 National platforms

Institution	Description
Ministry of Ecology and Natural Resources - http://eco.gov.az	The Ministry of Ecology and Natural Resources provides a variety of information on its website, such as: • weather forecast • air quality information (interactive data) • data from radarmeteorological station (map images) • information about hydrometeorological services • national parks • reports by its departments and other However, most of information is available in non-reusable formats, such as textual information or images. The Ministry also provides information on individual request. None of the subordinate institutions publishes separately information. However, in most cases, information is limited to annual reports.
State Statistical Committee www.stat.gov.az/index.php	The State Statistical Committee's website is now the main platform for disseminating statistics and providing information on statistical activities, including environmental statistics. In addition, the State Statistical Committee established the Azerbaijan Statistical Information Service, a portal for selecting and displaying statistical data, including environmental statistics, and interactive tables. The website contains databases, metadata and publications. The website provides a statistical database, interactive tables and Excel files, including data on environment protection, ecology and agriculture.

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[61] http://www.e-imza.az/index.php?lang=az

3.2 *Portal maturity for environmental data*

3.2.1 Statistics over availability of environmental data online

Open Data portal

The Open Data portal has now over 650 datasets. Nonetheless, there is no statistics on the portal. Also, the search of datasets is complicated as there is no possibility to filter search results on such criteria as data format, date of upload, etc. Currently, there are 11 datasets related to environment and 15 datasets related to agriculture, which is relatively low.

The Open Data Maturity in Europe 2018 report groups countries according to their open data maturity, into Beginners, Followers, Fast Trackers and Trend Setters. Based on the scores and our evaluation, Azerbaijan would most likely belong to the group of "Beginners", characterised as a group of countries that have "shows early stage of maturity on the four dimensions, with more prominent progress on the Open Data policy dimension" but still have limitations in open data availability and use.

State Statistical Committee of the Republic of Azerbaijan website

Currently, 44 out of 49 UNECE environmental indicators[62] which can provide a practical and economical way to track the state-of-the-environment are available in the State Statistical Committee web page. All datasets are available as xls files for the download.

Also, all data is available on Azerbaijan Statistical Information Service in form of interactive tables that can be downloaded. Data also can be presented on the map, indicating the discrepancies among regions.

3.2.2 Re-usability of data

The situation in Azerbaijan is mixed. On one hand, the open data portal has few datasets available, but all of them are available in machine-readable format. On the other hand, the State Statistical Committee provides a comprehensive platform for selecting, visualising and downloading environmental data in machine-readable format.

Open Data portal

All datasets on the open data portal are available in XML and JSON formats and thus are machine readable and re-usable.

Datasets are mostly available in Azerbaijani, as well as metadata. No translation is available for the metadata of the dataset. This could undermine international cooperation and/or re-use of data. The portal is not harvested by the European Data Portal, unlike for portal of the Republic of Moldova and the portal from Ukraine.

The portal also provides an API functionality which allows portal users to access data by sending a direct link to the system.

State Statistical Committee of the Republic of Azerbaijan website

All key SEIS indicators as well as other environmental data are published in Excel format (machine-readable) and are available for download. The State Statistical Committee also provide the metadata on statistical indicators and methodological explanations. All data is available on Azerbaijan Statistical Information Service platform.

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[62] https://www.unece.org/index.php?id=30331&L=0

The State Statistical Committee portal[63] provides a very good interface to select and visualise environmental information. Furthermore, the portal enables downloading the data in machine-readable format. One minus is the absence of cross analysis between environmental indicators (e.g. air and water pollution at one specific place). The portal should also provide a mechanism to view the data on a map. In addition, the State Statistical Committee publishes statistical yearbooks, including one on environment. Yearbooks can be downloaded in pdf.

Ministry of Ecology and Natural Resources website
The information on the Ministry of Ecology and Natural Resources website is mostly provided as text or images and thus is not machine readable nor re-usable. However, Ministry of Ecology and Natural Resources takes individual requests to access environmental data, which can be delivered in the requested format.

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[63] https://www.azstat.org/portal/

4 Achieving a high level of maturity for environmental information management

4.1 *Main challenges*

4.1.1 E-government

The major problems and challenges related to e-governance initiatives in Azerbaijan are presented in the table below.

Table 12 Major problems related to e-governance

Content	- The e-service portal contains less than 500 e-services, while a typical mature e-service portal contain more than a thousand services. This means that the public services could be further digitalised. - Descriptions of public services are not standardised, neither categorised into life events (e.g. birth of a child, change in employment status, a serious injury or illness). E-services are categorised per institution, but not by life event. This renders difficult for citizens to search for services. - Lack of digitalisation of public administration. Despite the programme on e-transformation, public administrations in Azerbaijan still use a lot of paper documents, while it could transfer using e-documents or granting access to the database directly.
Infrastructure	- The state institutions use the e-government gateway (electronic information exchange function) in limited cases, especially when they provide the population with e-services.[64] - The major technical barriers facing e-government are the lack of relevant ICT infrastructure, lack of common standards, privacy and security. The access to the internet is difficult in regions with relatively poor coverage of telecommunications and Internet networks. In regions, this indicator is lower than in urban areas[65].
Network	- There is a low awareness about open data both among institutions and users, as it is indicated by low number of published datasets and low usage. Cooperation and awareness promotion programs should be implemented to build open data community. - One of the largest social problems in the e-government implementation is the inability of the population to use e-government services for reasons such as a lack of IT knowledge.

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[64] http://transparency.az/alac/files/Progress_Report_on_E-Government_EN.pdf
[65] https://reg.e-gov.az/upload/meqalefiles/qalib/135.doc

4.1.2 Open data

The major problems and challenges related to electronic access to information and open data are presented in the table below.

Table 13 Major problems related to open data[66]

Content	• There are very few datasets published on the open data portal. Therefore, there should measures to raise awareness, improve the organisational model and update the open data portal to foster open data publishing on the portal.
	• The UI is modern but finding datasets is difficult and complicated.
	• No licences are specified. Thus, terms of use of datasets are not clear, limiting the reuse of data.
	• Problems arising from the effective implementation of the legislation in the implementation of control over the fulfilment of the tasks arising from the requirements of the Law of the Republic of Azerbaijan "On Access to Information.
Infrastructure	• Mobile versions of local state authorities' websites are not developed. Not responding to information requests in time, especially in electronic form or refusing to respond are also among the remaining issues.
	• The Open Data portal standards are not clearly published. Some efforts were made for documenting the API, but more detailed guidelines are required. In addition, using international standards such as DCAT would enable integration with the European Data portal.
Network	• Problems related to providing information in accessible and re-usable form by information holder.
	• There is no legal responsibility for institutions to publish its data in Open data portal.

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[66] http://ogp.org.az/wp-content/uploads/2017/11/Report-summary.pdf

4.1.3 Environmental information sharing

The main problems related to environmental information management is presented in the table below.

Table 14 Major problems related to environmental information management

Content	• Lack of unified methodology for emission calculations. • Need to revise official statistic reporting forms in term of aligning with international requirements and expansion of the pollutant coverage. • No clear licencing and copyrights are provided, thus limiting the potential use of environmental information.
Infrastructure	• Even though the State Statistical Committee web page contains major data on environmental statistics, there are still missing data. • Ministry of Ecology and Natural Resources website provides information in non-re-usable formats (textual information, images). • The open data portal, developed by the Ministry of Transport, Communication and High Technologies, needs further maintenance and development of environmental information system so that relevant institutions to be able to better share environmental information.
Network	• Inconsistencies in providing environmental information. Sometimes, data holders, especially enterprises, do not provide full information on activities to the State Statistical Committee. There is a need to establish mechanisms to enforce minimal requirements of environmental data sharing. • The lack of specific Regulations and data sharing agreements on sharing and exchange of environmental information between organisations.

4.2   Roadmap

This section presents key areas[67] of development for the Republic of Belarus. It is to be noted that these initiatives should be undertaken considering regional and international collaboration. Initiatives which were undertaken in other countries could be leveraged. In addition, the development of national standards would benefit if developed regionally and/or aligned to international standards. This especially is true for the design of information systems, metadata standards, portals and interoperability standards.

In addition, the following roadmap assumes that few elements are already in place for its smooth implementation. If some of these elements are not in place in the country, it is heavily recommended to first address issues related to these topics. In particular:

- Long term Digital and Open Data strategy: a national strategy and action plan for Open Data should be in place. It should ensure scoping, management and funding of the national Open Data portal, as well as that enough resources are allocated to open data awareness raising activities with both publishers and potential re-users.

- General interoperability framework: the country should have in place an interoperability framework or at least its foundation in place. This is especially required for building environmental information systems and ensuring smooth integration / exchange of environmental data.

- Open Data policy: the open data policy provides the foundation for a structured approach for public sector information dissemination.

- E-government, Open Data and geo-portals: the country should have effective e-government, open data and geo-portals on which environmental information can be shared / disseminated, and where services can be built.

- Environmental strategy: this strategy should contain key objectives for fostering sharing and dissemination of environmental information.

- Enforcement mechanisms for the collection, sharing and dissemination of environmental information.

Some of these measures are already in place (or ongoing) in the Republic of Azerbaijan, but nonetheless, it is advised to look at these elements from a perspective of environmental information sharing and dissemination, and to update them where appropriate. It is to be noted that these elements are under continuous development and hence reviewed periodically.

4.2.1   Content

Measure	Priority	Description
Revision of legal framework to promote accessibility and re-use of non-sensitive public sector information (PSI) online	High	Review of the legal framework for data governance related to environmental monitoring, decision-making and control, natural resources, ecosystems and pollution inventories and environmental assessments, in accordance with the Aarhus Convention, the Protocol on PRTRs (as appropriate). This can include: • improving environmental information system(s) by defining themes, sources (lists, registers, databases, funds, etc.), formats, metadata and interoperability requirements in

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[67] At this moment, the roadmap does not take into account potential interdependences of measure and timeframe for their execution.

Measure	Priority	Description
		accordance with the Aarhus Convention, Protocol on PRTRs, ECE environmental indicators and other international commitments and the e-government/open data framework • improving procedures for environmental data collection in electronic forms • improving procedures for environmental data update, quality assurance, reporting, online dissemination and other means of dissemination • proving public participation in the design, use and update of the environmental information system(s) of the and taking on citizens science and citizens engagement initiatives • division of responsibilities of the public authorities at all levels and across the sectors to ensure their clear roles and coordination • reviewing the application of the exceptions in disclosure of environmental information and establishing a clear and predictable legal framework to ensure the legitimate application of these exceptions and the disclosure of information on emissions in accordance with the Convention • Setting out the requirement to separate non-confidential information of public importance for its further disclosure
		Adopt guidance defining the practical arrangements for environmental information management, sharing and dissemination: • scope of environmental information system(s) with their metadata description and registry (to be explained) • environmental data management system (data architecture, data stewardship, database administration, data privacy, data security, data quality) • decision-making procedure on non-confidential themes or datasets to be shared and published online and the relevant online portals (e.g. website of the public authority, environmental portals (one web access points for environmental information), geospatial portals, statistical, open data and other portals) • separation of non-confidential information as appropriate • data quality assurance mechanism • stakeholder communication, including public participation procedure in the design, use and update of the environmental information system(s)
		Adopt an environment data policy: • Types and scope of environmental information available • Basic terms of availability and accessibility, including open access and sharing policy • Stakeholder care and support • Licensing standards Point of contact for access to environmental information

Measure	Priority	Description
Timely and regular collection and delivery of environmental data in accordance with the Aarhus Convention, the Protocol on PRTRs (as appropriate) and the decisions and recommendations of the Meeting of the Parties to the Convention and the Protocol	High	Consider the possibility of accession to the Protocol on PRTRs and define practical arrangements for establishing pollutant release and transfer registers within integrated environmental information system(s).
Definition of metadata description standard for all environmental information	High	This action will aim to define standards for the publication/exchange of environmental data and the publication of environmental reports. As a result, it will be easier for institutions to exchange and manage environmental data, while also making easier for citizens to find information. An example could be implementation of EU DCAT-AP standard, which would also enable integration with the European Data portal. Refer to the best practice report to get more information about metadata standards for Open Data.
Update/adopt interoperability standards for environmental systems and establishment of norms regarding inter-institutional data flow exchange/sharing, its format and improvement of the management of data collected.	High	This action will review the existing standards for exchanging environmental data between institutions and systems and standardise the exchanges. This action is a prerequisite for building an effective central environmental information system.
Develop and publish quality control mechanisms for environmental data	Medium	This action will: 1. Assess the current quality control mechanisms from the collection (monitoring) of environmental data to the publication (aggregation, sorting, enhancement) 2. Provide a standard mechanism for quality control and set minimum standards to respect during the data flow (data gathering, data preparation and cleaning, data publication). 3. Provide the legal framework for setting obligations at different levels, and penalties in regards with quality controls of environmental data 4. Implement the quality control mechanisms and set up an annual reporting process for the evaluation of the quality of environmental data. To implement these actions, refer to the best practice report to get examples.

Measure	Priority	Description
Transformation of data published to machine-readable format	Medium	The true potential of environmental data lies in their usability. Ensure the publication of environmental data in machine-readable format.
Inventory, re-engineering and publication of public services as e-services	Medium	Ensure that environment services are described and accessible through the electronic service portal, in accordance with the national standards. For more information about the standardisation of the description of e-services and the development of an electronic service portal, please consult the best practice report.
Harmonise licensing terms and conditions of environmental data to promote its public use and re-use	Low	This action will harmonise all licensing terms and conditions on the different portals used for publishing environmental data. More information about licensing are available in the best practice report.
Carry Open Data impact analysis framework in relation to the environment	Low	Carry on the assessment of the impact of environmental data on the environment, as part of the open data impact assessment framework. For instance, evaluate the following criteria: • Number of environment data downloaded and re-used • User feedback received/collected • Apps developed using environmental data • Applications and apps developed using environmental data and having an impact on the environment (including re-use of environmental data in other disciplines, for instance transport). More information about the general open data impact assessment can be found in the best practice report.

4.2.2 Infrastructure

Measure	Priority	Description
Establish a single and user-friendly web-access point for environmental information	High	As recommended by the meeting of the parties of the Aarhus Convention, in the annex 6.1, establish a single web access point to environmental information. The portal should have a standard metadata tool and a tool for the verification of the metadata quality. The portal should act as a public awareness and communication tool for environmental information. Authorities should also consider which environmental data to publish to the "eco-portal", and: • Ensure the continuous maintenance of the access point through the execution of an action plan to ensure the portal's sustainability over time • Increase the discoverability of environmental data and information by having: - a content-driven structure of the menu and

Measure	Priority	Description
		- advanced search functionality that allow the user to use multiple field search and filter options (e.g. file format) to refine a search; combining the keywords with Boolean operators; - offer the possibility to download datasets - Specific "Request data" button - Public consultations for addressing environmental data demand The design of the web-access point should be done through the public consultation on its functionality and design. More information about single access point can be found in the best practices report.
Enhance Interoperability of geospatial, statistical, health and environmental information systems	High	Now, different information systems and portals produce, consume and disseminate environment data. This action will: • Undertake a comprehensive review of portals and information systems, including their interfaces and technological implementation • Provide standards for the design of systems consuming, producing or disseminating environmental data • Provide interoperability standard for exchange of environmental information between public information systems (e.g. health, environment, energy, and statistics) and provide external APIs for external data consumers. • Provide mechanisms for consolidating environmental data across time and space These actions can be also addressed within an overarching national interoperability framework. Refer to the best practices for more details about this action.
Build an electronic registry of public environmental information	High	This action will aim to make a registry of environmental information available in each institution (i.e. metadata management system), and publishable considering the legal framework defined. This action could be coupled with the standardisation of metadata for environmental information as well as the definition of standard "environmental information" access points which would enable the registry to collect automatically this information. The registry will be used by public servants to support the continuous development of environmental information systems and the dissemination of environmental information. It will map systems, databases, institutions, datasets and reports published.
Improve accessibility and use of available environmental data and information by improving the multi-lingual aspect	Medium	This action will provide a full translation to English/Russian of public institutions websites, yearly reports and environmental information metadata.

Measure	Priority	Description
		An example of multilingual portal is the GEMET[68], which provides a thesaurus translated in 23 languages, including Russian.
Development of e-services for the environment	Medium	To describe the environment services according to the national standards (service passports) Development of environment services as e-services according to service interoperability standard (e.g. e-signature, e-payment). More information about the description of public services can be found in the best practices report.
Strengthening of technical capacity for environmental monitoring	Medium	Provision of modernised monitoring equipment
Develop and/or continue to enhance an integrated system for environmental information management, including environmental information in accordance with the Aarhus Convention and the Protocol on PRTRs.	Low	Development of an Integrated Environmental Management System, which will ensure management of data on environmental quality or long-range forecasting. To do so, this action will: • Make an inventory of all systems used for management of environmental information • Define requirements for a central system for environmental information management • Implement the system • Train users and institutions on how to use it This action will foresee the development of an efficient system for integrating various environmental factors. Note: the system should provide a standard API and a possibility to upload data manually so that compatibility with legacy and external systems can be maintained.
Develop applications to engage citizens in environmental protection through technology, especially extending the scope of existing widely used one regarding meteo forecasts or citizens engagement tools	Low	This action should aim to create a series of apps and/or an "environmental data ecosystem" which would enable citizens to consult and interact with environmental data. For instance, through apps: • consult environmental information in real time according their location • public could report poaching, mark polluted areas, etc. • public could take part into environmentally friendly events in their neighbourhood to fight pollution Integration of environmental data with popular national apps, where possible

4.2.3 Institutional Cooperation (Network)

Measure	Priority	Description

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[68] https://www.eionet.europa.eu/gemet/en/concept/4438

Establish a collaborative institutional framework for the implementation of an Open Data concept	High	This action will strengthen the necessary institutional framework for managing open data. This action will emphasis on the need to create a strong cooperation between institutions to ensure the publication of public sector information (PSI).
Continuously ensure availability of adequate capabilities for handling environmental and open data issues	Medium	This action will assess existing capacity of organisations for dealing with environmental information. It will continuously address methods, procedures, mandates, tools & technical maturity, skills and resources for handling environmental data.
Promote international and regional cooperation on good practices, challenges and lessons learned in the implementation of the points of this roadmap	Medium	Identify forums and meetings where experience can be shared.
Building capacity for environmental monitoring	Low	Provision of human resources for performing environment monitoring. Professional development/ training plan for civil servants and/or data stewards or data officers working with data (organised in the frame of the professional development programmes for civil servant). Capacity building – official training plan (Mandatory) for people responsible for data publication and recognised certifications for these people to increase the motivation and to be formally recognised as professional development training within the public bodies.
Develop a framework for measuring the social, political, environmental and economic impact of Open Data	Continuous	This action will develop a framework for measuring the social, political, environmental and economic impact of Open Data. The framework will be tailored to take into consideration environmental data.
Implementation of policies regarding improvement of public awareness	Continuous	This action will develop a framework for measuring the social, political, environmental and economic impact of Open Data. The framework will be tailored to take into consideration environmental data.
Raise awareness about open government and open data among the citizens and economic operators	Continuous	Driving demand for open government and data through greater awareness. Undertake a series of activities for promoting re-use and sharing of environmental information: • Hackathon • Forums • Promotion campaigns • Develop incubators • Develop public private partnership Develop cooperation between national bodies and NGOs and the academic sector