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Current state and development of the Shared Environmental Information System (SEIS)

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IMPROVED ENVIRONMENTAL MONITORING AND ASSESSMENT IN SUPPORT OF THE 2030 SUSTAINABLE DEVELOPMENT AGENDA IN SOUTH-EASTERN EUROPE, CENTRAL ASIA AND THE CAUCASUS

Led by the United Nations Economic Commission for Europe (UNECE) and implemented together with the United Nations Environment Programme (UNEP), this project aims to strengthen the national capacities of seven target countries: Armenia, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, North Macedonia and Tajikistan. The target countries have requested support to improve environmental monitoring and assessment for the 2030 Agenda, highlighting the need to enhance the comparability of environmental statistics in the ECE region.

The project will focus on the following expected accomplishments:

- strengthened capacities of national environmental authorities and statistical agencies to collect and produce required data and application of environmental indicators in accordance with the Shared Environmental Information System (SEIS) principles and practices;
- improved accessibility and use of regularly updated and high-quality environmental indicators, within the framework of SEIS, to respond to international indicator-based reporting obligations, including monitoring progress towards the Sustainable Development Goals.

The current report intends to address some of the national gaps and needs identified for this project on SEIS establishment and on the collection and management of environmental information and data for regular reporting, such as for the 2030 Agenda. The gap analysis also intends to address the use of environmental data and information in decision-making processes and communication.

The gap analysis review will serve multiple purposes, including defining existing gaps in data collection in the target country as a basis for developing training materials and as a background paper for two national workshops with national officials and experts responsible for environmental data collection. It will also contribute to the development of national roadmaps to monitor the SDGs for each target country to support country ownership and future endorsement and implementation.

This project is funded by the United Nations Development Account (UNDA) and implemented by UNECE Environmental Monitoring and Assessment Programme[1] in cooperation with UNEP.

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[1] See http://www.unece.org/environmental-policy/environmental-monitoring-and-assessment/envema.html

The Republic of Armenia became an independent state after the fall of the Soviet Union in 1991. In administrative and territorial terms, the country is divided into 10 regions and the capital city Yerevan. Mountains and hills cover about 90 per cent of the Armenian territory. There are about 9,480 rivers and more than 100 lakes in Armenia. The largest river is the Aras with its tributary the Hrazdan, and the largest lake is Sevan, at an elevation of 1,900 m above sea level. In terms of biodiversity, Armenia occupies a leading place in the Caucasus region with about 3,500 species of plants, 452 of which are listed in the Red Book, and 108 are of which endemic. Protected areas cover 12 per cent of the country.

In 2016 Armenia ranked 37th among 180 countries on the global index of environmental efficiency, with the largest environmental problems being air pollution, habitat protection and the inept use of water resources. Other environmental problems include soils polluted with heavy metals; inadequate waste management; and the lowering of the water level in Lake Sevan, resulting in changes in surface water and groundwater regimes and in the disturbance of biodiversity.

The Ministry of Nature Protection (MNP) develops and implements state policy in environmental protection and in the use of natural resources, including the protection of atmospheric air, water bodies, land, mineral resources, flora and fauna, and protected areas.

STATUS AND DEVELOPMENT OF SEIS

A Shared Environmental Information System rests on three pillars – content, infrastructure and cooperation – and this assessment considers each in turn.

SEIS PILLAR I CONTENT

Current system of collection of environmental data

At the country level, the main organizations responsible for collection, production, storage, processing and availability of environmental data are the Ministry of Nature Protection; the Ministry of Emergency Situations (MES); and the Statistical Committee (SC). The Environmental Monitoring and Information Centre has responsibility for information on atmospheric air, water supply, soil and waste, and the State Forest Committee manages protected areas. Both of these organizations are MNP subdivisions.

The Hydrometeorology and Monitoring Service (HMS), a subdivision of MES, monitors the atmosphere, surface water, soil, agricultural plants, pastures and the ozone layer. Other HMS functions include data storage, usage and processing, official weather forecasts and warnings, and the study of climate change.

Armenia is implementing a modern system of unified state monitoring, but currently has no regular monitoring of biodiversity, waste, or land cover, and no forest cadaster or self-monitoring at industrial enterprises.

Production of environmental indicators

In 2015, in advance of the Eighth Environment for Europe Ministerial Conference (Batumi, Georgia, 8–10 June 2016), UNECE analysed the availability, accessibility and presentation of 67 data sets approved

by the UNECE Working Group on Environmental Monitoring and Assessment (1).[2] UNECE acknowledged 62 of 67 data sets as available in Armenia. In 2017, the European Environment Agency (EEA) reported that 44 environmental indicators were available in Armenia (2).

A 2018 UNECE study (3) confirmed the full availability of 48 data sets (out of 67); some of the data sets previously reported as available were missing or lacking crucial components. In the study 23 out of 49 UNECE environmental indicators were assessed in detail. The other 26 indicators were covered in lesser detail and applied less rigorous criteria. Among the 23 assessed indicators in Armenia:

- 16 showed the organizations responsible for producing the indicator;
- 21 included the time of update;
- 6 contained references to their conformity with international standards;
- 21 included graphics or diagrams.

In a 2018 UNECE mid-term SEIS review, Armenia attained the highest possible performance score for the seven data flows in the review (4), but the overall reported progress score of 93 per cent may be somewhat overstated: the measurement of dust concentrations in cities, for instance, does not apply the SEIS criterion of PM_{10} concentrations. Armenia further reported in 2018 (5) that 42 of 49 UNECE environmental indicators were available for users.

The current UNDA study analysed 32 of the UNECE environmental indicators (23 from the main set and 9 additional) against the SEIS criteria. The analysis of the main indicators revealed that not all indicators meet the accuracy requirements. Some indicators do not contain a full set of data flows, and most are not accompanied by other available data on the same topic. (See Annex I for the evaluation criteria and detailed assessment results.)

The study noted the lack of necessary details in the punctuality category and the absence of references to internationally established measurement and calculation techniques, and reported that the majority of indicators lacked metadata, narrative assessments and recommended uses in environmental policymaking. In addition, the "Final energy consumption" and "Total primary energy supply" indicators refer to electricity (instead of energy), which does not match the indicator requirements.

The existing waste management systems are weak and deteriorating. With no state system for the inventory and classification of waste, data on waste are incomplete or not available, and the regulatory framework needs to be reformed in accordance with international requirements (6).

Armenia's combination of measurement methods from the former Soviet Union and the European Union makes data comparisons with other countries difficult, and the country needs to harmonize its data formats to assure effective data sharing and compatibility (7).

Use of environmental information

Armenia has no national legal requirement to prepare national state-of-the-environment reports, and has inadequate resources or experience for preparation of such reports based on indicators (8). The country's last report, prepared in 2002 with the support of UNECE, was mostly descriptive. The UNECE Aarhus Convention, however, requires the regular preparation of state-of-the-environment reports, and Armenia is a Party to the Convention.

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[2] Reference materials are indicated by a number in parentheses and listed at the end of the report.

The SC regularly publishes statistical yearbooks that contain a section, "Natural Resources and the Environment", with data series underpinning UNECE environmental indicators.[3] The yearbooks are published in Armenian, Russian and English. The MNP publishes thematic reports and reviews on biodiversity, climate change, persistent organic pollutants, and desertification. In addition, "Nature" magazine is published (9).

SEIS PILLAR II INFRASTRUCTURE

Data collection

The agencies that perform environmental monitoring have a shortage of modern equipment, and the hydrometeorological network has deteriorated by 60–70 per cent since Armenia's independence.[4]

Processing and analysis

The Armenian public authorities that perform environmental monitoring use specially developed software, but lack modern innovative technologies and software for harmonizing statistical and environmental data (10).

Armenia stores environmental data in the information systems of the organizations and agencies responsible for data collection. Not all authorities have complete databases, the usage of inter-departmental networks is limited, and a number of agencies store data in hard copy, a form not easily accessed by external users (10).

Dissemination of environmental information

Two websites – one maintained by MNP, the other by SC – provide public information, statistical indicators, environmental data and thematic environmental reports (9). ArmStatBank provides access to a set of UNECE environmental indicators on a single integrated platform that can generate data in different formats in both Armenian and English.[5] Armenia's reports related to its multilateral international agreements are available on the websites of MNP and the United Nations Development Programme (UNDP) country office.

Armenia's reports to multilateral international agreements (see the next section) are also publicly available on the websites of the MNP and UNDP.

SEIS PILLAR III COOPERATION

Basis and practice of inter-agency exchange of environmental information

Armenia enjoys good cooperation among its national stakeholders in environmental protection (7), practices the sharing of environmental data based on SEIS principles, and has taken measures to

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[3] See https://www.armstat.am/file/doc/99511883.pdf
[4] See https://docplayer.ru/38965995-Nacionalnaya-gidrometeorologicheskaya-sluzhba-armenii-direktor-armgosgidrometa.html.
[5] See https://www.armstat.am/ru/?nid=586&year=2018

develop inter-institutional dialogue for cooperation. Within the framework of the ENI-SEIS EAST II project,[6] on 30 August 2017 the MNP, the SC and the EEA signed a letter of intent. On the basis of this letter, the MNP issued an order (5) creating an inter-sectoral committee to support the implementation of SEIS in Armenia, and establishing the goals, objectives, and procedures of the committee, as well as the powers of the chairman and members (7). The inter-sectoral committee approved a working group that includes representatives of the MNP, the Ministries of Health; Transport; Communications and Information Technologies; Territorial Development; Education and Science; Economic Development and Investments; Emergencies; the SC; and academic institutions.

The MNP order calls for improving data exchange practices and for the implementation of SEIS principles based on inter-institutional protocols with HMS, the tax inspectorate, the Regional Environmental Centre for the Caucasus, Aarhus centres, academic institutions, the Council for Sustainable Development, and others. It also provides for regular official working meetings with contact persons in relevant services, and the involvement of these contacts in discussions on user requirements for environmental information. At present, however, the sharing of data among agencies is not running smoothly (10).

Inter-sectoral exchange: producers vs. users of information

In Armenia, users of environmental information include state territorial governments and local communities and municipalities. Non-governmental users include scientific and educational institutions, international and public organizations, the media, the general public, and the business community. Information is open and accessible to all customers (9).

International exchange and reporting

In recent years Armenia has prepared several national reports to the United Nations Framework Convention on Climate Change and the Convention on Biological Diversity. Stakeholders in the EEA survey identified the Third National Communication to the UNFCCC as a well-communicated report that could serve as example for other similar assessments (11).

Armenia actively participates in UNECE indicator processes and SEIS-related activities supported by the European Union and the EEA (7). Armenian representatives play an active part and make significant contributions to the work of such UNECE environmental bodies as the Working Group on Environmental Monitoring and Assessment and the Joint Task Force on Environmental Statistics and Indicators.

SEIS PRINCIPLES AND CONCLUSIONS

Armenia has achieved definite progress in establishing and implementing the SEIS elements of content, infrastructure, collaboration and environmental monitoring, and is working to strengthen its data from primary sources, to provide users with information as required, and to produce information one time for multiple uses (10). Environmental data collection, planning, policies and regulations are areas with room for improvement.

Use of the UNECE environmental indicators is consistent with the Concept for the Development of State Environmental Monitoring (adopted by the Government in January 2018) and with the Government's five-year programme, which identifies environmental monitoring and information as

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

development priorities. An environmental monitoring development action programme has been drafted and submitted to the Government for approval (12).

Armenia's main priorities for SEIS implementation in 2019 are:

- enhancing the production and use of regionally established environmental indicators for the development and implementation of environmental policy;
- improving the legal framework for environmental analysis and the preparation of national environmental reports on a regular basis;
- expanding the use of environmental indicators in international reports related to climate change, desertification, SDGs and "Green growth";
- translating the ENI-SEIS II East project document into the national language (5).

SDG MONITORING AND REPORTING FRAMEWORK

Country approach to Sustainable Development Goal (SDG) reporting

Armenia considers progress towards the SDGs to be progress towards the realization of comprehensive internal reforms. Since 2015, the country has been developing the infrastructure necessary to reach the SDGs, and has created the Prime Minister's national council on sustainable development, an inter-agency task force on SDGs in Armenia, and a national laboratory for SDG innovations. The model of cooperation between the national government of Armenia and the United Nations is the first of its kind, and provides an innovative example of how to support the achievement of the SDGs in a country.[7] The National Statistical Service, which will help assess progress toward the SDGs, has developed global metadata on all indicators.[8]

The statistics committee of Armenia has created an SDG indicator reporting platform – an integrated website consisting of a database and infrastructure for the collection, storage and dissemination of information. The platform includes all the global SDG indicators and more than 250 national indicators,[9] and meets the minimum standards for official UN statistics. It is managed by the national statistics committee, includes official statistics and metadata in accordance with the specified methodology, is accessible to the public, and provides for user feedback.

Armenia's self-assessment of data compliance with the global SDG indicators has shown that there are data for the production of 78 per cent of the global indicators on the national level and that (10):

- 44 per cent of the data is published;
- 7 per cent of the data is available, but has a different definition;
- 20 per cent of the data can be obtained through the further development of statistical databases;
- 14 per cent of the data can be obtained by using new mechanisms and tools for data collection;
- 15 per cent of the data requires methodological verification of data collection tools.

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[7] See https://sustainabledevelopment.un.org/vnrs/.
[8] See https://sustainabledevelopment.un.org/index.php?page=view&type=30022&nr=831&menu=3170.
[9] See http://armstat.am/en/?nid=655.

In July 2018 at the High-level Political Forum on Sustainable Development, Armenia presented its first voluntary national review of progress on the 2030 Agenda.[10] This review provides insights to the political, legal, practical and behavioral dimensions of work on the 2030 Agenda, and reveals the related problems in everyday life in Armenia. In its SDG monitoring and reporting, Armenia uses the UNECE environmental indicators in the majority of cases. (See Annex II for details.)

Overview of the readiness of UNECE indicators for SDG monitoring and reporting

According to this UNDA assessment, 31 global environmental indicators from the SDG set can be used to monitor SDG attainment in Armenia[11] (See Annex II):

- to produce five of these global environmental indicators in Armenia, nine indicators have been developed at the national level: one for each of the three global indicators 3.9.1, 6.1.1 and 6.3.1, and three for each of the two global indicators 6.2.1 and 15.5.1;
- for the 15 global environmental indicators that were not developed at the national level, proxy quantitative data are being provided that may not fully match the definitions of the respective global indicators. For example, quantity of wastes per capita in kilograms was shown for the global indicator 12.4.2 "Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment";
- for the remaining 11 global environmental indicators relevant to Armenia, the corresponding national indicators have not been developed.

For the majority of the developed national SDG indicators and the corresponding data, the UNECE environmental indicators were used, the organizations responsible for their implementation were named, and the results of monitoring were presented: 2015–2017 data for 8 of the indicators, 2015-2016 data for 10 indicators, and 2015 data for 6 indicators (See Annex II).

At the same time, UNECE environmental indicators were not used for the development of national SDG indicators characterizing the quality of water (indicator 6.3.2), water use efficiency (indicator 6.4.1), atmospheric air quality in cities (indicator 11.6.2), recycling and disposal of waste (indicator 12.5.1) and several others.

GAPS AND SUGGESTED ACTIONS

The table below summarizes the gaps in Armenia's environmental information, and suggests actions for moving forward. The country needs to take the lead on the longer-term actions, some of which may require long-term support from the international community. The short-term actions can and should occur quickly, supported in some cases by international partners through the UNDA project.

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[10] See https://sustainabledevelopment.un.org/content/documents/20315Armenia_SDG_VNR_report.pdf.
[11] Indicators 14.1.1 "Index of coastal eutrophication and floating plastic debris density" and 14.5.1 "Protected marine area" are not relevant since Armenia is a land-locked country.

Gaps	Long-term actions not directly associated with the UNDA Project	Short-term actions that can be taken by UNDA Project partners
Absence of regular monitoring of biodiversity, wastes, land cover, forest cadaster	Develop and implement monitoring systems	Develop guidance document on an environmental monitoring system based on SEIS principles and practices, and ensure data sharing and information exchange
Incomplete reporting or difficulties with waste accounting	Develop an effective system of accounting and reporting for the waste indicators	
Incomplete production or presentation of selected indicators as per UNECE standards: not all required data flows are included, no metadata, visualization, narrative analysis, policy use recommendations	Ensure full compliance with UNECE requirements	Assist in further development of environmental indicators
Incomplete databases (partially in hard copies) in a number of state agencies	Create complete environmental databases in state bodies, and apply on modern technologies and software	Train staff in monitoring, collecting, storing, assessing and digitizing environmental data
Incomplete application of accepted methods in environmental monitoring		Train staff so as to maintain the level of qualifications necessary to apply the international standards
Insufficient development of automated environmental monitoring systems	Allocate funds to accelerate the implementation of automated environmental monitoring systems	
Deterioration of instruments and equipment for environmental monitoring	Supply monitoring networks and laboratories with modern technical and analytical equipment	
Absence of state-of-the-environment reports	Adopt legislation on the preparation of state-of-the-environment reports	Provide methodological assistance
Incomplete sets of required data in some environmental indicators	Develop the missing data sets and add some environmental indicators	
Missing national indicators for 11 global SDG environmental indicators	Use the UNECE environmental indicators to develop nationalized SDG indicators	
Lack of coordination between the organizations responsible for the UNECE environmental indicators and for the nationalization of the global SDG indicators	Ensure closer communication and coordination between the organizations responsible for the UNECE environmental indicators and the nationalization of the global SDG indicators	Invite the organization responsible for the nationalization of the SDG indicators to the national workshops

CONCLUSIONS

Armenia's significant progress in making the UNECE environmental indicators more accessible is evidenced by the increasing publication of the indicators on the websites of national environmental authorities and statistical committee and on the ArmStatBank integrated data portal. This compliance with the UNECE requirements is offset, however, by a number of indicators that do not fully meet SEIS quality criteria: not all required data streams are defined, publication details are incomplete, and metadata, narrative assessments and recommendations for use in policy development are missing.

The regularly published Statistical Yearbook and thematic reports together with the ArmStatBank integrated platform provide a large amount of environmental information and data, but the absence of legislation on the preparation of national state-of-the-environment reports remains a challenge.

Armenia has the potential to apply the UNECE environmental indicators more broadly by nationalizing the global SDG environmental indicators, i.e. incorporating them into the national context. The country has already developed a matrix of global environmental SDG indicators, and is working on nationalizing them, but to date the use of UNECE environmental indicators is insufficient. Strengthening the interaction between focal points for UNECE environmental indicators and those responsible for the development and implementation of national environmental indicators in the SDG context will facilitate this process.

In the short term, the UNDA project may be able to support Armenia through advice and operational and methodological guidance on the development of the national environmental information system, and on monitoring, indicators and environmental assessment and reporting. This support may include training the staff of responsible organizations in the specifics of the best global and European practices.

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ANNEX I   EVALUATION OF SELECTED UNECE INDICATORS AGAINST THE SEIS ASSESSMENT FRAMEWORK CRITERIA

Core indicators							
Indicators (no. of data flows)	Accuracy	Relevance	Timeliness & punctuality	Accessibility	Clarity	Comparability	Inst / org arrangements
Air emissions (14)	+/-	-/+	+/-	+	+/-	+/-	
Air quality (4)	+/-	+/-	+	+	+/-	+/-	
ODS consumption (8)	+/-	+/-	+	+	+/-	+/-	
Air temperature (1)	+	+/-	+	+	+/-	+/-	
Precipitation (1)	+	+	+	+	+/-	+/-	
GHG emissions (2)	+	+	+/-	+	+	+	
Renewable water res (1)	+/-	+/-	+	+	+/-	+/-	
Water abstraction (3)	+	+	+	+	+	+	
Water use (4)	+/-	+	+	+	+/-	+	
Water supply (1)	+/-	+/-	+	+	+/-	+/-	
BOD and NH_4 in rivers (2)	+	+	+	+	+	+/-	
Nutrients in freshwater (5)	+	+	+	+	+	+/-	
Pop. connected to WWT (1)	+/-	+/-	+	+	+	+/-	
WWT facilities (1)	+/-	+/-	+	+	+/-	+/-	
Polluted waste water (2)	+	+	+	+	+/-	+/-	
Protected areas (1)	+	+	+	+	+/-	+	
Forests and woodland (1)	+	+	+	+	+/-	+/-	
Threatened and protect. species (2)	+	+/-	+	+	+/-	+/-	
Land uptake (2)	-/+	-/+	+	+	-/+	+/-	
Final energy consumption (2)	-	-	+	+	-	+/-	
Primary energy supply (2)	-	-	+	+	-	+/-	

Indicator						
Waste generation (2)	+	+	+	+	+/-	+
Hazardous waste management (6)	-/+	+/-	+	+	+/-	+/-
Additional indicators						
Household water use per capita (3)	+/-	+/-	+	+	+/-	+/-
Conn. to public water supply (1)	+/-	+/-	+/-	+	+/-	+/-
Water losses (3)	-/+	+/-	+	+	+/-	+
Fertiliser consumption (4)	+/-	+	+	+	+/-	+/-
Pesticide consumption (3)	+/-	+/-	+	+	+/-	+/-
Passenger transport (3)	+/-	+/-	+	+	+/-	+/-
Freight transport (3)	+/-	+/-	+	+	+/-	+/-
Age of motor vehicles (5)	+	+	+/-	+/-	+/-	+/-
Env protection expenditures*	+	+	+	+	+	+/-

* Indicator not reviewed by the UNECE Join Task Force on Environmental Indicators

THE APPLIED RATING SCALE

+   all is well
+/-   not all is well
- / +   all is not that well
-        all is not well

Explanations of the criteria and further analysis are provided in Annex III.

All the reviewed indicators are available on a integrated national platform of ArmStatBank
http://armstatbank.am/pxweb/hy/?rxid=25471e3b-46a7-4a1f-91e2-55506b88d543

SDG indicators	National indicators of Armenia				UNECE Indicators
SDG target 2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil					
2.4.1 Proportion of agricultural area under productive and sustainable agriculture		**2015**	**2016**	**2017**	F1. Irrigation* F2. Fertilizer consumption F3. Gross nitrogen balance*
	Arable land: thousand ha	446,7	446,4	446,0	
	Sown areas: thousand ha	337,5	353,4	294,5	
	Perennial plants: thousand ha	57,6	57,6	58,1	
SDG target 3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination					
3.9.1 Mortality rate attributed to household and ambient air pollution	3.9.1a Number of deaths caused by registered social-domestic toxification cases per 100,000 population**	**2015**	**2016**	**2017**	A1. Emissions of pollutants into the atmospheric air A2. Ambient air quality in urban areas
		1,4	1,3	1,4	
3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene	Infectious and parasitic diseases per 100,000 population	**2015**	**2016**	**2017**	C5. Water supply industry and population connected to water supply industry; C6. Connection of population to public water supply; C9. Drinking water quality; C14. Population connected to wastewater treatment
		0,3	0,2	n/d	
	cases	9	7	n/d	
3.9.3 Mortality from unintentional poisoning		**2015**	**2016**	**2017**	F4. Pesticide consumption
	per 100,000 population	2,5	2,2	n/d	
	cases	76	65	n/d	

SDG target 6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all					
6.1.1 Proportion of population using safely managed drinking water services	6.1.1.a Proportion of households with centralized water supply %**	**2015**	**2016**	**2017**	C5. Water supply industry and population connected to water supply industry
		97,3	97,9	n/d	C6. Connection of population to public water supply
					C9. Drinking water quality
SDG target 6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations					
6.2.1 Proportion of population using safely managed sanitation services, including a hand-washing facility with soap and water	6.2.1.a Proportion of population using safely managed sanitation facility %**	**2015**	**2016**	**2017**	C4. Household water use per capita;
		76,6	n/d	n/d	C5. Water supply industry and population connected to water supply industry;
	6.2.1.b Proportion of population using hand-washing facility with soap and water %**				C14. Population connected to wastewater treatment.
		96,5	n/d	n/d	
	6.2.1.c Proportion of population using sanitary-hygienic services defined by sanitation norms %**				
		76,6	n/d	n/d	
SDG target 6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally					
6.3.1 Proportion of wastewater safely treated	6.3.1.a Proportion of insufficiently treated wastewater %**	**2015**	**2016**	**2017**	C16. Polluted (non-treated) wastewater
		47,3	52,1	n\d	

		2015	2016	2017	
6.3.2 Proportion of bodies of water with good ambient water quality	No data				C10. BOD and concentration of ammonium in rivers C11. Nutrients in freshwater

		2015	2016	2017	
SDG target 6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity					
6.4.1 Change in water use efficiency over time	No data				C3. Total water use C4. Household water use per capita C7. Water losses
6.4.2 Level of Water Stress: freshwater withdrawal as a proportion of available freshwater resources	%	50,8	46,2	n\d	C1. Renewable freshwater resources C2. Freshwater abstraction
SDG target 6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes					
6.6.1 Change in the extent of water-related ecosystems over time	No data				D1. Protected areas D2. Biosphere reserves and wetlands of international importance*
SDG target 7.1 By 2030, ensure universal access to affordable, reliable and modern energy services					
7.1.1 Proportion of population with access to electricity	%	99,6	99,82	n\d	G5. Final electricity consumption*
SDG target 7.2 By 2030, increase substantially the share of renewable energy in the global energy mix					
7.2.1 Renewable energy share in the total final energy consumption	%	11,2	14,1	n\d	G1. Final energy consumption G4. Renewable energy consumption
SDG target 7.3 By 2030 double the global rate of improvement in energy efficiency					
7.3.1 Energy intensity measured in terms of primary energy and GDP	1000 t.o.e./bn dram	0,63	0,611	n\d	G3. Energy intensity
SDG target 9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all					

9.1.2 Passenger and freight volumes, by mode of transport		**2015**	**2016**	**2017**	H2. Freight transport demand
	Passenger volume thousand people	208941,4	206277,6	200498,2	
	Freight volumes 1000 tons	11052.6	20483.8	28046.7	

9.4.1 CO_2 emission per unit of value added		**2015**	**2016**	**2017**	B3. Greenhouse gas emissions
	kg/mln. dram	23,3	23,6	n\d	

11.3.1 Ratio of land consumption rate to population growth rate	No data	E1. Land uptake E2. Area affected by soil erosion

11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban waste generated, by cities		**2015**	**2016**	**2017**	I3. Waste reuse and recycling I4. Final waste disposal
	%	99	99	n\d	
11.6.2 Annual mean levels of fine particulate matter (i.e. PM2.5 and PM10) in cities (population weighted)	No data				A2. Ambient air quality in urban areas.

		2015	2016	2017	
12.2.1 Material footprint, material footprint per capita, and material footprint per GDP	No data				C2. Freshwater abstraction; D3. Forests and other wooded land; E1. Land uptake.
12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	Domestic material consumption mln. dram	3915973	3892686	4271679	C3. Total water use G1. Final energy consumption G5. Final electricity consumption*
	Domestic material consumption per capita dram	1303326	130090	1433738	
	Domestic material consumption per GDP %	77.6	76,8	76,7	

		2015	2016	2017	
12.4.2 Hazardous waste generated per capita and proportion of hazardous waste treated, by type of treatment	kg per capita	20,7	38,7	n/d	I2. Management of hazardous waste I3. Waste reuse and recycling

12.5.1 National recycling rate, tons of material recycled	No data	I2. Management of hazardous waste I3. Waste reuse and recycling I4. Final waste disposal

14.1.1 Index of coastal eutrophication and floating plastic debris density	For Armenia the indicator is not relevant. The country has no outlet to the sea				C12. Nutrients in coastal seawaters

SDG target 14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information

14.5.1 Coverage of protected areas in relation to marine areas	For Armenia the indicator is not relevant. The country has no outlet to the sea				D1. Protected areas.

SDG target 15.1 By 2020, ensure the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements

		2015	2016	2017	
15.1.1 Forest area as a proportion of total land area	%	11,24	11,23	11,23	D3. Forests and other wooded land
15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	%	13	13	13	D1. Protected areas

Second header row for 15.1.2: 2015 2016 2017

SDG target 15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally

15.2.1 Progress towards sustainable forest management	No data				D3. Forests and other wooded land

SDG target 15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation neutral world

		2015	2016	2017	
15.3.1 Proportion of land that is degraded over total land area	%	6,2	6,0	n/d	E2. Area affected by soil erosion

SDG target 15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development					
15.4.1 Coverage by protected areas of important sites for mountain biodiversity	No data				D1. Protected areas

SDG target 15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species					
15.5.1 Red List Index	15.5.1.a Threatened and protected species, incl. species registered in the Red Book of RA/Biodiversity representation of RA**	**2015**	**2016**	**2017**	D4. Threatened and protected species
	- 15.5.1.a.1 Registered vertebrate and invertebrate species, of which**				
	- total	17500	n/d	n/d	
	- Registered in the Red Book of RA	308	n/d	n/d	
	- Included in the specially protected natural areas	100	n/d	n/d	
	- 15.5.1.a.2 Registered high and low plant species, of which:**				

		- total	9000	n/d	n/d	
		- High plant species registered in the Red Book of RA	452	n/d	n/d	
		Included in the specially protected natural areas	166	n/d	n/d	

SDG target 15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species		
15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien	No data	D6. Invasive alien species (indicator is not currently developed)

SDG target 15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts		
15.9.1 Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011-2020	No data	D4. Threatened and protected species.

* Indicator not reviewed by the UNECE Join Task Force on Environmental Indicators
** Developed national indicators for global SDG indicators (See http://armstat.am/en/?nid=655).

Checklist for evaluating UNECE environmental indicators against SEIS Assessment Framework criteria (cf. Annex I)

ACCURACY

1. What are the primary data sources?
2. Are other data sources on the same topic available?
3. Are all data included in the definition of the indicator used for calculating and presenting the indicator? Are any incorrect data used?

Elements not yet taken into account and requiring additional country information:

- Is there systematic comparison of the data used with data from other sources?
- Are data validation procedures used?
- Are data ever revised?

Notes:

- An "all is well" rating cannot be assigned if the calculation and presentation do not use all data that are part of the indicator by definition;
- The existence of only one data source shall not lower the rating.

RELEVANCE

1. Are the data that are required to produce the indicator used for more than one purpose? (Multipurpose use: for example, to produce various national or regional indicators, to fulfill various reporting obligations, to form components of other indicators)
2. Do the actual data sets used to produce the indicator match its definition?
3. Are the necessary details included?
4. Is geographic coverage sufficient? (For example, how many units – water bodies, cities, etc. – does the indicator cover?)
5. Do the content and the presentation of the indicator allow for its broad application?

Elements not taken into account so far, for which additional country information would be required:

- In assessing whether the data meet user requirements, are user responses collected actively or passively?
- Are data regularly improved to meet the needs of users?

TIMELINESS AND PUNCTUALITY

1. With what frequency are the data disseminated?
2. When was the most recent data set created (year, month)?
3. When were the data last updated (the latest publication time)?
4. How punctually are the data published online (the difference between the initially planned date and the publishing date)?

Note: publication of data is considered delayed if the delay is more than a year.

AVAILABILITY

1. Are the data accessible for users (including on integrated national platforms)?
2. Is there an integrated platform that provides access to all data sets and key environmental indicators?
3. Are data presented in a user-friendly format?

Elements not taken into account so far, for which additional country information would be required:

- Are raw data accessible to users, including governmental agencies?

CLARITY

1. Are metadata (additional data describing the content of the indicator) accessible?
2. Is the indicator presented in a visual form (graphs, charts, maps)?
3. In which languages is the indicator presented (national, English, Russian)?
4. Does the indicator have a narrative assessment and recommendations and conclusions in the context of designing or evaluating environmental policies?

Note: an indicator is positively evaluated if it is presented in at least two languages.

COMPARABILITY

1. Are the procedures used for measurements and calculations agreed upon internationally?
2. How long are the data time series?
3. Are there are gaps in the data time series?

Note: an indicator is positively evaluated if the methods used for data collection and production are agreed upon internationally.

INSTITUTIONAL AND ORGANIZATIONAL ARRANGEMENTS

Elements not yet taken into account, for which additional country information would be required:

- Are there national laws, plans, programmes, strategies related to the production of relevant data?
- Are there legal or institutional mechanisms for the regular production and exchange of data between various organizations within a country?

THE APPLIED RATING SCALE

+   all is well
+/-   not all is well
- / +   all is not that well
-        all is not well

Further details of indicator evaluation

Accuracy

Among 23 indicators from the main set, 11 fully meet the quality criteria "all is well" rating. Eight indicators have some drawbacks ("not all is well"). For example, indicator A1 "Emissions of pollutants into the atmospheric air" contains only 7 sets of data instead of the 14 recommended (the measurement values for dust instead of PM_{10} and $PM_{2.5}$; no values for emissions of cadmium, PAHs, PHBs, PCDD/F; no primary data sources indicated).

Most of these indicators are not supplemented with information on any other available data on the same topic.

Two indicators have ratings of "all is not that well". Indicator E1 "Land uptake" contains only substituted data, which do not completely reflect its content. Indicator I2 "Management of hazardous waste" contains only 2 sets of data (of 6 recommended).

Two energy indicators, G1 "Final energy consumption" and G2 "Total primary energy supply", include values of electrical energy (instead of energy). The unit of measurement used – kWh (instead of kilotons of oil equivalent, ktoe) contravenes the indicator content.

Relevance

Ten indicators fully meet the quality criteria.

Nine indicators have some drawbacks, mostly related to the lack of necessary information. Some indicators do not show the possibilities for broad application.

Two indicators (A1 and E1) contain data that do not completely correspond to content.

Timeliness and Punctuality

All indicators from the main set (except for A1 and B3) fully meet the quality criteria.

Availability

All the indicators from the main set are easily accessible to users and presented in user-friendly formats.

Clarity

Five indicators fully meet the quality criteria.