

# Working Group on Environmental Monitoring and Assessment

Twenty-third session, Geneva and online, 4-5 May 2021

Agenda Item 8. Progress in environmental monitoring and assessment, including institutional and regulatory mechanisms and infrastructure at the national level:

## Major actions taken in Armenia, 2020-2021

[Gayane Shahnazaryan](#)

Ministry of Environment of Republic of Armenia

[Nelli Baghdasaryan](#)

Statistical Committee of Republic of Armenia



# Recent developments



- Production of environmental reports, analyses and assessments based on environmental information and indicators, including through the use of SEIS.
- Modernization and upgrading of national monitoring networks
- Improvements in data quality assurance and control, as well as management of data.
- Improvements in data policy & institutional and regulatory mechanisms & technical solutions for data exchange between various ministries and agencies & with other users, including the public.
- Implementation of recommendations regarding environmental monitoring & assessment made in national environmental performance reviews.
- **Development at country level to enhance digitalization & digital transformation related to environmental information including through the use of new technologies, big data, artificial intelligence & Earth observation for environmental monitoring.**
- Remaining challenges

# Improvements in data policy & institutional and regulatory mechanisms & technical solutions for data exchange between various ministries and agencies & with other users, including the public



- In January 2020, three state non-commercial organizations carried out environmental monitoring; Hydromet Service of Ministry of Emergency Situation, Environmental Monitoring and Information Center and Forest Monitoring Center, have been merged and formed the Hydrometeorology and Monitoring Center of the Ministry of Environment in order to establish united environmental monitoring system and to improve data exchange between services.
- The Division of Nature Protection Statistics was formed within the Statistical Committee.
- To faster data exchange between national organizations the several memorandums has been signed between HMC, ME and other governmental organizations, academic institutions, and etc.

# Modernization and upgrading of national monitoring networks



## ➤ Upgrading meteorological stations

- In 2020, 23 meteorological stations have been equipped with automatic instruments

## ➤ Upgrading hydrological stations

- In 2020, 6 hydrological observation points were renovated, equipped and modernized with the financing of the EUWI + project.

## ➤ Upgrading groundwater monitoring stations

- In 2020, 13 groundwater monitoring stations were renovated and 12 new stations were built in Sevan and Hrazdan river basin management areas within the EUWI + project.



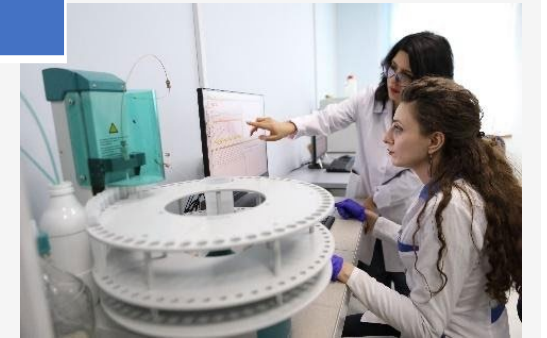
# Modernization and upgrading of national monitoring laboratory



In January 2020, the newly equipped laboratory of the “Hydrometeorology and Monitoring Center” SNCO of the Ministry of Environment of the Republic of Armenia has been opened renovated with the co-financing of the European Union and the Government of Armenia in the framework of the EU-funded project “European Union Water Initiative Plus for Eastern Partnership Countries”.

With the support of EUWI+ project the following activities took place:

- **Technical assistance: Purchase new equipment and spare parts, installation and trainings** (Ion chromatograph, spectrometers, field multiparameter instruments, high precision scales and etc)
- **Methodology harmonization and proficiency testing**
- **Purchased standard ISO methods for conducting analyzes (in English and Armenian)**
- **Preparation Laboratory Accreditation documents (Quality Manual and SOPs)**



# Developing of national monitoring system (programs)



- **Hydrobiological monitoring has been started to implement regularly**
  - Since June 2020, the implementation of the hydrobiological monitoring has been started regularly. The hydrobiological network has been established based on the previous investigations in the pilot river basins in Armenia within EU funded project (EUWI+, EPIRB and etc) and considering the provisions of EU water framework directive.
- **Since June 2020, the soil pollution monitoring has been started to implement a wide range**
  - The soil pollution monitoring network includes basic river basins in Armenia aimed to understand the influence of pollution of basins on the rivers. Besides basic monitoring programs, in 2019-2020, the investigation monitoring has been carried out in rehabilitate abandoned, ownerless sites.
- **In March 2020, the new network of the surface water quality and groundwater quality and quantity monitoring has been approved by the Order of the Ministry of Environment.**
  - According to the new network, the list of monitoring sites has been expanded essentially and consist 144 (from 131) surface water quality sites on rivers, reservoirs and Lake Sevan, and 109 ground water quality and quantity monitoring sites (from 100).
- **To fill the gap of the data in the national water monitoring**
  - The investigative monitoring of surface water has been carried out (EUWI+ project).
  - The surface water and ground water surveys has been carried out (EUWI+ project).
  - The monitoring of Lake Sevan within the SEVANMODE2 project founded by Derman Government



Since 2021 January, within the framework of the "EU4Climate" regional project (funded by EU and implemented by UNDP) the Austrian Environment Agency has started to develop a comprehensive concept for improvement of air quality monitoring in Armenia, which is based on the Armenia-EU Comprehensive Extended Partnership Agreement (harmonized with the EU Air Quality Framework Directive).

# Production of environmental reports, analyses and assessments based on environmental information and indicators, including through the use of SEIS



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## ➤ National environmental reports, State of environment report

[http://mnp.am/uploads/1/1534773643report2007-2011\\_eng.pdf](http://mnp.am/uploads/1/1534773643report2007-2011_eng.pdf)

## ➤ Specialised reports – climate

[http://www.mnp.am/uploads/1/1594377030FNC\\_Eng.pdf](http://www.mnp.am/uploads/1/1594377030FNC_Eng.pdf)

## ➤ Specialised reports – air

<http://armmonitoring.am/public/admin/ckfinder/userfiles/files/ampopag/Odi%20Obzor%202020.pdf>

## ➤ Specialised reports - water

<http://armmonitoring.am/public/admin/ckfinder/userfiles/files/ampopag/Water%20report%202019.pdf>

## ➤ Specialised reports - biodiversity

<http://mnp.am/uploads/1/15840212196-N.REPORT-ARMENIA-revised-eng-05.03.2019.pdf>

## ➤ National Statistical yearbooks

<https://www.armstat.am/am/?nid=586&year=2020>

## ➤ Environment and Natural Resources in the Republic of Armenia for 2019 (Statistical publications)

<https://www.armstat.am/en/?nid=82&id=2301>

## ➤ Environmental Statistics of Armenia for 2019 and Time-Series of Indicators for 2015-2019

<https://www.armstat.am/en/?nid=82&id=2309>

## ➤ Reports on the state of the environment (Annual reports produced by Hydrometeorology and Monitoring Center SNCO)

<http://armmonitoring.am/public/admin/ckfinder/userfiles/files/texekang/tarekan/Annual-19.pdf>

## ➤ Report on the results of Environmental monitoring (Quarterly reports produced by Hydrometeorology and Monitoring Center SNCO, which has been expanded essentially and included the results of meteorological conditions, climate change, forests, and hydrological monitoring)

<http://armmonitoring.am/public/admin/ckfinder/userfiles/files/texekang/eramsjak/II%20Eramsyak%202020.pdf>

# Production of environmental reports, analyses and assessments based on environmental information and indicators, including through the use of SEIS



## ➤ In the Republic of Armenia, EcoPortal-water component has been developed within the ENI SEIS II East project

- The water related (C1, C2, C3, C4, C5, C10, C11) and Protected Areas (D1) indicators have been developed jointly by the European Environment Agency (EEA), European Topic Centres on Inland, Coastal and Marine waters and national experts from Armenia under the ENI SEIS II East project funded by the European Union and published on the EcoPortal.

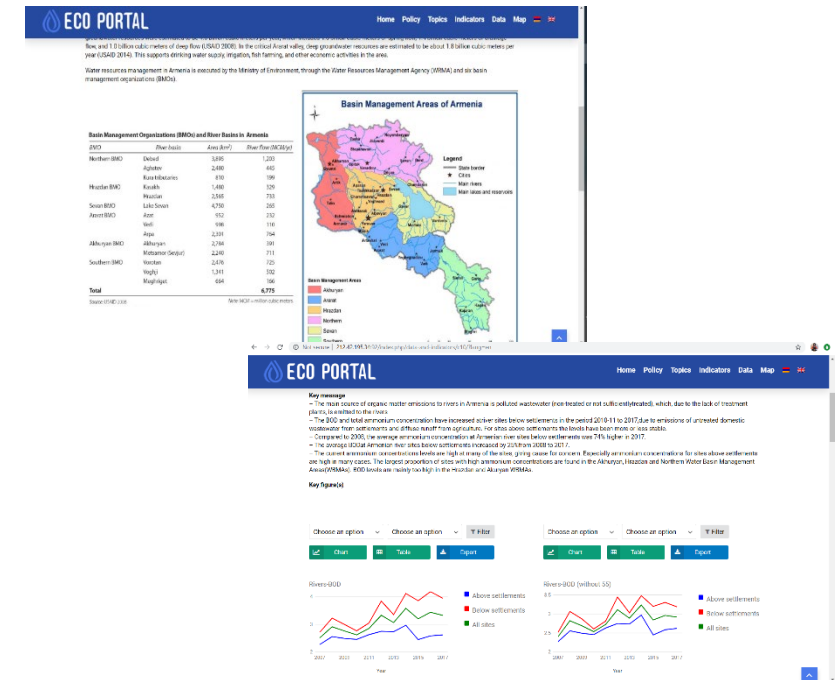
<http://212.42.195.34:92/index.php/data-and-indicators/?lang=en>

## ➤ For the first time ARMSTAT has developed a new indicator on "Drinking water quality", that indicates the proportion of drinking water samples that do not meet sanitary-microbiological standards

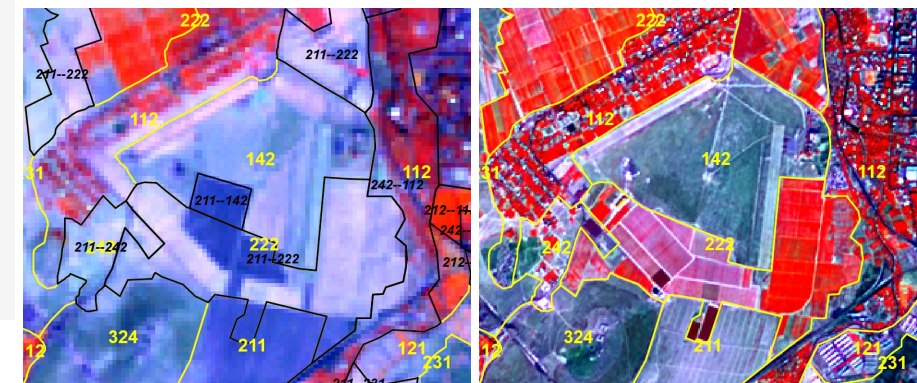
- At the same time, it provides UNECE C9 indicator, on the accountability of which the country has obligations. The implementation of the indicator has completed the provision of accountability of the country related to water resources

[https://armstatbank.am/pxweb/en/ArmStatBank/ArmStatBank\\_8%20Environment\\_\(C\)%20Water%20resources/EE-c9.px/?rxid=622702ca-2012-4b2c-b431-da8d316049d5](https://armstatbank.am/pxweb/en/ArmStatBank/ArmStatBank_8%20Environment_(C)%20Water%20resources/EE-c9.px/?rxid=622702ca-2012-4b2c-b431-da8d316049d5)

## ➤ CLC-pilot project was implemented, the national capacity was improved within the ENI SEIS II East project



Some examples of changes (2000-2018)





Twinning Partnership with the Statistical Committee of the Republic of Armenia for the Project Implementation within the World Bank's Implementation of the National Strategy Program for Strengthening of the National Statistical System

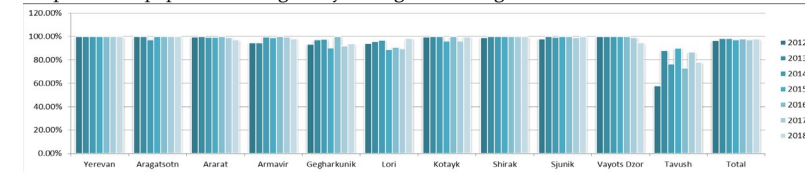
### Pre-selected environmental quality of life indicators list

Target concept	Indicator
<b>Impact of environmental hazards on human health:</b>	
<b>Environmental health</b>	1. Mortality rate attributed to household and ambient air pollution
	2. Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
	3. Mortality rate attributed to unintentional poisoning
<b>Natural disasters impact</b>	1. Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
<b>Access to environmental services and amenities</b>	
<b>Intangible services and amenities</b>	1. Terrestrial protected areas (% of total land area)
	2. Forest area as a proportion of total land area
<b>Objective services and amenities</b>	1. Proportion of population using safely managed drinking water services
	2. Exceedance of air quality standards in urban areas
	3. Proportion of population using safely managed sanitation services
	4. Green area per 100,000 inhabitants
<b>Subjective services and amenities</b>	1. Satisfaction with the quality of water supply
	2. Satisfaction with the level of pollution
	3. Satisfaction with the level of noise
	4. Satisfaction with the quality of waste management
	5. Satisfaction with the level of traffic
	6. Satisfaction with the availability of green areas
<b>Quality of the environment</b>	1. Proportion of bodies of water with good ambient water quality
	2. Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
	3. Annual mean levels of fine particulate matter in cities

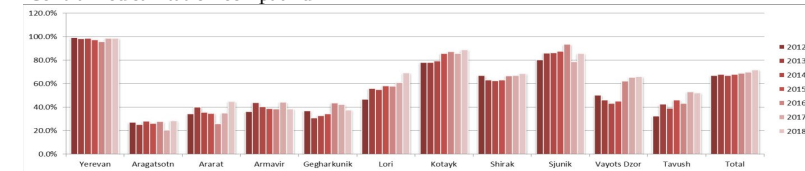
### Basic Set of Environment Statistics (BSES) of the Framework for the Development of Environment Statistics (FDES 2013)

It follows the hierarchical structure of the FDES and serves as a tool to assess the national relevance, importance, availability and sources of the individual statistics contained in the BSES. It also helps to identify relevant quantitative and qualitative data gaps, and to develop a plan for filling them in with a view to strengthen environment statistics according to national priorities, needs and available resources.

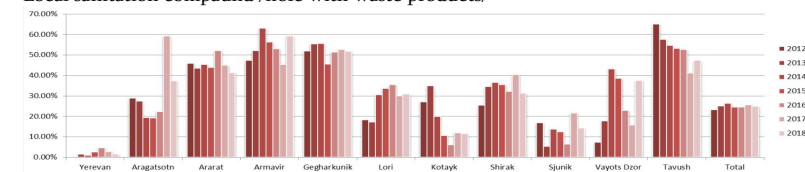
Proportion of population using safely managed drinking water services



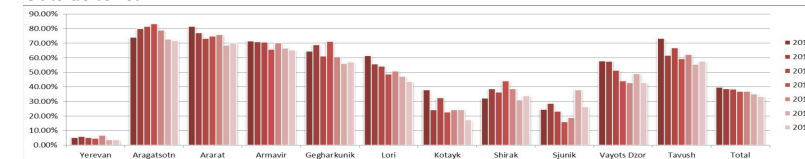
Proportion of population using safely managed sanitation services / Centralized sanitation compound



Proportion of population using safely managed sanitation services / Local sanitation compound /hole with waste products/



Proportion of population using safely managed sanitation services / Outside toilet

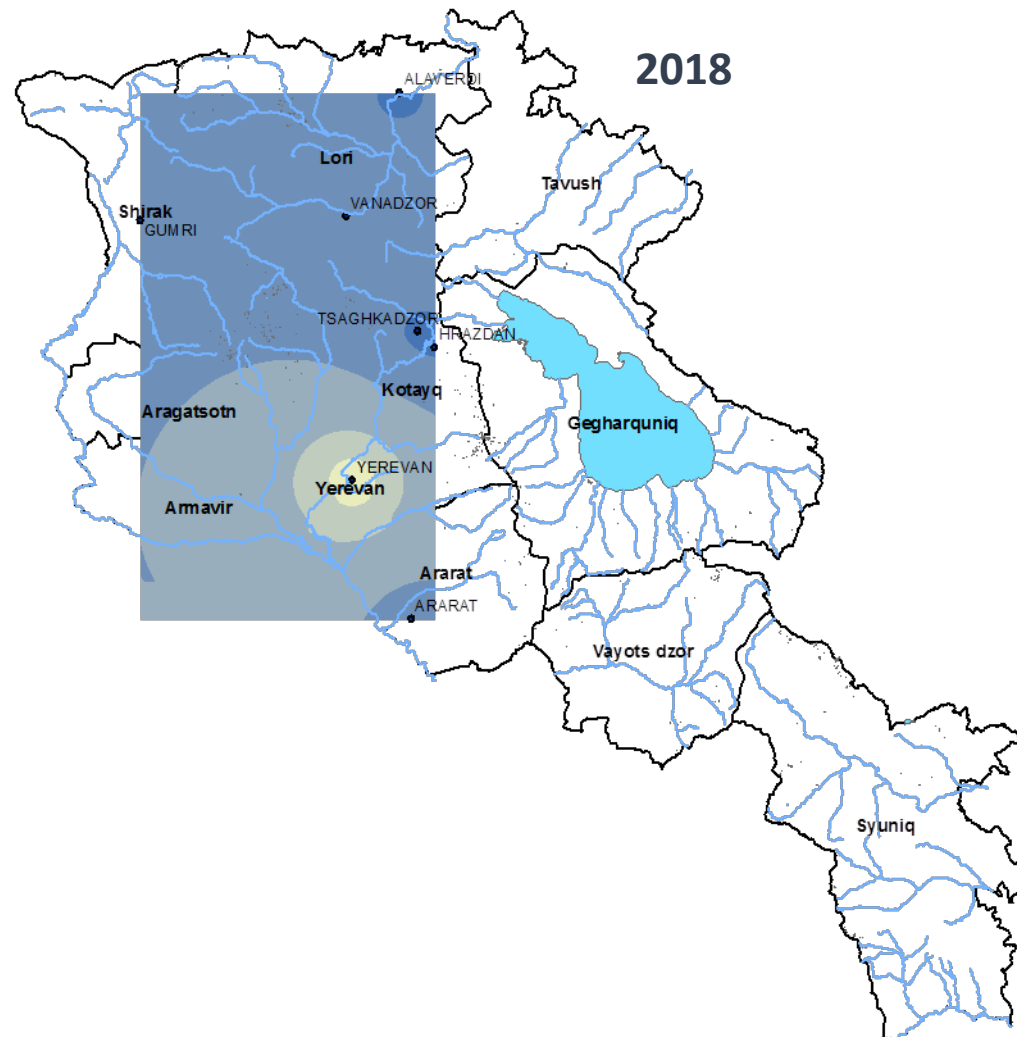


# GIS-CoKriging method for 2013 and 2018

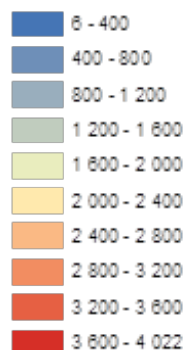
Mortality rate attributed to household and ambient air pollution  
Air Quality (mean value of Dust from monitoring stations of 7 cities)  
Elevation

2013

2018

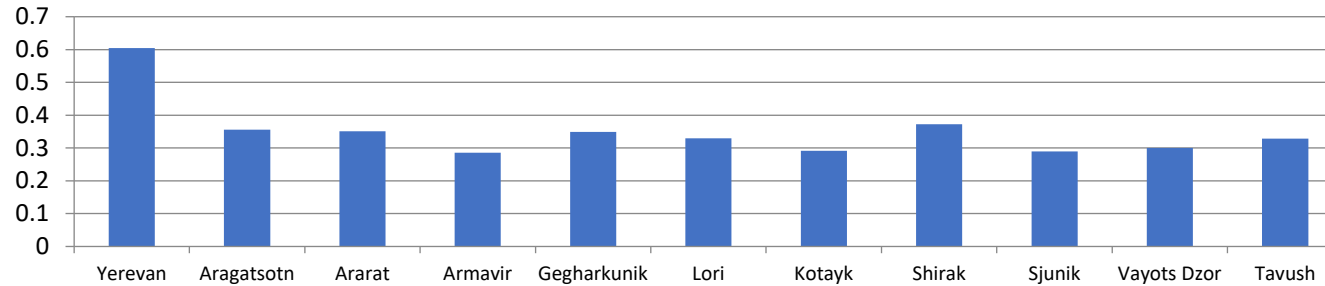


Filled Contours



1. Alaverdi
2. Ararat
3. Gyumri
4. Hrazdan
5. Tcaghkadzor
6. Vanadzor
7. Yerevan

## Factor Analysis - Principal Component Extraction, 2012 (in progress)



N	Indicators
1	Unsafe water
2	Air pollution
3	Unintentional poisoning
4	Emergency situation
5	Social-biological emergency situations
6	Natural disasters
7	Man-caused disasters
8	Safely managed drinking water
9	Safely managed sanitation
10	Proportion of population using safely managed sanitation services /Local sanitation compound /hole with waste products/
11	Proportion of population using safely managed sanitation services /Outside toilet
12	Safely managed garbage evacuation
13	Noise from neighbors and from outside
14	Heavy traffic
15	Industrial pollution
16	Bad water supply
17	Bad garbage evacuation

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Aggregate index/ 2012
<b>Yerevan</b>	0.939994391	0.379344036	0.4790806	0.51524	0.362652	<b>0.604516671</b>
<b>Aragatsotn</b>	0.174692117	0.528340171	0.5424587	0.233933	0.330586	<b>0.355733011</b>
<b>Ararat</b>	0.200810285	0.407609189	0.5568006	0.451554	0.108004	<b>0.350908689</b>
<b>Armavir</b>	0.244890381	0.272458123	0.4625216	0.217052	0.098905	<b>0.285865441</b>
<b>Gegharkunik</b>	0.197073745	0.398539371	0.5847994	0.316381	0.211536	<b>0.349041754</b>
<b>Lori</b>	0.159300467	0.449873385	0.4852121	0.40809	0.192594	<b>0.329905177</b>
<b>Kotayk</b>	0.228190976	0.335249357	0.3699838	0.399904	0.09836	<b>0.291412973</b>
<b>Shirak</b>	0.200599429	0.431967322	0.6109654	0.357258	0.250664	<b>0.372418733</b>
<b>Sjunik</b>	0.14286719	0.303405657	0.4685522	0.277084	0.297567	<b>0.289228581</b>
<b>Vayots Dzor</b>	0.224831039	0.454895717	0.3180886	0.224799	0.332412	<b>0.300681924</b>
<b>Tavush</b>	0.135518357	0.38276691	0.6682042	0.224549	0.147555	<b>0.328489645</b>

**Development at country level to enhance digitalization & digital transformation related to environmental information including through the use of new technologies, big data, artificial intelligence & Earth observation for environmental monitoring.**



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- The data base the surface and groundwaters has been developed with the support of the EUSWI + project.
- Hydrometeorological data collection and redistribution software developed, as well as IMS CLDB integrated climate database. System management software allows to collect data, compile it, create and distribute messages in accordance with WMO standards, as well as manage data and metadata.
- Earth observation capacity development activities and projects are implemented in Armenia (CLC-pilot ENI SEIS II EAST, SEVANMODE2, Copernicus assisted environmental monitoring across the Black Sea Basin – PONTOS and etc).

# Remaining challenges



- Lack of geospatial initiative. At the moment, there is no central geoportal available, hence there is a need to develop a central and standard platform for the dissemination of environmental information with spatial data.
- Collaboration for the development of digitalisation. There is a need to assess common functions in public institutions and to find solutions which are generic, applicable and interoperable between them. In that regards, there is a need for a cross-sectorial approach to digitalisation, which involves the participation from all Ministries.
- Lack of extended legal basis concerning the open data access. The Law on Freedom of Information (adopted in 2003) is the main legal source concerning open data in the country.
- Need for implementation and appropriate use of the top-down and bottom-up approach with clear division of roles and responsibilities among governmental institutions on national and local level.

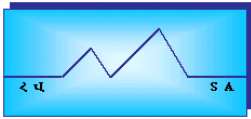
# Remaining challenges



- Weak IT structure of territorial Government entities. Digitalisation of public administrations require trained staff, clear procedures, and technical standards to follow.
- To continue develop and upgrade the monitoring networks to have real-time and accurate data,
- To continue develop and use ecoportal for other indicators,
- Capacity building of the producing indicator based national state environment reports,
- To continue the use of CLC in the different sectors.
- To continue to establishment of SEIS in Armenia.

**Thank you!**





[Nelli Baghdasaryan](#)

Statistical Committee of Republic of Armenia

Council Member (Environment Sphere)  
3 Government House, Republic ave.,  
Yerevan 0010, Republic of Armenia  
Phone: (+374 11) 524 618

E-mail: [info@armstat.am](mailto:info@armstat.am)  
[neli@armstat.am](mailto:neli@armstat.am)

[www.armstat.am](http://www.armstat.am)  
[www.armstatbank.am](http://www.armstatbank.am)

[Gayane Shahnazaryan](#)

Ministry of Environment

Deputy Director  
Hydrometeorology and Monitoring Center SNCO,  
56 Charents Str., Yerevan 0010, Republic of Armenia  
Phone: (+374 10) 576280

E-mail: [gayane\\_shahnazaryan@yahoo.com](mailto:gayane_shahnazaryan@yahoo.com)

[www.armmonitoring.am](http://www.armmonitoring.am)  
[www.env.am](http://www.env.am)