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**ELECTRONIC NETWORKING AND DATABASES**

Note by the secretariat

**SUMMARY**

The present note describes the situation in Eastern Europe, the Caucasus and Central Asia (EECCA) regarding electronic environmental networking, data management and reporting, presents the progress made in the activities launched by the Working Group on Environmental Monitoring and Assessment to strengthen EECCA capacities in these areas, and indicate areas of further work. The Working Group is expected to assess the results achieved and to provide possible guidance.

Introduction

1. Information systems provide the link between monitoring data and environmental reporting and assessment that can be understood and applied by end-users. They cover a wide variety of functions: from transmitting, compiling and storing monitoring data to their analysis and synthesis, their further processing for end users, the development of meta-information (meta-databases) as well as reporting formats and mechanisms to transmit information to end-users.
2. Computer-based technologies, including the Internet, in environmental information systems, can link the various sources and users of information into a network. They are a key area for development in the EECCA countries, and are a focus of attention for the Working Group on Environmental Monitoring and Assessment. The section that follows presents an overview of electronic environmental networking, data management and reporting in EECCA.

Annex I to this note presents examples of country situations in each of the three EECCA subregions.

## **I. Developments in EECCA**

3. Many countries lack advanced computer systems to collect, store, analyse and work with monitoring data. Databases of different national agencies, and those at different levels of government, are rarely connected and often use different formats for data storage. In a few countries, some monitoring data are still provided in writing. In most countries, the exchange of data is difficult, owing to both technical and institutional constraints, hindering reporting and information efforts. Access to databases is at times difficult. Data and information are often in closed archives and sometimes on paper rather than in electronic form.

4. Hydrometeorological services are generally responsible for monitoring such environmental parameters as air and surface water quality, radiation conditions and contamination of land by toxic substances. In many countries data are delivered daily through bulletins circulated among various governmental bodies. In a few countries these bulletins are also provided to the mass media and very rarely are circulated via the Internet. Several countries publish yearbooks with the results of monitoring in specific media (air, surface water, etc). Three countries publish yearbooks covering different media. With few exceptions, these publications are not easily accessible.

5. It is usually the Environment Ministry that collects data on emissions into the atmosphere, discharges into water bodies, waste streams, protected areas and biodiversity. Analytical laboratories and environmental inspectorates collect data on compliance of polluters with environmental standards and norms. When a water committee or agency, a geological service and a forestry committee report to an Environment Ministry, the latter is also responsible for data collection on surface water quantity, the abstraction and pollution of groundwater and the state of forest resources. In any case, the respective committee, agency or service maintains the database of monitoring results. In most countries, access to groundwater data is very difficult. Biodiversity data is scarce and databases are generally inaccessible.

6. Ministries of Health measure air and drinking water quality and soil contamination in cities. In several countries the results are published annually in the State report on sanitary and epidemiological conditions. Only a few countries make these reports available to the public, including via Internet. Ministries of agriculture and institutions of national academies of sciences are involved in data collection and reporting on soil conditions and on biodiversity, respectively. Databases are sketchy and generally inaccessible.

7. In many EECCA countries, it is the publication of the national state-of-the-environment report that serves as a driving force for environmental data coordination and exchange. In several countries, the publication led to the creation of networks of experts responsible in the given country for individual data flows and assessments. Evidence is lacking, however, that periodic state-of-the-environment reporting has led to the creation of centralized electronic databases. Neither has it made databases of participating institutions mutually accessible. Underdeveloped

computer networks and the high costs of Internet connections are frequently the main cause. Additionally, regulations are lacking that would ensure effective data exchange and accessibility.

8. Mandatory statistical reporting is another driving force in EECCA for better data communication, exchange and reporting. Countries have a long history of collecting and publishing environmental statistics. The forms of statistical reporting generally cover: (a) emissions in the atmospheric air from industry, energy and transport; (b) water resources, abstraction and use, and the discharge and treatment of waste water; (c) waste generation, treatment and disposal; (d) forest management, fires and protection; (e) nature protected areas; (f) hunting management; (g) land resources and their quality, use, protection and rehabilitation; (h) application of mineral fertilizers and other agrochemicals; and (i) environmental expenditures. National statistical agencies are treating most of these forms. In some countries, Environment Ministries are collecting and handling statistical data on water, waste and environmental and natural resource payments. Environmental statistics data are frequently published in statistical yearbooks and specialized environmental statistical compendiums. With few exceptions these data are unavailable on the Internet.

9. Thanks to the implementation of multilateral environmental agreements, specific working entities have been established in many EECCA countries (often within or at the Environment Ministries) that collect, calculate, model, store and report data on greenhouse-gas emissions, ozone-destructing substances, transboundary movements of hazardous waste, state of biodiversity including forests, and on land degradation. In several countries, however, environmental reports that are submitted to the international bodies are not easily available either to interested officials or the general public.

10. Currently, national environmental authorities in most EECCA countries have websites. Some of these websites are used actively for the purposes of networking, data exchange and reporting. Most of them, however, provide limited access to a variety of periodical environmental reports, compendiums and bulletins that these countries are actually publishing. Uploading on the official environmental websites of national environmental strategies, policies, programmes, plans and reports on their implementation has not yet become general practice in these countries.

## **II. Strengthening EECCA networks**

11. In 2001, the Working Group on Environmental Monitoring established a Task Force to develop recommendations for practical tools, using modern information technologies, to improve the use and exchange of environmental information within EECCA and to harmonize their approaches with those of European networks. Developing a network of national focal points was the first step: UNECE and EEA provided technical assistance to establish such focal points, including computer hardware and software. As a result, the Environment Ministries or their designated agencies in 12 countries developed an electronic database containing the details of some 150 officials responsible for the main environmental data flows and information systems.

12. The collection of meta-information was a second step. This activity resulted in an electronic catalogue containing more than 1,500 descriptions of environmental data sources in

EECCA, including governmental agencies, reports and databases, and providing electronic links to many of them. Entries vary from 100 to 162 per country, and cover, for instance, some 600 institutions generating environmental data and information in EECCA.

13. EEA software (Win and Web CDS (Catalogue of Data Sources), and a multilingual thesaurus) was used in developing these electronic tools. They can be accessed via the bilingual (English/Russian) web site of the Working Group (<http://unece.unog.ch/enhs/wgema/>).

14. A workshop on electronic databases for environmental reporting was organized in cooperation with the Russian Federal Environmental Information Agency and EEA. It was held on 13 and 14 May 2004 near Moscow. Members of the Working Group from EECCA countries and the environmental technology experts from these countries, as well as representatives of EEA, the United Nations Environment Programme, the Interstate Statistical Committee of the Commonwealth of Independent States (CIS), the International Centre of Scientific and Technical Information, the Russian Regional Environmental Centre, non-governmental organizations and the private sector took part. Documentation is available on the Web, at: [http://www.unece.org/env/europe/monitoring/TandG\\_en.html](http://www.unece.org/env/europe/monitoring/TandG_en.html).

15. EECCA representatives agreed that in updating the electronic data catalogue the emphasis should be on references to national rather than local environmental publications and especially those that were accessible online. They decided to keep the database on networks up to date and to promote communication online among the officials of these networks. They voiced the need for wider use of Internet technologies to improve and better coordinate EECCA reporting according to national and international obligations.

16. The workshop reviewed the current application of telecommunication technologies in EECCA environment ministries, including the availability of personal computers and Intranet systems, access to e-mail and the Internet, and the development of official environmental websites, as means to support and promote environmental reporting. The results of the assessment of the official websites are presented in annex II below.

17. The workshop concluded that the outdated computers and low-speed but high-cost Internet connections were the main difficulties facing EECCA environment ministries. Not all ministries were operating local computer networks. The best prepared were those of Belarus, the Russian Federation and Ukraine, while those of Armenia, Georgia, Tajikistan and Turkmenistan seemed the least well prepared. Most countries were sufficiently equipped technically and had the trained personnel to develop or improve their electronic systems of environmental reporting.

18. The workshop also reviewed the situation in EECCA with the publication of national state-of-the-environment reports and other periodic publications on the environment. The results are summarized in annex III below.

19. The workshop agreed that EECCA countries should develop an EcoReporting electronic system on the Working Group's website. EcoReporting should follow the general approach of the EEA ReportNet system, except that:

- (a) EcoReporting should be bilingual (English/Russian) rather than monolingual (English only);
- (b) It should not cover reporting that is not applicable to EECCA, namely reporting under the European Union's environmental directives, environmental reporting to the Statistical Office of the European Communities (Eurostat) and reporting under the European Environment Agency programmes and projects;
- (c) In addition to reporting from EECCA countries' international environmental obligations, EcoReporting should also cover reporting required by national legislation.

20. The workshop agreed that EcoReporting should cover 15 subject areas, including state and protection of the environment; environmental pollution; atmospheric air; climate change; biodiversity; forests; fisheries; land resources and soils; water; marine environment; waste; environmental health; emergencies; environment statistics; and sustainable development. The national reporting component should include periodic (regular and ad hoc) national environmental publications such as state-of-the-environment reports, environmental compendiums and bulletins, environmental programmes and action programmes, and reviews of their implementation. The international component would cover initially 30 multilateral environmental legal instruments, organizations and programmes.

### **III. Progress with EcoReporting and the work ahead**

21. EcoReporting was launched in early 2005 (<http://unece.unog.ch/enhs/EcoReport/>). By mid-March 2005, the database contained records of 54 national publications and 106 records of country submissions to international bodies. The secretariat made these initial records by browsing the world wide web. National administrators in EECCA are expected to take the ownership of this database onwards and start recording new entries in relevant parts of EcoReporting.

22. The part on national reports consists mainly of state-of-the-environment reports. The majority of other records refer to health and environment reports, biodiversity strategies and action plans, and environmental statistics bulletins. Comparing the records made with the inventory of official periodicals contained in annex III, one would expect that records to be made by national administrators in the near future would relate, primarily, to countries with the biggest number of periodicals, namely Belarus, the Russian Federation, Ukraine and Uzbekistan. Where necessary, additional national administrators may need to be designated to facilitate recording process. This relates, for instance, to the Russian Federation where, in addition to publications of the Ministry of Natural Resources, the Federal Service for Hydrometeorology and Environmental Monitoring is publishing ten yearbooks on environmental issues. Only one of these yearbooks (on radiation conditions) is uploaded on the Internet in the country.

23. The international part of EcoReporting presents cross-links to EECCA reports to the governing bodies of the conventions on climate change, biodiversity, desertification, and hazardous wastes, as well as to the United Nations Commission on Sustainable Development. In addition, the secretariat is currently establishing cross-links to UNECE databases on air

pollution, public participation and on forestry, as well as to FAO national forestry reports and the United Nations Development Programme national reports on the Millennium Development Goals. The latter will be recorded in the sustainable development section. The efforts of national administrators themselves will have to focus initially on country reports submitted to the governing bodies of the conventions on the ozone layer and the marine environment, and to country replies to the 2004 questionnaire on environment statistics of the United Nations Statistics Division and the United Nations Environment Programme.

24. In the future, EcoReporting might include online reporting on an agreed set of environmental indicators from the EECCA core set of indicators. Some 50 indicators could constitute a starting point for such online reporting. These would include indicators that are considered by EECCA countries to be of both national and international priority, that are easily understood by the public, that are supported by international guidelines and for which there exist data time series. The use in the *Kiev Assessment*, the inclusion in the United Nations Commission on Sustainable Development list of sustainable development indicators and in the EEA core set of indicators would be supplementary criteria for selecting the indicators. There is a practical experience in EECCA in online indicator reporting which could be taken into account should the Working Group take the decision to start developing a third (indicator) pillar of EcoReporting.

Annex I**EXAMPLES OF COUNTRY SITUATIONS WITH ENVIRONMENTAL NETWORKING,  
DATA MANAGEMENT AND REPORTING IN EECCA SUBREGIONS****Azerbaijan**

1. There is no centralized or local electronic network for transmission of monitoring data in the country. Owing to an overall lack of methodological coordination, the results obtained from monitoring networks operated by the National Department of Environmental Monitoring within the Ministry of Ecology and Natural Resources, regional environmental committees, the National Hydrometeorological Department and the Sanitary Epidemiological Inspectorate of the Ministry of Health are frequently incomparable and not complementary. There are practically no data exchange between these institutions.
2. The Ministry of Ecology and Natural Resources publishes five regular bulletins with monitoring results. Four bulletins, on hydrometeorological conditions, the state of the environment, Caspian Sea pollution and seismic and geodynamic conditions, are published daily. A further bulletin that is published monthly provides information, in particular, on hydrometeorological conditions, the results of pollution monitoring in the Caspian Sea and the activities of the Ministry. From time to time, the Ministry publishes some media- and topic-specific bulletins. Apart from the environmental statistical yearbook, there is no comprehensive environmental publication published in Azerbaijan on a regular basis, however.
3. The Ministry of Ecology and Natural Resources set up the State information and archive database on environmental protection and the use of natural resources. It stores data and information on the environment, hydrometeorology, forestry and geology. Environmental information covers, mainly, air pollution, the state of surface and groundwater resources, the Caspian Sea, land degradation, the state of nature reserves and biodiversity, environmental damage caused by economic activities, and charges and fines paid by polluters. The hydrometeorological and geological databases together with the environmental monitoring bulletins and monthly and annual reports of the main departments and services of the Ministry provide the basis for the database. Regional environmental committees, the State Committee of Amelioration and Water Management and the State Oil Company also contribute their reports.
4. The Environmental Electronic Information Centre, an institutional part of the database management, develops the web site of the Ministry of Ecology and Natural Resources. Its information is primarily in the national language but the English version of the site is slowly expanding. It is updated regularly and the state-of-the-environment bulletin is posted daily.

**Belarus**

5. The Scientific and Research Centre for Ecology of the Ministry of Natural Resources and Environmental Protection processes, stores and publishes monitoring data and information

transmitted by monitoring and information institutions within the National System of Environmental Monitoring (NSEM). NSEM data and information are published:

- Quarterly: In a newsletter on Exceedences of Limits for Pollutant Emissions/Discharges into the Environment by Enterprises;
- Annually: In the review National System of Environmental Monitoring: Observation Results, Yearbook of the Quality of Surface Waters, Yearbook of the Quality of Surface Waters by Hydrobiological Parameters, Yearbook of the State of the Pollution of the Atmospheric Air in the Cities and Industrial Centres; State Land Cadastre;
- Every five years: In the review Land of Belarus.

Since 2004 NSEM results are available via the Internet (<http://ecoinfoby.net/>).

6. The Ministry of Natural Resources and Environmental Protection together with the National Academy of Sciences publishes a national report on the state of the environment every four years. The Ministry's publications include also a bulletin on environmental conditions in Belarus, a reference and statistical publication on the state and protection of the environment and a bulletin on natural resources. Many reference and statistical materials are available on the President's (<http://www.president.gov.by/Minpriroda/rus/publ/nd2000/index.htm>) and the Ministry's (<http://www.minpriroda.by>) web sites.

7. The Ministry of Health publishes annually: the State report On Sanitary and Epidemiological Conditions; the collection of works on Main Indicators of Public Health, Activities of the Sanitary and Epidemiological Service and of the State of the Environment; and as part of the Water Cadastre. The data are also on the web site [www.rcheph.by](http://www.rcheph.by). The Ministry of Statistics and Analysis publishes an annual statistical bulletin on the environment. These publications are circulated among public authorities and libraries.

8. In accordance with the legislation on natural resource cadastres, governmental bodies are responsible for collecting information on the state and the use of land, minerals, peat, waters, air, climate, forests, plants, animals and waste. Monitoring data from the NSEM activities constitute the core of these cadastres. The cadastres represent decentralized databases managed by organizations reporting to governmental agencies. For data collected outside NSEM, there is no protocol for data exchange. Data are collected in different forms (on paper and electronically) with different periodicity and accessibility to users including the general public.

9. A server has recently been installed in the Ministry of Natural Resources and Environmental Protection to establish a computer network and to provide the staff with access to legal and other databases, Internet and e-mail. There is a single e-mail address for most of the Ministry's staff. All subordinated national, oblast and local organizations (including 121 local inspectors) have access to e-mail.



## Tajikistan

10. Practically all environmental observation materials in the country are processed manually, and only a small portion electronically, leading to a long delay in the publication of meteorological and hydrological yearbooks. The latest hydrological yearbook was issued in 1991. Regional environmental committees have no computerized environmental database. Data are entered by hand on standard forms. Consequently, it takes several weeks for data and information to reach the State Committee for Environmental Protection and Forestry, excluding processing time.

11. There are few connections to Internet and e-mail at the State Committee for Environmental Protection and Forestry. The cost of Internet services in Tajikistan is high and the quality of phone lines and service providers is such that connection is difficult, interruptions are frequent and transmission rates are often below 100 bytes per second during business hours. The cost of mobile phone services is also high. All these difficulties hamper data communication and processing by the monitoring and information entities of the State Committee.

12. There is no unified or coordinated environmental database in the country. Few organizations conducting environmental monitoring share data and information or publish their observation results. At times, information can be obtained only through personal contacts. Sometimes it is necessary to pay for such information or have a letter from the relevant ministry explaining why the information is required. The fee requested by certain agencies exceeds the actual cost of production, and is often set so high that neither private individuals nor organizations can afford it.

13. By statute, the State Committee for Environmental Protection and Forestry, together with other governmental bodies, should create a State information system with data on the state of the environment and the use of natural resources as well as information systems on individual natural resources. No steps seem to have been taken so far to implement this.

14. The Hydrometeorology Service produces daily (on working days) a bulletin with hydrometeorological and air pollution data. Reports on the state of the environment have not been published since 2000. The State Committee for Statistics published an environmental statistics compendium in 2002 and 2004.

### Sources:

- *Environmental Performance Review – Azerbaijan*, United Nations, New York and Geneva, 2004;
- *Environmental Performance Review – Belarus*, United Nations, New York and Geneva, Forthcoming;
- *Environmental Performance Review – Tajikistan*, United Nations, New York and Geneva, Forthcoming.

## Annex II

### REVIEW OF OFFICIAL ENVIRONMENTAL WEB SITES IN EECCA

Country	Web site	Language			Access to national environmental reports	References to international obligations
		National	Russian	English		
Azerbaijan	<a href="http://www.eco.gov.az/">http://www.eco.gov.az/</a>	+		+		
Armenia	<a href="http://www.mnpiac.am/">http://www.mnpiac.am/</a>	+	+	+	+	+
Belarus	<a href="http://www.president.gov.by/Minpriroda">http://www.president.gov.by/Minpriroda</a> <a href="http://minpriroda.by/">http://minpriroda.by/</a>		+	+	+	+
Georgia	<a href="http://www.parliament.ge/SOEGEO/english/institut/moe/moe.htm">http://www.parliament.ge/SOEGEO/english/institut/moe/moe.htm</a> <sup>1</sup>	+		+	+	
Kazakhstan	<a href="http://www.nature.kz">http://www.nature.kz</a>		+		+	+
Kyrgyzstan	<a href="http://www.ecomon.kg/">http://www.ecomon.kg/</a>		+		+	+
Republic of Moldova	<a href="http://www.moldova.md/">http://www.moldova.md/</a>	+	+			+
Russian Federation	<a href="http://www.mnr.gov.ru/">http://www.mnr.gov.ru/</a>	+	+		+	+ <sup>2</sup>
Tajikistan	<a href="http://www.mop.tojikiston.com/">http://www.mop.tojikiston.com/</a> <sup>3</sup>		+			
Turkmenistan	No					
Uzbekistan	<a href="http://www.uznature.uz">http://www.uznature.uz</a>	+	+	+	+	
Ukraine	<a href="http://www.menr.gov.ua">http://www.menr.gov.ua</a>	+		+	+ <sup>4</sup>	+

<sup>1</sup> has not been updated since 1996.

<sup>2</sup> on the old version of the site [http://www.mnr.gov.ru/old\\_site/](http://www.mnr.gov.ru/old_site/).

<sup>3</sup> has not been updated since 2001.

<sup>4</sup> has not been updated since 2002.

### Annex III

#### OFFICIAL PERIODICALS (STATE OR NATIONAL REPORTS, COMPENDIUMS AND BULLETINS) ON THE ENVIRONMENT IN EECCA

	Armenia	Azerbaijan	Belarus	Georgia	Kazakhstan	Kyrgyzstan	Republic of Moldova	Russian Federation	Tajikistan	Turkmenistan	Ukraine	Uzbekistan
State and protection of the Environment <sup>1/</sup>	Ad hoc <sup>2/</sup>		Every 4 years <sup>3/</sup>	Annually	Ad hoc <sup>4/</sup>	Ad hoc	Annually	Annually	Ad hoc <sup>5/</sup>	Ad hoc <sup>6/</sup>	Every 2 years	Every 2 years
Environmental Pollution			Every 4 years					Annually <sup>7/</sup>				Annually
Atmospheric air	Monthly		Annually <sup>8/</sup>					Annually <sup>8/</sup>		Every 2 years		Annually
Biodiversity	Ad hoc <sup>9/</sup>	Ad hoc			Ad hoc <sup>10/</sup>			Ad hoc	Ad hoc <sup>11/</sup>	Ad hoc <sup>12/</sup>	Ad hoc <sup>13/</sup>	Every 2 years
Forests			Annually <sup>14/</sup>					Annually		Annually		
Fisheries			-					Ad hoc		-		
Land resources and soils			Annually <sup>15/</sup>					Ad hoc <sup>16/</sup>		Annually		Annually <sup>17/</sup>
Water	Monthly		Annually		Ad hoc			Annually <sup>18/</sup>		Annually	Annually	Annually
Environmental Health <sup>19/</sup>			Annually			Monthly	Annually	Every 2 years		Annually	Annually	Annually
Emergencies			Annually <sup>20/</sup>				Annually	Ad hoc <sup>21/</sup>		Annually		Ad hoc
Environment statistics	Annually	Annually	Annually		Ad hoc	Annually	Annually	Annually	Annually	Annually <sup>22/</sup>	Annually	Annually
Other			Annually <sup>23/</sup>					Ad hoc <sup>24/</sup>				

1/ In some countries such reports include all or many of the subjects listed below as well as climate change, waste and sustainable development for which no independent periodicals are published.

2/ In 1994 and 2003.

3/ In addition, *State of the natural environment: Environmental bulletin* is published annually.

4/ The last one was published in 2000. The next one will be published in 2004.

5/ The last one was published in 1999.

6/ Published once in 1999.

7/ In addition, the results of monitoring of pesticides in natural objects are published annually.

8/ Pollution of atmospheric air in cities and industrial centres. In addition, in the Russian Federation, a Yearbook of Emissions of Polluting Substances in Cities and Regions is published annually.

9/ Published once in 1999.

10/ Published once in 2002.

11/ Published once in 2003.

12/ Published once in 2002. Information on nature reserves is published annually.

13/ Issued twice as a separate publication.

14/ State Forestry Cadastre.

15/ State Land Cadastre.

16/ Published once in 2002. In addition, a report on soil pollution by toxic substances of industrial origin is published annually.

17/ Soil pollution.

18/ State report on the state and use of water resources. In addition, reports are published annually on: (a) the state of surface water ecosystems according to hydrobiological indicators; (b) quality of surface waters according to hydrochemical indicators; (c) quality of marine waters according to hydrochemical indicators; and (d) state of marine environment of seas and selected areas of the World ocean.

19/ Report on the health and epidemiological situation.

20/ National report on the *Consequences of the Chernobyl Disaster*.

21/ Published once in 2000. A report on the state of radiation on the territory of the Russian Federation and adjacent States is published annually.

22/ As part of the *Statistical Yearbook*.

23/ *National environmental monitoring system: Monitoring results*.

24/ A State report on the state and use of mineral resources was published in 2002.