INFORMATION SYSTEMS: USING COMPUTER-BASED TECHNOLOGIES

STRENGTHENING NETWORKS IN EECCA COUNTRIES[1]

Information systems provide the link between monitoring data and environmental reporting and assessment that can be understood and applied by end-users (the section on assessments and indicators in this CD-ROM describes means and approaches for reporting and assessment). Information systems 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.

This section focuses on the use of computer-based technologies, including the Internet, in environmental information systems. These technologies can link the various sources and users of information into a network. Computer-based technologies are a key area for development in the countries of Eastern Europe, the Caucasus and Central Asia, and are a focus of attention for the UNECE Working Group on Monitoring and Assessment.

Databases and information exchange in EECCA countries

Many EECCA countries lack advanced computer systems to collect, store, analyse and work with monitoring data. Moreover, databases at different national agencies, and those at different levels of government, are rarely connected and often use different formats for data storage. In a few

[1] This section is adapted from the UN Publication *Environmental Monitoring and Reporting: Eastern Europe, the Caucasus and Central Asia*, New York and Geneva, 2003 (Sales No. E.03.II.E.33).

countries, some monitoring data are still provided in writing. Overall, the exchange of data is often difficult, owing to both technical and institutional constraints, hindering reporting and information efforts.

Central Asian countries, for example, lack unified databases for environmental information: databases are scattered among different ministries and organizations, including international ones. Moreover, many government ministries and departments are involved: they do not always share the statistics they produce, nor do they make them easily available to the public. In Kyrgyzstan, the Hydrometeorological Institute monitors air quality – however, its monitoring results are not regularly transmitted to the Ministry of Emergency Situations and Environmental Protection. Access to databases in Central Asia is at times difficult. In Uzbekistan, data and information are often in closed archives and sometimes on paper rather than in electronic form. Moreover, databases often contain contradictory data (RECCA, 2002).

Across EECCA, countries are planning and introducing new information technologies for creating digital environmental databases, inventories of natural resources and ecosystem maps. Box 1 describes the national goals in Belarus. In Georgia, the Ministry of Environment intends to build a system for the collection, compilation, processing and storage of data on environmental pollution, and a suitable geographic information system. In Ukraine, an important objective for the State Environmental Monitoring System is the use of Internet technology to submit and process data, and also to provide wide public access.

Box 1. Belarus: unifying databases and analysis centres

In Belarus, establishing a unified information system is a key goal for the national environmental monitoring system, as various government bodies hold databases related to the environment, without an overall system of organization. Developing common standards for data storage and analysis, including the development of common indicators, is an important related goal. Moreover, computer technology needs to be installed or upgraded. The Government intends to build a unified information network step by step. To begin with, analysis centres for different monitoring areas should be integrated into the Main Information Analysis Centre. In addition, dedicated operating software is needed for the overall network.

Source: Belarus, 2002a.

Currently, national environmental authorities in eight EECCA countries have web sites. In only five countries, however, are these managed directly by environment ministries or committees. Few of these web sites are updated frequently. In addition, other government agencies as well as NGOs maintain web sites, including electronic libraries of environmental information (on notable site is maintained by the Russian Federation's National Information Agency on Natural Resources, www.priroad.ru). No countries, however, have uniform information systems that allow users (including the general public) to find information quickly. (Web sites are reviewed in Annex I of the Guidelines for the Development of Environmental Networks and Information Systems in Eastern Europe, the Caucasus and Central Asia, found in this CD).

Strengthening EECCA networks

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.

In its work, the Task Force has focused on harmonizing EECCA information networks with EIONET, the EEA information network (see box 2). For example, in early work the Task Force supported the development of a prototype web site for presenting environmental information using EIONET formats. This prototype covers information on air quality in EECCA countries, and was tested using data from the Russian Federation (from the report on "The State of atmospheric air contamination in the cities of the Russian Federation in 2000") and Kyrgyzstan (from the national state-of-the-environment report for 2000). In addition, a prototype meta-database, using EIONET software, was developed.

Box 2. EIONET

EIONET is a collaborative network of the European Environment Agency and its 31 member countries (the 15 current EU members, the 10 accession countries, Iceland, Switzerland, Turkey and other European countries). EIONET is both a network of organizations and the electronic network (e-EIONET) linking these together.

The network of organizations is comprised of four main types of institutions:

- National focal points, the offices responsible for national coordination of activities related to the EEA work programme;
- Main component elements, key institutions of national networks that regularly collect and supply environmental data;
- National reference centres, nominated to cooperate with EEA on specific topics; and
- European topic centres, consortiums (each with one leading institution) that undertake specific tasks in the EEA work programme (topics include air quality, air emissions, soil, inland waters, marine and coast, nature, waste, and the cataloguing of data sources).

These institutions jointly provide the information used for reporting to support EU and European environmental policies.

The EIONET electronic network is organized in concentric layers, including the EEA Intranet, an "extranet" connecting the main institutions, and public Internet sites providing data and reports. The network has developed and uses a variety of software for communication (for example, supporting various interest groups), project cooperation, common database and document management, and web-based reporting. The electronic network establishes a common European approach to collecting data and information on the state of the environment. The work programmes of its topic centres will help harmonize data collection approaches.

Among the applications in development, EIONET will provide EEA member countries a single gateway – called Reportnet – for reporting to different MEA secretariats, international organizations and other forums. For EU members, Reportnet will assist with reporting requirements under environmental legislation. EIONET is also seeking to connect to databases on economic sectors, to provide information, including indicators, to support policy integration, a key EU goal.

Sources: EEA and EIONET (http://www.eea.eu.int and http://eionet.eu.int).

Task Force work launched in 2003 focuses on strengthening EECCA environmental information networks and harmonizing these with EEA and EIONET software. Key elements include:

- Establishing national focal points to collect meta-data;
- Developing electronic Catalogues of Data Sources, providing national meta-information;
- Creating coordinated structures for information transfer within countries;
- Processing and storing priority data, such as data sets used for the Kiev report (waste, water, soil);
- Posting information on national data sources on the Internet, on national sites and on the UNECE server;

Developing a network of national focal points is the first goal: UNECE and EEA are providing technical assistance to establish such focal points, including computer hardware and software.

The development of meta-information is a key step: electronic databases that identify key data sources, including national and sub-national agencies, as well as enterprises, NGOs and scientific literature. Moreover, a contacts network – the officials who supply data to the focal point – must be defined: this is key initial information for the Catalogue of Data Sources. In most EECCA countries, this work will help strengthen existing national environmental information networks, in particular those that provide information for national SoE reporting. In a few countries, however, the information networks must be developed; in some EECCA countries, legislation and regulations facilitating exchange of information need to be strengthened.

The figure below provides a schematic view of data flows in national networks. Initial data flows will focus on priority environmental themes, such as areas for which EECCA provided data for the Kiev Report.

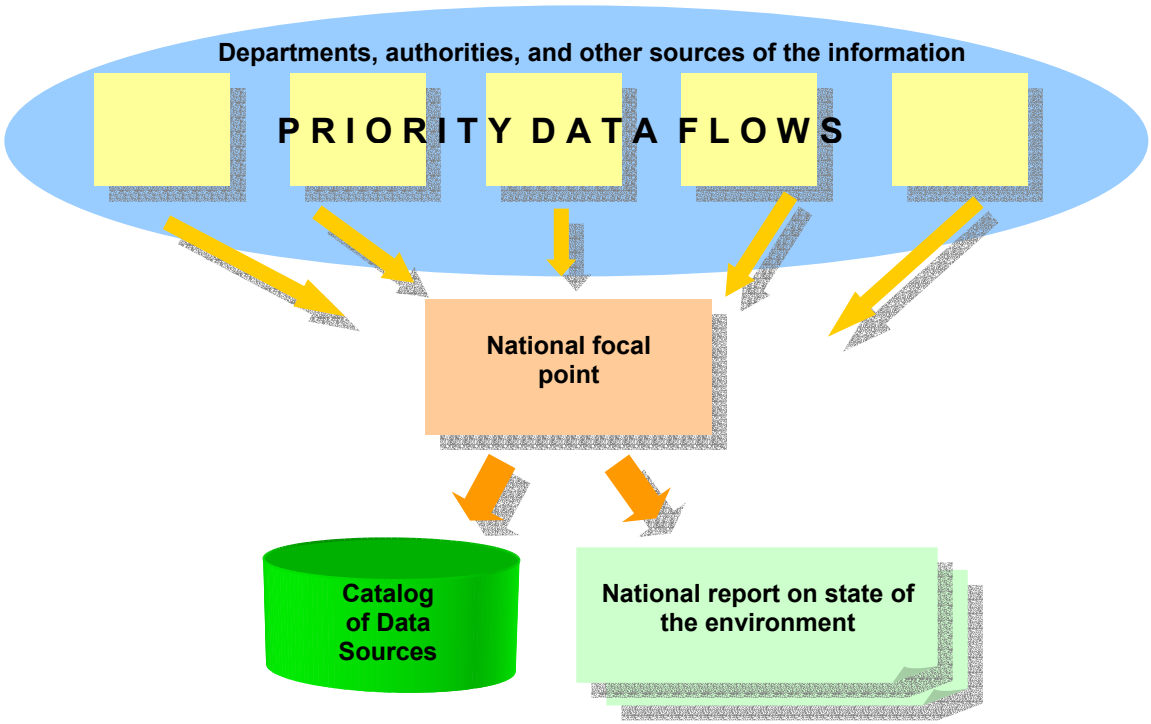

Figure. Data flows in national networks

Future areas of work for strengthening information networks could include the development of national topic centres (mirroring those in EEA countries) as well as national portals through which users can obtain data and meta-information. Overall, significant efforts will be needed to develop and strengthen EECCA electronic networks for environmental information. New equipment and software, as well as major changes in the management and communication of data, will be needed. Concerted approaches and facilities will have to be developed across EECCA for receiving, preparing and disseminating environmental information on the basis of the EIONET approaches and technology. Moreover, government authorities will need to build capacity in using electronic facilities. In addition, further technical assistance may be needed to further integrate EECCA environmental monitoring information systems into EIONET.