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## Working Group on Environmental Information and Outlooks

# ENVIRONMENTAL INFORMATION SYSTEMS IN BULGARIA

# AN OECD ASSESSMENT

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## INTRODUCTION

This report reviews the environmental information system of Bulgaria within the context of Bulgaria's transition to a market economy and its integration into European and other international environmental processes. It makes specific recommendations on priority areas where current achievements should be further consolidated and where further progress is needed.

The assessment is based on an OECD review mission* to Bulgaria in April 2001. It benefited from the financial assistance of Greece and has been carried out under the auspices of the OECD Environment Policy Committee's Working Group on Environmental Information and Outlooks (WGEIO).

The report has been prepared by the OECD Environment Directorate in co-operation with the OECD Development Co-operation Directorate (DCD) and the OECD Centre for Co-operation with Non-Members. The Working Group on Environmental Information and Outlooks reviewed the report at its meeting** on 17-19 October 2001 and approved its conclusions and recommendations.

The outcome of this OECD assessment also serves as a basis for an international seminar on "Environmental Information Systems in South East Europe and Black Sea Countries" organised by Greece (Athens, December 2001) with the participation of representatives from competent Greek authorities, representatives from Bulgaria, OECD representatives (from the Environment Directorate and the Development Co-operation Directorate) as well as of representatives from other Balkan and Black Sea countries. This seminar will provide an opportunity for exchange of experience with environmental information systems with other non member countries.

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**. *Special Session on Environmental Information Systems in Bulgaria (Paris, 18 October 2001) chaired by Ms. Maria Peppa, Vice-president of the Working Group on Environmental Information and Outlooks.*

***. *As part of the Ministry's Bilateral Programme of Development Assistance and Co-operation for the year 2000.*

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# CONCLUSIONS AND RECOMMENDATIONS

This report reviews Bulgaria's environmental information systems within the context of the transition to a market economy. As Bulgaria has been increasingly integrated into European and other international environmental processes, the demand for such information has accelerated. Today the country faces multiple demands for environmental information.

Bulgaria has a solid core of systems for gathering environmental information, especially concerning ambient quality monitoring and statistical data collection. These systems are reinforced by the high level of technical skills available in relevant ministries and agencies. A regular state of the environment report is prepared by the Ministry of Environment and Water (MOEW) and its Executive Environmental Agency (ExEA); a regular publication with environmental statistics is also issued by the National Statistical Institute (NSI). Replies to the joint OECD/Eurostat Questionnaires on the State of the Environment and on Pollution Abatement and Control Expenditure indicate that data are available for a number of environmental parameters.

Over the past few years, Bulgaria has made significant progress in the area of environmental information and related institutional arrangements. It is committed to environmental transparency and democracy, and to playing its full role in the international community. Positive developments include greater horizontal co-operation among administrations involved in the production, treatment and dissemination of environmental information, greater involvement of civil society in environmental decision making, and reduced inefficiencies in the way environmental information systems, particularly environmental monitoring systems, are set up.

These achievements provide a good basis for further strengthening environmental information systems i) to better monitor progress, ii) to assist in policy development, implementation and assessment at both national and local level, iii) to help integrate environmental concerns into sectoral policies, and iv) to better inform the public about environmental issues, related measures taken by authorities, and results obtained. An initial challenge is to provide the right information for the right purposes and to ensure continuity in core activities. Another challenge is to harmonise Bulgaria's environmental information system with the requirements of the EU Directive on reporting, and the requirements of the European Environmental Agency, in the context of preparation for accession to the EU.

This report identifies several interrelated priority areas in which current achievements should be further consolidated and where further progress is needed:

- Further moving from data to information relevant to decision making and performance evaluation. This includes developing sets of environmental and sustainable development indicators, and economic information, for environmental policies and improving data quality and the monitoring of environmental conditions and policy results;
- developing access to environmental information, particularly to information held by non-environmental administrations and sub-national authorities;
- increasing the visibility and recognition of Bulgaria's contributions to international co-operation.

The success of these developments will depend on the cost-effectiveness of the information systems in place, and on integrating and using information from various sources. It will require:

- promoting an integrated hierarchy of environmental information systems to support priority setting and resources allocation;
- strengthening both horizontal and vertical co-operation among administrations, and promoting partnerships with non-governmental stakeholders.

## 1. Further moving from data to information relevant to decision making and performance evaluation

### *Achievements*

Over the past ten years, Bulgaria has faced significant changes in the demand for environmental information for both national and international purposes. Since 1998, it has adopted a National Programme for the Environment and five sectoral national strategies, which are being implemented. A Framework Environmental Law covering the entire environmental sector has been adopted. Bulgaria has been actively preparing for the EU accession process.

The Ministry of Environment and Water (MOEW) is striving to build environmental policies on a solid and strengthened information base. Environmental monitoring is well established and quite well developed, and data are available for a number of environmental parameters. Over the past few years, Bulgaria has made considerable progress in producing better environmental data and adapting its statistical system to EU and other international requirements.

Environmental information is regularly used for state of the environment reporting and to communicate with the public. Information tools are also regularly used in environmental impact assessments, monitoring of compliance with environmental regulations, and developing environmental legislation and strategies. Environmental policy objectives and related compliance information play an important role in the industrial privatisation process, in which environmental impact assessments are undertaken together with the analysis of past damage and environmental audits.

### *Progress to be made*

There is difficulty using the large amount of primary data collected to evaluate the results of environmental policies (i.e. to explain connections between environmental change and human actions, or to link data from various sources) and to support integration of environmental concerns into sectoral policies and measures. Almost no work has been done on environmental indicators and on tracking environmental performance. Moreover, not enough information is easily understandable or usable by citizens.

In a few areas information remains weak. There is only partial economic information concerning the environment (e.g. expenditure, prices, taxes). Little work has been done with respect to information on sustainable development and on environmental implications of sectoral policy decisions. These information gaps are of particular importance at the local level, but are also important for Bulgaria's economy, for investors and for the development of environmental policies consistent with EU requirements.

Current efforts to strengthen the environmental information base, and to produce environmental information that is more responsive to policy and public information needs, should be encouraged. In particular, efforts should be made to develop better information and reporting tools to:

- monitor implementation of environmental legislation and policies;
- assess the economic implications of environmental policies;
- assess the environmental implications of economic and sectoral policies (e.g. for energy, land use planning, transport and tourism).

More needs to be done to better use existing data. There is a general need for better interpretation and analysis of the data, for developing environmental indicators and for moving towards performance oriented reporting. More could also be done to fill remaining data gaps and improve the quality of primary data in areas such as economic information, waste management, waste water treatment and biodiversity, to adopt "horizontal" and "integrated" approaches to environmental information, and to institute effective quality assurance at all stages of the information chain.

***Recommendations***

*Filling information gaps*

- improve the availability and quality of economic information used to make environmental decisions (e.g. environmental expenditure and financing, cost-benefit analysis, pricing of water and waste services, environmentally-related taxes);
- improve the availability and quality of data on:
  - waste generation and management (including waste recovery and waste prevention);
  - biodiversity (e.g. monitoring of biodiversity and integration of biodiversity information, which is currently scattered among several administrations, to support implementation of the five-year National Biodiversity Conservation Plan and related international commitments, including commitments associated with EU accession);
  - water (e.g. expanding the scope of water monitoring and applying the ecosystem approach to monitoring, with information on qualitative and ecological parameters, to support implementation of the Water Act that provides for integrated river basin management).

*Interpretation and analysis*

- improve information quality without excessive cost, giving priority to the development of sets of environmental indicators (using international experience and the experience of other individual countries), particularly indicators for measuring environmental performance progress with respect to national objectives and international commitments;
- further develop the annual Green Book in order to move towards performance evaluation.

*Quality assurance*

- reinforce quality assurance throughout the whole environmental information production chain focusing on the assessment and reporting stages;
- continue the process of national and European accreditation of laboratories carrying out analysis of monitoring samples, and ensure appropriate maintenance and upgrading of technical equipment.

## 2. Developing access to environmental information

### *Achievements*

Up to 1993, there was little dissemination of or access to environmental information in Bulgaria and very limited public participation. Today the Ministry of Environment and Water (MOEW) is strongly committed to environmental democracy and transparency and related practices (i.e. provision of environmental information, access to environmental information, public participation). An initial reluctance to allow free access to environmental information has been overcome. Under Bulgarian law, environmental information should be freely available to the public and the right to environmental information is formally recognised as enforceable in the courts. This is reinforced by Bulgaria's commitment to the Aarhus Convention and to the EU accession process. The number of active environmental NGOs has been increasing, along with their involvement in environmental decision making (e.g. the EIA process) and the development of environmental legislation and strategies.

The MOEW is pursuing an active information policy to stimulate public awareness of environmental issues using various media. Environmental data and state of the environment reports are published regularly. The most important is the Green Book, an annual state of the environment report published in Bulgarian and English. The Green Book is prepared by the MOEW in co-operation with other governmental institutions, approved by the Council of Ministers and adopted by the National Assembly. A public environmental information centre managed by the MOEW has operated effectively for several years.

Among the main national administrations dealing with environmental information, information flows and access to information are well organised and have benefited from recent restructuring of the environmental administration.

### *Progress to be made*

While access to environmental information is well organised at national level, it is uneven at regional level and weak at municipal level. A number of the smaller municipalities do not have the necessary equipment to transmit information electronically or to access information held by the Regional Environment and Water Inspectorates (REWIs) or by the MOEW and its Executive Environment Agency (ExEA). Environmental information held by non-environmental administrations is still dispersed, and information about the information being produced is not systematically exchanged.

Practical difficulties in providing and obtaining information include the lack of a general overview of existing data sources, absence of user-friendly information systems (e.g. with a portal giving access to environmental information), and the limited amount of information available on internet. Consequently, there is a general lack of knowledge about what information is available and how to obtain it.

While the need to respect confidentiality for commercial and state purposes does not now appear to be a problem, the legal provisions for confidentiality require further specification if future claims in administrative courts are to be avoided. The legal provisions concerning environmental information included in Chapter 2 of the EPAct are not specific enough, and this could lead to confusion in their interpretation. Ratification of the Aarhus Convention and transposition into national law of the revised EU Directive will be important steps towards clarifying legal provisions and avoiding court cases in the future.

There is also a need to continue to better inform the general public and the private sector, so as to ensure that all stakeholders can fully play their roles. This is particularly important at the local level, where citizens often do not understand the relationships between environmental charges, human actions and the services provided by local authorities. Sources of information (e.g. water bills) and dissemination tools should be better adapted to different information users.

***Recommendations***

*Legal framework*

- fully implement the law on access to public information and the provisions of the current EPAct;
- clarify the legal framework, particularly provisions concerning confidential environmental information and access to justice;
- ensure timely transposition of the revised EU Directive into national law, as well as ratification of the Aarhus Convention.

*Access to environmental information by the public*

- better inform the public about its information rights and ensure easier and better co-ordinated access to all environmental data held by public authorities. In particular,
  - compile a guide for use by the public, outlining ways to obtain environmental information;
  - make greater use of internet and of computerised information by increasing the amount of information made available there and by creating a user-friendly portal;
  - make greater use of Public Information Centres (PICs) by increasing the user friendliness and accessibility of existing centres operated by the MOEW and the ExEA and by promoting the creation of small local PICs in the six largest REWIs.

*Access to environmental information among governmental institutions*

- further improve exchanges of environmental information within and among public authorities, including non-environmental administrations. In particular,
  - compile a catalogue of data sources and a who's who in the area of environmental information;
  - establish agreements between the MOEW and other sectoral ministries and non-environmental institutions including technical specifications to promote and structure the circulation of information and to facilitate access;
  - progressively make greater use of computer networks and intranet to facilitate information flows within and between institutions and to promote the use of common databases and software at all levels of government including municipalities; set-up a governmental intranet portal.

*Dissemination of information to the public*

- develop a dissemination strategy based on a multi-media approach and targeted at a wide audience, extending the experience gained in publishing state of the environment reports to a range of products and media (e.g. not only reports on paper, but also CD-ROMs, videos, radio/television, internet);
- in the short term, focus on compact, easy-to-read products addressed to a wide audience, statistical booklets presenting key environmental data, indicators reports and thematic leaflets or brochures produced at regular intervals;
- make greater use of internet to keep interested citizens and NGOs informed about events and publications and establish, for example, virtual networks with regular e-mail bulletins;
- provide environmental information relevant to citizens in their local context (e.g. information on water and waste services and related prices and charges, PRTRs and environmental health, regional Green Books).

## 3. Increasing the visibility and recognition of Bulgaria's contributions to international co-operation

### *Achievements*

Over the past ten years, Bulgaria has greatly increased its international environmental co-operation. It is a party to many regional and global environmental agreements, co-operates with neighbouring countries to address common environmental issues, and participates in several international networks co-ordinating environmental monitoring and reporting activities. Bulgaria has further established relationships with international organisations. It generally fulfils reporting obligations under international environmental agreements to which it is a party, and has made much progress in adapting its environmental statistics to conform to international definitions.

Bulgaria's very positive achievements with respect to environmental information deserve greater recognition at the international level.

### *Progress to be made*

Steps need to be taken to give more visibility to Bulgaria's contributions to international environmental reporting and to its national environmental reporting activities at international level. This should include a systematic translation of major national reports or their summaries into English and their dissemination on internet. It should also include a greater participation of Bulgarian officials in international meetings.

At the same time, more should be done to assess and prioritise the information demands arising from Bulgaria's international environmental co-operation. The costs and benefits of implementing international environmental reporting obligations should be considered closely in light of economic constraints and domestic priorities, and in the context of national environmental monitoring and information programmes. This could be supported by expanded exchanges of experience on best practices with OECD countries and with other Balkan and Mediterranean countries, and by improved access to relevant international and foreign publications (e.g. through translating portions into Bulgarian).

Further efforts are also required in order to pursue and consolidate work on harmonisation of definitions, classifications and monitoring protocols with international standards. This is of particular importance for reporting under international agreements (e.g. on air pollution, greenhouse gas emissions, biodiversity) and within the EU (e.g. on waste, environmental expenditure, air and water monitoring).

***Recommendations***

- increase the visibility of Bulgaria's national environmental reporting activities at the international level (e.g. through translating major reports into English and making them available on internet, greater participation of Bulgarian officials in international meetings);
- assess and prioritise information demands arising from Bulgaria's international environmental co-operation (e.g. through reviewing costs and benefits in light of economic constraints and domestic priorities, exchanging experience on best practices with other countries, translating appropriate publications into Bulgarian);
- pursue and consolidate work on harmonisation of definitions, classifications and monitoring protocols with international standards.

## 4. Implementing cost-effective approaches to environmental information

### *Achievements*

Bulgaria has made great efforts to upgrade its environmental information systems to meet national needs and international standards and requirements. Reviewing of environmental monitoring systems began in 1999. The review of current systems with respect to water monitoring, now completed, has helped optimise a number of monitoring activities, reduce inefficiencies, and improve the level of co-operation among the institutions involved. A review of ambient air monitoring is under way.

Bulgaria inherited from the former Communist system an institutional set-up with a strong vertical hierarchy and a low level of co-operation among departments. This has long been an obstacle to effective organisation of environmental information. However, during the past few years the principal mandates for co-ordinating and integrating environmental information have been clarified, the MOEW has been reorganised, and co-operative arrangements have been established in a number of areas. The MOEW, with the support of its ExEA, plays an active role in co-ordinating sub-national activities and national contributions to international work. Inter-ministerial bodies have been created to co-ordinate horizontal work on topics such as sustainable development and European integration; they will also be created to co-ordinate work on integrated water management at river basin level.

Much progress has been made possible through support from the EU and other international sources.

### *Progress to be made*

Bulgaria's environmental administration understands very well the strengths and weaknesses of its EIS. Nevertheless, more needs to be done to put this knowledge into effect. The MOEW experiences difficulties ensuring continuity and regular upgrading. Like other countries in the region, Bulgaria faces simultaneous and expanding demands for information on a number of topics including socio-economic ones. It is accentuating the need for priority setting and for provision of the right information for the right purpose, with an appropriate level of quality.

*Pursuing efforts to strengthen horizontal and vertical co-operation among administrations*

The reorganisation of environmental responsibilities in 1997 was an important step towards more efficient institutional arrangements. While positive results have already been achieved, there is a need to further strengthen co-operation and co-ordination both horizontally and vertically. In particular, current arrangements for intra-governmental co-operation should be extended to a greater number of non-environmental administrations. Concerning environmental information systems at the municipal level, appropriate support and tools for local decision making ought to be provided. This is especially important in the context of economic development, including tourism, and of specific local information needs.

***Recommendations***

- further strengthen co-operation among administrations producing, processing or using environmental information, building on the co-operation already existing among the Ministry of Environment and Water, the Ministry of Health and the National Statistics Institute; extend co-operation to administrations responsible for agriculture and forestry, transport, tourism and energy, in particular;
- strengthen institutional co-operation and capacities in the MOEW and regionally in order to further integrate instruments and information related to river basin and land use management;
- promote continuing dialogue between municipalities and the central administration (MOEW, ExEA) including its regional inspectorates in order to assess local needs in terms of environmental data, methodology, technology and personnel and to provide municipalities with advice and support. This is especially important for small municipalities that do not have the capacity to fully play their role in the area of environmental information and are dependent on the REWIs for these activities. This could be done through establishing a network of municipalities, managed by the REWIs and overseen by the central administration.

***Technical design and monitoring***

Further efficiency gains could probably be made. In addition to the 1999 review of water monitoring systems and the ongoing review of the air monitoring system, it is important that regular reviews of environmental monitoring systems are carried out using an integrated approach. This would help identify a core programme that ensures continuity in monitoring key parameters and topics, as well as identifying activities that could be abandoned to the benefit of initiatives that respond to new domestic or international information demands.

It is also important to ensure that the mechanisms, procedures, tools and equipment supporting monitoring activities, and subsequent data treatment and processing, are sufficiently harmonised and regularly upgraded. This is of particular importance in the case of data from core monitoring activities, and in the case of the main institutions handling environmental data and information (i.e. the MOEW, the ExEA, the NSI), but could be extended to other administrations and to some municipalities.

Cross-media or integrated approaches to environmental monitoring should be given more attention. In the case of water monitoring, a broader framework should be established to expand the scope of monitoring and integrate the various monitoring results to support implementation of the Water Act, which provides for integrated management of water resources at river basin level. In the case of biodiversity, integration of presently fragmented information sources should be improved, and monitoring activities should be further developed to support implementation of the five-year National Biodiversity Conservation Plan and related European and other international commitments.

More attention needs to be paid to quality assurance, particularly during the assessment and reporting stages, in order to improve data analysis and interpretation and further develop dissemination of monitoring information. Greater use could be made of environmental modelling and of monitoring feedback (e.g. on emissions) to reduce information gathering per se and cross-check monitoring results.

***Recommendations***

- promote the development of an integrated hierarchy of environmental information systems to serve international, national and local needs, and to link environmental information systems more closely to existing economic and social information systems. This would include:
  - further integrating the different stages of data production, management and dissemination;
  - further integrating data and information from various sources;
  - further integrating thematic monitoring programmes (e.g. using an ecosystem approach).
- modernise and harmonise information processing capacity to support data treatment, information flows and access to information with a focus on data from core monitoring activities and on the main institutions handling environmental data;
- establish regular reviews of environmental monitoring systems based on an integrated approach, including economic evaluation of their costs, assessment of their benefits in supporting decision making and informing the public, and prioritisation of information needs with respect to new demands;
- improve integration of presently fragmented information sources in areas such as biodiversity and forests, and make greater use of modelling and of monitoring feedback to reduce information gathering per se and reduce monitoring costs.

### *Defining priorities and ensuring continuity*

While international funding and twinning projects with donor countries have helped upgrade Bulgaria's environmental information system, reliance on external funding has also grown. Some funding has ended or is now ending, which raises the question of continuity of financing of some environmental information systems.

In the short term, there is a need to further mobilise international funds and to diversify funding sources and mechanisms. However, it is important to avoid costly technology-driven choices and to ensure that external funding does not distort the development of EIS in Bulgaria. Improvements will need to be made within an integrated information framework, taking into account Bulgaria's domestic environmental priorities and requirements and prioritising information needs (focusing on those which are the most urgent), while preparing for longer term developments. Ultimately, Bulgaria will need to reduce its dependence on external funding and ensure sufficient domestic funding to finance core activities. This could be facilitated through a pluri-annual funding programme, associated with an environmental information strategy.

***Recommendations***

- give particular attention to the continuity of financing of core activities and develop a mix of funding sources and mechanisms;
- ensure that external funding does not distort the development of environmental information systems with respect to domestic priorities and needs. To be cost-effective, external funding might concentrate on specific areas (e.g. participation of Bulgarian representatives in international meetings, staff exchanges, improved access to and dissemination of information);
- give particular attention to continuity in human resources for core activities and maintain the high level of technical skills currently available.

# PART I. ENVIRONMENTAL INFORMATION SYSTEMS IN BULGARIA – OECD ASSESSMENT

# I. BACKGROUND AND CONTEXT

### *Physical context*

The Republic of Bulgaria covers a territory of 111 000 km$^2$ on the Balkan peninsula (Annex I). About half this territory is mountainous. Bulgaria occupies three parallel east-west geographical zones: the Danubian plain in the north, the Balkan Mountains (Stara Planina) at the centre, and the Thracian plain and Rhodope, Rila and Pirin Mountains in the south. Land use resembles that in OECD Europe, with agricultural areas covering more than half the country, and forests and wooded areas covering over one-third. Bulgaria is poorly endowed with mineral resources, but its biodiversity is very rich.

### *Legislative and administrative context*

Bulgaria has been a parliamentary democracy since 1990. It is divided administratively into 28 regions and 262 municipalities. Most legislative and executive powers are concentrated at the central government level (National Assembly and Council of Ministers). The regions exercise basic administrative functions. The Regional Governor, appointed by the Council of Ministers, has executive powers, co-ordinating the work of state bodies at regional level and their co-operation with local authorities. Municipalities may associate on a voluntary basis to pursue objectives of mutual interest.

The administrative entities in charge of elaborating and implementing environmental policy are the Ministry of Environment and Water (MOEW), its regional bodies (15 Regional Environment and Water Inspectorates, four river basin divisions, *to be established before January 2002,* three National Park Directorates) and the municipalities.

The Constitution of 1991 guarantees all citizens the right to a healthy environment. In March 1993, Bulgaria signed an Association Agreement with the European Community. It entered into force in 1995. Since then, considerable efforts have been made to achieve political and economic convergence with western Europe and to prepare for EU membership.

Laws relating to the environment are drafted by the Ministry of Environment and Water and other relevant ministries. They are submitted to the Council of Ministers. Draft laws must first be presented to the Parliamentary Committee on Environment and Water, which recommends whether they should be enacted. If a draft law does not conflict with the Constitution, the body of Bulgarian law or EU legislation,[1] it is presented to the National Assembly, where two readings and a simple majority are required for passage; enactment is by presidential decree.[2] Regulations concerning the environment are issued by the Council of Ministers and the MOEW. Regulations can also be enacted at municipal level on issues of local importance that fall within a municipality's responsibility. New ambient and emission standards are drafted after consultation with the MOEW, the Ministry of Health, the Ministry of Agriculture and Forests, and the Ministry of Regional Development and Public Works (MRDPW).

### *Economic context*

In 1995-1997, Bulgaria experienced a major economic and political crisis with corresponding social consequences. Since 1997, a comprehensive economic stabilisation and reform programme has been implemented and the Bulgarian economy has gradually started to improve. While annual CPI inflation approached 600% in 1997, it fell to negligible levels in 1998 and has remained moderate since (6.2% in 1999). A consolidated budget deficit of over 15% of GDP in 1996 was totally eliminated in 1998. Tax revenue has increased, partly due to tougher tax administration and rules. The pace of privatisation has picked up again, but a number of non-viable enterprises were phased out in 1999 because of economic difficulties.

*1. Conformity with EU Directives and regulations is reviewed by the Council for European Integration, established under the Ministry of Foreign Affairs.*

*2 . The National Assembly can also submit a draft law for public approval through a referendum. The President can veto legislation, but a veto may be overridden by an absolute majority of the National Assembly.*

Agriculture has benefited considerably from changes in policy orientation since 1997, although it was affected by numerous problems throughout the transition period including heavy price and trade regulation. Continued agricultural recovery will depend on speedy completion of the land restitution process and development of land markets.

Stability and clarity with respect to rules and conditions affecting foreign investors, together with progress in privatisation, can help attract greater foreign direct investment. Small and medium-sized enterprises play a valuable role in absorbing employees and other resources from larger firms undergoing restructuring.

The progress made since 1997 has withstood the effects of financial crises globally and in some of the emerging market economies (which used to be Bulgaria's main export markets) as well as the conflict in Kosovo, during which important trade routes were blocked. The stabilisation achieved provides the opportunity to address remaining needs for restructuring and institution building. While restructuring is necessary for economic viability and competitiveness, it entails failures, liquidations and social costs.

***Human context***

Bulgaria has a population of about 8.2 million. This figure fell significantly during the 1990s, reflecting a negative rate of natural increase as well as emigration, partly resulting from worsening economic conditions and the crisis of 1996-1997. Compared to OECD Europe and to other central and eastern European countries, Bulgaria's population density (74.1 inh./km$^2$) is low.

Despite economic progress, living standards remain low compared to those in most other central and eastern European countries and are still below pre-crisis levels. GDP per capita is US$ 1267.6 and the monthly average per capita income is less than US$ 50. Despite the considerable need for social assistance, social expenditure is low even relative to that in most other transition economies. For many households, small plots of land on which they can grow their own produce are invaluable if they are to withstand the difficult economic conditions.

Bulgaria's educational system is similar to that of many other central and eastern European countries. There are more than a dozen universities, located in Sofia, Blagoevgrad, Bourgas, Plovdiv, Rousse, Stara Zagora, Varna and Veliko Tarnovo. Most Bulgarian universities offer some type of environmentally-related courses.

## II. DEMANDS FOR ENVIRONMENTAL INFORMATION

Over the past ten years, Bulgaria has faced significant changes in the demand for environmental information to be used for national or international purposes. These changes have occurred in parallel with the development of environmental policies and the transition to a democratic market economy. They have been driven by Bulgaria's desire to complete EU accession successfully and to become an active member of the international community. Today Bulgaria is confronted with numerous parallel demands for environmental information.

### 1. Development of Environmental Policy

Environmental policy first began to be developed in the late 1960s with the creation of basic environmental legislation. From the early 1970s, Bulgaria's five-year plans devoted several chapters to setting targets for investment in environmental protection at enterprise and at regional level. Environmental issues became progressively more prominent in the early 1990s at the beginning of the democratic era. This is demonstrated by the establishment of the Ministry of Environment under the Council of Ministers (1990), the adoption of an Environmental Protection Law (1991), and the increasingly active role played by environmental NGOs. An Environmental Strategy was adopted in 1992 and updated in 1994.

Since 1998, Bulgaria has adopted a National Programme on the Adoption of the Acquis (NPAA) for the Environment and five sectoral national strategies, which are being implemented. A National

Environment and Health Action Plan (NEHAP), prepared jointly by the MOEW and the Ministry of Health (MH), was adopted by the Council of Ministers in June 1998. A number of EU Directives and regulations have been transposed into national law; others are now being transposed or their transposition is under preparation. The list of recently adopted and enforced environmental laws, and of environmental programmes and strategies already implemented or under preparation, is impressive (Table 1).

Despite the economic crisis of 1995-1997 and the need to emphasise economic growth and industrial modernisation, Bulgaria has succeeded in keeping the environment from slipping down the political agenda. This is partly because of the obligations imposed by accession to the EU, and partly because the MOEW devotes considerable effort to promoting the importance of environmental issues. The environment has high priority both in the Governmental Programme for 2001 and in the National Plan for Economic Development 2000-2006. Its importance is also shown by the adoption in May 2001 of a new National Environmental Strategy, and by the preparation of a new Act on Environmental Protection that will completely replace the current one, so as to ensure full compliance with the EU Directives on environmental information, environmental impact assessment (EIA), and integrated pollution prevention and control (IPCC). The new act also clearly refers to sustainable development.

## 2. Main environmental issues

Key environmental issues and areas for priority action are identified in the National Environmental Strategy. The principal strategic objective of Bulgarian environmental policy is to protect the quality of the environment in environmentally clean areas and to improve conditions in damaged and contaminated areas.

The main environmental issues Bulgaria must address include human health problems in some areas associated with environmental pollution, mainly from poor quality drinking water and urban air pollution; soil contamination around large industrial sites and uranium extraction sites; and protection of biodiversity (including species, landscapes, ecosystems, the Black Sea). A number of these issues are common to other countries in the region (see also Part II, Selected Environmental Data and Indicators):

- Despite some improvements in river quality, high nitrogen and BOD levels have been detected in a number of rivers. In some areas, the provision of drinking water is a challenge: in regions with intensive agriculture groundwater is contaminated with nitrates, and in regions with intense mining and metallurgic industries river water often contains metals and toxic elements at levels above the existing standards.
- Despite a general drop in air emissions from industrial sources as a result of both decreased activity and environmental protection measures, a large percentage of the population lives in "hot spot" areas in which there is severe air pollution, mainly from industrial sources. Transboundary air pollution is a problem in the Danube basin where it contributes to local pollution.
- With respect to biodiversity, the main concerns relate to loss of aquatic ecosystems due to factors such as waste disposal, drainage of wetlands and alteration of river beds, and loss of old forests due to fellings for economic reasons. Changes in land ownership resulting from land restitution are also perceived as a potential threat to biodiversity, since they interfere with the establishment of a network of protected areas.

## 3. Main demands for environmental information

These developments have led to increased demands for reliable environmental information by decision makers and inspectors responsible for enforcing environmental laws and regulations, and by the public, NGOs, the emerging private sector and foreign investors. As Bulgaria has begun to be integrated into European and other international environmental processes, such demands have even expanded and accelerated, as have demands for information concerning other areas such as economic and social policies. Today Bulgaria is confronted with multiple and parallel demands for environmental information originating from both the transition process and EU obligations.

**Table 1 List of recent environmental legislation, programmes and strategies**

**Achievements in the Process of Transposing EU Environmental Acquis**

- Adoption and enforcement of framework laws and over 60 subsequent regulations:
  - Act on Environmental Protection (1991, last amended 12.02.1999)
  - Clean Air Act (1996, amended 31.03.2000)
  - Water Act (1999, in force since 2000)
  - Act on Limitation of the Harmful Impact of Waste on the Environment (1997, last amended 04.04.2000)
  - Protected Areas Act (1998)
  - Nature Protection Act (1967, last amended 1998)
  - Act on Protection from the Harmful Impact of Chemicals Substances, Preparations and Products (04.02.2000, will come into force 05.02.2002)
  - Medical Plants Act (07.04.2000)
- Elaboration of new laws:
  - New Act on Environmental Protection
  - Draft Biodiversity Act
  - Draft Act on GMOs

**Programmes and Strategies Being Implemented**

- National Waste Management Programme (1999)
- National Programme for Priority Construction of Waste Water Treatment Plants (WWTPs) (1999)
- National Biodiversity Conservation Strategy (1999) and Action Plan (2000)
- National Programme for Phasing Out Production and Use of Leaded Petrol (1998)
- National Programme for Phasing Out Use of Ozone Depleting Substances (1995)
- National Action Plan on Climate Change (2000)
- National PHARE Instrument for Structural Policies for pre-Accession (ISPA) Strategy - Sector Environment (1999)
- Programme for the Transposition and Implementation of EU Environmental Legislation (2000)
- Programme for Water Resources Conservation in conditions of Drought (2001)
- National Environmental Strategy and Action Plan 2000-2006 (2001)

**Programmes and Strategies Being Prepared**

- National CFCs Management Strategy
- National Halon Management Strategy
- River Basin Management Plans
- Protected Area Management Plans
- Municipalities' programmes for long-term air quality protection

The MOEW is striving to build environmental policies on a solid and strengthened information base, and sees public access to environmental information and participation in decision making as a priority. Environmental information is regularly used for state of the environment reporting and also for communicating with the public. Information tools are further regularly used in environmental impact assessments, in monitoring the compliance with environmental regulations and standards, in the industrial privatisation process and in the development of environmental legislation and strategies. But despite the considerable work already done in the environmental administration, continuous improvements are needed and new challenges lie ahead.

In Bulgaria, reliable information is needed in particular to monitor the implementation of environmental legislation and policies and to assess the results of measures taken; to assess the economic implications of environmental policies; to assess the environmental implications of economic and sectoral policies; and to ensure active participation of the public in decision making. Information is also needed to respond to specific local needs and to international reporting requirements.

While sustainable development is recognised as an important issue, little has been done so far concerning practical policies: Bulgaria has no national agenda 21 or sustainable development strategy, and local agenda 21 have been elaborated in a few municipalities only. The progressive integration of sustainable development issues and concepts in new legislation (e.g. the new EPAct) will however ultimately lead to new information demands, that need to be taken into account as of today.

*Monitoring the implementation of environmental legislation and policies*

Implementing environmental policies and enforcing environmental legislation, especially new legislation put in place as part of the transposition of EU Directives and regulations, are among Bulgaria's main environmental challenges. Meeting these challenges will require not only significant investment in terms of money, skilled personnel and administrative structure, but also appropriate monitoring of compliance (and of the results achieved) and reliable information. Types of information and information tools of particular relevance include:

- state of the environment information on the state of and changes in environmental conditions and associated underlying pressures. Such information is indispensable in order to better understand environmental conditions and trends. It helps identify long term trends as well as new and emerging problems that need to be addressed. This type of information also provides a factual basis for developing policies, managing resources and carrying out forecasting and research activities.
- compliance information that supports compliance and enforcement mechanisms;
- performance information on progress in achieving the objectives of environmental policies and, where appropriate, related international commitments. Such information is particularly useful in assessing the results of measures taken and identifying areas where further progress is needed. Gathering this type of information should include the development and systematic use of environmental performance indicators, and preparation of regular performance assessments as part of annual state of the environment reports.

*Assessing the economic aspects of environmental policies*

Information on the economic aspects of environmental policies is important in both environmental and economic decision making, especially when the cost-effectiveness of actions taken and the trade-offs involved in decision making are assessed. It is of particular importance during preparation for EU accession, in view of the need to estimate the length of the environmental transition period and related costs and financial flows (e.g. from taxpayers and users, or financial transfers from the EU for environmental infrastructure and services). Relevant information includes environmental expenditures and financing, cost-benefit analysis, pricing, environmentally-related taxes and subsidies.

*Assessing the environmental implications of economic and sectoral policies*

Environmental policies cannot be isolated from other policy areas. As industrial restructuring proceeds and the economy develops, pollution from human activities and threats to wildlife, ecosystem diversity and the landscape can be expected to increase. This calls for greater and more systematic integration of environmental concerns into economic restructuring and into decision making in other areas, especially those where there is high development potential. In Bulgaria these areas include energy, land use planning, transport and tourism.

Environment began to be taken into account systematically during the industrial privatisation process, in which assessments of past and present pollution at individual sites, and compliance with environmental policy objectives, have played an important role. Environmental measures are included in Bulgaria's sectoral programmes, such as those on energy. Integration at an early stage is also ensured through the EIA processes.

Integrating environmental considerations into economic and sectoral decision making requires control measures and continuous monitoring. This has implications for the collection, treatment and use of information. It necessitates the establishment of close links between environmental and economic or sectoral information and related information systems. It also means that information must be presented in a way that is useful to decision makers, and that highlights links between sectoral development, environmental conditions and related economic and policy aspects. Indicators, for example, can be very effective in this respect. Other examples include EIAs and economic information related to the environment.

*Responding to local information needs*

At local level, environmental information is needed to support municipalities in their environmental tasks and to make the public aware of the role played by municipal authorities in providing environmental services. Information is also needed to inform citizens about the quality of their local environment, and about their rights and opportunities to participate in local decision making.

Thus, information and dissemination tools should be tailored to local needs and circumstances. Examples of such tools include Local Agenda 21, brochures presenting the environmental services provided by municipalities, real-time information on air pollution levels, and the information needed to set up local environmental programmes.

*Informing the public and encouraging its active participation in decision making*

Under Bulgarian law, environmental information is freely available to the public. The right to this information is officially recognised as enforceable in the courts. This requires the production of well synthesised and readable information that informs citizens about their rights and enables the public, environmental NGOs and other parties to form their views and to influence decision making whenever needed. It also necessitates the use of appropriate dissemination tools, ranging from information in the press and on radio/television and on the internet, to the distribution of compact, easy-to-read information products. It further requires regular distribution of state of the environment reports and policy assessments to keep the public informed about measures taken by the government and the results achieved.

*Fulfilling international reporting obligations*

Bulgaria is a party to a number of regional and global environmental agreements. Information is needed to monitor progress and to fulfil reporting obligations under these agreements. The main international environmental issues concerned include climate change, biodiversity and ozone depleting substances, for each of which national plans or strategies have been developed. The main regional issues include protection of the Black Sea and transboundary air and water pollution (e.g. in the Danube basin). Addressing these issues requires regional and pan-European co-operation, including the establishment of joint monitoring systems. It also requires internationally comparable information and harmonised reporting tools, mechanisms and techniques.

## III. CHARACTERISTICS OF THE ENVIRONMENTAL INFORMATION SYSTEM

### 1. Legal framework

In Bulgaria the production of, and access to, environmental information are regulated by a number of laws and regulations and by the codes of practice of the institutions involved. The most important legal texts include:

- the Environmental Protection Act (EPAct), a framework law[3] that regulates, inter alia, collection and provision of information concerning the state of the environment and the terms and procedures of environment impact assessment;
- the Water Act;
- the Clean Air Act;
- the Protected Areas Act;
- the Act on Limiting the Harmful Impact of Waste on the Environment;
- the Subsurface Resources Act;
- the Statistics Act;
- the Act on Access to Public Information;
- the Act on Administrative Procedures.

*3 . The EPAct provides the foundation for Bulgaria's environmental policy. It adheres to the polluter-pays principle. It also sets up a system for the implementation of environmental policy, including application of an EIA procedure; introduction of charges for use of natural resources; establishment of the National Environmental Protection Fund and Municipal Environmental Protection Funds; exemption for investors from liability for past pollution; and provision for right of access to information on the state of environment. The current EPAct is being revised.*

The Environmental Protection Act (EPAct) requires information concerning the state of the environment[4] to be collected by the Ministry of Environment and Water (MOEW), the Ministry of Health (MH), the Ministry of Agricultural Development, Land Use and Restoration of Land Ownership, and the National Statistics Institute (NSI) by the persons they have authorised and by municipal authorities. This information is to be disseminated via the mass media or by other means in a form understandable by the average citizen. The Council of Ministers is required to prepare a report every year on the state of the environment, to be submitted to the National Assembly and published following its approval.

## 2. Institutional arrangements and partnerships

In the late 1960s, the Ministry of Forests was given responsibility for establishing basic environmental legislation. During the 1970s, responsibility for environmental matters was shared by ten administrations dealing with land and forest issues, eight dealing with agricultural land, and seven dealing with water. The strong vertical hierarchy and low level of co-operation among departments that characterised the Communist system were clearly an obstacle to effective collection and use of environmental information.

Over the past decade, the principal mandates for co-ordinating and integrating environmental information have progressively been clarified. Co-operative arrangements have been established in a number of areas. An early step was taken in 1990 with the creation of a Ministry of the Environment under the Council of Ministers. Another important step was the creation in 1997 of the current Ministry of Environment and Water (MOEW), merging the former Ministry of Environment, National Water Council and Geology Committee and bringing much national-level environmental management under one administration. At the same time, measures were taken to establish new institutional units. A new Environmental Integration Department has been created within the European Integration Department in the MOEW. The Water Directorate and the 15 Regional Inspectorates have been upgraded. A National Centre for Environment and Sustainable Development was created.

### *Ministry of Environment and Water (MOEW)*

The MOEW[5] plays a leading role in collecting, publishing and disseminating environmental information. It is assisted by an *Executive Environment Agency (ExEA)*, created in mid-2000 from the former National Centre for Environment and Sustainable Development. The MOEW co-ordinates work carried out at sub-national level through a network of 15 *Regional Environment and Water Inspectorates (REWIs) and three National Park Directorates*. It also co-ordinates national contributions to international activities, and mobilises and co-ordinates the financial resources (internal and external) required for programme implementation.

The MOEW is responsible for the National Automated Environmental Monitoring System (NAEMS), through which an important portion of environmental information is collected. The NAEMS also maintains information registers on permits for waste treatment, water use and use of water bodies; environmental impact assessments; and protected areas. It manages databases on sanctions for polluting the environment above admissible limits, internationally funded environmental projects co-ordinated by the MOEW, and on projects funded by the National Environmental Protection Fund. It further controls greenhouse gas emissions.

*Executive Environment Agency (ExEA)*

The Executive Environment Agency (ExEA) of the MOEW is in charge of the national environmental information system. It is responsible for quality assurance of environmental data, publishes information on the state of the environment, and is the national focal point for the European Environment Agency (EEA). It collects, processes and manages information on hazardous waste at the national level

*4 . Defined as: a) data concerning the state of the environment components; b) data about the results of activities that bring about or may bring about pollution or damage to the environment or its components; and c) data concerning activities and actions undertaken for protection and restoration of the environment.*

*5 . The Ministry of Environment and Water is responsible for developing and implementing environmental policy; preparing environmental legislation and adapting the legislation to EU legislation; managing protected areas; allocating and protecting water resources; issuing permits on the use of natural resources, and deciding on large and nationally important environmental impact assessments.*

and manages a system of environmental cadastres covering protected areas, water resources and water economy, polluted land, and emissions of hazardous substances.

The ExEA manages the NAEMS and operates most environmental monitoring activities jointly with the REWIs, to which it provides methodological guidance. The ExEA itself acts as the REWI for the Sofia region. It is also responsible for gradual implementation in Bulgaria of the European Environment Agency's main criteria and recommendations for establishment and operation of monitoring networks.

*Regional Environment and Water Inspectorates (REWIs)*

The Regional Environment and Water Inspectorates (REWIs) assist the MOEW and the ExEA with law enforcement, preparation and implementation of sub-national environmental policy, public information on the state of the environment, environmental monitoring, issuing of permits for industrial activities and waste treatment, and decision making on environmental impact assessments of regional or local importance. They also serve municipalities that do not have their own environmental protection equipment and staff.

The MOEW is in charge of the structure and general management of the 15 REWIs. The directors take decisions on management and budgetary control at the Inspectorates.

*National Park Directorates*

The National Park Directorates are responsible for the management of the three National Parks in Bulgaria and for species and habitat monitoring within the parks. Public Information Centres are established in two parks and the establishment of such a Centre in the third park is envisaged.

***Other ministries and agencies***

*National Statistics Institute (NSI)*

The National Statistics Institute (NSI), founded in 1880, processes and manages national level environmental information related to:

- environmental expenditure, based on information provided by firms, municipalities and other institutions;
- long term assets for environmental purposes, based on information provided by firms, municipalities and other institutions;
- water supply and use, water consumption and waste water, based on information provided by firms, municipalities and other institutions;
- pollutant emissions to air, based on information collected by the NSI and ExEA;
- coastal water control, based on information from the State Shipping Inspectorate (Ministry of Transport and Communications);
- noise levels in settlements, based on information from the National Centre for Hygiene, Medical Ecology and Food (Ministry of Health);
- non-hazardous industrial waste, based on information provided by firms, and municipal waste, based on information provided by municipal authorities;
- protected areas, based on information from the MOEW.

*National Institute of Hydrology and Meteorology (NIHM)*

The National Institute of Hydrology and Meteorology (NIHM) (Bulgarian Academy of Sciences) collects hydrological and meteorological data and manages related databases, e.g. on weather conditions, radioactivity in air, precipitation, and quantities of surface and ground water. The NIHM is responsible for information concerning long-range airborne pollution, civil protection, the Black Sea, climate change and international commitments (e.g. with respect to the World Meteorological Organisation).

*Ministry of Health (MH)*

The Ministry of Health (MH) oversees the impacts of the ambient and working environment on human health, disease prevention and drinking water quality. The National Centre for Hygiene, Medical Ecology and Food Safety assists the MH in carrying out investigations and providing information on ambient and health related environmental issues. It makes assessments and prognoses concerning health risks associated with the impacts of different environmental and working environment factors and stores

the information from these assessments. The 28 regional Hygienic Epidemiological Inspectorates (HEIs) monitor ambient air quality, drinking and bathing water quality and support related information databases. The HEIs exercise control over, process and summarise information on noise pollution in settlements. The MH receives monthly information from its regional administration on incidents in which water quality standards have been exceeded and compares this information with epidemiological data from the region. National accreditation of the laboratories of the HEIs is in progress.

*Ministry of Agriculture and Forests (MAF)*

The Ministry of Agriculture and Forests (MAF) is responsible for protection and management of agricultural soil, protection of crops from pesticides and heavy metals pollution, prevention of eutrophication due to fertiliser use, and management of forest resources (including wildlife). It produces, supports and stores cadastre information on agricultural land and forests. The National Forests Directorate collects and summarises qualitative and quantitative information on forests. It oversees the state of (and collects and processes information on) game stocks and hunting, including some large predators (e.g. bear, wolf). The cadastres are not updated fast enough, which could create problems when information on land ownership is required by a third party. The MAF's Executive Agency of Soil Resources provides information on the productivity of agricultural soils.

*Ministry of Regional Development and Public Works (MRDPW)*

The Ministry of Regional Development and Public Works (MRDPW) is involved in EIA. It oversees central and regional land use planning and development, as well as construction of water supply and sewerage facilities. The MRDPW issues construction criteria for municipal landfills.

*Ministry of Transport and Communications (MTC)*

The Ministry of Transport and Communications (MTC) prepares and implements norms and regulations for vehicle emissions. Its Executive Agency, "Study and Maintenance of the River Danube", carries out hydrometeorological studies, including on risks of flooding and of river bank erosion. The State Shipping Inspectorate is responsible for information concerning prevention and control of oil spills and solid waste pollution of the Danube and the coastal waters of the Black Sea.

*Ministry of Education and Science (MOS)*

The Ministry of Education and Science (MOS) is responsible for environmental education in secondary and tertiary schools. It publishes and distributes environmental education bulletins. The Ecological Education in Secondary School curriculum groups environmental elements that had formerly been dispersed.

*State Civil Protection Agency*

The State Civil Protection Agency (formerly Ministry of Defence-Civil Protection) supports an information system on natural disasters and accidents that have taken place in Bulgaria, including those with environmental impacts.

*State Agency for Standardisation and Metrology*

The State Agency for Standardisation and Metrology harmonises national standards with international and EU standards for measuring the state of the environment. It is responsible for technical control of high-risk equipment and border control of the quality of imported and exported goods.

***Municipal authorities***

Municipalities are empowered to develop environmental protection programmes in co-ordination with the Ministry of Environment and Water and, where applicable, the Ministry of Health or the Ministry of Agriculture and Forests. Municipalities' environmental responsibilities include collection and disposal of household waste; management of Municipal Environmental Protection Funds; development, maintenance and operation of facilities for treating drinking and waste water; protection of air, water and soil from pollution originating within the municipality; and local noise control.

Municipal authorities are required by law (the EPAct) to inform the public about the state of the environment, measures taken, and activities subject to EIA. They provide data on waste generation and water use to the NSI, and on air emissions from local stationary sources to the REWIs.

Larger municipalities generally have an environment department and work with municipal ecologists to carry out their environmental tasks. A network of municipal ecologists, including freelance experts, has been established by the Bulgarian Association of Municipal Ecologists to share information on environmental topics and problems.

***Inter-ministerial co-operation***

Co-operation among administrations is often organised on an ad-hoc basis and relates to special issues such as sustainable development or implementation of new legislation adopted as part of the preparation for EU accession.

Concerning environmental information, the MOEW has established regular working relationships with a number of other ministries and government agencies, particularly the National Statistics Institute and Ministry of Health.

The National Commission on Sustainable Development, created in 1999, began work in 2000. Chaired by the MOEW, it has ten members, including the Ministers of Environment, Social Affairs, Agriculture and Forestry, Culture and Education and the Deputy Ministers of Regional Development, Finance, Tourism and Industry. To prepare Bulgaria's contributions to Rio+10, the Commission has established an expert group made up of representatives of the ten ministries. Representatives of other sectors (or ministries) may participate on an ad-hoc basis.

The Council for European Integration, under the Ministry of Foreign Affairs, has established a Working Group to address environmental issues. It is composed of representatives of 11 ministries, as well as participants from social groups including NGOs. Its main task is to review legal instruments' conformity with EU Directives and regulations before they are submitted to the Council of Ministers and to the Parliament.

An inter-agency Council on Environmental Health, chaired by the MOEW and the Ministry of Health, co-ordinates and controls implementation of the NEHAP. Its members include ministers from 12 other ministries.

The Ministry of Finance, which also has responsibilities in the areas of industry, trade and tourism, has a staff of seven to co-ordinate with the MOEW.

To apply the Water Act, creation of a High Water Council to support the MOEW is planned. It will include representatives of different ministries and agencies, the Bulgarian Academy of Sciences (BAS), local management bodies and NGOs.

***Co-operation and co-ordination at sub-national level***

Co-operation among REWIs is ensured through the MOEW and the ExEA, which have supervision and co-ordination functions. Co-operation is also ensured between the REWIs and the HEIs, as far as permitted by the different administrative boundaries.

Municipalities may associate in order to pursue common objectives. However, co-operation on environmental information is weak, which hinders the development and implementation of joint projects that could improve cost-effectiveness. Smaller municipalities often lack personnel and technical equipment.

***Partnerships with non-governmental organisations***

*Industries*

In compliance with recent legal requirements, industries must establish self-monitoring systems for emissions to air and to water bodies and, in certain cases, air quality control systems in the area around an installation. Companies must keep pertinent information and provide it to REWIs.

The Bulgarian Chamber of Commerce supports work by its members to address environmental issues and related standards, to set up environmental information systems, and to exchange experience. For most Bulgarian enterprises, environmental monitoring and reporting is a new area; existing information is only partial, and it is rarely possible to relate this information to economic or financial data.

Large industrial companies also carry out their own environmental reporting. A few have begun to prepare Pollutant Release and Transfer Registers (PRTRs). The Bulgarian Union Minière (UM) uses an automatic on-line system to monitor air and water emissions and ambient air concentrations, as well as to oversee point sources. This information is made available to managers in real time and used for both environmental oversight and oversight of technical processes. Air and water data are regularly provided to the MOEW and the REWIs as part of firms' reporting obligations. Ambient air data are displayed in two nearby municipalities to inform the public about local air quality. The UM maintains regular contacts with the two municipalities and meets weekly with the Municipal Council. AgroPolyChim, a recently privatised fertiliser company, uses similar procedures. It co-operates closely with the municipalities of Varna and Devnia.

*NGOs*

NGOs actively support MOEW projects. They support municipalities in their environmental tasks and in drafting local programmes. Many NGOs are also active in raising public awareness through publishing promotional material and organising information campaigns. They are involved in a number of MOEW activities, such as preparation of draft laws and strategies, and are members of, for example, councils and management boards for protected areas and river basin management.

***Strengthening horizontal and vertical co-operation among administrations***

From the very start, the transition process in Bulgaria was characterised by political instability, political rivalries, and high turnover of civil servants and enterprise managers following numerous changes of government. Public administration has long struggled with a shortage of personnel and over-centralised decision making. However, Bulgaria's achievements in macroeconomic stabilisation provide an opportunity to address its remaining restructuring and institutional development needs.

Efforts have been made to address the institutional problems (e.g. vertical hierarchy, little co-operation among departments) inherited from the former Communist system. Over the past few years, the principal mandates for co-ordinating and integrating environmental information have been clarified, the MOEW has been reorganised, and co-operative arrangements have been put in place in several areas. The MOEW, with the support of its ExEA, plays an active role in co-ordinating sub-national activities and national contributions to international activities. Inter-ministerial bodies have been set up to co-ordinate horizontal work on topics including sustainable development and European integration. They will also be created to co-ordinate work on integrated water management at river basin level.

While positive results have already been achieved, there is a need to further strengthen co-operation and co-ordination both horizontally and vertically. In particular, current arrangements for inter-governmental co-operation should be extended to a greater number of non-environmental administrations.

*Horizontal co-ordination*

There is a need for stronger co-operation among all administrations producing, processing or using environmental information, building on co-operation among the MOEW, the Ministry of Health and the National Statistics Institute. Existing co-operation should be strengthened and be extended to other non-environmental administrations such as those with responsibilities for agriculture, forestry, transport, land use, tourism and energy. Stronger institutional co-operation and capacities are also needed in the MOEW, and regionally, to further integrate instruments and information related to river basin management and land use management. This could be done through establishing memoranda or agreements among relevant administrations.

Within the environmental administration, the division of labour between the MOEW and its ExEA will need to be fully implemented, with the MOEW in charge of strategic planning and legislative work and the ExEA carrying out operational monitoring and data production.

*Vertical co-ordination*

Concerning environmental information systems at the municipal level, the aim should be to provide municipalities with appropriate support and tools for local decision making. This is particularly important in the context of economic development, including tourism, and of specific local information needs.

The central government (MOEW, ExEA) and its REWIs should establish a continuing dialogue with the municipalities to assess local requirements for environmental data, methodology, technology and personnel; establish common strategies; and provide instruction and advice to support the development of compatible environmental information systems at local level. This is important, for example, in the case of small municipalities that do not have the capacity to play their role in the environmental information area fully and are dependent on REWIs to carry out these activities.

Such a dialogue could be initiated by creating a network of municipalities, managed by the REWIs and overseen by the central government. Its objective would be to facilitate and promote exchanges of experience and information among municipalities and between the REWIs and local authorities, and to better assist small municipalities in their environmental information tasks. This type of network could build on already existing regional associations of municipalities and on the national association of municipalities. Large municipalities could be expected to play a leadership role.

## 3. Environmental monitoring

Bulgaria has a long tradition of environmental monitoring, particularly monitoring of ambient air and water quality.

Observing, measuring, collecting, processing and summarising environmental information is carried out through the National Automated Environmental Monitoring System (NAEMS), based on continuous or periodic monitoring of qualitative and quantitative parameters. This system, which covers the whole country, is supported by an information database at the national and regional level. It comprises e.g. monitoring data on:

- ambient air quality and emissions of pollutants to air;
- surface and ground water quality;
- subsurface (soil) quality;
- noise from aviation as well as road and rail traffic;
- ionising radiation;
- hazardous, industrial, municipal and construction waste.

NAEMS environmental monitoring programmes are approved by the MOEW. The ExEA is the managing and controlling authority. It directs most environmental monitoring activities jointly with the REWIs, to which it provides methodological guidance. The REWIs collect monitoring data for the ExEA and for their own purposes. Municipalities have a role to play, together with the MOEW, in the supervision of self-monitoring by enterprises.

Monitoring is also carried out by other administrations and institutes, such as the NIHM (air quality), the Ministry of Health (drinking water, bathing water, noise) and the Ministry of Agriculture and Forests (soils). A number of these activities are co-ordinated as part of the NAEMS.

### *Air monitoring*

Air quality monitoring comprises monitoring of ambient air quality and of emissions to air. The Clean Air Act, adopted in 1996 and amended in 2000, establishes the monitoring obligations of operators of stationary sources, as well as their reporting obligations to the REWIs and municipalities. It provides the framework for an air quality monitoring management structure, with national and municipal networks. The operator of an installation can be required to monitor local air quality at source.

*Ambient air quality monitoring*

The network for ambient air quality monitoring, set up in 1972, has improved significantly over the past ten years. The monitoring stations operated by the MOEW and the National Institute of Hydrology and Meteorology have been organised into a single system that integrates measurements from all stations.

Equipment at many of the older manual stations has been improved, and new automated stations with continuous sampling have been added (including mobile stations). Air quality monitoring carried out by the HEIs is not part of the NAEMS.

The air quality monitoring network is currently being re-evaluated. This work is expected to be completed by the end of 2001.

The network now consists of 66 stationary stations, operated by the MOEW and the Ministry of Health. There are 16 automated online stations, and 50 stations with manual sampling and chemical analysis. In addition, there are six mobile automated stations. The sampling frequency in the case of manually operated stations is four times a day, five days a week. Automated stations operate continuously. The stationary stations are located in 37 urban, industrial and rural settlements in different parts of the country. The basic measurements carried out are for TSP, Pb, aerosols, $SO_2$, $NO_2$ and $H_2S$. In industrial areas $NH_3$, phenols, THC, As aer., HCl, $Cl_2$, CO, NO, $O_3$, Cd and Mn are also measured. Tropospheric ozone is monitored at most (i.e. 15) automatic stations and $PM_{10}$ is measured at most stations; particulates smaller than 2.5μg, although threatening to health, have not been monitored so far. While information from the automatic air monitoring stations, transferred via telex and radio, supports a warning system in cases of emergencies, this system does not yet support pollution alert programmes for areas exceeding approved threshold levels, as required in the Clean Air Act.

The National Institute of Hydrology and Meteorology (Bulgarian Academy of Sciences) operates five air quality monitoring stations that mainly provide data for digital modelling of trajectories (dispersion models). Measurements from these stations are integrated into the national air quality monitoring system. The NIHM also has some 130 weather stations and some 250 stations that measure precipitation. These are managed more or less on a voluntary basis, i.e. by volunteers or persons who receive a symbolic reward.

Air quality is mostly monitored in urban areas. There is only one background station for air quality monitoring, operated by one of the REWIs (Smolian) and situated on one of Bulgaria's highest peaks (Rojen). Monitoring of transboundary pollution is carried out jointly by the MOEW and the NIHM.

Fifty two stations belong to the European air quality control network, EUROAIRNET. Measurement results are sent to the EEA in Copenhagen. The background station in Rojen is part of the UNEP-GEMS, WMO and UNESCO networks.

*Air emissions monitoring*

Emissions monitoring has improved considerably since 1996, following adoption of the Clean Air Act, which provides for mandatory regular reporting of emissions by large enterprises and supports enforcement of regulations.

For emissions from stationary sources, the MOEW, the REWIs and municipal bodies are the responsible authorities. Bulgaria's 150 largest enterprises produce around 80% of air pollutant emissions. As part of their emissions control efforts, these enterprises must carry out self-monitoring on a periodic or continuous basis. Continuous emissions monitoring will be mandatory for large industrial plants as of the beginning of 2004. A list of enterprises obliged to undertake this type of self-monitoring according to the decision for Reporting on Environmental Impact Assessment is held by the MOEW. Monitoring programmes for self monitoring of the emissions are approved by the ExEA. Self-monitoring activities are supervised and controlled by the MOEW, the REWIs and municipal authorities. Self-monitoring data is submitted by the operator twice a year. In practice, the process works well for large point sources and less well for emissions from smaller sources.

Two parallel projects on emissions inventories are currently being conducted in Bulgaria. The first covers 150 large point sources. It is carried out by the ExEA and the REWIs. The second covers nearly 2000 point sources. It is conducted by the National Institute of Statistics. Both projects are under the guidance of the MOEW. The information collected also covers air pollution control facilities and their efficiency, technologies and production, fuels used and fines imposed. Both projects use CORINAIR methodologies.

Emissions of TSP, soot, $SO_2$, $NO_2$ and other specific pollutants are directly measured in order to assess compliance with national emissions standards. This takes place twice a year, using four mobile

automatic stations and eight mobile analysers. A list of enterprises to be monitored is approved every year by the MOEW.

In the case of mobile sources, responsibility for emissions control lies with the State Automobile Inspectorate (SAI) of the Ministry of Transport and Communication (when the vehicle is moving, control done by licensed car garages) and the Ministry of the Interior (when the engine is idling), which report back to the MOEW. Annual inventories of national emissions from mobile sources are currently established by the NSI and the ExEA on the basis of motor fuel consumption data and of the CORINAIR methodology. A national register of motor vehicles, including exhaust emission data, is being established by the Ministry of Interior jointly with the SAI.

Bulgarian GHG emission inventories are organised and co-ordinated by the MOEW on the basis of a contract with an external organisation.

The MOEW provides the UN-ECE Convention on Long-range Transboundary Air Pollution (LRTAP) with yearly emissions data on $SO_2$, $NO_2$, $CH_4$, NMVOC, CO, $NH_3$, Cd, Pb, Hg, PAH, PCBs, HCB, PCP and dioxins from 11 activity sector groups. Included are emissions from different types of energy production, industrial processes, extraction and distribution of fossil fuels, solvents use, road transport, other mobile sources and machinery, waste treatment and disposal, as well as from agriculture and nature. Data on $SO_2$, $NO_2$, $CH_4$, NMVOC, CO and $NH_3$ emissions from 34 large point sources are also reported to the UN-ECE in Geneva. Data on GHG emissions are reported annually to the Secretariat of the UN Framework Convention on Climate Change (UNFCCC). Data on ozone depleting substances are reported annually to the UNEP Ozone Secretariat.

***Water monitoring***

Water quality monitoring is carried out through a number of programmes co-ordinated under the NAEMS. Bulgaria's 78 river basins are covered. The environmental administration is responsible for physical, chemical and biological monitoring of fresh ground and surface waters and of coastal waters. The health administration is mainly responsible for monitoring water quality in sources supplying drinking water and for overseeing bathing waters (physical, chemical and microbiological analysis).

Water monitoring programmes were reviewed in 1997-1998. The monitoring activities of the MOEW, the Ministry of Health and the National Institute for Hydrology and Meteorology were covered. The purpose of the review was to reduce overlaps in monitoring activities and to make the use of current resources within each participating institution as effective as possible. According to the Water Act, the biggest water polluting enterprises are required to self-monitor the quantity and quality of their sewage water.

*Surface water monitoring*

The main purposes of the national surface water monitoring network are to:

- obtain quantitative and qualitative data on the state of surface waters and assess trends with respect to their past, present and future development;
- oversee compliance with national surface water quality standards;
- assess the impacts of point sources on the receiving water body;
- identify heavily polluted water areas (hot spots) where immediate action is needed;
- provide public and private decision makers, academics and the general public with relevant information on the state of surface waters.

Surface waters are divided into three categories, according to their use: water supply; leisure, fishing and industrial; irrigation. The national network for monitoring surface water quality comprises 253 stations covering all major river basins. Three of these stations, located on the rivers Struma, Mesta and Maritza, are automatic. Of the surface water stations, 185 are in rivers (ten in the Danube), eight in lakes, 26 in reservoirs and 24 in the Black Sea. Fresh water measurements are made for some 30 parameters, including quantity, temperature, DO, BOD, COD, $NH_4$, $NO_2$, $NO_3$, total N, $PO_4$, total P, heavy metals, detergents and hydrocarbons. Measurements are taken once a month in rivers and lakes and seven times a year in the Black Sea.

Biological monitoring of surface waters has been carried out since 1992. There are 1200 sampling points, located along rivers at a distance of 5-10 km. The method is based on analysis of sensitive benthic macroinvertebrates. Water quality is assessed according to the biotic index, using five levels.

Microbiological parameters such as bacteria, pathogens and coliforms are monitored in three areas (Sofia, Stara Zagora, Smolyan) at the same sampling sites as those used for physical and chemical monitoring.

Monitoring of the Black Sea takes place in connection with the Black Sea Convention (Bucharest, 1992), which was signed by six bordering countries. Due to its hydrophysical and ecological characteristics, the Black Sea is highly sensitive to pollution by oil and oil products. Its basin was therefore declared a special area that benefits from systematic monitoring of the content of oil products in sea water, sediments and the bottom bio-indicators. According to the Convention on the Protection and Sustainable Use of the River Danube, five of Bulgaria's water quality stations on the Danube and three on its Bulgarian tributaries belong to a transfrontier monitoring network. Data are regularly submitted to the Commission on the Protection of the River Danube in Vienna and to the data base of the ExEA in Bratislava.

Bulgaria reports monitoring results from 111 surface water stations to the EUROWATERNET system.

*Ground water monitoring*

The main purposes of the national ground water monitoring network are to:

- obtain quantitative and qualitative data, as well as assess trends in the state of ground water;
- control compliance with national standards for ambient ground water;
- provide decision makers and interest groups with up to date information on the state of ground water.

The national network for monitoring ground water quality is made up of 225 stations. They are sampled two or four times a year for about 30 parameters. Co-operation with RHEIs is ensured in cases where ground water sources are used for drinking water.

Bulgaria reports monitoring results from 74 ground water stations to the EUROWATERNET system.

*Water resources and use*

The national network for monitoring water resources comprises 373 rainfall measuring stations, 236 hydrological stations and 595 hydrogeological stations. The headquarters for this network is based within the National Institute of Hydrology and Meteorology (NIHM) in Sofia. Meteorological information is collected and received via satellite from 18 hydrological stations, which also serve to give warning in case of flood danger. Water quantity is monitored via the networks of other specialised administrations, such as the "Reservoirs and Cascades" administration, which operates 140 hydrometric stations and 40 rainfall measuring stations. However, information from that administration is not made available to the public or to local administrations. Providing access to the information collected by the NIHM is time-consuming and must be paid for.

Water supply is managed by some 13 Water Supply and Sewage (WS&S) companies under the responsibility of local administrations, and by nine state companies and 20 companies jointly owned by the state and municipalities, which are under the responsibility of the Ministry of Regional Development and Public Works (MRDPW). The WS&S companies operate automated systems for water supply management, covering 2 000 sites and operating in real time. Information from this system only serves the WS&S companies. It is not made available to local administrations.

***Soil monitoring***

Land and soil quality monitoring, managed by the ExEA as part of the NAEMS, includes:

- monitoring and control of subsoil resources including abstraction waste and sewage sludge;
- control and protection of soil from pollution with persistent organic pollutants (20 monitoring stations for PAH, PCB and pesticides, and 48 stations for pesticide monitoring);

- acidification (70 sampling plots);
- salinisation (15 sampling plots);
- erosion.

Data on polluted soils are collected by ExEA, together with the Institute of Soil Science and Agroecology. These data are not available in a database.

Soil contamination of industrial sites is also monitored using EIA procedures and an environmental auditing system. This monitoring is associated with the liability issues addressed as part of the privatisation process.

***Waste monitoring***

Data on municipal waste are directly obtained from the municipalities responsible for waste management. The NSI collects data on non-hazardous industrial waste from enterprises through annual statistical surveys. Data on hazardous waste compiled by the ExEA are transmitted to the Secretariat of the Basel Convention. Data on transfrontier movement of wastes are provided by Bulgarian customs authorities. The MOEW has arranged training courses for customs officers to help them monitor and classify wastes.

The waste reporting system covers some 620 landfills; almost 2 000 other waste dumps operate without proper reporting on the quality and quantity of wastes deposited. It is expected that these dumps will be closed by 2007 and will be replaced by regional landfills. The National Waste Management Programme foresees the construction of 37 new landfills that would meet EU criteria by 2002 and that will cover approximately 33% of the country's territory.

Thus far, waste monitoring in Bulgaria has been very unsatisfactory. Rough estimates of waste volumes have been based on the number of trips made to the landfill or dump and related transport documents. In many cases volumes have been overestimated, especially as this information originates with private entrepreneurs subsidised by municipalities. Information on certain types of wastes or waste streams remains weak and incomplete. For example, there are no reliable data on waste composition and a breakdown by sector of origin is often unavailable. Elaboration of a national waste database containing sufficient and reliable data is one of the objectives of Bulgaria's waste management policy. In particular, this policy aims at improving information gathering and processing with respect to municipal and household waste, construction waste and non-hazardous industrial waste at the national and regional level.

***Radiation monitoring***

The National Automatic System for Radiation Control in Real Time was set up in 1997 to meet international requirements for safe use of nuclear energy and monitoring of transboundary transmissions of nuclear material. The system is completely automated and has a hierarchical structure. It consists of 26 local gamma background monitoring stations (LMS) covering the entire country. The nuclear power plant "Kozlodouy" benefits from special monitoring through a higher density of monitoring stations around the plant. All LMS are supplied with measurement and communication equipment. Data are transmitted in real time to the ExEA where they are processed and stored in a database. They are then transmitted on to the authorities responsible for emergency situations and civil protection (i.e. the Civil Defence Department and the Committee on the use of Atomic Energy for Peaceful Purposes).

Radiation is also monitored as part of the air, soil, surface and ground water monitoring networks. A mobile monitoring station is available in case of an accident "in situ".

***Biodiversity monitoring***

There is no comprehensive and unified information on Bulgarian ecosystems and habitats, nor is there a programme for monitoring biodiversity. In some protected areas the number of certain endangered species is monitored by the environmental administration. The Ministry of Agriculture and Forests is in charge of the forest survey (inventory). However, as in a number of countries this survey does not cover the entire forest ecosystem, but only, for example, tree species, forest types and timber volume. The forest

survey is mainly carried out by experts from the Sofia University of Forestry and the Forest Research Institute (Bulgarian Academy of Sciences).

Monitoring of species and habitats within the three National Parks is carried out by the National Parks Directorate of the MOEW, established in 1999. Related data sets have yet to be developed. Monitoring of forest damage is carried out in the framework of the Convention on Long Range Transboundary Air Pollution (LRTAP) and the International Co-operation Programme on Forests led by the EU and UN-ECE. The ExEA acts as a focal point; field studies are carried out by University of Forestry and the Forest Research Institutes.

***Environmental health monitoring***

A National Environmental Health and Communicable Disease Information system is being established under the responsibility of the MH and will be operational at the end of 2001. The system comprises five modules: drinking water, ambient air, food safety and nutrition, WHO environmental health indicators and communicable diseases.

***Mechanisms for transmission, analysis and storage of monitoring data***

Analysis of monitoring samples is carried out by the central laboratory of the ExEA and the laboratories of the REWIs. Harmonised procedures and intercalibration are essential to ensure comparability of monitoring results from different monitoring networks. In Bulgaria this is ensured through:

- regular quality assurance (QA) procedures applied throughout the whole network. The ExEA and all REWIs have a quality assurance manager responsible for the network's QA;
- standardised analytical methods such as the handbook on air sample analysis. Some REWIs encounter problems with sampling methods, e.g. in the area of air emissions monitoring;
- accreditation of laboratories performing analyses. Not all laboratories are accredited. Laboratories used for air quality measurements at the ExEA are accredited by the Bulgarian Accreditation Body; the REWIs' laboratories are in the process of being accredited. No laboratories are accredited as national reference laboratories according to EU requirements.

The laboratories' analytical capacity is generally good, covering most of the important parameters. Difficulties experienced relate to:

- lack of sufficient equipment to analyse organic compounds. For example, only the ExEA has the ability to perform analyses of pesticides in surface and ground water. No laboratory in Bulgaria is accredited to measure dioxines or furanes;
- the need to carry out regular maintenance of laboratory equipment. In 1993-1995, the EU PHARE programme made a significant contribution towards providing modern laboratory equipment to Bulgaria's environmental administration. Some of this equipment needs upgrading, some needs in-depth technical maintenance. Such maintenance, though costly, is indispensable to ensure the quality of monitoring results.

Processed information is sent via telex from the REWIs to the ExEA, where the national databases are maintained. Real-time transfer of observation or measuring data to a database from a monitoring station does not exist yet, but on-line data transmission is now common.

Data from air emission inventories are stored at the national and local level. Databases have been created in the REWIs and the NSI. Both provide emissions data to the national database in the ExEA, with yearly updates.

To further integrate information from various monitoring systems, the ExEA has elaborated a National Information System on Environmental Components. This system, which uses a hierarchical structure, involves the creation of local databases in the REWIs and a national database in the ExEA. The system has not yet been implemented, but several pilot projects have been launched. One project concerns the transmission and processing of monitoring results from automatic ambient air monitoring stations. It is part of the EU twinning projects.

Monitoring results are made publicly available by the ExEA upon official request or through regular information bulletins. Municipalities receive summarised environmental information directly from REWIs on a monthly basis. For other and more detailed data, municipalities must follow the same procedure as the public and submit an official request for information.

Despite relatively slow computer connections (most transmissions are via telephone and telex lines), and in some cases sending of paper copies, the ExEA has succeeded in managing data flow from the REWIs satisfactorily. However, communications with municipalities and with other institutions and institutes involved works less well. Lack of sufficient data processing capacity, particularly lack of computer equipment and harmonised software, hinders exchange of information among administrations and administrative levels and makes access to data more difficult. This presents an obstacle of increasing importance to efficient management of Bulgaria's environmental information system.

***Improving the effectiveness and policy relevance of monitoring systems***

Environmental monitoring in Bulgaria has improved considerably over the past ten years. This improvement concerns both co-operative arrangements between the environmental administration and other administrations, such as the NIHM, and the technical design of the monitoring systems. Nevertheless, further efficiency gains could be made.

In addition to the 1999 review of water monitoring and the ongoing review of air monitoring, regular reviews of environmental monitoring systems should be carried out using an integrated approach. Such reviews should include an economic evaluation of the costs of monitoring systems, an assessment of their benefits in supporting decision making and informing the public, and prioritisation of information needs with respect to continued and new demands. This would help identify a core programme that ensures continuity in monitoring key parameters and topics, and identify activities that could be abandoned to the benefit of new activities responding to new domestic or international information demands. Examples of requirements for new or better monitoring are the need for pollution alert programmes in highly polluted areas, combined with public information, and the need to implement policies concerning water and biodiversity.

To facilitate regular reviews and the identification of gaps and overlaps, Bulgaria could consider developing a national register of environmental monitoring programmes that provides an overview of programmes in operation at the same time, the operating agencies, and the purposes of programmes where these may go beyond purely environmental ones.

*Mechanisms, procedures, tools and equipment*

It is important to ensure that mechanisms, procedures, tools and equipment supporting monitoring activities and subsequent data treatment and processing are sufficiently harmonised and are regularly upgraded. Examples are the capacity for processing the information, which needs to be modernised and harmonised in order to optimise data treatment, including real time treatment; information flows and transmission speeds; and access to information. This is of particular importance in the case of data from core monitoring activities, and in the case of the main institutions handling environmental data and information (i.e. the MOEW, ExEA, NSI), but it could be extended to other administrative bodies and to certain municipalities.

*Institutional arrangements*

From an institutional point of view, co-ordination between the MOEW, its ExEA and other administrative bodies could be further improved. Outstanding areas include noise monitoring and other health related monitoring, where better co-ordination with the health administration is needed, and biodiversity monitoring, where information is currently scattered among several administrations and closer co-operation, particularly with the MAF, would be beneficial.

*Cross-media or integrated approaches*

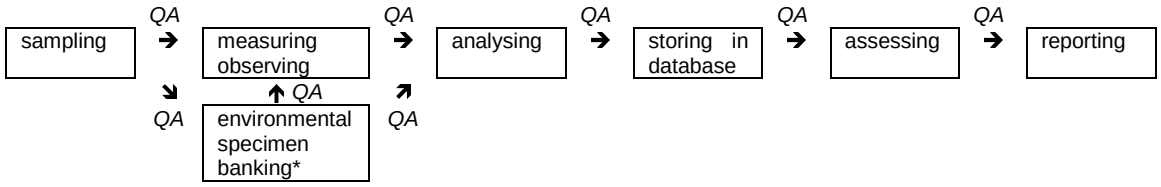
Cross-media or integrated approaches to environmental monitoring have so far been applied to only a few cases, mainly with foreign financial support. In general, these approaches, which are not well developed, deserve greater attention. In the case of water monitoring an ecosystem framework should be established to expand the scope of monitoring and to integrate the various monitoring results, i.e. those from monitoring of flows and of qualitative parameters, including biological monitoring and monitoring of sediment quality. This is needed in order to support implementation of the Water Act, which provides for

integrated water management at river basin level. Concerning biodiversity, integration of information sources that are currently fragmented, such as those on forests, should be improved and monitoring activities should be further developed to cover species, habitats and ecosystems. This is needed in order to support implementation of the five-year National Biodiversity Conservation Plan and related European and other international commitments. The MOEW, together with the MAF, should consider establishing a biodiversity monitoring programme with a corresponding database. It should also carry out field sampling, together with competent experts from the respective regional inspectorates representing both administrations as well as the University of Forestry and the Forest Research.

*Quality assurance*

More attention needs to be paid to quality assurance at every stage of the monitoring chain (Figure 1). In the short term it is important to continue with national and European accreditation of laboratories carrying out analyses of monitoring samples, and to ensure that there is appropriate maintenance of the technical equipment in place. More attention should also be paid to the assessment and reporting stages. Improving data analysis and interpretation, and further developing dissemination of monitoring information, is a relatively inexpensive way to increase the benefits of environmental monitoring. It is generally less costly than strengthening the measurement stage, and helps make better use of existing data and increase the system's cost-effectiveness. Greater use could also be made of environmental modelling and of monitoring feedback information (e.g. on emissions), in order to reduce information gathering per se and to cross-check monitoring results. In the long term, developing a system that would allow all environmental monitoring data (with their geographical co-ordinates) to be supplied could be considered. This would also help better trace changes in the position of monitoring sites.

Figure 1. **Monitoring stages and quality assurance**




QA: Quality assurance.
* Sampled material may be stored in an environmental specimen bank for future use (e.g. to trace previously unknown pollutants).

## 4. Data quality and relevance

Data quality needs to be viewed not only from the perspective of absolute statistical quality, but overall in terms of how well the data meets the needs of users (including national and local public authorities, the public and the international community). Quality obviously varies according to the type of data, and results from trade-offs among various data quality attributes such as policy relevance, statistical reliability and timeliness, taking into account the cost-effectiveness of the underlying processes and institutional arrangements as well as the design of monitoring systems and regulatory instruments.

### *Data availability*

Bulgaria has responded three times (in 1994, 1998 and 2000) to the joint OECD/Eurostat Questionnaire[6] on the State of the Environment and on Pollution Abatement and Control expenditure. Much progress has been made since 1995, mainly as a result of Bulgaria's continued efforts to adapt its environmental statistics to EU requirements and internationally accepted definitions. Bulgaria regularly participates in Eurostat meetings concerning environmental statistics. Recent responses indicate that data are available for a number of environmental parameters. These include:

- air emissions: NOx, SOx, NH3, PM (stationary sources only), CO, NMVOC, CO2, CH4, N2O, Pb, Hg, Cd, apparent consumption of halons and CFCs. Air emissions data are calculated according to the European CORINAIR '94 methodology; greenhouse gas emissions data are

*6. Responses to the OECD/Eurostat questionnaires are prepared and co-ordinated by the NSI (Environmental Statistics Unit), with input from the ExEA.*

presented according to the IPCC methodology. Since 1995, harmonised data have been available from the NSI on "traditional pollutants" and from the ExEA on hazardous substances and ozone depleting substances.

- air concentrations: SO2, NO2, Pb, particulates, acid precipitation. Since 1986, data for major Bulgarian urban areas have been available from the ExEA.
- water resources (long term average), water abstractions and supply by sector (data available since 1991); population connected to waste water treatment plants (since 1991); treatment capacity of waste water treatment plants (since 1993); generation and discharge of waste water (since 1991). Most of these data are available from the NSI.
- water quality: river quality at mouth or downstream frontier; quality of lakes (data provided for 1998 and 1999);
- non-hazardous waste generation by sector (data available since 1994 from the NSI), hazardous waste generation (partial information available since 1992, detailed breakdown by type of waste available since 1998 from the ExEA);
- threatened species: mammals, birds, reptiles, amphibians, fish, invertebrates;
- pollution abatement and control expenditure: public and business sector (investment and current expenditure, data available since 1992 from the NSI).

*Thematic coverage*

Looking at the pressure state response (PSR) model, data on societal responses appear to be the least developed, but deficiencies are also seen with respect to data on environmental conditions (e.g. biodiversity, toxic contamination, water quality). Progress has been made in areas such as pollution abatement and control expenditure and waste, but these efforts have not yet shown full results and need to be further strengthened.

While some data on environmental expenditure are available, the Bulgarian accounting system is not suitable for detailed recording of such expenditure. Making a distinction between environmental and other costs is often impossible, and there is no category for enterprises that produce environmental goods and services in the Bulgarian national classification of economic activities (applied since 1997). Data are collected through questionnaires sent to private companies, to the MOEW, and to local authorities. Further progress will depend on changes to the Accounting Act that require an agreement between the MOEW, the NSI and the Ministry of Finance, and on transposition of the EU regulation on structural business statistics, which includes environmental information requirements.

Information on economic instruments (fees, taxes, prices, subsidies) is weak. The full cost of water treatment and supply remains largely unknown. Some information on state-owned water companies is available from the MRDPW. Information from private companies is more difficult to obtain, as is information from municipalities. No national level information exists on fees and charges for waste collection and treatment. Local information, which is partial, is available only from selected municipalities.

At local level, data on expenditure and cost of municipal services are generally not accessible to citizens in an understandable form. As they are part of municipal balance sheets, they require more analysis and treatment before being released to the public.

*Historical completeness and consistency*

Time series for most environmental variables have been available since the early 1990s. The consistency of the data over time has been affected by changes made in definitions and methods to adapt them to European and other international standards or requirements. Depending on the topics covered, ex-post revisions are limited to the 1990s or to recent years. In areas such as air emissions, comparison with older time series is impossible and the analysis of trends over longer periods is difficult. The same is true of waste statistics, with the application of the European Waste Catalogue in 1999.

*Timeliness*

The overall timeliness of Bulgarian environmental information is satisfactory. Most of the data published nationally or transmitted to international organisations refer to the year n-2. This is very similar to the situation encountered in an average OECD country. Further improving timeliness would require higher data transmission speeds, as well as better data processing equipment, software and ICT. Given the costs involved and the already satisfactory situation, further improvement should be considered a longer term priority.

***Meeting the demand for environmental information***

Over the past few years, Bulgaria has made considerable progress in producing better environmental data and adapting its statistical system to EU and other international requirements. These achievements need to be consolidated, and current efforts need to be continued and expanded so that environmental information becomes more responsive to policy and public information needs.

The OECD assessment shows that more needs to be done in order to a) better use existing data through greater analysis, interpretation and integration, and b) fill remaining data gaps and improve the quality of primary data. Attention is first given to topics on which Bulgaria can act given the resources at its disposal, and which are considered to offer real potential for progress.

*Making better use of existing data*

There is a contrast between the increasingly large volume of data produced and the difficulty using them to monitor the effects of environmental policies, and to support the integration of environmental concerns into sectoral policies and measures. Almost no work has been done on environmental indicators or on tracking environmental performance.

Above all, making better use of existing data implies better data interpretation and analysis and communication of the data to the public and other users in a readable and understandable form. To improve information quality at moderate cost, priority should be attached to clarifying the concept of indicators and to developing sets of environmental indicators based on experience in other countries and at international level. Attention should be given to indicators that can be used as a tool to measure environmental performance. These indicators can be linked to national priorities and objectives, as well as to international commitments. Such work would cover a number of environmental issues, along with the economic and sectoral dimensions of environmental performance, with a focus on selected sectors such as energy, transport, agriculture or tourism.

Another characteristic of the Bulgarian environmental information system is lack of integrated information, at the level of monitoring activities or of data use. This is particularly apparent in areas such as biodiversity and water monitoring, but also in “horizontal” areas such as sustainable development or integration of economic and environmental policies.

Integration of environmental and socio-economic information is recognised by most OECD countries as a key issue in the design of their EIS. One important function of this integration is that it conveys environmental information to non-environmental decision makers and thus helps promote policy integration. Information has long been developed and used in a compartmentalised way in Bulgaria, reflecting the institutional set-up and administrative culture of the former Communist system. Consequently, economic information on the environment is partial and limited work has been carried out concerning information on sustainable development and the environmental implications of sectoral policy decisions. While sectoral breakdowns (i.e. per economic activity) exist for variables such as air emissions, water use and non-hazardous waste generation, they are not used sufficiently to establish the link to human activities and economic information systems. These information gaps are of particular concern with respect to investors, local environmental information needs, and the development and implementation of environmental policies in line with EU requirements.

*Filling data gaps and improving the quality of primary data*

Two major problems encountered in primary data production are the privatisation of former state owned companies, which has made data collection more difficult, and the investments needed to maintain and upgrade existing monitoring networks and equipment. This has implications for the quality of monitoring results and the completeness and historical consistency of certain data series, e.g. on waste.

Areas where information remains weak, and where data quality and mobilisation efforts should be focused, include economic information on the environment, information on the environmental implications of economic and sectoral decisions, and waste statistics. Other areas where there is room for further progress include the availability and quality of biodiversity information and of water statistics. Efforts in these fields need to be seen in connection with longer term developments of related monitoring activities. In the short term, priority should be given to "pressure" and "response" aspects, which have greater potential for progress than "state" aspects.

More attention should be given, in particular, to improving the availability and quality of information related to economic aspects of environmental decisions (e.g. environmental expenditures and financing, cost-benefit analysis, pricing, environmentally-related taxes, subsidies), for example by updating the Counting Act. In the longer term, efforts should aim at developing environmental accounts as part of the national accounts system.

Efforts also need to be made to further improve the availability and quality of information on waste generation and management, particularly information on waste recovery and disposal. This includes data on transfrontier movements of wastes, which could be further improved through amending the Customs Act, and data on construction waste, which could be improved through establishing a special programme and monitoring network.

Continued support by EU funds and twinning projects will be invaluable if progress is to be made in specific areas. An example is the new project on environmental expenditure and waste statistics launched jointly by the MOEW and the NSI, with the support of the EU PHARE programme. Another example is the exchange of personnel between the NSI and Eurostat for the purpose of training young statisticians. Generally, the efforts made by the NSI in association with the MOEW and its ExEA need to be continued and even strengthened.

## 5. Cost-effectiveness and financing

As in a number of OECD countries, very little information is available on the cost of the Bulgarian environmental information system as a whole or of parts of it. Funding is provided by domestic and external sources.

### *Domestic funding*

Domestic funding sources include the state budget, municipal budgets, the National Environmental Protection Fund (NEPF), established in 1992 and managed by the MOEW, and the municipal environmental protection funds managed by individual municipalities. These funds depend on pollution fees and fines (60% of fees and 70% of fines go to the NEPF, the rest going to the municipal funds) and on charges for environmental services.

The NEPF supports, inter alia, a national system to monitor and oversee the environment, purchasing of capital and non-material assets for environmental protection (mainly to be used by the central laboratory of the ExEA and by the REWIs), scientific or technical services for environmental assessments and audits, participation in environmental conferences and other events, and education and awareness raising activities. The NEPF provides much of the operating expenditure for the ambient air monitoring network.

### *External funding*

Bulgaria has obtained international assistance for environmental policy development and environmental investment projects. Since 1990, a number of environmental projects have benefited from international support and funding. Sources include the Framework Agreement with the European Union, the EU PHARE programme, and other foreign aid programmes of international financial institutions (World Bank, EBRD, EIB); international environmental programmes (UNDP, GEF); and individual countries. The MOEW acts as the implementing agency for EU and other foreign funding.

*EU funding*

EU support has mainly been dedicated to assisting the transition to a market economy and to preparing for Bulgaria's future EU membership. Money from the PHARE National Programme, managed by the MOEW, was primarily for monitoring and data collection, field sampling, laboratory equipment, information systems and IT equipment, training and public awareness raising. Funds from the PHARE Cross Border Co-operation Programme, managed by the Ministry of Regional Development and Public Works (MRDPW), were used inter alia for monitoring river quality. Funding from the PHARE Instrument for Structural Policies for pre-Accession (ISPA), co-ordinated by the MRDPW with the MOEW, has been designed to help meet large infrastructure investment needs in both the environment and transport sectors required to implement EU legislation in these areas (e.g. drinking water supply, waste water treatment, air quality). It can, however, also assist in related technical support measures including information and publicity actions.

*UN funding*

UNDP has provided grants for technical assistance and capacity building in areas such ecological monitoring of the Maritsa River basin and the Black Sea. A GEF project managed by UNDP and Bulgaria established funding opportunities to meet obligations concerning biodiversity conservation. A biodiversity strategy and action plan has been developed. It now needs to be implemented, including appropriate monitoring. UNDP also finances a "Capacity 21" project, supporting preparation of Agenda 21 activities at local level and, as of 2000, at regional level. It has financed creation of a task force on local sustainable development in the MRDPW and supported the establishment of the National Commission on Sustainable Development.

*Bilateral funding mechanisms*

Bulgaria receives support from Austria, Denmark, France, Germany, Greece[7], Japan, the Netherlands, Switzerland, the United Kingdom and the United States. The US Agency for International Development supported publication in Bulgarian and English of a booklet on Bulgaria's biodiversity through its GEF Biodiversity Project in Bulgaria. A swap deal, "Debt for Environment", was arranged with Switzerland and managed by the National Trust EcoFund. "Joint implementation" projects have been organised with several countries.

Bulgaria benefits from PHARE twinning projects with several EU Member States. Some of these projects have an information component. The new environmental strategy was thus developed with the support of EU twinning partners Germany, France and Austria.

Such bilateral assistance is perceived as extremely valuable, as it offers transfers of knowledge and experience and exchange of personnel.

***Increasing cost-effectiveness and setting priorities***

The Bulgarian environmental administration has a good understanding of the strengths and weaknesses of its EIS, but more needs to be done to put this understanding into practice. While the MOEW has succeeded in keeping environmental issues high on the political agenda, it experiences difficulties ensuring continuity and regular upgrading. Like many other countries in the region, Bulgaria faces simultaneous and expanding demands for information on a number of topics, including socio-economic ones. Balancing these numerous demands is not an easy task, nor is financing related activities. A constraint is placed on the scarce resources available. The need for priority setting and for providing the right information for the right purpose - with an optimal level of quality – is accentuated.

Since the early 1990s, Bulgaria has benefited from a number of international funding sources and from twinning projects with donor countries. This has helped upgrade its environmental information system and its technical equipment (e.g. monitoring and laboratory equipment, computers), but has also increased

*7 . As part of its Bilateral Programme of Development Co-operation in the field of Environment, Greece supports many projects and activities in Bulgaria that are connected to environmental information. Examples include projects on environmental impact assessments, on quality control of surface waters and more specifically of transboundary rivers of Strimona and Nesto, and on integrated systems for continuous monitoring of VOC emissions from organic solvents and transfer of petrol. Many of these projects are carried out by Bulgarian universities, research departments and NGOs.*

reliance on external funding. Today some of this funding (e.g. from EU PHARE) is ending, raising the question of the continuity of environmental information systems' financing.

In the short term, there is a need to further mobilise international funds and bilateral co-operation, as well as to diversify funding sources and mechanisms. Nevertheless, it is important to ensure that external funding does not distort the development of EIS in Bulgaria (e.g. through overemphasising costly information techniques such as GIS rather than better interpretation and analysis) and that it is consistent with domestic environmental priorities and needs. To be cost-effective, external funding might concentrate on specific areas such as funding Bulgarian representatives' participation in international meetings, promoting exchanges of staff, and promoting access to and dissemination of information (e.g. through funding the publication and/or free distribution of brochures and leaflets, ensuring regular maintenance of existing technical equipment, improving processing capacity).

Ultimately, Bulgaria will need to reduce its dependence upon external funding and ensure sufficient domestic funding to finance core activities. This could be facilitated through a pluri-annual funding programme associated with an environmental information strategy. Such a strategy, if based on an integrated framework, would also help attract more focused external funding and bilateral assistance.

## 6. International co-operation

Over the past ten years, Bulgaria has greatly increased the importance it gives to international environmental co-operation. It is a party to many regional and global environmental agreements, co-operates with neighbouring countries to address common environmental issues, and participates in several international networks co-ordinating environmental monitoring and reporting activities. The government gives considerable attention to requirements for implementing international commitments. Internationally recognised principles and procedures have been introduced into national law, including harmonisation with EU standards. National plans and strategies have been prepared for the implementation of international agreements in areas such as climate change, ozone depleting substances and biodiversity. Thus Bulgaria is faced with an increasing number of international reporting obligations, including regular monitoring of and reporting on domestic progress.

### *European Union*

At European Union level, Bulgaria has established regular relationships with the Statistical Office of the European Communities (Eurostat) and has participated since 1996 in Eurostat meetings concerned with environmental statistics. In 1998, the Bulgarian ExEA joined the European Environment Agency EIONET project, which provides programming and technical means for production of information and information exchange with EU Member States. Since 1998, Bulgaria has also participated in the EU Environmental Monitoring and Information Network (the section for air quality monitoring, EUROAIRNET, and that for water quality monitoring, EUROWATERNET), managed by the European Environment Agency.

On 8 December 2000, the National Assembly ratified Bulgaria's membership in the European Environment Agency.

### *United Nations*

Bulgaria participates in several UN networks that co-ordinate environmental monitoring and reporting activities, such as UNEP-GEMS, UNEP-Infoterra, WMO, UNESCO and UN-ECE.

The government also takes part in follow-up work to UNCED. Until recently, however, relatively little action had been taken domestically. A National Commission on Sustainable Development was created in 1999 and began work in 2000. Bulgaria's participation in UN meetings is kept to a minimum, but regular country profiles are produced as input to these meetings.

### *Multilateral Environmental Agreements*

Bulgaria is a party to a number of global and regional environmental agreements. It has committed itself to monitor and report on related environmental trends. Main activities include:

- monitoring the quality of the Black Sea in connection with the Black Sea Convention, signed by six bordering countries;
- monitoring the quality of the Danube in co-operation with Rumania. Monitoring results are submitted to the Danube information centre in Vienna;
- furnishing air emissions data to the UN-ECE Convention on Long-range Transboundary Air Pollution on an annual basis;
- provision of data on GHG emissions to the UNFCCC Secretariat on an annual basis;
- provision of data on generation of hazardous wastes and their transboundary movements to the Secretariat of the Basel Convention ,on an annual basis.

***Bilateral and regional co-operation***

Bulgaria has established bilateral environmental agreements with almost all its neighbours and with several OECD countries, including Turkey, Poland, the Netherlands, Denmark, the Slovak Republic, Ireland, Greece and Italy. It also benefits from a number of twinning projects with EU Member States as part of the EU PHARE programme, and has been successful in attracting assistance from countries such as the United States and Switzerland.

Bulgaria participates actively in the Environmental Action Programme for Central and Eastern Europe, for which it hosted the third "Environment for Europe" Conference (Sofia, October 1995). Bulgaria is also a member of the Regional Environmental Centre for Central and Eastern Europe. The REC provides a platform for environmental projects among central and eastern European NGOs and has an office in Sofia. Under its Regional Environmental Reconstruction Program for South Eastern Europe, the REC is establishing an Environmental NGO Network with the support of the Dutch Ministry of Foreign Affairs.[8]

Co-operation takes also place on an ad-hoc basis to prepare and implement joint EIAs for sites with transboundary impacts.

***Increasing the visibility and recognition of Bulgaria's contributions to international co-operation***

Bulgaria is committed to becoming a full member of the international community. Its relationships with international organisations are well established. Reporting obligations under international environmental agreements to which Bulgaria is a party are generally fulfilled with satisfaction, and much progress has been made in adapting Bulgaria's environmental statistics to fit EU requirements and international definitions.

Given these very positive developments, Bulgaria's contributions to international environmental reporting and its domestic information activities and products deserve greater recognition internationally. Steps need to be taken to give more visibility to Bulgaria's national environmental reporting activities at the international level. This should include a systematic translation of major national reports or their summaries into English, and their dissemination via internet. It should also entail greater participation of Bulgarian officials in international meetings.

More also needs to be done to assess and prioritise information demands arising from Bulgaria's international environmental co-operation. The costs of implementing international environmental reporting obligations should be considered closely, in light of economic constraints and domestic priorities, and in connection with national environmental monitoring and information programmes. This could be supported with a regular exchange of experience on best practices with OECD countries and other countries of the Balkan and the Mediterranean regions, and by translation of relevant international and foreign reports or portions of them into Bulgarian.

Finally, further efforts are required to pursue and consolidate work on harmonising definitions, classifications and monitoring protocols with international standards. This is of particular importance for reporting under international agreements such as air pollutant and greenhouse gas emissions and biodiversity, as well as for reporting under EU obligations, such as statistics on waste, on environmental expenditure and on results from air and water monitoring.

*8 . Internet: http:// www.rec.org/rec-hungary [Hungary]; E-Mail: rec@iterra.net [Bulgaria].*

## IV. ACCESS TO AND DISSEMINATION OF ENVIRONMENTAL INFORMATION

Up to 1993, there was little access to or dissemination of environmental information in Bulgaria and very limited public participation. The concept of provision of information to (and participation by) the public was new, particularly regarding environmental issues. In recent years the different institutions have become more active in this field. Preparations for EU accession have further stimulated these efforts. Today Bulgaria is strongly committed to democracy and transparency. There is a 'modern' legal basis for access to environmental information, and civil society is increasingly involved in environmental decision making. Several new national strategies and programmes are being developed, including a national programme for public awareness and involvement in resolving environmental problems that is part of the National Environmental Strategy and of the Action Plan (2000-2006).

### 1. Legal framework

The 1991 Constitution established a general guarantee of public access to information. The legal framework for the public's right to access environmental information is provided by the Environmental Protection Act (EPAct), the Law on Access to Information, the Act on Statistics, the Act on Administrative Procedures, and specialised laws in the area of environment.

Bulgaria has signed but not yet ratified the Aarhus Convention on Public Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. Ratification is expected to occur soon after approval of the revised EU Directive on Public Access to Environmental Information [COM(2000)402], which Bulgaria is committed to implement as part of its application to join the EU. Certain provisions of the 1990 EU Directive on Freedom of Access to Information on the Environment (90/313/EEC) have already been transposed in the Environmental Protection Act, as amended in 1999, and will be fully transposed in the Regulation on Collecting Environmental Information and on Access to Environmental Information being prepared.

Under the Environmental Protection Act, individuals, organisations and public bodies have the right to information on the state of the environment. Such information is defined as "relating to i) the state of the environment components; ii) the results of activities that bring or may bring about pollution or damage to the environment or its components; and iii) activities and actions undertaken for the protection and the restoration of the environment." If there is dissatisfaction, anyone may seek a remedy through the courts or through administrative procedures.

The new EPAct, not yet adopted, further strengthens the principles of public awareness, public participation and transparency in decision making. It gives a more detailed definition of environmental information, and defines cases in which access to information may be limited. It includes provisions concerning the role of radio and television operators: they are requested to disseminate and promote information on environmental protection and management, and on related activities.

The Law on Access to Public Information (LAPI), adopted in June 2000, obliges the Government and its institutions to respond to requests for information of public interest within 14 days. It is to make such information available without an interest having to be stated, and in the form requested. Access to public information is free. The costs to be borne by requesters are determined by the Finance Minister; for information that is readily available, these cost should not exceed the material costs (e.g. for photocopying, discs). Receipts from provision of information feed into the budget of the body that provided the information. Information considered under law to be protected by state, commercial or other secrecy is excluded from the provisions of the LAPI. The LAPI does not define "state, commercial or other secrecy", but refers to the related provisions in other specialised laws.

The Clean Air Act stipulates that data from the national and local air quality monitoring systems must be published in official bulletins and must be accessible at no charge to everyone. If additional information is requested, the requester must pay for it according to a tariff approved by the Council of Ministers. Similar provisions are included in other specialised laws pertaining to the environment.

Public participation is also guaranteed by a number of laws and regulations concerning, for example, environmental impact assessment, management of protected areas and river basin management.

Environmental impact assessment is covered by the Environmental Protection Act, the regulation on EIA and the 1991 UN-ECE Convention on Environmental Impact Assessment in a Transboundary Context, ratified by Bulgaria in 1995.

Through the PHARE twinning process, regulations on public participation under the integrated pollution prevention and control (IPPC) and Seveso Directives are being developed and should be in effect by 2002.

## 2. Implementation

### *Public access to environmental information*

Bulgaria is progressively implementing its laws regulating access to environmental information. The environmental administration provides public access to environmental information in various forms, using a wide range of information sources. Information is provided upon request through public information centres at the MOEW and the ExEA, via Green Phone lines within the MOEW and the REWIs, and at regular press conferences. Certain types of environmental information such as air quality and radiation levels are systematically made available to the Bulgarian Telegraphic Agency by the ExEA.

*Providing information upon request*

The MOEW, the ExEA and the REWIs provide environmental information to individuals and organisations upon request. Responses to requests are usually made within 14 days, corresponding to legal provisions. Where the public authority does not possess the information, or where additional data processing is required, it may take up to one month to respond. Most demands come from environmental NGOs and private consulting firms. The price charged for a 20-page photocopied document is 1 Leva (around USD 0.50).

No case of refusal by the MOEW to provide environmental information has been reported during the past year or two. The few cases in which difficulties were encountered concerned information on economic aspects and on environmental standards, or information held by non-environmental administrations (e.g. on biodiversity issues, the status of Bulgarian forests, energy efficiency, nuclear energy). Procedures for obtaining these types of information appeared to be very slow, and to depend more on the goodwill of the officials contacted than on an effective legal or administrative system. Under current arrangements a procedure involving the courts would be time-consuming, requiring at least nine months.

*Public information centres*

Both the MOEW and its ExEA have established public information centres on their premises where a large number of publications and studies are available, including reports on studies commissioned by the Ministry, environmental impact assessment reports and material from European and international environmental organisations.

The MOEW's centre for environmental information and public relations is located on the ground floor of the Ministry at the centre of Sofia. Established in 1995 to allow public access to environmental information sources, this Public Information Centre (PIC) has benefited from experience gained in Ireland with that country's National Environmental Information Centre (ENFO).[9] The MOEW's centre is open to visitors every afternoon. There are some 10,000 visitors per year and about 100 telephone requests are received per week. The centre has developed and maintains the MOEW web site. Staff work closely with NGOs on publications for children and adults telling how to take care of the fragile environment. School groups and teachers are welcome at the centre, where material on a range of environmental projects and a selection of posters are available.

Documentation at the PIC includes:

- books from Bulgaria and from international organisations: 2100 titles;
- journals (national and international): 5;
- CD-ROMs: 15;

9. *Further information on the Irish ENFO is available on: http://www.enfo.ie/ .*

- videos: 35;
- reports on environmental impact assessments: 700.

Public Information Centres also exist in two of Bulgaria's National Parks.

*Press conferences*

The MOEW holds regular press conferences on environmental issues of interest to the public. The Ministry's Public Relations desk, located in the Public Information Centre, is frequented daily by environmental journalists.

*Access to environmental information at regional and local level*

Most REWIs work closely with local NGOs and businesses. Attendance at public hearings on EIAs is high. All sectors of society are represented. Regular contact is maintained with local radio and with the press. Many REWIs operate Green Phones to deal with requests for information on environmental accidents and incidents. Access to environmental information is more limited, however, than at the national level. The REWIs do not have well organised PICs, and not all of them have sufficient resources and staff to meet all demands. Information can be obtained easily from some inspectorates and with more difficulty from others. The information is generally of good quality.

To ascertain the level of environmental information available to the public, a survey was carried out recently by the MOEW jointly with the Austrian Federal Environment Agency at the six largest inspectorates. The results showed that information access and dissemination at these REWIs is very varied, and that the level of service provided and the type of difficulties encountered vary with the resources available (Table 2). Providing better and more adequate service from all REWIs would imply the use of additional financial and staff resources.

At municipal level, access to environmental information remains generally weak. However, the situation varies according to the size of the municipality. Larger municipalities close to the REWIs generally

Table 2. **Environmental information characteristics of selected REWIs**

| | |
|---|---|
| ♦ Veliko Turnova | High media profile<br>Participated in Clean Bulgaria competition<br>Active in local Green School project<br>Lectures given to school groups<br>Students have access to information for thesis preparation<br>Action plan on the local environment |
| ♦ Rouse | Information sold to local business/industry<br>Assists local high polluters with information to obtain funding for emissions reduction<br>Works with NGOs on eco-tourism projects<br>Good press relations |
| ♦ Varna | Carried out 600 EIAs<br>Good co-operation with local university<br>Involved in international programmes (e.g. nature conservation with Switzerland and the Bulgaria-France environment project)<br>Assists municipalities with environmental protection and implementation of laws and regulations |
| ♦ Bourgas | Works with municipalities to organise environmental awareness meetings<br>Co-operates with universities at Lille and Lyon<br>Staff lecture at local schools on the Black Sea, biodiversity, pollution and recycling<br>Co-operation with local NGOs<br>Open house for the public and NGOs every week |
| ♦ Stara Zagora | Village ecology programmes with municipalities on environmental problems such as household waste and waste water<br>Problems with sampling methods and emissions monitoring |
| ♦ Plovdiv | Co-operates with NGOs<br>Needs publicity material to increase public awareness |

have adequate resources to carry out their basic information tasks. They are well equipped (computers, software, internet connections) and have an environment department and skilled staff. Smaller municipalities suffer from a general lack of resources and expertise that hampers their ability to deal with environmental information (e.g. inadequate or no computer equipment, no access to internet, no environmental expert on the staff). They often cannot access the information available from the REWIs and the MOEW.

While some of the larger municipalities began to set up environmental databases a few years ago, obtaining information often remains difficult. Another difficulty encountered is that most information municipalities need from the REWIs (e.g. for preparing municipal environmental programmes and municipal waste management programmes) does not suit their local purposes. Information held at the REWIs is extremely diverse and detailed, but in most cases it is in a format that requires considerable further processing before it can be used at municipal level.

*Access to information by private consulting firms*

Provision of information by governmental and municipal administrations to consultant firms and organisations working on various projects has considerably improved over the past few years. Problems still arise, however, mainly because public authorities are reluctant to share their information with private companies that have the reputation of profiting from information collected by others. The fact that information held by public bodies is not only intended to serve the needs of the body that produced and collected the information, but also the public as a whole, is often not well understood or is ignored.

***Public participation***

Participation by the public in environmental decision making is seen by the MOEW as a strong means of improving the effectiveness of the decision making process and of taking the interests of all stakeholders into account. Public participation is ensured through administrative processes concerning, for example, environmental impact assessments, management of protected areas and river basin management. NGO involvement in the development of legislative acts and policy programmes is another important way to attract the interest of NGOs in environmentally-related activities.

In recent years the MOEW has been organising public hearings on draft laws and national programmes in the environmental area. Preparation of the National Environment Protection Strategy is a good example. In drafting the new Environmental Protection Act, the MOEW was assisted by a lawyer representing NGOs. The Parliamentary Commission on Environment and Water invites NGO representatives to sessions at which draft environmental laws are debated.

Other MOEW initiatives to increase public participation in decision making include:

- NGOs, academics and all other interested stakeholders can participate in discussions on protected areas management plans. Proposals can be made to the competent authorities for designating new protected areas;
- NGOs and the public can participate in [municipal authorities are required to invite them] the development of municipal environmental programmes, including in areas such as waste management and air quality;
- NGOs, academics, interested individuals and firms may participate in discussions on river basin management plans, and may obtain access to permit applications for water use and use of water bodies;
- NGO and academics are members of the management boards of the National Environmental Protection Fund, the National Trust Eco-Fund and the Municipal Environmental Protection Funds.

NGO participation in the Superior Expert Water Council, Superior Expert Medical Plants Council, Water Basins Management Councils, and other bodies is anticipated.

*Environmental NGOs*

Since the early 1990s, environmental NGOs have taken action on several projects. Early examples include the case of the Belen nuclear power station, whose construction was suspended by the Council of

Ministers following eight months of opposition. Other projects suspended after protests were the Cheri Sam dam and a plan to divert the Rile River to Sofia.

Today some 250 to 300 NGOs in Bulgaria participate at least occasionally in environmentally-related activities. It is estimated that only about 60 actively work on environmental issues, with half of these being very active. Re-registration of NGOs is planned. While all NGOs are not active at all times, there is a hopeful trend with respect to the new NGOs emerging with membership drawn from the youth of Bulgaria.

Several NGOs support municipalities in drafting local programmes and backing up MOEW projects. Many are active in raising public awareness through publication of promotional material and organisation of information campaigns. The Bulgarian Association for Nature, for example, has been preparing a public information campaign to promote the national waste management programme; other campaigns cover topics such as water, the ozone layer and acid rain.

To serve NGOs and other organisations interested in issues related to the environment, natural resources and sustainable development, a virtual network called Blue Link (http://bluelink.net/en http://bluelink.net/en/downrow.http://bluelink.net/en) was set up in 1998 by eight Bulgarian NGOs. Blue link, which was registered as a foundation in 1999, offers a broad range of internet based services available to individuals, the mass media, academic and educational institutions, governmental and municipal offices, and businesses. It benefits from the support of Bulgarian and foreign sponsors, among which are a Dutch NGO (Milieukontakt-Oost Europa), the Regional Environmental Centre for Central and Eastern Europe (REC), the US Institute for Sustainable Communities, and the Canada Fund Program for Local Initiatives.

*Environmental impact assessment*

Access and participation are also organised through arrangements established under the EIA process. Bulgaria's administrative processes combine EIA and integrated pollution prevention and control (IPPC) permitting. In the new Act on EIA are two annexes, one listing activities for which EIA is compulsory and one listing those for which it is optional. The MOEW deals with EIAs for larger sites (about 80 cases per year), whereas the regional inspectorates deal with smaller ones (about 250 per year). Where applicable, other ministries or their regional administrations are consulted. Municipalities issue permits for activities that do not require a compulsory EIA. According to legislation, it is the responsibility of a project's beneficiary to have the EIA statement prepared by an independent expert.

Public participation in the EIA process generally works well in Bulgaria. Public consultations take place on all EIAs. Procedures for public announcement of EIAs require preliminary reports to be made available to citizens one month before consultations take place. The reports can be obtained from municipal authorities or from the REWI. The competent authorities (the MOEW or the REWIs) take into consideration proposals made by all interested stakeholders. Representatives of NGOs are voting members of the Superior Expert Environmental Council within the MOEW, which takes decisions on EIA reports. Where authorities do not take public opinion into consideration, an appeal can be made through the courts.

All EIA reports are available at the two PICs and at all the REWIs. Examples of EIAs that raise big public interest can also be consulted on the MOEW's internet site.

*Participation in local decision making*

Apart from EIA procedures, participation in local decision making remains weak. Citizens are not always aware of the possibilities open to them, and they cannot yet build on a sufficiently long tradition of local democracy. Environmental information made available locally is limited and often does often not meet specific local needs for informing citizens.

***Publication and dissemination of environmental information***

The MOEW and other administrations at national, regional and local level that collect or hold environmental information are responsible under law for disseminating this information to the public.

*Major reporting activities and tools*

State of the environment reports and publications containing environmental data are produced regularly (Table 3). The most important of these are:

- The MOEW publishes an annual state of the environment report or Green Book in Bulgarian and English. The Green Book describes the policies put in place by the MOEW and its bodies. It is prepared by the MOEW in co-operation with other governmental institutions, approved by the Council of Ministers and adopted by the National Assembly. The data included are provided by the National Automated System for Environmental Monitoring, the MOEW, its ExEA, its REWIs and the National Statistical Institute.
- An annual bulletin on the state of the environment is published by the ExEA and is based on monitoring data.
- An annual publication of selected environmental statistics is prepared by the NSI.

Thematic brochures and information bulletins are published regularly, including:

- daily bulletins on ambient air quality and radiation levels, prepared by the ExEA;
- quarterly bulletins on the state of the environment, published by the ExEA on the basis of information from the NAEMS;
- a monthly bulletin, prepared by the MOEW, providing information on, for example, the most important events related to newly passed legislative acts, projects implemented, polluting industries sanctioned, permits issued, decisions on EIAs;
- a monthly bulletin prepared by the NIHM.

At regional level, the REWIs publish a monthly newsletter with summaries of environmental information, which is circulated to municipalities.

No publication exists on environmental indicators.

*Major communication and dissemination tools*

Most publications are paper versions. They are sold to the public or may be consulted at the PIC. Smaller information bulletins, such as those on ambient air quality and the radiation situation, are available at no charge and are systematically transmitted to the Bulgarian Telegraphic Agency. Target audiences are the general public, environmental NGOs, schools and governmental authorities.

The budget available for publication and/or free distribution is limited. In a few cases, foreign support has been useful in disseminating information to a broader public. USAID, for example, has supported the production and publication (in Bulgarian and English) of a book on Bulgaria's biodiversity. The Environmental Education and Technologies Association, sponsored by the EU PHARE programme, has assisted the Ministry of Education and Science (MOS) in the publication and distribution of environmental education bulletins for schools.

Use of internet as a dissemination tool has recently been given more attention. Web pages have been created for the MOEW, the ExEA and the NSI (Inset 1).

- Information on the MOEW site includes that on national programmes and legislation adopted, European integration, international co-operative activities, EIAs, sustainable development, etc. The content of the site is maintained by the PIC.
- Bulgaria's involvement in the activities of the European Environment Agency (EEA-Copenhagen) has contributed to the setting up of a user-friendly web site for the Bulgarian ExEA, with links to the MOEW and the NSI. It contains information requested as part of the EIONET project, the ExEA's annual state of the environment bulletin, and selected information bulletins.
- The NSI site provides a description of its statistical publications, information on how to purchase publications, and a description of the national programme for the adoption of EU acquis in the area of statistics. Actual data are not made available on the site.

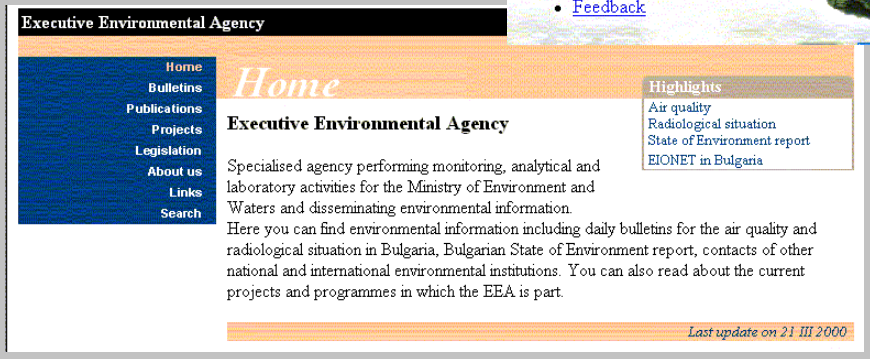
Table 3 **List of environmental reports produced regularly in Bulgaria**

| Title of publication | Responsible Agency | Description | Audience | Frequency | Cost | Dissemination | Language |
|---|---|---|---|---|---|---|---|
| Report on the state of the environment, The Green Book | Prepared by the MOEW in co-operation with other governmental institutions | Describes the policy and activities of the Ministry of Environment and Water (MOEW) and its bodies for improving the environment | Approved by the Council of Ministers and adopted by the National Assembly | Annual<br>Latest edition 1998, published 2000<br>First edition 1985 | Paper: 5 L<br>Internet: free | Paper<br>Internet (Bulgarian version) | Bulgarian, English (*planned*) |
| Annual bulletin on the state of the environment in Bulgaria | Published by the ExEA (based on monitoring data) | Describes monitoring activities carried out by the Ministry of Environment and Water; presents an analysis of the current state of different environmental components | | Annual<br>Latest edition 1998<br>Published 2000<br>First edition 1989 | Paper: 3 L | Paper | Bulgarian |
| Statistical Yearbook of the Republic of Bulgaria | Published by the National Statistics Institute | Since 1980, includes one section on the environment | Broad public, state authorities | Annual<br>Latest edition 1999<br>Published 2000<br>First edition 1909 | Paper: 20 L<br>USD 75<br>CD-ROM: USD 17 | Paper,<br>CD-ROM | Bulgarian, English |
| Annual bulletin on environmental statistics | Published by the National Statistics Institute | Contains aggregated data from NSI statistical surveys. Included are: air emissions; water supply, use and consumption, waste water, waste water treatment stations; waste generation and disposal; expenditure on tangible long term assets with ecological destination; tangible long term assets with ecological destination; noise; protected areas, etc.; data presented by economic activity, and by administrative-territorial and geographical levels | Broad public, state authorities, ecologists and economists | Annual<br>Latest edition 1999<br>Published 2000<br>First edition 1979 | USD 35 | Paper; approx. 90 pages | Bulgarian, English |
| Quarterly bulletin on the state of the environment in Bulgaria | Published by the ExEA on the basis of information collected by the NAEMS | Publication of the National System for Environmental Monitoring; includes data from samples and analyses carried out by the REWIs, the ExEA and the National Hydrometeorological Institute | | Quarter | Free | Paper | |
| Bulletin on air quality and radiation | ExEA | Short bulletin published daily and monthly; contains information on cities where limit values for selected air pollutants have been exceeded and on radiological gamma background data from the NAEMS | Available to the Bulgarian Telegraphic Agency | Daily<br>Monthly | Free | Daily: Internet<br>Monthly: paper | Bulgarian, English |
| Information bulletin of the MOEW | MOEW | Contains information on the most important events related to new legislation enacted, projects implemented, EIA decisions, permits issued and pollution sanctions | | Monthly | Free | Paper | |
| Bulletin on the state of the environment of the common Bulgarian and Rumanian section of the Danube | ExEA with Rumanian National Institute | Bulletin prepared by Bulgarian Executive Environmental Agency and Romanian National Research and Development Institute for Environmental Protection - ICIM Bucharest | | Biannual | Free | Paper | |

Inset 1. **Bulgarian Web sites on environmental information**

Ministry of Environment and Waters
http://www.moew.govrn.bg/indexengl.htm


Executive Environmental Agency
http://nfp-bg.eionet.eu.int/ncesd/eng/index.html




National Statistical Institute
http://www.nsi.bg/Index_e.htm

## 3. Facilitating and broadening access to information by the public

While access to environmental information is well organised at national level, it is uneven at regional level and weak at municipal level. Municipalities often lack the expertise and resources to provide environmental information to users. Environmental information held by non-environmental administrations is still dispersed, and information about what is being produced is not systematically exchanged.

Practical difficulties providing and obtaining information include, for example, lack of an overview of existing data sources, lack of user-friendly information systems such as a portal for environmental information, and the limited amount of information accessible on internet. As a consequence, knowledge about available information and how to obtain it is limited to certain segments of the population.

The goal of further developing access to environmental information can only be achieved by establishing a clear environmental information strategy involving all stakeholders, including relevant non-environmental administrations. This would also help in setting priorities, clarifying related financial and institutional issues, and further developing the legal basis of information provision.

### *Consolidating the legal basis*

Bulgaria already has a good legal basis for access to public information. The main challenges are i) to fully implement current legal provisions, and ii) to further develop and clarify the legal framework to ensure consistency with the Aarhus Convention and the new EU Directive on public access to environmental information.

To implement the right to environmental information, its precise scope needs to be defined (as well as possible exceptions). Legal instruments such as the Aarhus Convention and the EU Directive are very specific, while the legal provisions on environmental information (as included in chapter 2 of the current EPAct) provide more general guidance. This may lead to confusion in interpretation. Further specification is therefore needed. For example:

- More precision is needed with respect to the scope and definition of environmental information. Questions arising include: Which types of information should be free and which should be paid for? How far does the copyright of scientific authors extend? Does the right to information concern EIA reports only or the whole administrative process? What about environmental information held by semi-public bodies not covered by Bulgarian legislation?
- While the need to respect confidentiality for commercial and state purposes does not yet seem to pose problems, legal provisions for confidentiality need to be further specified if time-consuming court procedures are to be avoided in the future. While information legally considered to be protected by state, commercial or other secrecy is excluded under the Law on Access to Public Information (LAPI), the current EPAct does not distinguish between information that can and cannot be accessed. A clear definition of environmental information protected under industrial or commercial confidentiality is not provided.

Clarification is also required on procedures to follow in case a request does not receive a satisfactory response. First, there is a need to provide an administrative or legal appeal procedure for all persons indicating that their right to freedom of access to information or to participation in decision making has been denied, and to ensure that delays in treating appeals are kept within a reasonable time frame. In this regard, it is necessary to include appropriate provisions in the proposed new EPAct and in related specialised legislation, (e.g. legislation on access to environmental information, EIA, IPPC and Seveso). Second, there is a need to facilitate settling of conflicts before they go to court. This could be done by nominating a mediator, or by establishing a commission composed of representatives from the administration, the business sector and NGOs. Such a commission might also be a useful forum for discussions on other aspects of public access and public participation.

In all these respects, the planned ratification of the Aarhus Convention and transposition of the revised EU Directive on public access to environmental information will be important steps. The proposed new EPAct goes in this direction and, when adopted, will help clarify several of the issues addressed above, particularly those relating to confidentiality and secrecy. It will also help clarify the status of the 2000 LAPI vis-à-vis the related EPAct provisions.

***Informing the public about its rights***

To implement the right to environmental information, the public needs to be informed that it has a right to environmental information held by public authorities, and that measures have been taken by these authorities to enable the public to exercise such a right effectively. This could be done by publishing a guide outlining ways in which environmental information may be obtained. Such a guide might include information about:

- types of information available or unavailable;
- suggestions concerning proper drafting of an information request;
- advice on how to address a request to the body(is) entrusted with the task of providing the information, or how to inform the requestor which body is likely to provide the information;
- the procedure to follow in case there is no response to a request or it is rejected.

Public awareness can be increased by making brochures, press communiqués or notices accessible on the internet site of the MOEW and the ExEA (or sites of other authorities concerned at regional and local levels, e.g. the REWIs). Continuing co-operation with NGOs and local community groups can also help keep the public informed and provide environmental awareness services. NGOs could, for example, issue guides, facilitate their distribution, or conduct surveys on how the public has exercised its right to information.

***Facilitating the search for and access to information***

The search for information could be aided by issuing a who's who in the area of environmental information drawn up by the MOEW or the ExEA (i.e. a list of public authorities, types of environmental information available, location, opening hours, etc.) and a catalogue of environmental information sources that are accessible on internet. Steps in this direction have been taken as part of Bulgaria's work with the European Environment Agency and with UNEP-Infoterra. At a later stage, and depending on how information requests evolve, nomination of a facilitator (to facilitate the flow of information of interest to the public) could be envisaged.

*Making greater use of internet*

Researching environmental information could be further facilitated by creating a user-friendly portal system and placing catalogues of available environmental information, lists of available registers, texts of environmental laws and regulations, basic statistics and indicators, summary information on specific environmental topics (with links to appropriate information sources at different administrative levels and to relevant reporting obligations), answers to frequently asked questions, and other types of material. While the content of Bulgaria's environmentally-related web sites evolves steadily, the amount of environmental information being made accessible on internet remains limited. It could easily be increased, and be expanded to include information held by non-environmental institutions.

Greater use could also be made of internet to make environmental reports and other information products known to a broader audience and to keep interested citizens and NGOs informed about new events, publications, and other material. This could be done, for example, by establishing virtual networks with regular e-mail bulletins and alert messages, possibly in partnership with Bulgarian NGOs (and in connection with other virtual networks, such as the Blue Link network). This would also give better access to Bulgaria's environmental information and help increase its visibility at international level.

*Making greater use of the Public Information Centres*

The role of the MOEW's Public Information Centre could be expanded and its activities given greater visibility. To better inform the public about the centre's existence and accessibility, related information could be presented in a small brochure and be presented regularly in the press. This information could also be made available on the MOEW and ExEA internet sites, combined with links to other relevant sites (e.g. the NSI and the non-governmental Blue Link network).

The user friendliness and accessibility of the MOEW PIC could be further improved by extending its opening hours[10] and creating a separate entrance not subject to security control. Small information centres

*10. i.e. all day from 9am-5pm including lunchtime when many working people can avail a visit to the PICs at both the MOEW and the ExEA.*

could also be created at local level in the REWIs and in some of the larger municipalities. In the short term, local PICs could be established in the six largest REWIs and later in all of them.

To improve management of the centre's documentation and facilitate consultation of documents, the PIC would need software to develop a database catalogue of books and journal articles, with appropriate search facilities. Such a database could be made available on its site. Depending on available resources, a computer with internet connection could be made available upon request to PIC visitors.

At the same time, there is a need for further training of staff at the Documentation Centre at the MOEW PIC, the ExEA and the REWIs. Training courses on access to environmental information at national and international levels, cataloguing, classification and data input to databases, and searching internet sites for environmental information would be particularly valuable, as would training on how to lecture to environmental groups and how to present the environmental message to all segments of society.

Finally, the PIC could serve as a model for other countries in the region and should co-operate with similar centres established in neighbouring countries.

*Supporting the development of environmental NGOs*

Involving NGOs in the development of legislation and environmental programmes is very important in order to obtain the views of a broad spectrum of society. NGOs can carry the environmental message from local groups, and can discuss proposed environmental legislation as it will affect local populations. All these benefits are to be welcomed. They are undoubtedly an achievement of the last few years. However, it should be noted that there are not many NGOs with national and local importance operating. Given the MOEW's commitment to transparency and democracy, it is very important that governmental institutions and local authorities make a major effort to support environmental NGOs. If not, contact with local community groups could be lost and access to environmental information denied to large sections of Bulgarian civil society.

***Facilitating access to information within and among governmental institutions***

There has been noticeable progress over the past few years with respect to the circulation of, and access to, environmental information within and among governmental institutions, including non-environmental administrations. Nevertheless, this remains one of the weak elements of the Bulgarian environmental information system. Municipalities, in particular, need assistance to acquire and to provide access to environmental information. A number of smaller municipalities do not have the means to access information held by the MOEW and the ExEA, or by the REWIs. Environmental information collected by other governmental organisations, such as the Ministry of Health and the Ministry of Agriculture and Forests, is not always available in a format that can be used by the MOEW to provide a more complete picture of the overall state of the Bulgarian environment.

To overcome the present difficulties, the following options should be considered:

- establishment of agreements between the MOEW and other sectoral ministries and non-environmental institutions, including technical specifications to promote and structure the circulation of information and facilitate access to it;
- establishing an integrated governmental information system by:
  - progressively making greater use of computer networks and intranet to facilitate information flows within and between institutions. This could also include setting up a governmental intranet portal. In the short term, internet and e-mail connections need to be developed for all the REWIs and for larger municipalities;
  - promoting the use of common or compatible databases and software to allow standardised and easier access to environmental information by all levels of government. In the short term this should cover major environmental data series needed for national and international reporting, and for implementation of policies at national and local levels. In the longer term the MOEW could consider forming an environmental consortium of stakeholders holding environmental data, with the aim of providing a common Bulgarian database. This approach is recommended by UNEP-Infoterra, whose network builds on national focal points for environmental information in 177 countries. Bulgaria is currently developing its

UNEP-Infoterra environmental profile, which will help identify relevant environmental data sources.

Progress will depend partly on the availability of adequate financial resources and partly on education and training aimed at developing a new information culture, with a better understanding of information sharing and of the advantages of modern information systems.

## 4. Adapting information products and dissemination tools to different users

The variety of information materials and the means of disseminating them is one of the remarkable achievements of the past few years. A difficulty encountered by Bulgarian authorities is how to adapt information (and the ways it is presented and disseminated) to different users, and how to further improve and broaden its circulation to the public. The steps taken to move forward in this direction need to be encouraged. They should be part of a broader environmental information strategy, based on a multi-media approach.

### *Adapting information products to different users*

The form in which monitoring data and other types of environmental information are presented should be given careful attention. This information needs to be presented in such a way that it can be correctly interpreted. The usefulness of much of the information being made available in Bulgaria is limited to professionals; user-friendly explanations are missing.

At national level, even analytical reports such as the MOEW Green Book do not give the user a clear picture of the effects of implemented environmental policies. This defect could be overcome through greater analysis and interpretation of the information compiled, and through using additional information from other sources. More could also be done to expand the Green Book's scope and to move towards performance evaluation. Consideration should also be given to publishing regional editions of the Green Book.

At local level, efforts are needed to provide citizens with environmental information relevant to their local context, such as that on environmental services (e.g. waste collection and disposal, water supply, waste water treatment, and related prices and charges). Since charges are directly paid to the state and then allocated to municipalities, people often do not understand the links between the fees or charges they pay and the services provided by their municipality.

Another example is information derived from urban air quality monitoring. While monitoring data indicate that there are serious pollution problems in some areas of Sofia, the media are unable to present the results in a way that would be understandable by a non-specialist audience. This problem calls for further analyses and digestion of monitoring information, to make it understandable and suitable for publication in the press. In general, clearer links between monitoring efforts and reporting on the state of the environment are advisable. Since the interpretation of many types of monitoring data requires highly technical knowledge, it is advisable to make them available to the public in the form of aggregated or indexed figures and to provide some assistance in interpreting them.

### *Diversifying reporting products*

The experience gained through publication of state of the environment reports and environmental information bulletins on air and radiation should be extended to a broader range of products, well targeted to various audiences and users.

In the short term, attention should be given to preparing compact, easy-to-read and well digested products targeted at a wider audience (e.g. booklets containing key environmental data or sets of key indicators, thematic leaflets or brochures) and to regular publication of environmental indicators (as part of the annual Green Book or as a stand-alone publication). Another type of useful product is the summary report providing information on specific environmental topics, with links to appropriate information sources at different administrative levels and relevant reporting obligations. Some of these products can be produced at relatively low cost.

### *Diversifying dissemination tools*

More use could be made of different and complementary media to disseminate environmental reports and other information products to a broader audience (e.g. reports on paper, CD-ROMs, videos, radio/television, articles in the press, internet). While the amount of information accessible on internet is regularly expanding, little has been done so far with respect to electronic publications. While the actual data accessible on internet are limited, the amount and scope of the information on internet could easily be expanded. This applies in particular to the Green Book and to environmental statistics produced by the NSI, which deserve greater visibility. Other information that could benefit from systematic dissemination via internet includes data and reports compiled in Bulgaria at the request of international organisations that have not yet been made available locally, as well as information on Local Agenda 21 projects collected by the ExEA that has been planned to be available on paper only.

Putting data on internet is a low cost solution, but it should be borne in mind that internet does not replace other means of dissemination. In Bulgaria, the internet connection rate is not very high. This points to the need for a broader dissemination strategy, making use of a mix of tools adapted to various audiences. Greater use of internet will first serve the administration itself, professional users such as consulting firms, academics, and certain NGOs. It will also help increase the visibility of Bulgaria's work in this area internationally.

# PART II. SELECTED ENVIRONMENTAL DATA AND INDICATORS

1. **Climate change**
2. **Air quality and emissions**
3. **Waste generation**
4. **Water quality**
5. **Water resources**
6. **Biodiversity**
7. **Pollution abatement and control expenditure**
8. **Economic growth**
9. **Population trends**

The following pages are based on Bulgaria's replies to the joint OECD/Eurostat questionnaire on the state of the environment and have been complemented with data from other OECD and international sources, as well as from selected national reports.

Whenever possible, values for Bulgaria are presented alongside values for the Russian Federation, Finland, Greece, Hungary and Portugal. When reading these pages, one should keep in mind that that definitions and measurement methods vary among countries and that comparisons require great caution.

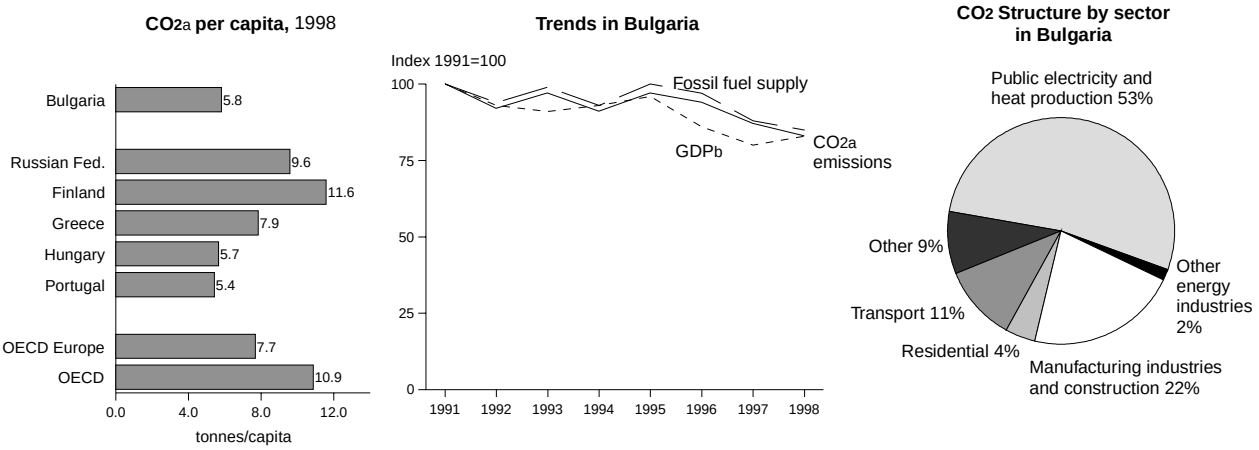
## 1 CLIMATE CHANGE

There are a large number of gases whose presence in the atmosphere reduces the rate at which heat is radiated from the earth i.e. greenhouse gases (GHGs). After water vapour, the most important greenhouse gas is carbon dioxide ($CO_2$). The Kyoto Protocol includes five other gases or groups of gases: methane ($CH_4$), nitrous oxide ($N_2O$), hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride. The last three do not spontaneously exist in nature, while emissions of $CO_2$, $CH_4$ and $N_2O$ may be of either human ("anthropogenic") or natural origin. After $CO_2$, methane is the most important anthropogenic GHG. The main sources of $CO_2$ are fossil fuel burning and deforestation; large sources of methane are animal husbandry, rice production and natural gas venting. Fluorine compounds' in the atmosphere originate largely from leakage from their use in refrigeration and in aluminium and magnesium manufacture.

In July 2000 the Bulgarian Council of Ministers adopted a National Climate Change Action Plan. The policy and the measures for a reduction of GHG emissions, as provided for in the Action Plan, cover all economic sectors and make provisions for the attaining of the highest economic efficiency at the lowest cost. The measures are based on both technical solutions and legal, institutional, managerial and behavioural changes. In a short term period (2-3 years), Bulgaria assumed, and fulfilled, the obligation that anthropogenic GHG emissions in the year 2000 should not increase above the levels of emissions of these gases of the base year of 1988. In the longer term (5-10 years), Bulgaria has the obligation to reduce anthropogenic GHG emissions between 2008 and 2012 by 8% compared to the base year. Between 1990 and 1998 CO2 emissions from energy use have decreased by 16.6%.

The indicators presented below relate to $CO_2$ emissions from energy use. They show emission intensities per unit of GDP and per capita for 1998, and related changes since 1980 and 1991. All emissions presented here are gross direct emissions, excluding sinks and indirect effects.

**Emissions of CO2 from energy use[a]**




| | CO2 emissions from energy use[a] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | | | | | per capita | | per GDP | |
| | million tonnes | | | % change | | tonnes/cap. | % change | tonnes/1000USD | % change |
| | 1980 | 1991 | 1998 | since 1980 | since 1991 | 1998 | since 1991 | 1998 | since 1991 |
| Bulgaria | 84.0 | 58.3 | 48.6 | -42.2 | -16.6 | 5.8 | -13.3 | 1.4 | 0.8 |
| Russian Fed. | .. | 2152.0 | 1415.8 | .. | -34.2 | 9.6 | -33.7 | 1.5 | .. |
| Finland | 59.3 | 56.3 | 59.7 | 0.7 | 6.1 | 11.6 | 3.6 | 0.5 | -11.6 |
| Greece | 46.0 | 70.3 | 82.6 | 79.5 | 17.5 | 7.9 | 14.0 | 0.6 | 4.2 |
| Hungary | 80.7 | 65.4 | 57.4 | -28.8 | -12.2 | 5.7 | -10.2 | 0.6 | -21.5 |
| Portugal | 24.6 | 41.3 | 54.3 | 121.0 | 31.6 | 5.4 | 30.1 | 0.4 | 10.9 |
| OECD Europe | 4230.3 | 4005.6 | 3970.9 | -6.1 | -0.9 | 7.7 | -4.1 | 0.4 | -14.0 |
| OECD | 10935.7 | 11147.3 | 12053.9 | 10.2 | 8.1 | 10.9 | 2.6 | 0.5 | -9.6 |

a) International marine and aviation bunkers are excluded.
b) GDP at 1995 prices and purchasing power parities.
*Source: OECD, IEA.*

## AIR QUALITY AND EMISSIONS 2

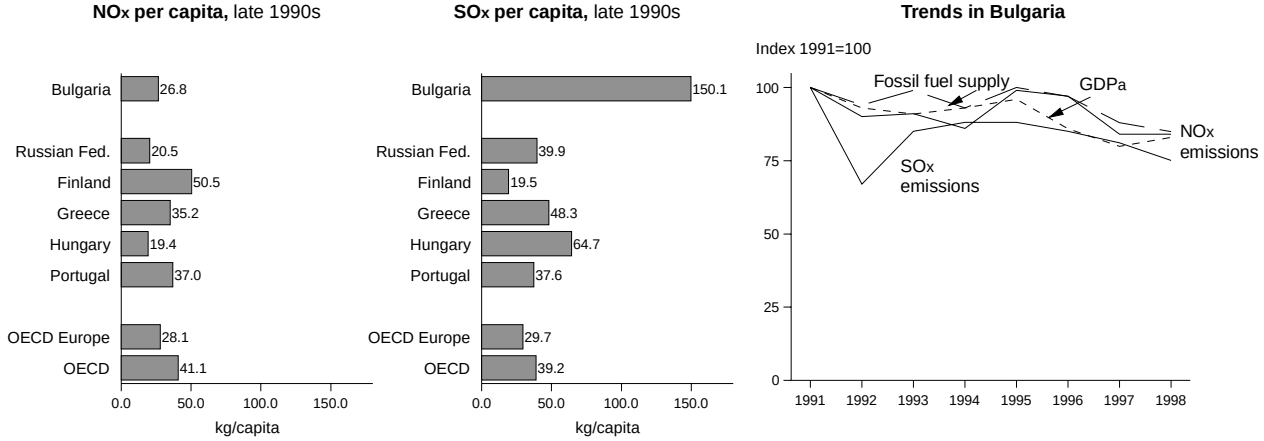
The main contributors to regional and local air pollution are atmospheric pollutants from energy transformation, energy consumption and industrial processes. Principal pollutants include carbon monoxide (CO), nitrogen oxides $NO_x$, sulphur dioxide ($SO_2$), volatile organic compounds (VOC) and particulate matter (PM). Human exposure to air pollution leads to adverse health effects, ranging from respiratory problems to carcinogenesis. Health effects are most acute for children, asthmatic and the elderly, and can damage ecosystems and material. Degraded air quality can result from and cause unsustainable development patterns. It can have substantial economic and social consequences ranging from medical costs and building restoration needs to reduce agricultural productivity, forest damage and a generally lower quality of life.

In Europe, the problem of acidification has led to several international agreements, i.e. the Convention on Long-Range Transboundary Air Pollution – LRTAP (Geneva 1979) and its protocols to reduce emissions of sulphur (Helsinki 1985, Oslo, 1994 and Gothenburg 1999), nitrogen (Sofia 1988 and Gothenburg 1999) and VOCs (Geneva 1991, Gothenburg 1999) have been adopted. Two other protocols aim at reducing emissions of heavy metals (Aarhus 1998) and persistent organic pollutants (Aarhus 1998).

The objective of air quality management in Bulgaria is to reach the recently introduced limits for contents of harmful substances in the ambient air, according to the European Framework legislation and the EU Directives, through elaboration of the respective long-terms programs for the improvement of the air quality and their action plans. Some of the main specific objectives are: to improve energy efficiency and liquid fuel quality, to reduce harmful emissions from large combustion plants and other stationary sources, as well as traffic emissions, and to implement measures to reduce fugitive emissions of VOC and ozone precursors. Between 1990 and 1998, $SO_x$ and $NO_X$ emissions of Bulgaria have decreased by 38%.

The indicators presented here relate to $SO_x$ and $NO_x$ emissions, expressed as $SO_2$ and $NO_2$ respectively. They show emission intensities per unit of GDP and per capita for the late 1990s, and related changes since 1990. They are complemented with indicators on urban air quality expressed as trends in annual SO2 and NO2 concentrations for selected cities.

### NOx and SOx emissions

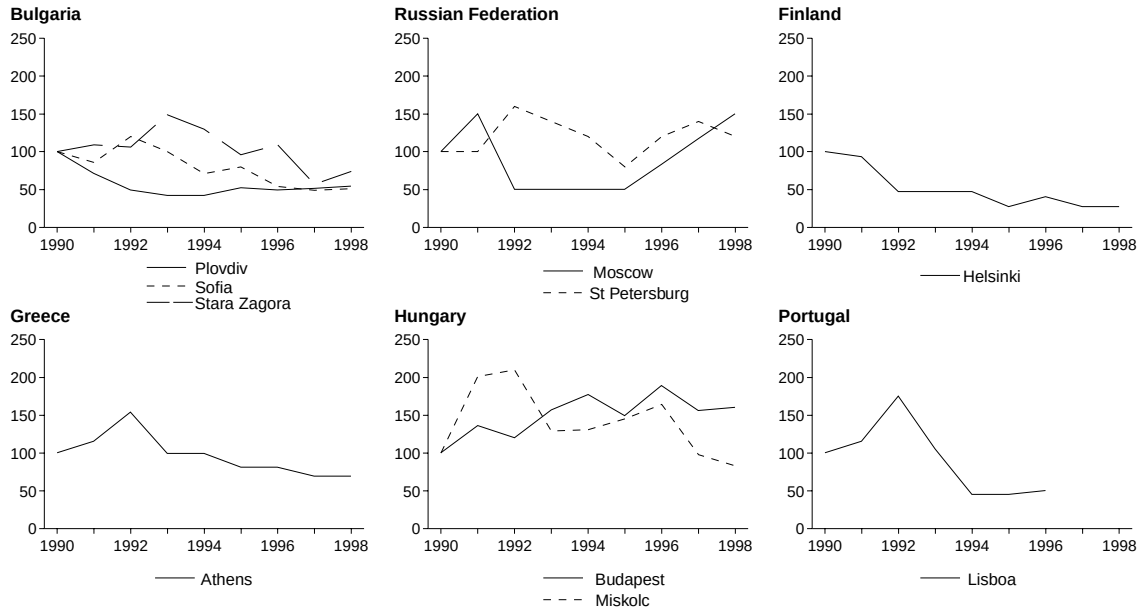



| | NOx emissions | | | | | | SOx emissions | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 000 t. late 90s | % change since 1990 | Per cap. late 90s | % change since 1990 | per GDP[a] late 90s | % change since 1990 | 1 000 t. late 90s | % change since 1990 | Per cap. late 90s | % change since 1990 | per GDP[a] late 90s | % change since 1990 |
| Bulgaria | 223.0 | -38.2 | 26.8 | -35.4 | 6.2 | 1.3 | 1251.0 | -37.7 | 150.1 | -34.8 | 35.0 | -9.9 |
| Russian Fed. | 3029.2 | -40.8 | 20.5 | -40.4 | 3.3 | .. | 5876.5 | -39.3 | 39.9 | -39.0 | 6.3 | .. |
| Finland | 259.8 | -13.4 | 50.5 | -16.0 | 2.4 | -19.0 | 100.3 | -61.4 | 19.5 | -62.6 | 0.9 | -63.9 |
| Greece | 369.2 | 7.7 | 35.2 | 3.5 | 2.6 | -4.5 | 507.0 | -0.4 | 48.3 | -4.3 | 3.6 | -11.7 |
| Hungary | 197.4 | -17.0 | 19.4 | -15.3 | 2.0 | -11.8 | 656.7 | -35.0 | 64.7 | -33.6 | 6.7 | -30.8 |
| Portugal | 369.3 | 16.5 | 37.0 | 15.3 | 2.4 | -4.0 | 374.9 | 4.3 | 37.6 | 3.2 | 2.5 | -14.1 |
| OECD Europe | 14400.0 | -14.8 | 28.1 | -17.5 | 1.7 | -21.0 | 15200.0 | -39.0 | 29.7 | -40.9 | 1.8 | -29.7 |
| OECD | 44900.0 | -3.4 | 41.1 | -8.0 | 2.1 | -17.9 | 42800.0 | -24.1 | 39.2 | -27.7 | 2.0 | -27.9 |

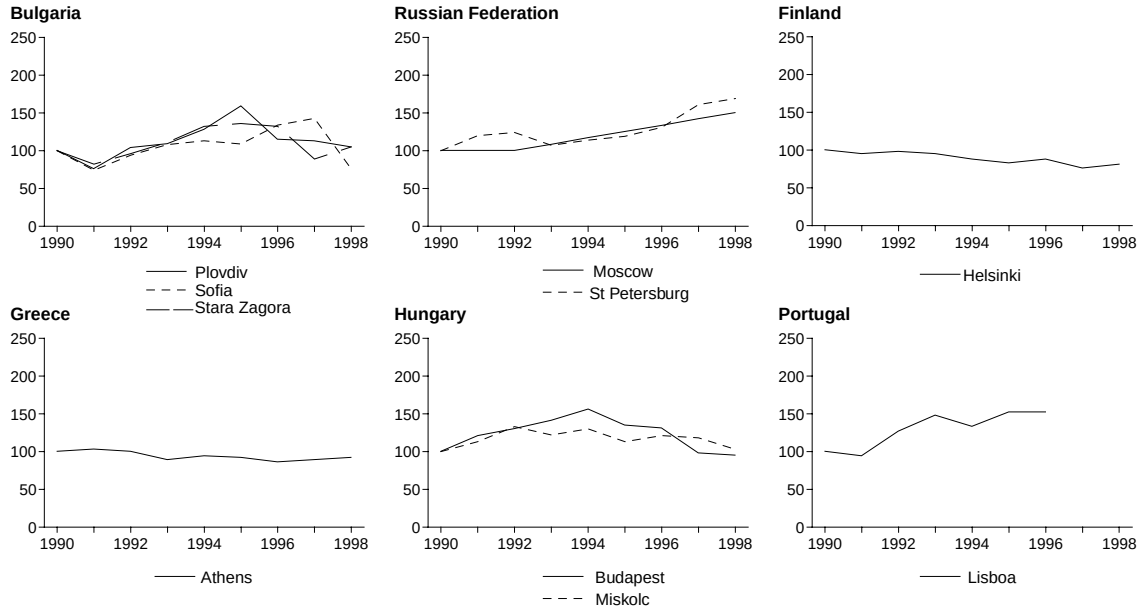
a) GDP at 1995 prices and purchasing power parities.
BUL) % change per GDP: since 1991.
RUS) % change: stationary sources only.
*Source: OECD.*

## 2 AIR QUALITY – TRENDS IN URBAN AREAS

**Concentrations of SO2 (Index 1990=100)**




**Concentrations of NO2 (Index 1990=100)**




| | | 1990 | **$SO_2$** (Index 1990=100) | | | | | | | | 1990 | **$NO_2$** (Index 1990=100) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | City | (µg/m³) | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | (µg/m³) | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 |
| Bulgaria | Sofia | 35 | 100 | 86 | 120 | 100 | 71 | 80 | 54 | 49 | 51 | 53 | 100 | 74 | 94 | 108 | 113 | 109 | 134 | 143 | 76 |
| | Plovdiv | 172 | 100 | 71 | 49 | 42 | 42 | 52 | 49 | 51 | 54 | 46 | 100 | 76 | 104 | 109 | 128 | 159 | 115 | 113 | 105 |
| | Stara Zagora | 47 | 100 | 109 | 106 | 149 | 130 | 96 | 109 | 57 | 74 | 28 | 100 | 82 | 96 | 111 | 132 | 136 | 132 | 89 | 105 |
| Russian Fed. | Moscow | 2 | 100 | 150 | 50 | .. | .. | 50 | .. | .. | 150 | 80 | 100 | 100 | 100 | .. | .. | 125 | .. | .. | 150 |
| | St Petersburg | 5 | 100 | 100 | 160 | 140 | 120 | 80 | 120 | 140 | 120 | 59 | 100 | 120 | 124 | 107 | 114 | 119 | 131 | 161 | 169 |
| Finland | Helsinki | 15 | 100 | 93 | 47 | 47 | 47 | 27 | 40 | 27 | 27 | 42 | 100 | 95 | 98 | 95 | 88 | 83 | 88 | 76 | 81 |
| Greece | Athens | 39 | 100 | 115 | 154 | 99 | 99 | 81 | 81 | 69 | 69 | 63 | 100 | 103 | 100 | 89 | 94 | 92 | 86 | 89 | 92 |
| Hungary | Budapest | 12 | 100 | 136 | 120 | 157 | 177 | 149 | 189 | 156 | 160 | 37 | 100 | 121 | 130 | 141 | 156 | 135 | 131 | 98 | 95 |
| | Miskolc | 26 | 100 | 201 | 210 | 129 | 131 | 145 | 164 | 98 | 83 | 26 | 100 | 113 | 133 | 122 | 130 | 113 | 121 | 118 | 103 |
| Portugal | Lisboa | 20 | 100 | 115 | 175 | 105 | 45 | 45 | 50 | .. | .. | 33 | 100 | 94 | 127 | 148 | 133 | 152 | 152 | .. | .. |

*Source: OECD*

## WASTE GENERATION 3

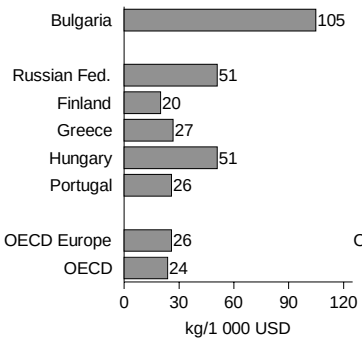
Waste is generated at all stages of human activities. Its composition and amounts depend largely on consumption and production patterns. Main concerns relate to the potential impact from inappropriate waste management on human health and the environment (soil and water contamination, air quality, land use and landscape). Amounts of solid waste going to final disposal are on the increase as are overall trends in waste generation. This raises important questions as to the capacities of existing facilities for final treatment and disposal and as to the location and social acceptance of new facilities. Hazardous waste, mainly from industry, is of particular concern since it entails serious environmental risks if badly managed. Also, long-term policies are needed for the disposal of high-level radioactive waste.

Waste management issues are at environmental centre stage in many countries. Responses have been directed mainly towards collection, treatment and disposal. Increasingly, waste minimisation can be achieved through waste prevention, reuse, recycling and recovery, and more broadly through better integration of environmental concerns into consumption and production patterns.

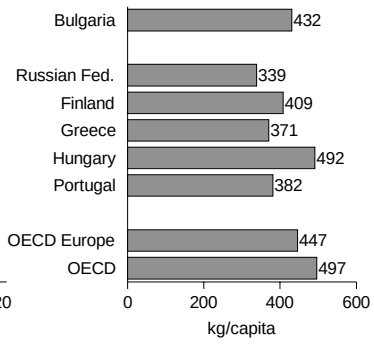
Some of the main objectives in the solid waste management policy in Bulgaria are treatment of waste at minimum risk to human health and the environment, approximation of EU legal requirements, implementation of "polluter pays principle" and public participation and awareness. Concerning hazardous waste management, the main priority will be the increase of investments in hazardous waste management including through external financing. Around 77% of the total amount of treated hazardous waste are disposed off in landfills on site of the enterprises. These landfills have exhausted their capacity and do not comply with the requirements of the modern national legislation, which is already harmonised with the relevant European Union directives.

The indicators presented here relate to amounts of municipal and industrial waste generated. They show waste generation intensities expressed per capita and per unit of GDP for the late 1990s.

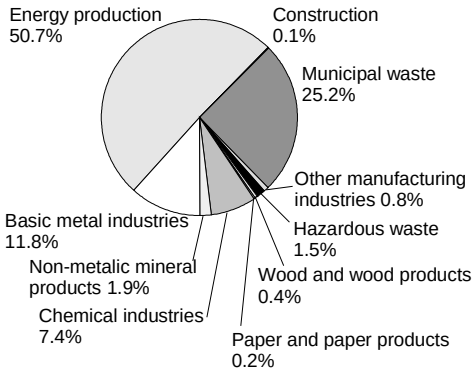
**Municipal waste per unit of GDP**, late 1990s




**Municipal waste per capita**, late 1990s




**Waste generation**, 1998




Total 12 701 000 t

| | Municipal waste, late 1990s[a] | | | Industrial waste (manufacturing industries) late 1990s[a] | | |
|---|---|---|---|---|---|---|
| | Total amounts (1000 tonnes) | kg/capita | per GDP[b] kg/1000 USD | Total amounts (1000 tonnes) | kg/capita | per GDP[b] kg/1000 USD |
| Bulgaria | 3628 | 432 | 105 | 3624 | 432 | 105 |
| Russian Fed. | 50000 | 339 | 51 | .. | .. | .. |
| Finland | 2100 | 409 | 20 | 11400 | 2218 | 107 |
| Greece | 3900 | 371 | 27 | 6680 | 636 | 47 |
| Hungary | 5000 | 492 | 51 | | | 0 |
| Portugal | 3800 | 382 | 26 | 420 | 42 | 3 |
| OECD Europe | 230000 | 447 | 26 | 436000 | 848 | 49 |
| OECD | 547000 | 497 | 24 | 1496000 | 1359 | 66 |

a) Data refer to 1997 or to most recent year.
b) GDP at 1995 prices and PPPs.

*Source: OECD*

## 4 WATER QUALITY

From 1940 to 1990 in many developed countries, contamination by pollutants has seriously degraded water quality in many rivers, lakes, and groundwater sources, effectively decreasing the supply of fresh water. The result has been increased pressure on freshwater resources in most regions of the world and a lack of adequate supplies in some localities. Main concerns relate to the impacts of water pollution (eutrophication, acidification, toxic contamination) on human health, on the cost of drinking water treatment and on aquatic ecosystems.

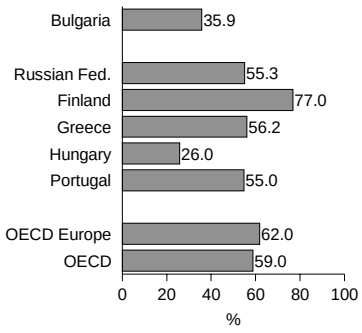
Pollution treatment capacity has not significantly expanded, nor has the operation of existing facilities improved. The quality of the drinking water supplied for the population is regulated by the Bulgarian State Standard 2823/83 “Drinking water” through organoleptic, physical, chemical, microbiological and radiological parameters. Around 3% of the population connected to drinking water supply systems uses water with higher level of nitrates. In some regions the level of manganese in the water exceeds the limits; this has a negative impact on the organoleptic qualities of the water and causes problems for the maintenance of the water network and installations.

The period after 1989 was characterised by significant reduction of discharges in the surface water and ground water resulting in an improvement of their quality parameters. This improvement is due to restricted activities and phasing out some industrial enterprises, as well as to ecological measures taken. Notwithstanding the positive changes registered, along the course of the rivers monitored there are considerable deviations in water quality for such indicators as ammonium nitrogen, BOD5, dissolved oxygen.

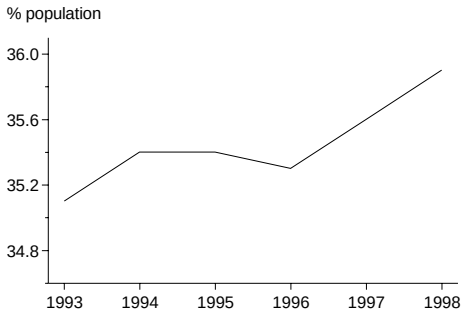
Monitoring and control of surface water quality are performed by the National system for ecological monitoring (NASEM), subsystem "Control and water protection", section "Surface water" and sector "Ground water". The National network for control and protection of surface water in 1995 includes 332 monitoring stations, of which 276 on domestic rivers, 21 stations along the Bulgarian stretch of the Danube River and 11 on inner lakes and basins. The quality of the Black Sea is monitored by 24 stations. Groundwater is monitored by a system of monitoring stations, including 43 springs.

The indicators presented here relate to waste water treatment. They show the percentage of the national population actually connected to public sewerage and waste water treatment plants in the late 1990s. The extent of secondary (biological) and/or tertiary (chemical) treatment provides an indication of efforts to reduce pollution loads. They are complemented with indicators on river water quality presenting three parameters: dissolved oxygen, biological oxygen demand and nitrates for selected rivers.

**Population connected to public sewage treatment**




**Trend in Bulgaria**, 1993-1998




| | Year | Connected to public sewerage | | | | | | Not connected to public sewerage |
|---|---|---|---|---|---|---|---|---|
| | | Total | of which | | | | | |
| | | | Connected to a sewage treatment plant (STP) | | | | Not connected to a STP | |
| | | | Total | of which Mechanical | Biological | Advanced | | |
| Bulgaria | 1998 | 66.7 | 35.9 | 0.9 | 35.0 | - | 30.0 | 33.3 |
| Russian Fed. | 1993 | .. | 55.3 | .. | .. | .. | .. | .. |
| Finland | 1993 | 77.3 | 77.0 | .. | .. | .. | 0.3 | 22.7 |
| Greece | 1997 | 67.5 | 56.2 | 32.4 | 14.2 | 9.6 | 11.3 | 32.5 |
| Hungary | 1998 | 48.0 | 26.0 | 3.0 | 20.0 | 3.0 | 22.0 | 52.0 |
| Portugal | 1999 | 75.0 | 55.0 | .. | .. | .. | 20.0 | 25.0 |

GRC) Treatment data include connections still under construction
*Source: OECD*

## WATER QUALITY 4

**Water quality of selected rivers,** annual mean concentrations*, 1990-1999

| | | 1990 | 1992 | 1995 | 1998 | 1999 |
|---|---|---|---|---|---|---|
| | | **Dissolved oxygen,** mg O2/liter | | | | |
| Bulgaria | Ogosta | 7.1 | 7.9 | 8.7 | 8.6 | 8.3 |
| | Iskar | 7.4 | 9.0 | 7.3 | 7.6 | 8.1 |
| | Osam | 6.7 | 8.5 | 9.7 | 10.4 | 9.8 |
| | Jantra | 7.0 | 9.4 | 9.1 | 9.8 | 9.5 |
| Finland | Torniojoki | 11.80 | 11.10 | 11.4 | 11.7 | .. |
| | Kymijoko | 10.90 | 11.80 | 11.2 | 12.1 | .. |
| | Kokemäenjoki | 11.80 | 10.90 | 10.6 | 10.6 | .. |
| Greece | Strimonas | 10.9 | 10.5 | 11.5 | 9.8 | 11.1 |
| | Axios | 10.6 | 11.4 | 12.1 | 8.3 | 8.5 |
| | Pinios | 11.4 | 11.1 | 8.6 | 7.4 | 7.8 |
| Hungary | Duna | 9.8 | 9.7 | 9.6 | 9.6 | 9.7 |
| | Drava | 10.3 | 10.7 | 9.8 | 9.8 | 9.8 |
| | Tisza | 11.6 | 11.9 | 11.3 | 12.1 | 12.7 |
| | | **Biochemical oxygen demand,** mg O2/liter | | | | |
| Bulgaria | Ogosta | 11.9 | | 5.1 | 3.6 | 2.7 |
| | Iskar | 12.9 | | 5.5 | 6.6 | 3.7 |
| | Osam | 11.6 | | 5.4 | 4.7 | 4.2 |
| | Jantra | 22.7 | | 8.5 | 6.5 | 3.6 |
| Greece | Axios | .. | | .. | 14.0 | 3.0 |
| | Aliakmonas | .. | | .. | 3.0 | 2.0 |
| | Nesto | .. | | .. | 4.5 | 4.4 |
| Hungary | Duna | 3.1 | | 2.5 | 2.6 | 2.1 |
| | Drava | 3.4 | | 3.1 | 3.0 | 2.9 |
| | Tisza | 1.5 | | 2.0 | 2.6 | 3.6 |
| | | **Nitrate,** mgN/liter | | | | |
| Bulgaria | Ogosta | 14.00 | 12.40 | 2.60 | 4.30 | 1.60 |
| | Iskar | 6.30 | 6.30 | 1.70 | 4.90 | 1.80 |
| | Osam | 2.80 | 3.20 | 1.50 | 1.10 | 1.50 |
| | Jantra | 2.70 | 3.00 | 0.90 | 1.40 | 1.90 |
| Finland | Torniojoki | 0.03 | 0.06 | 0.07 | 0.06 | .. |
| | Kymijoko | 0.25 | 0.28 | 0.23 | 0.19 | .. |
| | Kokemäenjoki | 1.04 | 0.65 | 0.51 | 0.71 | .. |
| Greece | Strimonas | 1.06 | 1.04 | 1.51 | 1.04 | 1.52 |
| | Axios | 1.94 | 1.94 | .. | 0.66 | 1.24 |
| | Pinios | 3.01 | 1.63 | .. | 2.07 | 2.04 |
| Hungary | Duna | 3.90 | 3.70 | 3.40 | 3.40 | 3.00 |
| | Drava | 5.44 | 5.75 | 8.18 | 6.06 | 6.50 |
| | Tisza | 4.56 | 4.83 | 4.10 | 3.39 | 2.84 |

FIN) 1998 data refers to 1997.
*Source: OECD*

*. *measured at mouth or downstream frontier.*

## 5 WATER RESOURCES

Despite improvements in the efficiency of water use in many developed countries, the demand for fresh water has continued to increase as the world's population and economic activity have expanded. Main concerns relate to the efficient use of water and to its environmental and socio-economic consequences: low river flows, water shortages, salinisation of freshwater bodies in coastal areas, human health problems, loss of wetlands, desertification and reduced food production.

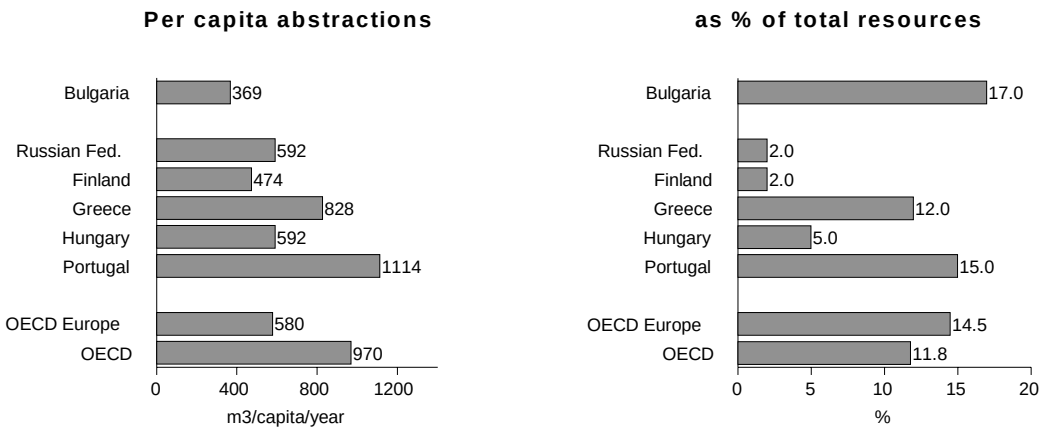
Bulgaria has limited water resources, which are unevenly distributed, both on the territory of the country, and in terms of seasons and years. Due to continuous draughts in 1993-96, unsustainable exploitation of some water sources and delayed policy measures, it was necessary to restrict public water supply in a number of regions. During the 1996-98 period, fresh water abstracted amounted to 3.1 – 3.5 billion cubic metres a year, of which 73-% of surface water and 24-27 % of groundwater. While abstractions of surface water were rather stable, there was a drop in the use of groundwater, mainly due to decreased use of water for irrigation and industrial production.

The country's internal water resources are quite modest - 21 billion $m^3$/per annum, i.e. 2.500 $m^3$/per capita per annum. By this indicator Bulgaria ranks lowest among all Balkan countries. If external resources are taken into account (the inflow from neighbouring countries), the difference remains. Bulgaria thus shows a rather high intensity of water use compared to available resources.

This situation creates an unfavourable pattern for water consumption and irrigation. Consequently, water resources in Bulgaria during the last 50 years have necessitated intensive runoff control.

The indicators presented here relate to the intensity of use of water resources, expressed as gross abstractions per capita, as % of total available renewable freshwater resources (including inflows from neighbouring countries) for the late 1990s.

**Freshwater abstractions, late 1990s**




**Freshwater abstractions**

| | Total million m3 | Total million m3 | Abstractions per capita m3/cap | Abstractions as % of available renewable freshwater resources |
|---|---|---|---|---|
| | 1990 | late 1990s (a) | late 1990s (a) | late 1990s (a) |
| Bulgaria | 4769 | 3096 | 369 | 17 |
| Russian Federation | 126083 | 87366 | 592 | 2 |
| Finland | 2347 | 2437 | 474 | 2 |
| Greece | .. | 8695 | 828 | 12 |
| Hungary | 6293 | 6011 | 592 | 5 |
| Portugal | 8600 | 11090 | 1114 | 15 |
| OECD Europe* | 292600 | 290000 | 580 | 15 |
| OECD | 1001500 | 1042200 | 970 | 12 |

a) Data refer to 1997 or latest available year
*Source: OECD*

# BIODIVERSITY 6

The geographic position, climate topography and ecosystem coverage of Bulgaria combine to give it a high diversity of species and habitats, including about 27000 insects and other invertebrate species, 3550-3783 vascular plants, more than 6500 non-vascular plants and fungi, up to 736 vertebrates (of which 81-94 mammals, 374-383 birds, 33-36 reptiles, 16-17 amphibians, and 207 seawater and freshwater fish). More than 50 per cent of the country retains areas of native and semi-native vegetation, chiefly due to the extent of forest cover and mountainous areas.

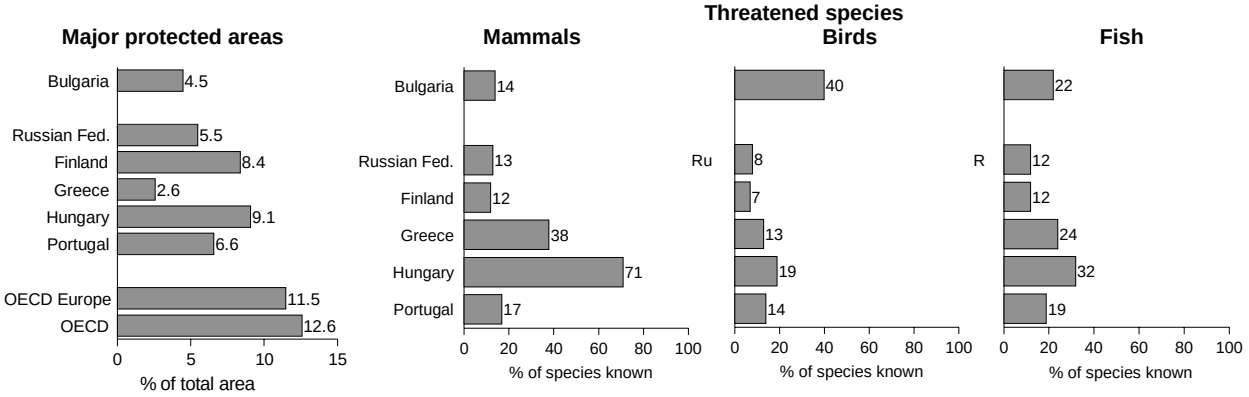
About 60% of the forests consist of native species and about 9% is within protected areas. Tree species composition is distorted in favour of conifers, with pine being the main species. The area planted with conifers has doubled in 30 years, while deciduous trees have seen a decrease of 28%. Forests are either state property (about 85%) or a combination of municipal, co-operative and church owned. Several of Bulgaria's protected areas are of international importance (certain forests, high mountain grasslands, alpine areas). The forest includes the only example of pontic beech forest in Europe.

Despite its small territory Bulgaria is rich in endemic species. About 200 endemic species of the Balkans have been found in Bulgaria: invertebrate non-insects (8.8%), insects (4.3%), plants (5%), freshwater fish (5.7%), amphibians (5.8%), reptiles (11.1%), and mammals (4.3%).

Due to the increasing anthropogenic pressures of the past decades, a few species are extinct. Among them, 27-31 species of vascular plants, 7 invertebrates, 3 fish species, 2 reptiles, 3 birds and 2 mammals species. Six breeds of indigenous domestic animals have also disappeared During the past three years 327 birds, 389 plants, 473 animals and 1766 trees have been registered as protected species.

In 1998, Bulgaria's Council of Ministers adopted the Strategy for the Conservation of Biological Diversity, and in 1999 the National Biodiversity Conservation Programme. This programme lists 43 new legal instruments that are expected to be introduced by 2003, including: a biodiversity law, a black Sea coast law, a strategy for the conservation and management of forest ecosystem biodiversity, a programme for integrated plant protection in forest, etc. Forests are managed and exploited according to the Forest Law, regulations for forest management, and the National Strategy on Forestry and Forest Management of 1996, reinforced by the State Programme on Management and Control of Forest Resources of 1998.

The indicators presented below relate to the number of threatened or extinct species compared to the number of known or assessed species. Major protected areas and forest areas are provided as a complement.




| | Total area [a] | Forest and other wooded land [a] | Major protected areas [b] | Threatened species: Mammals Species known | Mammals Species threatened [c] | | Birds Species known | Birds Species threatened [c] | | Fish Species known | Fish Species threatened [c] | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1 000 km2) | (% of land area) | (% of total area) | Number | Number | % | known | Number | % | known | Number | % |
| Bulgaria | 111 | 35.4 | 4.5 | 97 | 14 | 14 | 415 | 164 | 40 | 94 | 21 | 22 |
| Russian Fed. | 17 075 | 46.9 | 5.5 | 320 | 40 | 13 | 732 | 56 | 8 | 277 | 34 | 12 |
| Finland | 338 | 76.0 | 8.4 | 59 | 7 | 12 | 240 | 16 | 7 | 59 | 7 | 12 |
| Greece | 132 | 23.0 | 2.6 | 116 | 44 | 38 | 422 | 55 | 13 | 107 | 26 | 24 |
| Hungary | 93 | 19.0 | 9.1 | 83 | 59 | 71 | 373 | 70 | 19 | 81 | 26 | 32 |
| Portugal | 92 | 38.0 | 6.6 | 98 | 17 | 17 | 313 | 43 | 14 | 43 | 8 | 19 |
| OECD Europe | 4975 | 35.0 | 11.5 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| OECD | 34728 | 34.0 | 12.6 | .. | .. | .. | .. | .. | .. | .. | .. | .. |

a) Data refer to latest available year.
b) IUCN management categories I-VI. National classifications may differ
c) "threatened refers to the sum of species "critically endangered", "endangered" and vulnerable (new IUCN categories), or to the sum of species "endangered" and "vulnerable" (old IUCN categories)
BUL) The number of threatened species is 40, of which 16 are considered as critically endangered species
*Source: OECD, IUCN.*

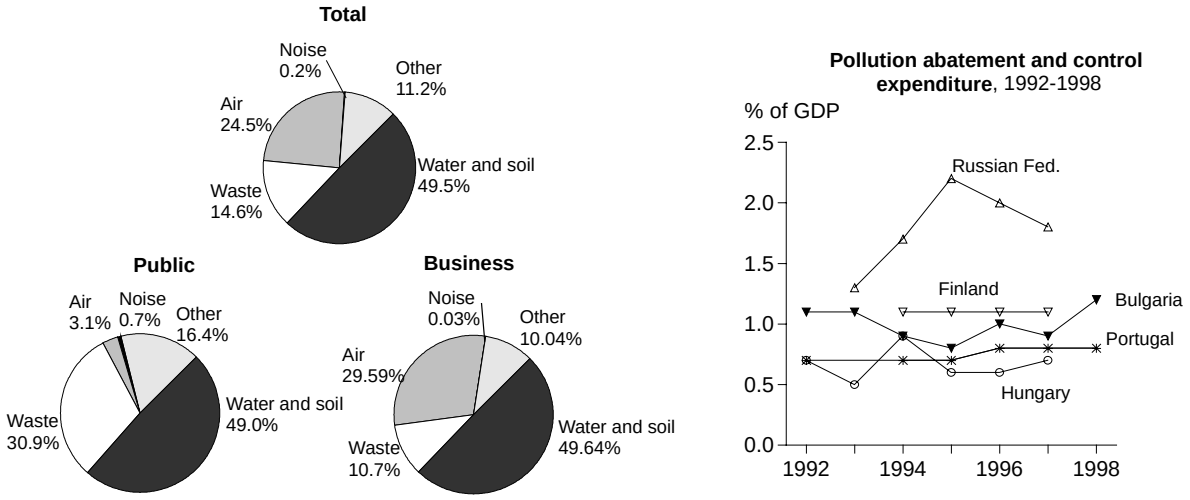
## 7 POLLUTION ABATEMENT AND CONTROL EXPENDITURE

In Bulgaria, the share of direct state subsidies for environmental investments amounts to 1-1.3% of GDP. An increase to 3% of GDP is foreseen over the next 10 years. It primarily concerns programmes closing uranium and ore mining, and investment for municipal waste-water treatment plants and waste disposal sites. The State budget also offers tax exemptions on grants for environmental projects, credit/loans without or at low interest (e.g. to the company NEFTOCHIM). Major sources of finance for environmental protection investment include:

- The National Environmental Protection Fund (NEPF) established in 1992, uses since 1996 taxes on imported fuel that have progressively become its main source of income. Pollution charges are collected nation-wide into non-budgetary accounts held by the Ministry of Finance. Of the total, 60% of fees and 70% of fines are transferred to the NEPF, and the rest going to the municipal funds.
- Municipal Environmental Protection Funds (MEPF) are governed by the same regulation as the NEPF. The funds available to the MEPF are used to finance basically the priority areas listed above for the NEPF, but on the territory of the respective municipalities.
- The National Trust Ecofund (NTEF) has been created following an agreement between Bulgaria and Switzerland called "Nature Debt Swap Agreement". The fund was devoted to the implementation of the Bulgarian Biodiversity Conservation Programme. Its wider objective is to manage funds under debt-for-nature and debt-for-environment swaps, as well as funds provided under other types of agreements with international or national sources, aimed at environmental protection in Bulgaria.
- Options for commercial banks to finance environmental investments were effectively closed as a consequence of the bank crisis in 1994 to 1996 and the restrictive regulations subsequently set by the Government. The surviving banks have gradually recovered and many of them are now ready to offer loans to enterprises.
- Another option is international funding supported by the European Union, the United Nations Development Programme (UNDP), the World Bank, the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB).
- A large number of countries are also offering bilateral assistance to Bulgaria, both to State institutions or municipalities and to private enterprises.

The indicators presented below relate to pollution abatement and control (PAC) expenditure expressed as % of GDP and per capita.

**Pollution abatement and control expenditure**




**Pollution abatement and control expenditure, public and business sectors, 1992-1998**

| | % of GDP | | | | | | | USD per cap. |
|---|---|---|---|---|---|---|---|---|
| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1998 |
| Bulgaria | 1.1 | 1.1 | 0.9 | 0.8 | 1.0 | 0.9 | 1.2 | 19.0 |
| Russian Fed. | .. | 1.3 | 1.7 | 2.2 | 2.0 | 1.8 | .. | .. |
| Finland | .. | .. | 1.1 | 1.1 | 1.1 | 1.1 | .. | 219.0 |
| Greece | .. | .. | .. | 0.8 | .. | .. | .. | 100.0 |
| Hungary | 0.7 | 0.5 | 0.9 | 0.6 | 0.6 | 0.7 | .. | 71.0 |
| Portugal | 0.7 | - | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 123.0 |

a) Activities such as nature protection, natural resource preservation and water supply are excluded, as is expenditure on workplace protection, energy saving or improvement of production processes for commercial or technical reasons, though these may have environmental benefits.

PRT) 1992 data refer to 1991.

*Source: OECD*

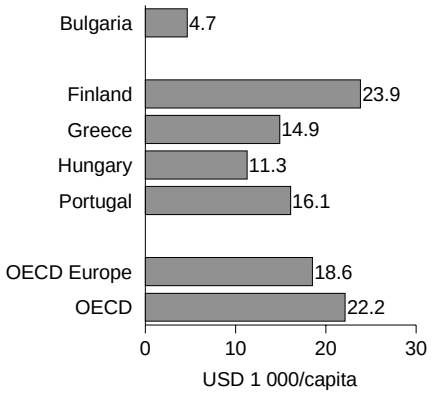
## ECONOMIC GROWTH 8

The standard of living in Bulgaria is low compared to most other eastern European countries. The reasons are common and well known: the political and economic crisis in 1995-1997 accelerated inflation, reduced real income, devaluated savings deposits, increased unemployment, and created additional hardship for a large part of the population. Since 1997 the new government implemented a successful reform policy that has stabilised and gradually started to improve the Bulgarian economy. In the second half of 1997 the GDP showed signs of recovery, but has stayed rather flat ever since. While the annual rate of inflation approached 600% in 1997, it fell to negligible levels in 1998, and has stayed moderate during the recent years. A consolidated budget deficit of over 15% of GDP in 1996 was reduced to 3% the next year, and eliminated totally in 1998. Tax revenue has increased, partly due to tougher tax administration and rules.

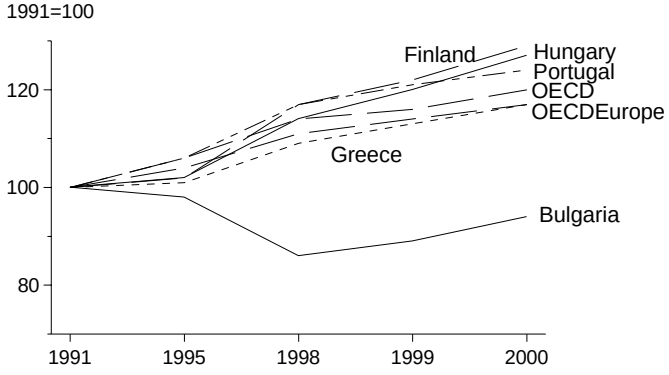
Living standards however still are below the pre-crisis (end of 1995) levels. The monthly average per capita money income in 1998 was less than US$ 50. Roughly half of this income comes from wages and one quarter from pensions. GDP per capita was US$ 1472 in 2000 (4700 if expressed at 1995 prices and PPPs). For many households small plots of land where to raise their own produce are invaluable, while trying to withstand the economic crisis.

Increasing rates of unemployment (17% in 1999), longer duration of unemployment, and a social insurance system in deep crises have been the most important factors feeding poverty. According to labour force surveys more than two thirds of the unemployed suffer long-term unemployment. The private sector (especially small and medium size enterprises) shows some tendency to absorb labour. There is a wide range of programmes for supporting and retraining unemployed workers.

**GDP per capita (a), 2000**




**Trends in GDP (a), Index 100 = 1991**




| | | GDP Million USD | | | | | GDP 1000 USD per capita | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1991 | 1995 | 1998 | 1999 | 2000 | 1991 | 1995 | 1998 | 1999 | 2000 |
| Bulgaria | a) | 43 188 | 41 330 | 35 746 | 36 606 | 38 721 | 5.0 | 4.9 | 4.3 | 4.4 | 4.7 |
| | b) | 6 225 | 12 451 | 12 881 | 11 699 | 12 110 | 0.7 | 1.5 | 1.5 | 1.4 | 1.5 |
| Russian Fed. | a) | .. | 999 312 | 931 826 | .. | .. | .. | 6.7 | 6.3 | .. | .. |
| Finland | a) | 93 393 | 96 318 | 112 164 | 116 835 | 123 508 | 18.6 | 18.9 | 21.8 | 22.6 | 23.9 |
| Greece | a) | 129 910 | 134 095 | 146 418 | 151 337 | 157 544 | 12.7 | 12.8 | 13.9 | 14.4 | 14.9 |
| Hungary | a) | 92 073 | 92 714 | 103 026 | 107 648 | 113 187 | 8.9 | 9.1 | 10.2 | 10.7 | 11.3 |
| Portugal | a) | 128 049 | 136 507 | 151 887 | 156 458 | 161 424 | 13.0 | 13.8 | 15.2 | 15.7 | 16.1 |
| OECD Europe | a) | 7 902 595 | 8 428 163 | 9 109 847 | 9 315 027 | 9 646 063 | 15.8 | 16.5 | 17.7 | 18.0 | 18.6 |
| OECD | a) | 19 332 734 | 21 119 285 | 23 135 771 | 23 872 027 | 2 486 0427 | 18.4 | 19.5 | 20.9 | 21.4 | 22.2 |

a) At 1995 prices and PPPs.
b) At current prices and exchange rates.
*Source: OECD*

## 9 POPULATION TRENDS

Since ancient times, Bulgaria has been a crossroads for population movement. Early settlement occurred mainly in the most fertile agricultural lands. After World War II, Bulgarian cities grew rapidly at the expense of rural population in concert with state industrialisation policy. In 1946 only Sofia and Plovdiv had over 100,000 inhabitants. By 1990, ten cities had populations exceeding 250,000: Burgas, Dobrich (formerly Tolbukhin), Pleven, Plodiv, Ruse, Shumen, Sliven, Sofia, Stara Zagora, and Varna.

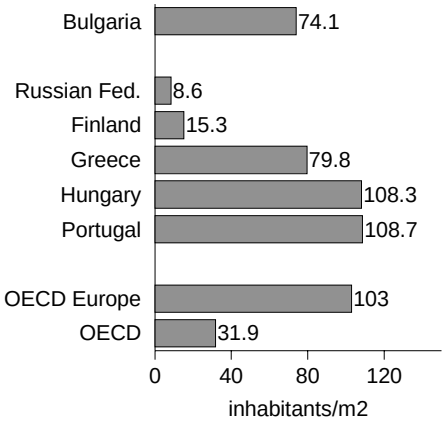
In 1990 nearly one-third of Bulgaria's population lived in the ten largest cities; two-thirds of the population was urban. Although the urban birth rate declined after the mid-1970s, large-scale migration from rural areas to cities continued through 1990. At the same time, migration from cities to rural areas more than doubled from the 1960s to the 1980s, mainly because more mechanical and service jobs became available in agriculture during that period. In cities such as Sofia and Plovdiv, where industrialisation started earliest, the population stabilised and the repercussions of rapid population growth slowed down in the 1980s.

After having grown by 0.16% annually in the 1980s, the population has fallen significantly during the 1990s as a result of a negative rate of natural increase and emigration partly prompted by worsening economic conditions. In 2000, Bulgaria's population was 8.2 million.

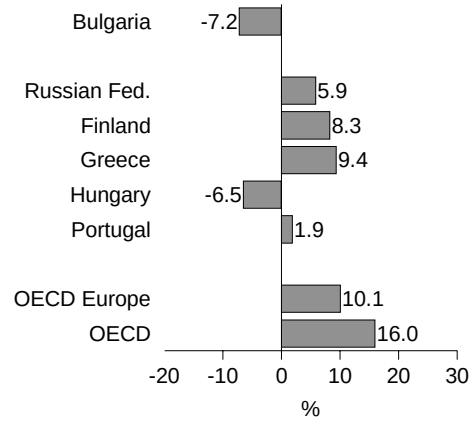
The turmoil of 1996 and 1997 is visible in many demographic, health and economic indicators: Between 1995 and 1997 the birth rate, death rate, number of registered cancer cases and especially infant mortality rate have continued to decline. In 1997 the death rate almost doubled the birth rate. In 1998, 16.3% of the population was under 15 and 15.9% over 65 years.

At 74.1 inhabitants per square kilometre, the population density is below the average for countries of OECD Europe and of Central and Eastern Europe. About 70% of the population live in urban areas. Sofia, the capital, has a population of 1.18 million. Other large cities include Plovdiv (340 000), Varna (300 000), Ruse (192 000), Burgas (182 000) and Stara Zagora (150 000).

**Population density, 2000**




**Population change, in %, 1990-2000**




| | National Population[a] 1000 | | | | | | | | % change | Population density[b] (inh./km2) |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1980 | 1985 | 1990 | 1995 | 1997 | 1998 | 1999 | 2000 | 1990-2000 | 2000 |
| Bulgaria | 8862 | 8960 | 8718 | 8499 | 8393 | 8336 | 8279 | 8227 | -7 | 74 |
| Russian Fed. | 138765 | 143585 | 148292 | 148097 | 147656 | 147434 | 147196 | 146970 | 6 | 9 |
| Finland | 4779 | 4902 | 4986 | 5108 | 5140 | 5153 | 5166 | 5174 | 8 | 15 |
| Greece | 9642 | 9934 | 10089 | 10454 | 10498 | 10507 | 10534 | 10553 | 9 | 80 |
| Hungary | 10707 | 10579 | 10365 | 10229 | 10155 | 10114 | 10068 | 10016 | -6 | 108 |
| Portugal | 9819 | 10014 | 9877 | 9921 | 9957 | 9979 | 9988 | 10008 | 2 | 109 |
| OECD Europe | 472115 | 483277 | 495921 | 509961 | 514174 | 516046 | 518026 | 519633 | 10 | 103 |
| OECD | 967035 | 1006439 | 1041753 | 1084952 | 1100589 | 1107917 | 1115371 | 1121875 | 16 | 32 |

a) All nationals present in or temporalily absent from a country, and aliens permanently settled in the country.
b) National population divided by the value of total land area.
*Source: OECD*

# ANNEXES

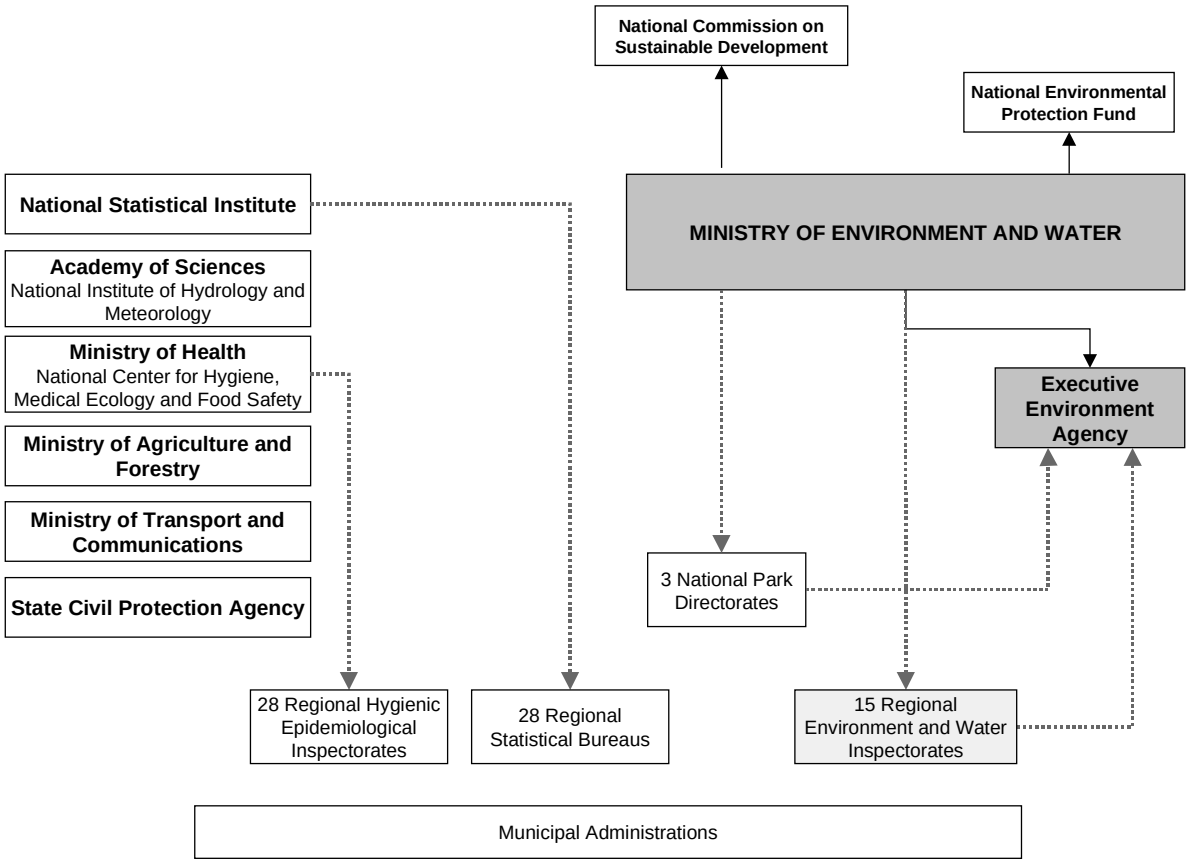
## ANNEX I. MAP AND BASIC STATISTICS OF BULGARIA


The Republic of Bulgaria covers a territory of 111 000 km$^2$ on the Balkan peninsula. It extends from the western shore of the Black Sea to parts of the former Yugoslavia and the Former Yugoslav Republic of Macedonia (FYROM) in the west. In the north, where the Danube forms the greater part of the border, is Romania. Greece and Turkey lie to the south and south-east. About half of Bulgaria is mountainous. The country can be divided into three parallel east-west zones: the Danubian plain in the north, the Balkan mountains (Stara Planina) in the centre and the Thracian plain and Rhodope, Rila and Pirin Mountains in the south. Bulgaria has a complex drainage system characterised, with the exception of the Danube, by fairly short rivers. There are three drainage areas: one discharging to the Danube, one to the Aegean Sea and one emptying to the Black Sea. Major lakes, mostly relatively small, are found in the mountains of the south and along the shores of the Black Sea.

Land use in Bulgaria resembles that in OECD Europe, with agricultural areas covering more than half of the country (shared between arable and permanent crop land, and permanent grassland), and forests and wooded areas more than one-third. Bulgaria is poorly endowed with mineral resources. Domestic oil and gas production covers less than 1% of the needs, black and anthracite coal less than 20% and iron less than 1%. In addition, the quality of some of Bulgaria's minerals is below the international average.

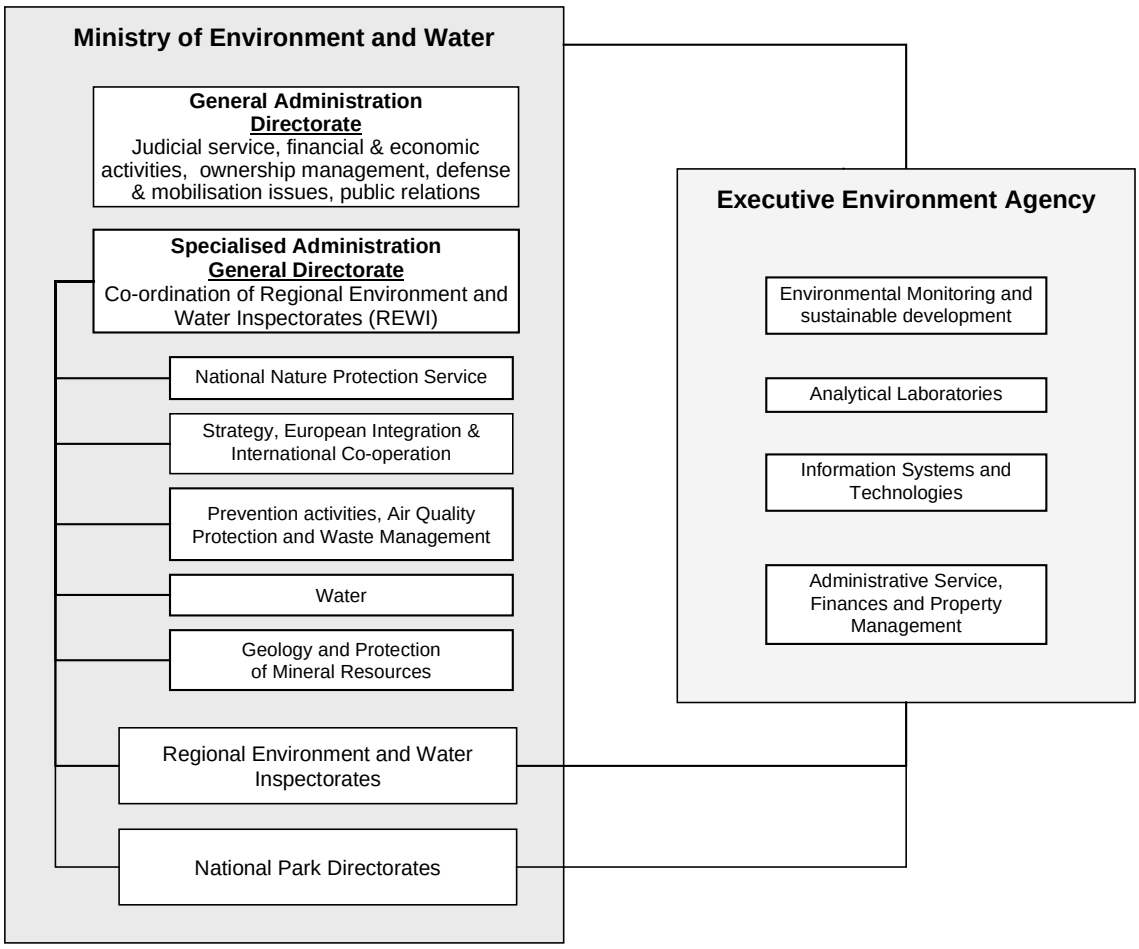
| | | | |
|---|---|---|---|
| **LAND** | Area (sq. km) | | 110 994 |
| | Agricultural area (percentage of total) | | 55.5 |
| **POPULATION** | Population (thousands, end-year) | | 8 283 |
| | Inhabitants per sq. km (end-year) | | 74.1 |
| | Average annual population growth (percentage, 1991-1997) | | –0.6 |
| | Unemployment (% of labour force, 1999) | | 17.0 |
| **GDP** | GDP (US$ billion, current prices and exchange rates, 2000) | | 12.1 |
| | GDP per capita (US$, current prices and exchange rates, 2000) | | 1 472 |
| | Structure of GDP (per cent, 1997): | Agriculture and forestry | 23.3 |
| | | Industry | 26.2 |
| | | Services | 39.6 |
| | | Other | 10.9 |
| **CURRENCY** | Monetary unit: lev | | |
| | Currency units per US$: 2000 exchange rates | | 2.102 |
| | Currency units per US$: 1995 exchange rates | | 0.071 |
| | Currency units per US$: 1995 purchasing power parities (PPP) | | 0.021 |

## ANNEX II. ADMINISTRATIVE STRUCTURE FOR ENVIRONMENTAL INFORMATION




| Ministry or Agency | Main environmental information competencies |
|---|---|
| The Ministry of Environment and Water (MOEW) | ♦ leading role in the collection, publication and dissemination of environmental information;<br>♦ co-ordination of i) work carried out by Regional Environment and Water Inspectorates (REWIs); ii) national contributions to international work; iii) related financial resources. |
| Regional Environment and Water Inspectorates (REWIs) | ♦ dissemination of public information on the state of the environment;<br>♦ environmental monitoring;<br>♦ environmental impact assessments of regional or local importance. |
| Executive Environment Agency (ExEA) | ♦ co-ordination of the national environmental information system;<br>♦ operation of most environmental monitoring activities jointly with the REWIs.<br>♦ quality assurance of environmental data;<br>♦ publication of information on the state of the environment. |
| The National Statistics Institute (NSI) | ♦ national level environmental information related to: environmental expenditures; water supply and use; waste water; air pollutant emissions; coastal waters; noise; non-hazardous industrial waste; protected areas |
| The National Institute of Hydrology and Meteorology (NIHM) | ♦ hydrological & meteorological data, radioactivity in air, quantity of surface and ground water;<br>♦ information on long-range air born pollution, civil protection, the Black Sea, climate change and international commitments. |
| Ministry of Health (MH) | ♦ information on health related environmental issues;<br>♦ monitoring of drinking water quality (regional Hygienic Epidemiological Inspectorates);<br>♦ information on noise pollution in settlements;<br>♦ information on water quality standards. |
| Ministry of Agriculture and Forests (MAF) | ♦ pesticides and heavy metal pollution; water eutrophication due to fertilisers; forest resources;<br>♦ cadastre information on agricultural land and forests;<br>♦ information on game stocks and hunting; on productivity of agricultural soils. |
| Ministry of Transport and Communications (MTC) | ♦ hydro-meteorological studies on the Danube, including flood risk and risk of river bank erosion;<br>♦ information concerning the prevention and control of oil spills and solid waste pollution of the Danube and the coastal waters of the Black Sea. |
| State Civil Protection Agency | ♦ information on natural disasters and accidents. |

## ANNEX III. ORGANISATION OF THE ENVIRONMENTAL ADMINISTRATION



# ANNEX IV. ABBREVIATIONS AND SIGNS

## GENERAL ABBREVIATIONS

| | |
|---|---|
| As Aer | Arsenic |
| BAS | Bulgarian Academy of Sciences |
| BOD | Biochemical Oxygen Demand |
| Cd | Cadmium |
| CFCs | Chlorofluorocarbons |
| $CH_4$ | Methane |
| $Cl_2$ | Chlorine |
| CO | Carbon Monoxide |
| $CO_2$ | Carbon Dioxide |
| COD | Chemical Oxygen Demand |
| Cu | Copper |
| DO | Dissolved Oxygen |
| EBRD | European Bank for Reconstruction and Development |
| EEA | European Environment Agency |
| EIA | Environmental Impact Assessments |
| EIB | European Investment Bank |
| EIS | Environmental Information System |
| ENFO | National Environmental Information Centre (Ireland) |
| EPAct | Environmental Protection Act |
| ExEA | Bulgarian Executive Environment Agency |
| GEF | Global Environment Facility |
| GHG | Greenhouse Gases |
| GMO | Genetically Modified Organisms |
| $H_2S$ | Hydrogen Sulphide |
| HCB | Hexachlorobenzene |
| HCl | Hydrochloric Acid |
| HEI | Hygienic Epidemiology Inspectorate |
| Hg | Mercury |
| ICT | Information Communication |
| IPCC | Integovernmental Panel on Climate Change |
| ISPA | Instrument for Structural Policies for pre-Accession |
| LAPI | Law on Access to Public Information |
| MAF | Bulgarian Ministry of Agriculture and Forests |
| MH | Bulgarian Ministry of Health |
| Mn | Manganese |
| MOEW | Bulgarian Ministry of Environment and Water |
| MOS | Bulgarian Ministry of Education and Science |
| MRDPW | Bulgarian Ministry of Regional Development and Public Works |
| MTC | Bulgarian Ministry of Transport and Communications |
| N | Nitrogen |
| NAEMS | National Automated Environmental Monitoring System |
| NEHAP | National Environment and Health Action Plan |
| NEPF | National Environmental Protection Fund |
| NGO | Non-Governmental Organisation |
| $NH_3$ | Ammonia |
| NIHM | The National Institute of Hydrology and Meteorology |
| NMVOC | Non-methane volatile organic compounds |
| NO | Nitric Oxide |
| $NO_2$ | Nitrogen Dioxide |
| $NO_3$ | Nitrates |
| $NO_x$ | Nitrogen Oxides |
| N2O | Nitrous Oxide |
| NSI | The National Statistics Institute |
| $O_3$ | Ozone |
| P | Phosphorous |
| PAH | Polycyclic aromatic hydrocarbons |
| Pb | Lead |
| PCB | Polychlorinated biphenyls |
| PCP | Pentachlorophenol |
| PIC | Public Information Centre |
| PM | Particulate Matter |
| $PO_4$ | Phosphates |
| PRTR | Pollutant Release and Transfer Register |
| QA | Quality Assurance |
| REC | Regional Environmental Centre |
| REWI | Regional Environment and Water Inspectorate |
| RHEI | Regional Hygienic Epidemiological Inspectorate |
| SEVESO | EC Directive on Control of Major Accident Hazards |
| SO | Sulphur Oxide |
| $SO_2$ | Sulphur Dioxide |
| THC | Total Hydro Carbons |
| TSP | Total Suspended Particulates |
| UNDP | UN Development Programme |
| UN-ECE | UN Economic Commission for Europe |
| UNEP-GEMS | UN Environment Programme Global Environment Monitoring System |
| UNESCO | UN Educational, Scientific and Cultural Organisation |
| UNFCCC | UN Framework Convention on Climate Change |
| WMO | World Meteorological Organisation |
| WS&S | Water Supply and Sewage |
| WWTP | Wastewater Treatment Plant |
| Zn | Zinc |

## COUNTRY AGGREGATIONS

| | |
|---|---|
| OECD Europe | All European Member countries of OECD, i.e. EU countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom ) plus Czech Republic, Hungary, Iceland, Norway, Poland, Switzerland, Turkey |
| OECD | All Member countries of OECD, i.e. countries of OECD Europe plus Canada, Mexico, United States, Japan, Korea, Australia, New Zealand |

## SIGNS

The following signs are used in figures and tables:
".." not available; "-" nil or negligible; "." decimal point.
The sign * indicates partial totals.

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**OECD Working Group on Environmental Information and Outlooks (WGEIO)**
Paris, 18 October 2001

**Chair of Special Session: Mrs. Maria PEPPA**

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