



EUROPE

# Environment and health performance review

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Serbia

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## ABSTRACT

This report describes and evaluates the current environment and health situation in Serbia. It evaluates the strong and weak points of the national environment and health status and presents recommendations given by independent experts. The conclusions and recommendations are based on a detailed environment and health performance review carried out in the country. The review identified the most important environment and health problems, evaluated the public health impact of environmental exposure and reviewed the policy and institutional framework, taking into account the institutional set-up, the policy setting and legal framework, the degree and structural functioning of intersectoral collaboration, and the tools available for action.

The WHO Regional Office for Europe developed this project to follow up the commitments made by Member States at the Fourth Ministerial Conference on Environment and Health in Budapest in June 2004 to reduce children's exposure to environmental hazards. The project was designed to provide the evidence base for developing and implementing such action. The environment and health performance reviews are country-based interdisciplinary assessments the WHO Regional Office for Europe carries out at the request of Member States. Through the environment and health performance reviews, Member States receive support in reforming and upgrading the overall public health system.

## Keywords

ENVIRONMENTAL HEALTH  
HEALTH STATUS INDICATORS  
PROGRAMME EVALUATION  
HEALTH POLICY  
PUBLIC HEALTH ADMINISTRATION  
SERBIA

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## CONTENTS

Contributors.....	vii
Abbreviations .....	x
Map of Serbia .....	xi
Foreword .....	xii
Executive summary: main conclusions and recommendations.....	xiii
1. Introduction .....	1
Background .....	1
Objectives.....	2
The EHPR process.....	2
Methods.....	3
Structure of the report.....	4
2. Health status of Serbia's population.....	5
Burden of disease .....	6
Noncommunicable diseases .....	6
Communicable diseases .....	7
3. Environment and health priorities .....	9
Access to safe and affordable water and adequate sanitation .....	11
Example of an environmental hot spot: Veliki Bački Canal.....	14
Wastewater and sewage.....	14
Reduce the adverse health effects of accidents and injuries and enhance physical activity ...	15
Injuries.....	15
Physical activity .....	16
Ensure environments with clean air to reduce respiratory diseases .....	17
Outdoor air quality .....	17
Indoor air quality .....	20
Reduce disability and disease arising from exposure to hazardous chemicals, physical and biological agents and hazardous working environments.....	21
Leaded petrol.....	21
Chemical contaminants in soil, food and water .....	21
Radiation .....	22
Noise.....	22
Occupational health.....	22
Waste.....	23
Natural disasters and flooding.....	23
Climate change .....	23
Environmental hot spot: Pančevo.....	24
Inequity in health and environment: minorities and Roma .....	25
4. Institutional set-up.....	28
Political system and demography.....	30

Health sector.....	31
Ministry of Health .....	31
Institutes of public health .....	34
Environment sector.....	37
Ministry of Environment and Spatial Planning.....	37
Environmental Protection Agency .....	45
Other sectors.....	46
Ministry of Interior.....	46
Ministry of Infrastructure: transport.....	46
Ministry of Youth and Sports: education .....	47
Ministry of Agriculture, Forestry and Water Management.....	48
Ministry of Mining and Energy.....	51
Ministry of Labour and Social Policy .....	52
Republic Hydrometeorological Service of Serbia.....	53
Municipalities and provinces .....	55
Nongovernmental organizations .....	59
5. Tools for management: policy setting and legal framework.....	61
The Constitution of Serbia .....	63
Health laws related to environment and health .....	63
Laws for environmental and other sectors .....	66
The Law on Environmental Protection .....	67
Environmental standards .....	69
Environmental liability.....	69
EU <i>acquis communautaire</i> .....	69
Environmental Inspectorate.....	70
Water .....	71
Genetically modified organisms.....	73
Noise.....	73
Radiation .....	73
Waste.....	74
International obligations.....	75
Norms and standards .....	75
Soft laws: strategies and action plans.....	76
The 16 environmental action plans in the National Environmental Strategy .....	78
Further Serbian strategic documents on public health .....	78
Economics and funding .....	79
6. Intersectoral collaboration.....	81
7. Tools for action .....	83
Environment impact assessment and health impact assessment .....	84
Monitoring.....	85
Injuries.....	86
Air.....	86
Chemicals .....	88
Noise.....	88

Physical hazards .....	88
Capacity building .....	88
Communication .....	89
Lessons on capacity building of health care waste management: a success story .....	91
References .....	92



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## Abbreviations

EHPR	Environment and health performance review
ENHIS	Environment and Health Information System Network
EU	European Union
NGO	Nongovernmental organization
PM	Particulate Matter
REACH	Registration, Evaluation, Authorization and Restriction of Chemical Substances
SEPA	Republic of Serbia Environmental Protection Agency
SWIFT	Sustainable Waste Management Initiative for a Healthier Tomorrow
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
WHO	World Health Organization

# Map of Serbia



Source: United Nations Map, No. 4268 Rev. 1, April 2007.

## Foreword

This report aims to convey a clear picture of the current environment and health situation in Serbia. It evaluates the strong and weak points of the environmental and health status in Serbia. It also includes recommendations from independent experts.

The process of preparing the environment and health performance review began in January 2008. The evaluation mission took place from 28 July to 1 August 2008. During this field visit, the WHO team, comprising three environment and health experts, Rokho Kim, Geraldine McWeeney and Christian Schweizer, met representatives from institutions from various sectors involved in environment and health. Additional information has been collected from national counterparts as needed during the preparation of the report. The national contributors are acknowledged at the beginning of this report. The cut-off date for the information summarized in this report is 30 September 2009. The report does not reflect changes in the structure of the various institutions occurring since then.

Thanks to the efforts and support of Serbia's Ministry of Health, the environment and health performance review for Serbia was carried out under the supervision of Assistant Minister Elizabet Paunovic, Head of the Sector for European Integrations, International Cooperation and Projects, Ministry of Health, who organized the visit, contacted all relevant sectors and provided background information. We are very grateful to all national specialists and experts who shared their knowledge about environment and health issues in the country.

Special thanks are extended to the WHO Country Office for Serbia and especially to Dorit Nitzan, Head of the Country Office, and to Melita Vujnovic, Deputy Head of Country Office, who supported the preparation and implementation of the mission and the preparation of the report since its beginning.

We acknowledge Grant Agreement 2005156 from the European Commission Directorate-General for Health and Consumer Protection for support in implementing this project and preparing this report.

The current report is also an integral part of the Biennial Collaborative Agreement between the WHO Regional Office for Europe and the Government of Serbia for 2008–2009 to support the development of health systems addressing environmental health determinants.

Srdan Matic  
Unit Head, Noncommunicable Diseases and Environment  
WHO Regional Office for Europe

## Executive summary: main conclusions and recommendations

### Main conclusions

Environmental health is supported in Serbia as the Constitution of Serbia stipulates the right to a healthy environment and the duty to protect and enhance the environment. The Health Care Law of 2005 includes the adoption of the National Programme in the area of protection of health from environmental pollution and its implementation. It also specifies the monitoring and assessment of the adverse effects of environmental factors on human health. The Public Health Law of 2009 includes environmental health in statutory public health activities. Many environment-related laws cover various industrial sectors, hazards and media. The majority of these laws are harmonized with EU legislation. In recent years, the Government of Serbia has initiated activities and investments in the environment and the country's health system, to address the environmental determinants of health in line with European Union standards and WHO initiatives. The Government of Serbia adopted the Children's Environment and Health Action Plan in 2009.

According to a WHO study based on regional exposure and national health statistics published in 2007, the burden of disease from environmental health risks is estimated to be as high as 27% of the total burden of disease in Serbia and Montenegro.

The priorities in environmental health for Serbia include:

- access to safe drinking-water in rural areas
- access to sanitation
- road traffic accidents
- air pollution
- children's exposure to environmental tobacco smoke
- lead in gasoline.

### *Stewardship*

- A clear vision for environmental health policy is not evident in Serbia.
- The absence of a specific dedicated environmental health unit (or capacity) in either the Ministry of Health or the Ministry of Environment and Spatial Planning has resulted in the lack of consistent and coherent policy actions and communication on environmental health issues.
- The Serbian Children's Environment and Health Action Plan was developed by the Government Committee with the participation of stakeholders and adopted in September 2009 in order to meet their commitments of the Budapest Declaration and the Children's Environment and Health Action Plan for Europe.
- Serbia is in the process of harmonizing its laws with EU legislation, which will result in the replacement of obsolete national laws related to environment and health. Sixteen laws were adopted recently and 160 by-laws are planned for adoption. This is an excellent opportunity to strengthen the health system to address the environmental determinants of health.
- The evidence base produced in Serbia that links health and environmental risks is too weak to be useful for policy-makers to set priorities. Serbia reports on only 7 of the 29 indicators in the WHO Environment and Health Information System database, although it collects data on 70% of these indicators.
- Civil society and social partners are represented very weakly in the process of policy-

making and policy implementation. Their involvement is mainly through environmental organizations, which are unable to fully represent the health perspective.

#### *Resource generation*

- Human and technical resources available in environment and health are limited, resulting in insufficient monitoring, reporting and evidence-based policy actions.
- The curriculum for educating and training health and environmental professionals in environmental health is weak. Environmental health is seldom considered to be a distinguished discipline. However, it is recognized as a special field of the health sector by the Law on Public Health of 2009.
- The national and district institutes of public health provide key resources to support management and service delivery in the area of environment and health.
- Equipment and facilities for environmental health research in institutions and universities are often outdated and in need of modernization.
- Data on exposure is seldom linked to data on health outcomes, resulting in very limited risk assessment activities.

#### *Service delivery*

- Monitoring and inspection services are poorly coordinated between ministries and institutions in most areas (such as water, air quality, radiation, food safety and hazardous chemicals), although the Ministry of Environment and Spatial Planning is responsible for surveillance of hazardous chemicals, air quality and radiation control.
- Although the movement towards sustainable development in Serbia is evident, a reactive (curative) approach is still the predominant method in the health system, rather than a proactive (preventive) approach. Ongoing health reform projects, especially in primary health care, focus on moving towards prevention.

#### *Financing*

- Except for time-limited project activities, the government lacks a budget planning and reporting process dedicated to overall environmental health programmes, and there is a gap between available financial resources and statutory services compelled by law.
- In the national institutes, activities are based on shorter-term projects rather than on sustainable programmes.
- Funding is made available, through projects, environmental inspectorate enforcement of the *polluter pays* principle and from the fund for environmental protection and these monies are invested in improving the state of the environment.

#### **Recommendations**

The Government of Serbia is encouraged to support, commit and invest in strengthening the health system to address environmental health issues, aiming to reduce the burden of disease in the population that results from environmental risk factors. To ensure an effective response to environmental health issues, the allocation of specific and appropriate human and financial resources to environmental health are encouraged, as one of the key elements of the health system addressing public health services.

#### *Stewardship*



- A national environmental health action plan should be developed and implemented in Serbia as a national strategy for protecting public health from environmental risks.
- The formal establishment of a specific unit (or capacity) dedicated to environmental health within the Ministry of Health is encouraged. This unit (or capacity) would provide strategic guidance and greatly support policy development while ensuring the strengthening of formal communication lines and ministerial level links with other relevant ministries, such as the Ministry of Environment and Spatial Planning and the Ministry of Agriculture, Forestry and Water Management.
- The Ministry of Health's efforts in environmental health would benefit from intensification of support from other ministries and would result in an enhanced capacity to develop the content of national policy and legislation on environmental health in all sectors.
- An interministerial body to coordinate the development and implementation of strategies, action plans and legislation on environmental health is suggested. It could be based on the already established National Committee for Environment and Children's Health.
- The overlapping roles and responsibilities of ministries and various institutions need to be clarified. The monitoring and inspection activities of the various institutions and governance in the different fields of environment and health should be evaluated in depth to identify the most appropriate resource allocation, thus preventing duplication and fostering the sharing of relevant information and actions.
- Funding and human resources need to be provided to implement the Children Environment and Health Action Plan.
- The harmonization of Serbian laws with EU legislation should be used as an opportunity to identify additional technical and financial support from both national and international sources and to strengthen the capacity to develop and implement environmental health policy tailored to Serbia.
- The collation of data and reporting to the Environment and Health Information System Network database should be expanded to more indicators. This can be achieved through the improved sharing of data collected and can be performed easily over a short period. Following this, data on more difficult indicators that require a greater institutional capacity should be collected. Environment and Health Information System Network indicators can also be used at the subnational level to better monitor regional differences, trends and peculiarities.
- The participation of civil society and social partners in the process of policy making and implementation needs to be strengthened. The support and development of nongovernmental organizations that specialize in environmental health and information-sharing with civil society need to be enhanced for increased awareness and empowerment of the public in environmental health issues.
- Environment and health issues should be integrated in formal and informal education systems. It should also be incorporated in school curricula – namely, in primary and secondary schools.

#### *Resource generation*

- The investment in human and technical capacity should be enhanced. This capacity development should be an integral part of the planning and implementation process

for the country's Children Environment and Health Action Plan and National Environment and Health Action Plan.

- The education of both health and environmental professionals in environmental health should be broadened and deepened through inclusion of environmental health subjects in the educational curriculum and in continuing education programmes for public health professionals, as well as the education of doctors and nurses at primary and secondary health services. The country would benefit from the development of a specialization in environmental health in collaboration with the Ministry of Education, the Ministry of Health and the Ministry of Environment and Spatial Planning.
- Building capacity and empowering the country's institutes of public health and the Network of Public Health Institutes should be undertaken as a high priority.
- Research and development should be strengthened in the area of environmental health. In line with international standards of good practice, updated and upgraded capacity is recommended.
- Public funding for research in environmental health should be increased, and environmental health researchers should be motivated through recognition, compensation and career opportunities.
- To promote evidence-based decision-making about environmental health, exposure data should be analysed in relation to health data by environmental epidemiologists. The broadening of current databases or the establishment of a specific database to allow for analysis of data on both health and the environment is recommended.

#### *Service delivery*

- Delivery of various environmental health services that implement environmental health policies through monitoring and control activities should be streamlined and better coordinated across the different providers and also possibly integrated for effectiveness and efficiency.
- Services at public health institutes (such as risk assessment and risk communication as a public health service) and at primary health centres (such as health education and counselling as individual health services) should be strengthened to address the population's needs in basic environmental and occupational health services. Also, the community-based preventive approach to environmental health should be encouraged.

#### *Financing*

- It is recommended that the Government of Serbia and responsible ministries allocate sustainable public funding for environmental health. Current environmental health activities would benefit from the longer-term project periods or institutionalized programmes based on regular budgets.
- Funding opportunities from other sectors, such as transport, labour, economy and education, could be explored and utilized, if they are relevant to environmental health.
- The cost of environmental health services can be partially funded through contributions from polluting industries or individuals. Passing by-laws that enable effective enforcement and financing activities is also recommended.

The legal, legislative and institutional framework for health and environment in Serbia is founded on the Constitution of Serbia, which stipulates the right to a healthy environment and the duty of all, in line with the law, to protect and enhance the environment. Health and environment is also supported by many governmental strategies, international agreements and the Millennium Development Goals.

Environmental legislation in Serbia has over 100 laws and regulations. Currently, the majority of these are harmonized with EU legislation, but lack a specific focus on the adverse effects of the environment on children. Progress, however, has been made in integrating the issues of child health and environment into legislation through its incorporation in new laws and strategies of different sectors.

Although there has been progress in recent years, the broad spectrum and linkage of environment and health issues in Serbia remain unfocused. Compiling an evidence base for prioritizing certain health and environment issues would be difficult for the following reasons.

- No specialist unit (or capacity) for health and environment exists in either the Ministry of Health or the Ministry of Environment and Spatial Planning.
- Formal ties between the health and environmental sectors are limited.
- A good part of legislation is outdated and, therefore, does not involve an environmental health component.
- Financial constraints result in limited monitoring capacity, thus restricting data collation, interpretation and reporting.

The Government of Serbia is encouraged to support, commit and invest in strengthening the health system to address environmental health issues, aiming to reduce the burden of disease in the population that results from environmental risk factors. To ensure an effective response to environmental health issues, the allocation of specific and appropriate human and financial resources to environmental health are encouraged, as one of the key elements of the health system addressing public health services. The recommendations on specific aspects of health system development are summarized in the box above.

## 1. Introduction

### **The main objectives of the environment and health performance review are to:**

- assist Member States in developing and strengthening a national institutional framework that will make it possible to draft national action plans that address children's health and environment;
- provide a country-based analytical description of the environment and health situation; and
- determine whether health policies are well designed to prevent ill health caused by environmental determinants.

## Background

In Europe, the processes of examining and monitoring the adverse effects of the environment on the health of the population commenced at the end of 1980s. Serbia did not immediately follow these activities and therefore has a great deal of work to do to develop the connections and capacities for a modern, multisectoral approach in this area.

According to the *Tallinn Charter: Health Systems for Health and Wealth (1)*:

Preventing disease and injury is at the heart of public health and health systems. Within the political and institutional framework of each country, a health system is the ensemble of all public and private organizations, institutions and resources mandated to improve, maintain and restore health. Health systems encompass both personal and population services, as well as activities to influence the policies and actions of other sectors to address the social, environmental and economic determinants of health.

The environment is responsible for as much as 20% of the total burden of disease (2, 3). Environment and health comprises the aspects of human health and disease that are determined by factors in the environment. It also refers to the theory and practice of assessing and controlling factors in the environment that can potentially affect health. According to the definition used by the WHO Regional Office for Europe, environment and health includes both the direct pathological effects of chemicals, radiation and some biological agents and the effects (often indirect) on health and well-being of the broad physical, psychological, social and aesthetic environment (4). In this report, the relationship between environment and health covers all human health issues that are related to environmental factors and all environmental factors that may (possibly) affect health (either negatively or positively).

In 1989, the WHO Regional Office for Europe launched the Environment and Health Process through a series of ministerial conferences, with the aim of eliminating the most significant environmental threats to health as rapidly as possible, based on the premise that prevention is better than cure.

Environment and health issues are essentially intersectoral, and human health can only be protected from the risks posed by a hazardous or contaminated environment through the coordinated input of different sectors and greater capacity on the part of the health sector to enlist the support of these actors in developing a high level of targeted activities and ensuring consistency and synergy with other relevant commitments made by Member States (5, 6).<sup>1</sup>

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<sup>1</sup> *The Budapest Declaration (6)* recognizes “the relevance of national environment and health action plans (NEHAPs) ... and commend the continuing efforts to implement and evaluate them” (paragraph 6).

The importance of coordinated input from different sectors was recognized by the ministers attending the Second Ministerial Conference on Environment and Health in Helsinki (7) and was endorsed in the commitments of the framework action plan: the Environment and Health Action Plan for Europe. This plan called for the development of national environment and health action plans. The *action in partnership* theme of the Third Ministerial Conference on Environment and Health (8), held in London in 1999, continued to promote this key message and relevant commitments. Following the Fourth Ministerial Conference on Environment and Health in Budapest in June 2004 (9), the Member States refined their action plans to address vulnerable populations, especially children, and committed to reducing children's exposure to environmental hazards. Countries are now seeking support to implement work. To provide assistance to Member States, the WHO Regional Office for Europe ensured implementation of a European Commission Directorate-General for Health and Consumer Protection funded project that would present the evidence base for developing and implementing such actions.

## Objectives

Through detailed environment and health performance reviews (EHPRs), the WHO Regional Office for Europe provides country-based analytical descriptions of the environment and health situation in Member States. The major areas of this strategic analysis are the institutional set-up, the policy setting and legal framework, the level and structural functioning of intersectoral collaboration, and the available tools for action. This interdisciplinary assessment objectively examines the relevant policy and institutional framework and gives guidance for strengthening environment and health policy-making, planning preventive interventions, ensuring service delivery and conducting surveillance in environment and health. The most important environment and health problems in the country are identified and the public health impact of environmental exposure is assessed. The national performance review is conceived as an integral part of the planning and management of environment and health services and is performed at the request of the Member State concerned.

## The EHPR process

The EHPRs are based on the programme of environmental performance reviews launched in 1991 by the Organisation for Economic Co-operation and Development to help its member countries improve their individual and collective performance in environmental management. The programme was mandated to the United Nations Economic Commission for Europe in 1993, to ensure coverage of the whole European Region (10, 11). In the period 1997–2004, the WHO Regional Office for Europe contributed to the environmental performance reviews, providing a review of the health aspects related to the environment.

Since the environmental performance reviews focus on environmental management, the Regional Office recognized the benefits of such country-specific tools and expanded the methods to better explore the relationship between human health and the environment and between the environment and health policy management (12–14).

The EHPRs are in line with and draw upon the national profiles of children's health and environment developed by WHO headquarters (15) and are strongly linked to ongoing

- 
- calls on organizations to establish mechanisms “for coordinating technical and financial assistance to the newly independent states and countries of south-eastern Europe, in order to stimulate legislative and institutional reforms, strengthen countries' capacities and effectively reduce exposures to environmental hazards and their health impacts” (paragraph 20c); and
  - invites the WHO Regional Office for Europe “to support the initiative of the newly independent states and some countries of south-eastern Europe to reform and upgrade their sanitary/epidemiological services and set up public health systems” (paragraph 20d).

Regional Office environment and health programmes. The European Environment and Health Information System (ENHIS) records information on national implementation and hence progress in achieving targets set through international action programmes (16).

The ENHIS provides reliable and standardized information about the health status of children, its determinants and its trends. It uses internationally available data sources and monitors and evaluates the effectiveness of policies.

The ENHIS is a standardized approach within the EHPRs to analyse the situation from a European (Region-wide) perspective. The analysis is then further complemented by the information gathered in the review process.

As in the case of ENHIS, the EHPRs focus on the risk factors that most affect the health of European children. At the Fourth Ministerial Conference on Environment and Health in 2004, ministers agreed to give priority to four regional priority goals for Europe (6):

- regional priority goal 1: prevent and significantly reduce the morbidity and mortality arising from gastrointestinal disorders and other health effects, by ensuring that adequate measures are taken to improve access to safe and affordable water and adequate sanitation for all children;
- regional priority goal 2: prevent and substantially reduce health consequences from accidents and injuries and pursue a decrease in morbidity from lack of adequate physical activity, by promoting safe, secure and supportive human settlements for all children;
- regional priority goal 3: prevent and reduce respiratory disease due to outdoor and indoor air pollution, thereby contributing to a reduction in the frequency of asthmatic attacks, in order to ensure that children can live in an environment with clean air; and
- regional priority goal 4: reduce the risk of disease and disability arising from exposure to hazardous chemicals (such as heavy metals), physical agents (such as excessive noise) and biological agents and to hazardous working environments during pregnancy, childhood and adolescence.

The implementation of EHPRs is made possible by the European Commission through its Directorate-General for Health and Consumer Protection. In support of the European environment and health process, the European Commission identified the need to develop and strengthen policy actions to reduce the risk of disease and disability arising from agents in the environment in Europe and is co-funding this WHO Regional Office for Europe activity.

## Methods

A team of WHO technical experts carries out each EHPR at the request of the health ministry of the country concerned or the responsible national authority for health. It takes the form of semistructured interviews with national technical representatives and policy-makers. The EHPR comprises the steps described below.

1. The standardized method for the review developed at the beginning of the process is applied to all Member States.
2. Consultations are held with the head of the WHO country office, and assistance and advice are sought on timing and the personnel involved.
3. Prior consultations are held with the environment and health focal point or project counterpart within the Member State.

4. Relevant policies, information, evidence and data are collected and analysed; and the national counterpart organizes the WHO field visit.
5. The field trip by the WHO technical team to the country takes place; interviews are conducted with preselected representatives of sectors and institutions.
6. A draft report is compiled, summarizing the information collected during the field visit.
7. A final report with recommendations for action is submitted to the counterpart, the head of the WHO country office and interviewees.
8. Final conclusions are presented to policy-makers at a national workshop.

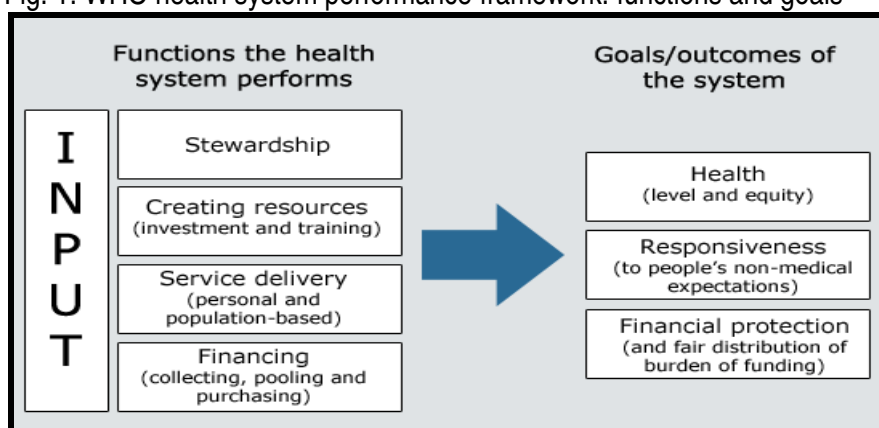
All the EHPR final reports will be collated into a single report to be presented at the WHO Fifth Ministerial Conference on Environment and Health to be held in Italy in March 2010.

## Structure of the report

The status of the environment and health situation in Serbia summarized in this report reflects the situation in the first decade of the 21st century and can be considered as a national baseline analysis after the commitments made at the Fourth Ministerial Conference on Environment and Health in Budapest in 2004. The cut-off date for the information and data summarized is 30 September 2009.

The report has six chapters. The first two describe the health characteristics of the Serbian population and the major environment and health risks in Serbia. The following chapters cover: the institutional set-up in environment and health; the legal framework under which environment and health policy is implemented; the degree and functioning of intersectoral collaboration mechanisms; and the tools available for the operation of environment and health services (monitoring, environmental health impact assessment, capacity building and communication). Recommendations are formulated depending on the background situation and are clearly set out at the beginning of each chapter. To contribute to strengthening the health system in Serbia, the main conclusions and recommendations of the EHPR have been presented in the performance framework of health systems functions and goals (see Fig. 1).

Fig. 1. WHO health system performance framework: functions and goals



Source: WHO's health system performance framework: functions and goals (17).

## 2. Health status of Serbia's population

### Conclusions

- The main causes of death in Serbia in 2006 were: cardiovascular diseases, malignant diseases, ill-defined conditions, respiratory diseases and injuries.
- WHO estimated the environmental burden of disease for Serbia and Montenegro<sup>2</sup> to be 27% (based on regional exposure and national statistics for 2004, not including the impact of leaded gasoline).

Life expectancy at birth in Serbia was 71 years for men and 76 years for women in 2008, according to the Statistical Office of the Republic of Serbia (18). During the period 1998–2008, the size of the population decreased due to the number of deaths exceeding the number of live births. During the same period, infant mortality decreased from 11.6 to 6.7 deaths per 1000 live births. Other indicators for this period are shown in Table 1.

Table 1. Demographic indicators for Serbia, 1998–2008<sup>a</sup>

Year	Population (mid-year)	Live births	Deaths		Population growth	Live births	Deaths	Population growth	Infant deaths (per 1000 live births)
			Total	Infant					
1998	7 567 745	76 330	99 376	882	-23 046	10.1	13.1	-3.0	11.6
1999	7 540 401	72 222	101 444	792	-29 222	9.6	13.5	-3.9	11.0
2000	7 516 346	73 764	104 042	785	-30 278	9.8	13.8	-4.0	10.6
2001	7 503 433	78 435	99 008	799	-20 573	10.5	13.2	-2.7	10.2
2002	7 500 031	78 101	102 785	790	-24 684	10.4	13.7	-3.3	10.1
2003	7 480 591	79 025	103 946	711	-24 921	10.6	13.9	-3.3	9.0
2004	7 463 157	78 186	104 320	633	-26 134	10.5	14	-3.5	8.1
2005	7 440 769	72 180	106 771	579	-34 591	9.7	14.3	-4.6	8.0
2006	7 411 569	70 997	102 884	525	-31 887	9.6	13.9	-4.3	7.4
2007	7 381 579	68 102	102 805	484	-34 703	9.2	13.9	-4.7	7.1
2008	7 350 222	69 083	102 711	460	-33 628	9.4	14.0	-4.6	6.7

<sup>a</sup> Data on Kosovo and Metohija are excluded.

Source: Vital statistics: population movement of the Republic of Serbia in the period 1998–200 (18).

The key public health problem in Serbia is the *increasing burden of noncommunicable diseases*. The country's two highest ranking causes of death are cardiovascular and malignant diseases, accounting for about 70% of all deaths. The country has reached a crude mortality

<sup>2</sup> Serbia and Montenegro became two separate Member States of WHO in September 2006. The WHO data referred to are those for the then one country of Serbia and Montenegro.



rate of 13.9 deaths per 1000 population, the highest in four decades and still growing. Among the standardized death rates for particular diseases, Serbia has a major problem in preventable cancers, such as cancer of the cervix, for which the standardized death rate is three times higher than in the European Union (EU) and two times higher than in the WHO European Region. Also breast cancer is above the standardized death rates in both the EU and the Region. A very high standardized death rate for lung cancer is closely linked with the still high prevalence of smoking, though a notable slow decrease of in the prevalence of smoking can be attributed to major public health campaigns. Moreover, injuries are the leading cause of death among young people. Furthermore, an analysis of suicides shows very high rates among the elderly.

Serbia is responding to the challenge of reducing the high burdens of noncommunicable diseases, preventable cancers and related lifestyle risk factors (smoking primarily). In 2009, a series of strategic documents and action plans were adopted to address this challenge. Major external funds are being directed to fund these measures, and health system reform has focused on shifting services to prevention, especially in primary health care. Although results show some progress, the country still needs sustained support and assistance to make further progress. The WHO Biennial Collaborative Agreement for 2008/2009 addresses these major problems and provides technical assistance and capacity building in these areas, such as the Noncommunicable Disease Strategy developed with WHO technical support and continuous support for implementing the National Tobacco Control Strategy, for which the latest activity is support for the introduction of a comprehensive law banning smoking in public places. Also, a primary health centre performance monitor will include a component to assess noncommunicable disease preventive services provided at the primary health care level and to provide advice on how to integrate prevention at this level. Moreover, insufficient attention is given to addressing dietary habits and the lack of physical activity as major risk factors.

## Burden of disease

### Noncommunicable diseases

Analyses of demographic and health data show that Serbia has entered a demographic and epidemiological transition, with a high proportion of ageing people and the highest burden of disease attributable to noncommunicable diseases. The five highest ranking causes of death in the last decade have been: cardiovascular diseases, malignant diseases, ill-defined conditions, respiratory diseases and injuries. This trend was observed throughout the period 1997–2007(19). The standardized mortality rate for ischaemic heart disease for men is higher in Serbia than in western Europe.

For women, the main cause of death is cerebrovascular stroke, but breast and cervical cancer rank highly among these gender-specific causes of death. In Serbia, mortality from cancer of the cervix is 10.4 deaths per 100 000 population (EU average: 3.4 deaths per 100 000 population) and the incidence of the disease is 30.5 cases per 100 000 population – the highest in the WHO European Region. Breast cancer is the most frequent malignant tumour among women in Serbia. There are 4000 newly registered cases a year, which represents more than a quarter of all malignant illnesses among women.

Annually, 1600 women die of breast cancer, which accounts for about 18% of the mortality rate caused by cancer. To reduce these figures, the Institute for Oncology and Radiology of Serbia is preparing a programme of prevention, early detection and treatment of malignant breast cancer. Also, it should be noted that, in 2009, the Government of Serbia adopted the Serbia against Cancer national programme and began to implement cancer screening activities.

The high prevalence of risk behaviour – such as smoking, drug abuse, alcohol consumption, obesity and lack of physical activity – is among the key causes of ill health. Concerted action to control the use of tobacco resulted in a decrease of 6.9% over 6 years in the prevalence of tobacco smoking among adults according to the National Health Surveys 2000 and 2006).

The health of marginalized populations, especially Roma, is significantly worse than that of the general population. According to the United Nations Children's Fund (UNICEF) Multiple Indicator Cluster Study for 2005 (20), the infant mortality rate and probability of dying before the age of 5 years among Roma populations living in unhygienic settlements was at least three times higher than the national average. The burden of noncommunicable diseases is disproportionately high in marginalized, poor populations (such as internally displaced Roma in slums near and in urban centres).

Based on the 2005 Law on Health Care (21), specific national programmes for the prevention of cervical, breast and colorectal cancers were adopted by the government in 2008 and 2009, respectively. Oversight of programmes and strategic management of them will remain at the Ministry of Health, while the institutes of public health of Serbia will host the management teams within the National Coordination Offices for Cancer Screening and Control. The programmes include:

- a media campaign for mobilizing the general public and, specifically, women 29–65 years of age and people older than 50 years, without any symptoms;
- re-educating and educating health staff engaged in implementing early detection of malignant tumours;
- equipping institutions with modern technology; and
- setting up organized screening programmes, for the population of women with cervical cancer, that will systematically screen women in Serbia, based on cervical cytology (Pap smears).

The Ministry of Health – in cooperation with WHO, UNICEF and other organizations – performs programmes that address inequities in health. All WHO projects are done together (or with the support of) the Ministry of Health. To reduce the health inequalities of Roma, Roma health mediators were employed by the Ministry of Health to improve access to health care, especially for women and children. As of 2009, there were 63 health mediators in 53 primary health care centres.

### **Communicable diseases**

Although the health scene is dominated by noncommunicable diseases, and vaccine preventable diseases seem to be well under control (considering the national averages), there are particular risks of outbreaks of communicable diseases among marginalized populations – in particular, Roma. The health system's low awareness of the existence of unregistered populations is obvious in some instances, which indicates a problem of higher rates of communicable diseases and especially outbreaks among marginalized people who fall through the public health system network – for example, the outbreak of measles in the Autonomous Province of Vojvodina in 2007 (mainly in the Roma population) and the low immunization coverage detected by WHO technical missions during visits to confirm a polio-free situation. The overall disease surveillance system is rather slow in identifying outbreaks of communicable diseases, with delays in reporting from the field to central epidemiological units of up to 30 days (22).

### *HIV/AIDS*

The country has a low prevalence of HIV/AIDS. At risk are mainly injecting drug users, men having sex with men, and sex workers. Two Global Fund to Fight AIDS, Tuberculosis and Malaria projects are currently active (one in Round 6 and the other in Round 8).

### *Tuberculosis*

The incidence of tuberculosis in Serbia decreased from 39 cases per 100 000 population in 2003 to 24 cases per 100 000 population in 2008, thus achieving the targets set in the Global Fund to Fight AIDS, Tuberculosis and Malaria funded project (WHO provided continuous support). The country applied to the Green Light Committee for, and is in the process of receiving, first drugs for systematic treatment of multidrug-resistant tuberculosis.

WHO continues to provide support to the country's National Tuberculosis Programme and provides technical assistance in drafting a project proposal to address coinfections of tuberculosis and HIV. The proposal will be submitted to the Global Fund to Fight AIDS, Tuberculosis and Malaria in Round 9.

The system for disaster preparedness and response in Serbia is being reorganized. Major steps were undertaken to increase preparedness in the health system, with WHO support throughout the process of setting up a national management structure for managing disasters and building capacity (Biennial Collaborative Agreement for 2008–2009).

The capacity of the International Health Regulations<sup>3</sup> in Serbia has been strengthened and in 2008 a national focal point institution was assigned. In April 2009 WHO provided technical assistance to review and harmonize national legislation with the International Health Regulations.

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<sup>3</sup> The International Health Regulations are an international legal instrument that is binding on 194 countries across the globe, including all the Member States of WHO. Their aim is to help the international community prevent and respond to acute public health risks that have the potential to cross borders and threaten people worldwide. The International Health Regulations, which entered into force on 15 June 2007, require countries to report certain disease outbreaks and public health events to WHO and define the rights and obligations of countries to report public health events, and establish a number of procedures that WHO must follow in its work to uphold global public health security.

### 3. Environment and health priorities

#### Conclusions

- Issues in environmental health that have a high priority in Serbia are:
  - access to safe drinking-water in rural areas
  - access to sanitation
  - traffic accidents
  - air pollution
  - children’s exposure to environmental tobacco smoke
  - lead in gasoline.
- Movement towards a health approach with greater emphasis on prevention is occurring, but currently the health system emphasis is on curative measures.
- Environmental health is viewed narrowly as sanitary surveillance and inspection for preventing communicable diseases and is not viewed in the full and broader scope of environmental health.
- Several environmental hot spots exist in Serbia.
- Improvement in regular and efficient systems of environmental monitoring and environmental health surveillance is evident.
- In rural areas, 36% of the population does not have access to an improved water supply system.
- Access to safe water and clean air for some cities and populations in Serbia is an important concern.
- The mean concentration of particulate matter less than 10 microns in diameter (PM<sub>10</sub>) in four cities in Serbia was about 55 µg/m<sup>3</sup> in 2004, putting Serbia among the countries of the European Region (for which data is available) with relatively more polluted cities.
- Physical activity is seen mainly as participation in sports rather than as a part of a healthy lifestyle.
- Leaded petrol remains in use in Serbia, and the production of cars that use leaded petrol also continues. However, as the manufacturing plant of the country’s sole car company (Naftna Industrija Srbije AD) moves towards producing different models of vehicles, the production of cars that use leaded fuel and the availability of leaded fuel are expected to decrease. Large investments are planned in the company, to produce fuels that fulfil the requirements of EU quality standards.

#### Recommendations

- Coordination of environmental health services within and between the sectors should be strengthened.
- Greater political will and support are required to implement the commitments of the national Children’s Environment and Health Action Plan and to establish sustainable preventative activities, together with effective monitoring and interventions.
- A greater focus on industrial pollution hot spots, as well as management of hazardous industrial waste, should occur to effectively address public and occupational health concerns in the areas affected.

- Practical tools for acquiring environment and health information that provides reliable data on population exposure to major environmental stressors should be put in place. Also, the link with the database on hazardous waste should be sorted by place and quantity.
- Environmental health training modules should be incorporated into the educational programme for health care workers.
- Inspection services should be expanded to effectively support preventative health services.
- Repair of the water distribution network and improvement of wells are required and should be expanded.
- A unifying reporting system and regular statistical reports on injuries in children by age group, sex, cause and setting of accidents, as well as number of fatal injuries, are needed and should be created.
- Leaded fuel should be phased out as soon as possible.

With the support of the European Commission Directorate General for Health and Consumer Protection, and in collaboration with partners from 18 Member States, including Serbia, the WHO Regional Office for Europe has developed the ENHIS, which has enhanced the availability and comparability of data on environment and health.

The system focuses on the health issues identified in the Children's Environment and Health Action Plan for Europe as priorities for pan-European action, particularly its four regional priority goals. The information provided by the ENHIS database covers health issues related to environment, environmental issues affecting children's health, and actions aimed at reducing or preventing health risks. For all information and data quoted in this section, see the country profile of Serbia (23) and the individual ENHIS fact sheets.

The WHO ENHIS database currently monitors 29 indicators of the environment and health in the EU and pre-accession countries. In Serbia, 70% of these indicators are monitored. However, irregular reporting of these monitoring data to WHO has resulted in a presentation of only the following six indicators:

1. percentage of the population connected to public health water supply;
2. percentage of the population connected to sanitation facilities in urban and rural areas;
3. implementation of 10 policies aimed at preventing road traffic injuries in children and young people;
4. proportion of 13–15-year-olds exposed to environmental tobacco smoke in their homes;
5. degree of implementation of policies to reduce the exposure of children to environmental tobacco smoke; and
6. standardized estimates of leukaemia in children younger than 15 years of age.

The evaluation of the environmental health situation summarized below is based on ENHIS data and national and international statistics.

## Access to safe and affordable water and adequate sanitation

Access to a regular, clean and safe drinking-water supply, to improved wastewater and sanitation, and to safe bathing water are an essential part of public health. The United Nations Economic Commission for Europe Environmental Performance Review for 2007 provided detailed information on the situation of water and sanitation in Serbia (24). Serbia has adequate water resources to supply drinking-water to its population (about 21 000 litres per second is used from the estimated potential of 60 000–90 000 litres per second) and has sufficient rainwater to replenish these resources. The main sources of drinking-water in Serbia are groundwater aquifers and built open water reservoirs (more than 30 major reservoirs and 100 small- to medium-size reservoirs exist). The ENHIS analysis, however, shows that wastewater management is one of the biggest challenges in Serbia, particularly in rural areas. Access to safe drinking-water is a key priority in Serbia, as the supply network is in need of upgrading and repair. In rural areas, 36% of the population does not have access to an improved water supply system.

Lack of access to sanitation has been highlighted in the ENHIS indicators for Serbia as an area of concern. Rural areas, in particular, have a low percentage of acceptable sanitation, and in Serbia as a whole there are very few operational sewage treatment facilities.

Significant health risks are associated with water and sanitation in Serbia, such as diarrhoeal diseases (chronic and infectious). Also, low-quality surface water poses threats to human health when used for recreation, especially when blue–green algae are present in eutrophic waters, which can cause serious skin and eye irritation. In some areas of Serbia, the Danubian endemic familial nephropathy (also known as Balkan endemic nephropathy) occurs and is hypothesized to be linked to drinking-water quality.

Water management is organized at several levels (national, provincial and municipal) and through public water companies (at regional and local levels). Since the early 1990s, the water utility companies have suffered due to low tariff rates and low collection rates, which did not allow for full cost recovery. Also, water quality differs significantly from region to region. Monitoring has shown the presence of: ammonia, nitrates, sulfides, iron and mineral oils in the Tisa River Basin; evaporable phenols and manganese in wells in the area of Bačka; and, in some cases, suspended solids – for example, in the South Morava Basin). Throughout Serbia, the most problematic physicochemical water quality parameters are turbidity, iron, manganese, nitrates and, in the Autonomous Province of Vojvodina, arsenic. In Central Serbia the main problem is bacteriological contamination, with more than 40% of samples not meeting standards. Moreover, the reserves of underground water in the Autonomous Province of Vojvodina are polluted with heavy metal contamination, particularly arsenic.

The most polluted rivers include the Stari and Plovni Begej, Topolica, Veliki Lug, Lugomir, Crni Timok and Bor, as well as the Vrbas–Bečej Canal. Generally, watercourses in Serbia are polluted, and their quality is deteriorating. According to the findings of the Republic Hydrometeorological Service of Serbia in 2005 and keeping in mind that the best quality is Class I and the most polluted is Class IV, the water parameters for 23% of 65 monitored river profiles fell into Class II, 70% into Class III and 6% into Class IV. In 2004, the Danube and Tisa rivers fell from Class II/III to Class III/IV, along with the transboundary rivers that come from Romania.

The Autonomous Province of Vojvodina's public water management is part of the water management committee at the republic level. There are 465 settlements in the Autonomous Province of Vojvodina, of which 69 do not have piped water. The Autonomous Province of Vojvodina has severe problems with both physicochemical and bacteriological water

standards; 67% of water samples do not meet standards. School children appear to be particularly at risk, since 90 schools in the Autonomous Province of Vojvodina have no water-supply facilities, and in 508 schools the bacteriological quality of water was found to be unsatisfactory. Belgrade is the only municipality where water quality is generally adequate, with more than 90% of water samples within standards. An estimated 20% of the population is exposed to unprotected water sources (25).

Rural populations have three types of drinking-water supply sources:

1. official piped water systems owned and operated by the municipality;
2. private piped systems built and operated by the communities themselves; and;
3. private wells.

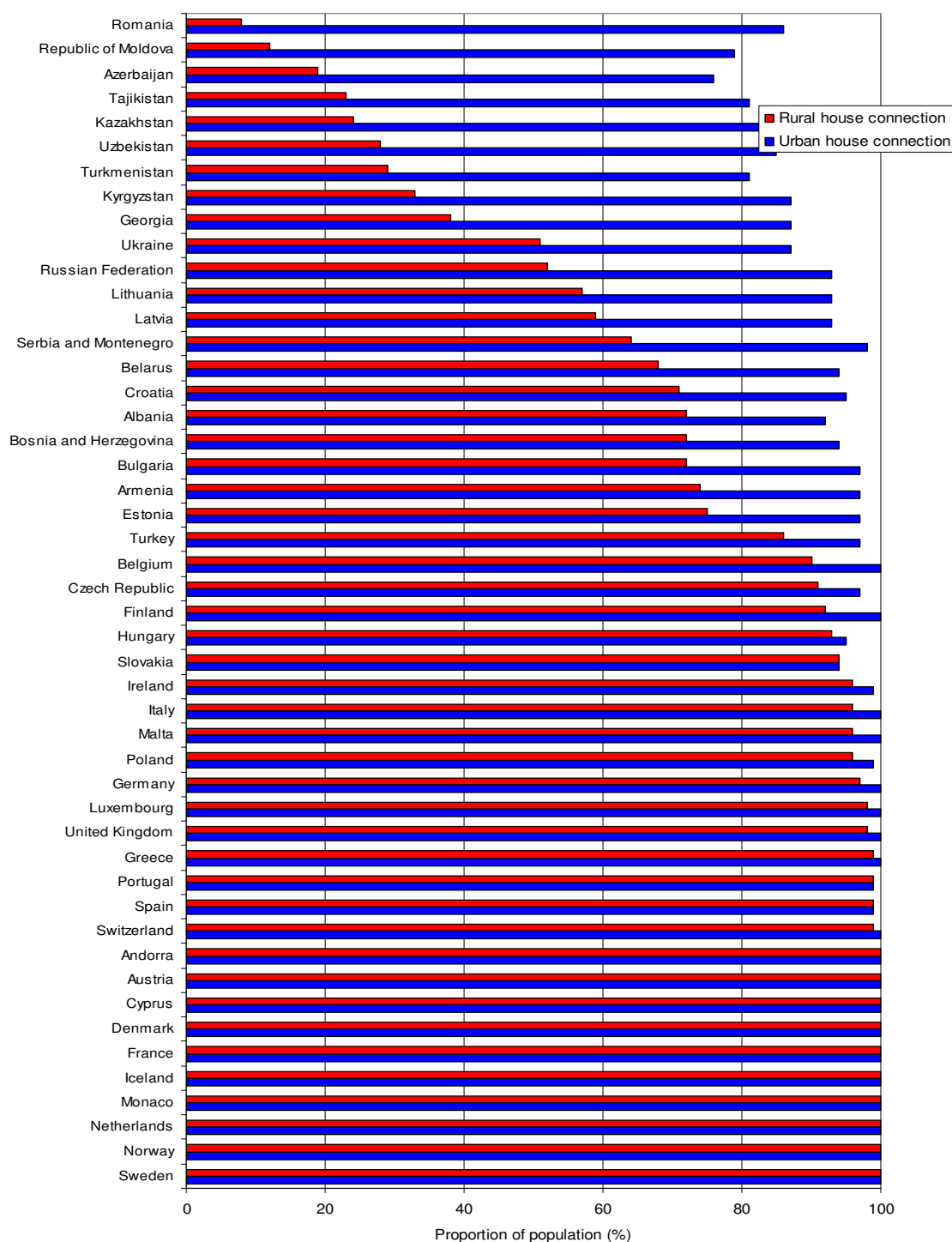
Data on rural public water supply systems are very limited, but many of these and private wells are not registered, and water quality controls are not performed. Also, few water sources have sanitary protection. Only the official piped water systems are monitored for drinking-water quality by the institutes of public health. The institutes of public health estimate that about 90% of the private drinking-water supplies do not meet bacteriological standards for drinking-water.

According to the official data reported by Serbia and Montenegro to the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation in 2006, 97% of the population in urban areas had access to an improved water supply in the home, and 53% in rural areas had access (26). This is important, because it indicates a considerable urban–rural disparity (Fig. 2).

About half the population of Serbia lives in urban areas and is supplied by large- or medium-size water supply systems. Water consumption is very high in urban areas where large quantities of water are injected into the deteriorating system to accommodate losses through leakage.

In Belgrade, the quality of drinking-water differs between the city and the suburbs. In 2005, 1.5% of the drinking-water samples in the city failed to meet physical and chemical criteria for safety and 6.4% did not meet the biological criteria, while 29.0% and 7.7%, respectively, failed to meet the criteria in the suburbs. Monitoring the water quality in schools located in city suburbs, which have their own water supply systems, showed that 57.7% and 62.8% of samples did not meet physical and/or chemical and biological requirements, respectively. Tests of drinking-water delivered by Belgrade's central water supply system from 2001 through 2005 showed an increase in the percentage of samples failing to meet quality standards. Each year, in the same period, the most common parameters of physicochemical noncompliance were increased turbidity in an average 17.0% of samples and increased concentrations of iron in an average 0.5% of samples. Also, each year, in the same period, the most common causes of microbiological noncompliance were an increased number of colony-forming units in an average 4.0% of samples and total coliform bacteria, as well as the presence of the bacteria *Pseudomonas aeruginosa* and *Streptococcus faecalis* in an average 0.3% of samples (27).

Fig. 2. Percentage of the population with access to an improved water supply in urban and rural areas in the WHO European Region, 2006 or last available year



Notes. Data for Belgium are for 1995; data for Finland, Bulgaria and Turkmenistan are for 2004. Also, Serbia and Montenegro became two separate Member States of WHO in September 2006. In this fact sheet, the data refer to the then one country of Serbia and Montenegro.

Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (26).



### **Example of an environmental hot spot: Veliki Bački Canal**

As part of a regional programme, a project to resolve one of the key environmental hot spots (a part of the Veliki Bački Canal that runs through the Municipality of Vrbas) was implemented. This part of the canal has been characterized as the worst polluted waterway in Europe. This project will address pretreated industrial and communal wastewater.

Within the framework of the United Nations Development Programme (UNDP) project Strengthening capacities in the Western Balkan countries to address environmental problems through remediation of high priority hot spots, the Programme for Monitoring Surface Water and Sediments Quality of the Grand Backa Canal was prepared (28). The UNDP project was implemented in Serbia in cooperation with the Department for Water and Soil Protection of the Ministry of Environment and Spatial Planning and included ten profiles for the period October 2008 to August 2012.

The goals of monitoring are: to establish the continual tracking of the quality of water and sediment of the Grand Backa Canal at the national level; to follow the long-term implementation of complete remediation of the Canal; to upgrade water quality management; and to enable the information gathered to adequately address the issue of cleanup and remediation of the Canal (execution of the Grand Backa Canal Remediation Project). Monitoring should also provide the basis for implementing appropriate measures to protect the Grand Backa Canal.

### **Wastewater and sewage**

Wastewater pollution of water sources and bodies used for drinking-water and for recreation is a problem in Serbia. The breakdown of the main sources of wastewater is about: a third from agricultural activities; a third from industrial sources (production has decreased due to diminished industrial activity since the war); and a third from household sewage (municipalities). Transboundary pollution, leakage from landfills and dump sites, as well as contamination from river transportation vehicles also contribute to the pollution of water sources.

In recent years; the total amount of industrial wastewater in Serbia has been rising. According to the environment performance review done by the United Nations Economic Commission for Europe, 75% of the inorganic discharges are generated by 10 of about 250 industrial installations – particularly, the a factory in Smederevo, the Nikola Tesla A and B thermal power plants in Obrenovac, the nonferrous metallurgy plant Zorka in Šabac, the Kostolac thermal power plant, power cable factory in Jagodina, the Bor and Sjenica mines, and the Kolubara open-pit mine (24).

The percentage of the population served by a sewage system connected to a safe wastewater disposal system indicates the potential level of pollution from domestic point sources that enters the aquatic environment and has an adverse effect on the health of inhabitants. The sewerage system covers about 48% of the country's population. Of the total urban population, 75% is connected to public sewage systems. Only 16% of the rural population is connected to sanitation facilities, and an estimated 13% of all municipal wastewater is treated. Also, only 28 towns in Serbia have a wastewater treatment plant, and some of the largest towns in the country do not have a municipal wastewater treatment plant. Furthermore, some of the existing wastewater treatment plants are abandoned, many only provide primary (mechanical) treatment and many are not continually operated. In addition, non-point-source pollution contributes to more than 50% of total water pollution: these sources produce over 80% of total nitrogen, 50% of total phosphorus, and 90% of faecal and total coliform bacteria.

Almost all schools and child-care institutions have access to a continuous sanitation infrastructure with separate facilities for boys and girls (20).

Almost 90% of the population has flush toilets linked either to a sewage system or a septic tank (20). However, there are important urban–rural differences. While most (84%) of the urban population uses a flush toilet linked to a sewage system, 64% of the rural population uses a flush toilet that empties into a septic tank and 19% uses traditional pit latrines. This difference is even more pronounced in the Roma population. About 50% of the Roma living in Roma settlements use the traditional pit latrine. Also, a third of their households are connected to the piped sewerage system – mainly those in periurban areas – and 5% live without toilet facilities.

Industries within urban areas generally use the municipal wastewater systems to discharge their wastewater. Industries outside urban areas usually discharge directly into the nearest water course, mainly with minimal treatment. Wastewater treatment facilities of the larger companies had mainly fallen into disrepair and were not functioning to full capacity until 2000, when projects were implemented to develop new plants or renovate existing facilities.

Most industrial and mining wastewater is discharged into the Sava River and its tributaries, and the main point sources of organic discharge in Serbia are the estimated 130 pig farms with 1.2 million animals (29).

## **Reduce the adverse health effects of accidents and injuries and enhance physical activity**

### *Injuries*

Unintentional injuries are among the leading causes of morbidity and mortality among children and adolescents in the European Region. In Serbia, the National Action Plan for Children (30) – within priority goal 2, that is, “Establishing conditions for optimal development of each child” – focuses on accidents and injuries and includes a specific goal: “Reduction of injuries and deaths in children due to accidents and violence”. An indicator – developed by the WHO Regional Office for Europe within the ENHIS to summarize the implementation of the 10 policies for injury prevention – shows that, in the WHO European Region, Serbia is among the countries in need of a stronger commitment to injury prevention. The Health Statistical Yearbook of Serbia 2007 identifies the two primary causes of death, one of which is identified as “accident or violence that caused lethal injuries” and states the mortality rate for injuries and poisonings as 52.4 deaths per 100 000 population in 2007 (31).

The standardized rate for external causes of injury and poisoning, for all ages per 100 000 population, has been decreasing almost consistently in Serbia since 1998 (32). In 2000 the rate was 49.5 events per 100 000 population and by 2006 this rate had fallen to 44.8 events per 100 000 population, much lower than the average European Region rate for 2006, 71.8 events per 100 000 population. On the other hand, the standardized rate for motor vehicles accidents has been increasing steadily since 2003 to a level of 8.2 accidents per 100 000 population in 2007. This figure is still lower than the European Region average rate of 11.0 accidents per 100 000 population in 2006.

The Ministry of Internal Affairs keeps complete figures on traffic accidents, and the Statistical Office of the Republic of Serbia routinely collects and publishes data on accidents by age

groups. Deaths from traffic accidents in 2006 were 889 deaths per 100 000 population, up from 621 deaths per 100 000 population in 2002 (33).

Road safety is generally not considered a high priority, and the systematic traffic education in schools that was previously institutionalized in schools is no longer performed. Currently, only traffic signals are taught in schools, accompanied by an annual visit from the police. Some local initiatives of local governments try to develop road safety in children and drivers. As car registration fees are collected and utilized by municipalities, some municipal projects for bicycle paths are evident, but no national effort has been initiated.

*Road traffic fatalities* declined from about 1200 deaths a year to about 400 deaths a year due to increased law enforcement in the past few years. However, the rate is growing again (currently at 964 deaths a year) due to reduced enforcement of traffic rules. Also, the number of registered vehicles increased dramatically in the same period (especially two-wheeled vehicles), which is often used to explain the entire increase in road fatalities, because mopeds and motorbikes are high risk vehicles.

The information available relies on data on accidents collected by the police. Such information, however, is not detailed enough to allow for localized interventions that address accident hot spots. Information is shared by personal and formal networks, and data on Serbia were provided to the *Global status report on road safety* (34).

The Serbia Institute of Public Health only registers and publishes broad groups of the WHO International Classification of Diseases for children under the age of 7 years and from 7 to 18 years of age. Rates per 1000 children for “injuries, intoxication and consequences of outside factors” (group 19) rose between 1997 and 2004 in both age groups (< 7 years old: from 45.1 to 68 events per 1000 children; 7–18 years old: from 38.3 to 71.0 events per 1000 children).

Various sectors and institutions are actively involved in injury prevention, such as the Ministry of Youth and Sports, the Ministry of Health, the Provincial Secretariat of Health, the public health institutes, the Institute of Mother and Child in Belgrade, the Centre for Control of Poisoning of the Military Academy Hospital in Belgrade, the Centre for the Control of Poisoning in Novi Sad, health clinics in local communities, the Ministry of Interior Affairs, the Centre for Research of Safety in Traffic, the City of Belgrade – Secretariat for Traffic, the Directorate of Traffic Police, the Faculty of Transportation, and the Police Academy of Belgrade.

Communications media are also actively involved, mostly through the City Secretariat for Information, and several important TV and radio stations have an active role in this campaign.

### *Physical activity*

A safe environment that encourages personal mobility and physical exercise is important for health and the prevention of obesity and excess body weight. Children, however, are less physically active than previously. According to a study of a representative random sample of the population of Serbia, 33.6% of children (19 years of age or younger) were physically active every day, 13.4% were active 4–6 times a week, and 53% were active 2–3 times a week or less (35). Among girls, 80.4% regularly attend sport classes in school, and among boys, 91.7% do. Moderate and severe obesity were found in 13.5% of children, more in boys (16.4%) than in girls (10.5%). Also, obesity was observed more often in younger children under 14 years of age (10.5%) than in older children from 15 to 19 years of age (5.4%).

Elementary, primary and high school children have three mandatory classes of sports a week (45 minutes each). According to the above-mentioned survey, 20% of girls and 8% of boys do not regularly attend these classes. There are discussions about including one more class of sports a week.

Among children, selected aspects of physical fitness, such as speed, strength and achievement, in sports events are periodically measured in schools. This is monitored and measured by the Republic Institute of Sports. Research conducted by the Republic Institute of Sports in the beginning of 2009 had the following conclusions.

- On average, the body weight of primary school children increased 14% in boys and 11% in girls, compared with figures for 1995; and, for the same base year, body mass index increased 7.3% in boys and 5.6% in girls.
- Measurements of physical fitness show that it decreases with physical growth – that is, there are significant decreases in the average values of physical fitness for boys (6%) and girls (12%), compared with similar measurements from 1995.
- When comparing results for Serbian children with those of children the same age from other European countries, it is evident that Serbian primary school children are below average in the majority of categories of physical fitness assessed by the Eurofit tests of physical fitness.

The physical fitness or activity of the general population, however, is monitored upon personal request and periodically by the Republic Institute of Sports, which is the competent institution for these activities, in accordance with Law on Sports.

In addition to the Ministry of Youth and Sports, leading actors in promoting physical activity among children are the Ministry of Health, the Faculty of Sports and Physical Education, the institutes of public health, nongovernmental organizations, UNICEF, communications media and other institutions on the local and national level. Nongovernmental organizations and civil society are often involved in promoting physical activity. Also, intergovernmental organizations, such as UNICEF, are active in promoting physical activity. All sectors acknowledge their role in supporting physical activity and, whenever necessary, get actively involved in the support, promotion and follow-up of sporting events.

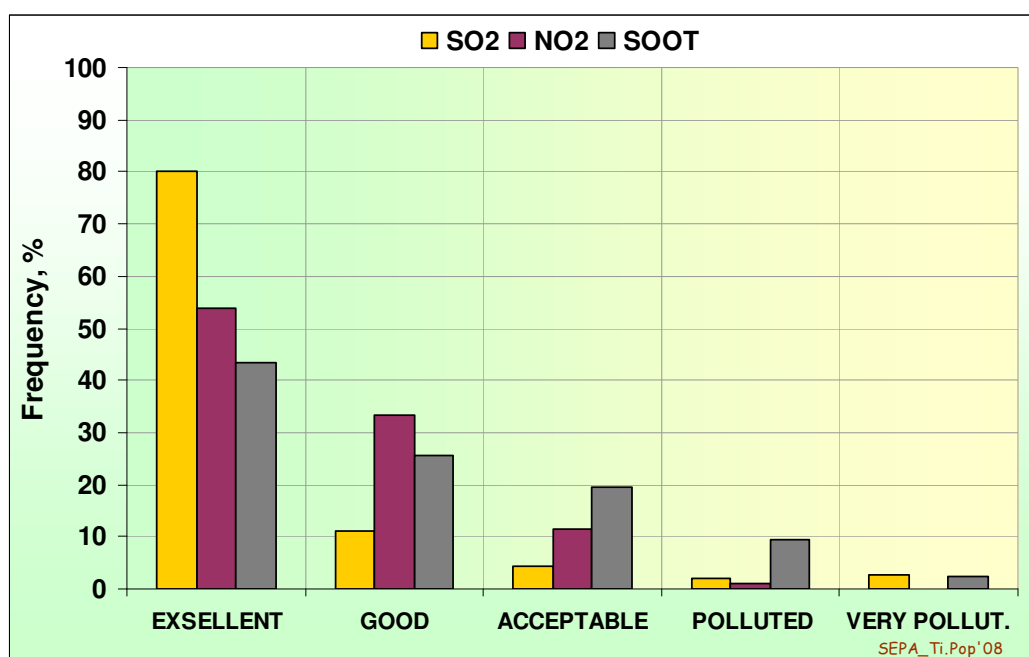
There are numerous accessible playgrounds and green areas in all municipalities in Serbia. Public entities involved in public hygiene are mostly responsible for the security of these areas (installing fences or green barriers for children's safety and for the security of playground equipment). It is a general policy within the Spatial Plan of the Republic of Serbia to increase, until 2020, the proportion of green and recreational areas by 15%.

## **Ensure environments with clean air to reduce respiratory diseases**

### *Outdoor air quality*

The poor quality of ambient air in a number of areas and towns in Serbia results from emissions of sulfur dioxide, nitrous oxides, carbon monoxide, soot and particulate matter (see Fig. 3). In particular, the air quality deteriorates during calm weather and during the heating season.

Fig. 3. Estimate of Serbian air quality in 2007<sup>a</sup>



<sup>a</sup> The estimates are based on daily values of concentrations of sulfur dioxide, nitrogen dioxide, and soot measured at 30 urban and urban–industrial locations.

Source: Republic Hydrometeorological Service of Serbia (36).

The assessment of air quality, using Air Quality Index S07 (defined by the Serbian Environmental Protection Agency), indicated that, during 2007 in Serbia, the air quality was mostly *excellent* in 80% of cases, because of the value of the daily mean concentration of sulfur dioxide; the assessment also indicated the air quality was *rarely excellent* in 43% cases, because of the value of the daily mean concentration of soot (see Table 2)

Table 2. Frequency of air quality classes, depending on basic pollutants in Serbia, in 2007

Air quality class	Pollutant frequency (%)		
	Sulfur dioxide	Nitrogen dioxide	Soot
Excellent	80.1	53.9	43.3
Good	11.0	33.2	25.5
Acceptable	4.4	11.6	19.5
Polluted	2.0	1.1	9.3
Very polluted	2.6	0.2	2.4

Source: Report on state of the environment in the Republic Serbia in 2007 (37:107).

In Serbia in 2007, the air was *mostly polluted* (9.3% of the time), and *very polluted* (2.4% of the time), because of soot. That is characteristic of the majority of urban areas in Serbia, and in 2007 the most significant locations were Užice, Sevojno, Subotica, Belgrade-Vračar and Pančevo.

Sulfur dioxide is the main air pollutant in the city of Bor. Air polluted by sulfur dioxide occurred in 2007 in Belgrade and Kostolac, but was much less than in Bor. In 2007, nitrogen dioxide was the main air pollutant in Belgrade and Čačak.

The high concentrations of particulate matter in industrial and urban areas in Serbia have received very little attention in the past, due to a lack of data. Because of this, but mainly because of fragmented and inconsistent monitoring systems, there is no estimate of the health burden due to this type of air pollution. Fig. 4 shows the population exposure to PM<sub>10</sub> in various European cities in 2006. This is expected to approximate the exposure in children, assuming children comprise similar proportions of the cities' populations.

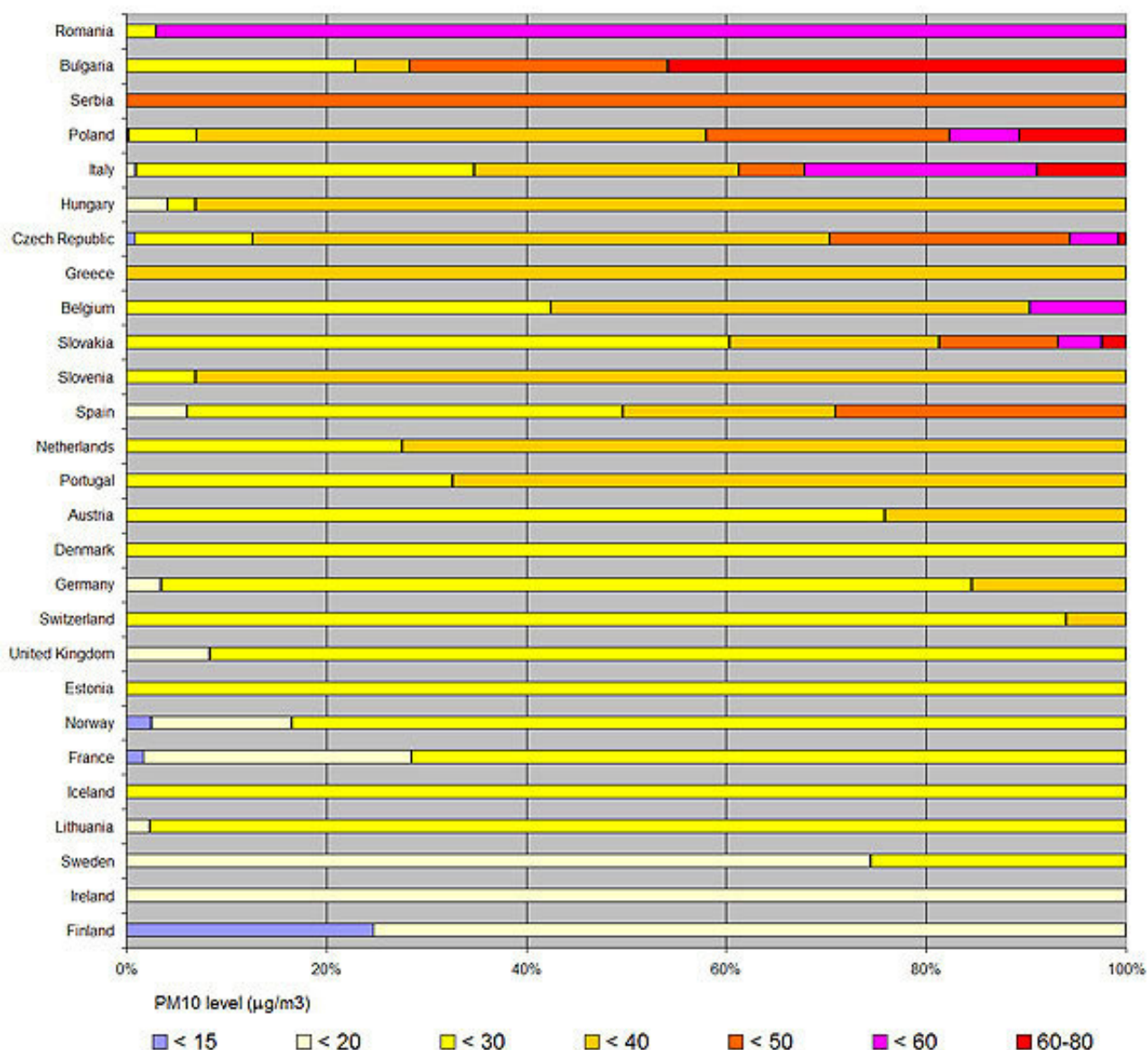
Among other sources, the main sources of air pollution are: the energy sector (coal-fired thermal power plants); district heating plants; oil refineries; the chemical industry; fuel combustion in households, industry, individual heating boiler plants; traffic, the construction industry; inadequate storage of raw materials; and waste dump sites. The major part of air pollution results from combustion of low-quality lignite and engine fuel. Lignite has a low calorific value and high moisture content, and its combustion produces high quantities of fly ash, sulfur and nitrogen oxides. Thermal power plants are equipped only with electrostatic precipitators and do not have means installed for desulfurization and denitrification.

Of the important sources of air pollution, there is evident improvement in the oil refineries in the city of Pančevo and in the city's cement factories, especially since 2004 when €63 million were invested in the Pančevo oil refinery, and adequate filters were added to the cement factories. Also, continued monitoring has been introduced.

Road vehicles are considered a major contributor to air pollution in Serbia, especially in larger cities. Emissions from vehicle exhausts contribute sulfur dioxide, carbon monoxide, nitrogen oxides, ozone, particulate matter, and lead pollution to the air. The main reasons for the air pollution from the transport sector are poor quality of engine fuel (leaded petrol), out-of-date vehicles and generally poor technical standards for the vehicle fleet. Leaded petrol is still in use in Serbia, although the use of unleaded fuel is increasing.



Fig. 4. Proportion of children living in cities with various PM<sub>10</sub> levels, 2006



Note. In several countries the assessment is based on one city only.

Source: Exposure of children to air pollution (particulate matter) in outdoor air (38).

### Indoor air quality

One of the main indoor air pollutants in Serbia is environmental tobacco smoke. A population-based survey in 2006 showed that 35.3% of adults in Serbia were smokers (39.7% of men and 30.5% of women). Among youth aged 15–19 years, 15.7% were regular smokers, while 71.4% were exposed to second-hand smoke in their homes. According to the Global Youth Tobacco Survey performed in 2003, 12.8% of males and 13.7% of females aged 13–15 years were regular smokers, while almost all (97.4%) children in that age group lived in homes where smoking was allowed in their presence (39:318–319). Recently released data showed a decline in the prevalence of smoking among youth 15–19 years of age, from 22.9% in 2000 to 15.5% in 2006, and in exposure to second-hand smoke in their homes, from 85.1% to 71.4%, respectively. Three quarters of children in the 13–15-year age group live in homes where they are exposed to environmental tobacco smoke at home according to the latest National Health Survey (40).

An analysis of mortality data on risk behaviour – particularly, smoking – shows that about 35% of all deaths are related to smoking. According to the latest population health household survey carried out in 2006, the prevalence of smoking among the domiciled adult population in Serbia (older than 19 years of age) has been decreasing by 1% annually, from above 40% in 2000 (Institutes of Public Health Serbia and WHO study on “Health status, health needs and health care utilization of population in Serbia” 2000 (41)). This percentage was even higher among refugees and internally displaced persons housed in collective shelters, as was shown by this study.

Only work environments are regulated for indoor air quality. Measurements of indoor temperature, relative humidity, air circulation, and noise are regularly performed, analysed and reported for all child-care centres and schools. This monitoring is mandatory.

To reduce the indoor use of solid fuel for heating, efforts are being made to connect households and residence buildings to the central heating system in the urban areas of Serbia. The action is strongly supported by the local authorities, including financial support and loans.

## **Reduce disability and disease arising from exposure to hazardous chemicals, physical and biological agents and hazardous working environments**

### *Leaded petrol*

Although lead emissions are particularly dangerous and can lead to mental development problems in children, Serbia has insufficient data on the exposure of children to lead that originates in the environment, especially from the use of leaded petrol. In the National Strategy for Sustainable Development (42, 43), as well as in the Serbian Children’s Environment and Health Action Plan, leaded petrol is planned to be phased out from 2012 to 2015, when the total ban will be in force.

### *Chemical contaminants in soil, food and water*

A programme of regular monitoring of drinking-water quality from urban water supply systems is conducted every year in Serbia. Monitoring has shown the presence of nitrites, nitrates and arsenic in drinking-water, which are health indicator parameters according to WHO. In about of 1.4% of samples, levels of nitrates and nitrites did not meet safety requirements.

Monitoring has also shown that, in 11% of urban water supply systems, arsenic concentrations exceeded the safety limit of 10 µg/l: all of these occurrences are in the Autonomous Province of Vojvodina, where the urban water supply systems do not have water treatment for arsenic removal. Arsenic is classified as a human carcinogen by the International Agency for Research on Cancer. In 2006, bladder cancer was the sixth most common form of cancer among men and the tenth most common among women in Serbia, as in most high- and middle-income countries. Serbia lacks data on the relationship between consuming arsenic via drinking-water and its adverse effects on health, such as bladder, lung and kidney cancer. Because the data on water quality from rural water supply systems and private wells are very limited, this problem is probably of greater public health concern.

The Ministry of Health and the Ministry of Agriculture, Forestry and Water Management are both responsible for food safety in Serbia. The food safety system in Serbia is currently under reconstruction, driven by the need to comply with EU regulations (*acquis communautaire*). Until the adoption of the Law on Food Safety (44) in June 2009, the system of food safety control was characterized by parallel official control. Thus, data on monitoring of different



chemical hazards in the food chain were collected by both ministries. Since 1989, the collection of data on safety of foodstuffs in Serbia has been performed according to established methods.

The Serbia Institute of Public Health analytical study Health of [the] Population of Serbia 1997–2007 showed the increased scope of physicochemical control of foodstuffs and the trend of increasing physicochemical safety. Although the extent of physicochemical control of foodstuffs in Serbia has not reach that stipulated in the previous Law on Health Safety of Foodstuffs and Items of General Use (45), it has increased 1.8 times over the period studied. In 1997, the number of samples per 1000 population was 4.5, rising to 7.9 in 2007.

The trends registered for domestic foodstuffs – that is, the presence or increased content of pesticides, additives, lead, cadmium, mercury, arsenic and organoleptic features – suggest a significant fall in the lack of physicochemical safety during the period studied. After an initial rise in physicochemical safety, a rise in the lack of safety of imported foodstuffs was recorded again in 2007.

### *Radiation*

Serbia has no nuclear power plants, and a research nuclear reactor w as shut down in 1984. Of the total number of sources of ionizing radiation in use in Serbia, about 80% are used in medicine, 15% in industry and 5% in other activities.

Radon is an issue for indoor air quality, and leukaemia is the most frequent type of malignancy among children in high- and middle-income nations. Radon is of considerable public concern, especially in areas perceived as having an excessively high incidence of leukaemia and in relation to such alleged environmental causes as radiation and chemicals. In Serbia, the standardized incidence of leukaemia per million people per year is 38.2 cases, which is lower than in most countries in the Region. During the past 20 years, several studies have been done by the Vinča Institute of Nuclear Sciences on radon content in soil and in day-care institutions for children. These studies, in many parts of Serbia, showed no health risk from radon in most of the locations analysed.

### *Noise*

Serbia has problems that relate to: inadequate legislation and limit values for noise; inadequate monitoring of noise in urban areas; lack of spatial planning, including noise zoning and improper location of industrial areas; lack of projects on protection against noise; insufficient control of noise emitted by motor vehicles; and improper traffic management. Also, the noise that arises from infrastructure development is not considered during planning. Significant progress in this field was made by the adoption of the Law on Protection against Environmental Noise in May 2009 (46). Work on the related by-laws will be performed until May 2010.

### *Occupational health*

On average, Serbia has 60 fatal cases of industrial accidents each year. Also, the magnitude and significance of the problem of child labour is not fully recognized. In 2003, Serbia ratified International Labour Organization Convention 182 on eliminating the worst forms of child labour.

According to a survey carried out in 2000, an estimated 15 000–20 000 children were involved in different forms of work in Serbia. Most of these were engaged in physical labour in agriculture and waste collection, in begging in cities, and in prostitution. The existing Law on Labour (47, 48) stipulates that employment can be established only with a child that is in good

health and is over 15 years of age. Employment under the age of 18 years is allowed only with parental permission. Moreover, children under 18 years of age must not work in high risk workplaces where they can be exposed to physical strain, toxic and carcinogenic agents, noise or vibration, and they must not participate in night work.

The Law on Labour also stipulates that pregnant women are not allowed to work in workplaces where they can be exposed to agents harmful to their health or to the health of the fetus, such as lifting, ionizing radiation, noise, vibration, or unfavourable indoor or outdoor climate conditions.

### *Waste*

The general state of waste management in Serbia is inadequate, posing public health and environmental hazards. The most acute problem is hazardous waste, which is not separately collected and dumped and is processed in regular waste disposal sites. In general, disposal sites do not meet the technical requirements of sanitary landfills. There are also hundreds of illegal dump sites of various sizes in rural areas.

Uncontrolled burning at dump sites produces harmful emissions of particulate matter, dioxins and polycyclic aromatic hydrocarbons. Also, degradation of biodegradable waste in dump sites results in the emissions of landfill gas that contains carbon dioxide and methane, of which the latter may, due to inadequate handling, lead to explosions. Moreover, leakage from dump sites poses a threat to groundwater, surface water and soil, due to the high content of organic matter and heavy metals. It is, however, important to mention adoption of the new Law on Waste Management (49), which is fully harmonized with the EU *acquis communautaire*, and the numerous sub-laws in the process of being adopted.

### *Natural disasters and flooding*

According to data available from the public health institutes, flooding has had no impact on human health in Serbia.

### *Climate change*

According to the World Meteorological Organization, the estimated effects of climate change on Serbia will be the medium range. Serbia, as well as south-east Europe, is likely to have hotter summers, decreased precipitation and, therefore, an increased risk of summer drought. Other projected effects of climate change are: (a) increased pressure on water resources; (b) increased risk of flooding, erosion, wild fires and wetland loss; (c) deterioration in soil quality and altered natural ecosystems, with some loss of habitats and potential loss of species; (d) decreased productivity of commercial forests and increased risk of forest fire, especially in the more southern areas; (e) negative effects on agriculture, due to increased stress on water resources; (f) altered fisheries potential; (g) increased property damage and altered patterns of tourism; and (h) adverse effects on human health, such as excess deaths attributable to heat, particularly among the aged population, changes in the distribution of disease-bearing vectors, and an increase in some communicable diseases (50, 51).

Deprived communities – lacking wealth, social institutions, environmental security, and robust health – are likely to be at greatest risk of adverse effects on health from climate and other environmental changes.

Serbia has a set of measures in place to respond to heatwaves. The development of a structured national Heat–Health Action Plan has recently been started, involving the whole range of institutions and authorities of various sectors, following the suggestions for the

development of national heat-health action plans (52). The following subsection gives further information about climate change and precipitation in Serbia.

### **Climate change and water in Serbia**

According to Intergovernmental Panel on Climate Change scenarios and EU and domestic investigations, the amount of precipitation in Serbia in the following decades is expected to decrease. Summer precipitation losses will be significant, about 40% of current normal precipitation. Also, droughts will be more frequent and stronger (53).

Large areas of Serbia are subject to flood damage, particularly in the Autonomous Province of Vojvodina and in eastern Belgrade. Countrywide, an estimated 500 large communities, 515 industrial facilities, 680 km of railroads, 4000 km of roads and about 30% of agricultural land are vulnerable to floods. The existing flood defence system includes 3434 km of riverside levees, 930 km of canals and 39 river reservoirs and retention areas.

Serbia's flood defence measures are designed and defined through the General Flood Defence Plan for five-year periods for the areas protected by structures built to safeguard against the detrimental effects of water. For areas vulnerable to floods, but not included in the General Flood Defence Plan, responsibility for adopting protective measures lies with the municipal assembly of the municipality where the area is located. The last decade's minimal maintenance of flood defences led to a reduction in their operational performance and an increased risk of flooding. In 2002, 2005 and 2006, major floods occurred. It is important to note that the General Flood Defence Plan does not include a full river basin and sub-basin risk management approach. Specifically, it does not include a complete map of areas subject to different risk levels of flooding or a unique scale of risk valid for all Serbian river basins and sub-basins. The characterization of lands potentially endangered by floods (such as land-use maps) is generally not coupled with mitigation measures.

The Directorate for Water of the Ministry of Agriculture, Forestry and Water Management is implementing an infrastructure rehabilitation programme for key drainage and flood control devices under the World Bank-funded Irrigation & Drainage Rehabilitation Project (2005–2011). Also, the Flood Action Programme of the International Commission for the Protection of the Danube River provides a road map for implementing a full risk management strategy. The Flood Action Programme focuses on a river basin approach to cope with the risk of flooding, recommending a set of actions to reduce the risk; it includes such measures as early warning systems and civil protection. The Directorate for Water started flood risk mapping activities in 2006 within the framework of the Flood Action Programme.

### **Environmental hot spot: Pančevo**

Industrial hot spots, such as Pančevo, are ongoing sources of concern from an environmental and occupational-health perspective. In 2007, UNDP identified Pančevo as an environmental *hot spot* (55). The city has several industrial factories, and the surrounding area has several small-to-medium-size industries and three larger industries: a fertilizer company, a petrochemical complex and an oil refinery. The three establishments, which cover about 480 hectares, employ about 6600 people and represent the major employer for the entire Pančevo area.

A health impact assessment (performed using EU guidelines) of air pollution in Pančevo was performed by the Institute of Public Health in Pančevo and financed by the province during

the years 2002–2005. Measurements of soot were taken, but interpretation was limited due to the lack of basic health data and limited environmental data.

The Pančevo Action Programme was launched in October 2004 and financed by the Italian Ministry of Environment, Land and Sea. The Programme was in the framework of the memorandum of understanding on cooperation on environmental protection signed with the Serbian Ministry of Environment and Spatial Planning. The main objectives of the Programme were: (a) environmental governance and management in the public and private sector; (b) identification of environmental risks and hot spots in industrial and urban areas; (c) implementation and compliance with international environmental conventions and protocols; (d) promotion of the best available technologies for reducing the consumption of natural and energy resources, for protecting the water and air quality and for managing urban and hazardous wastes; (e) the use of renewable energy sources through innovative market mechanisms, such as the clean development mechanism of the Kyoto Protocol.

As part of the Programme, a study of air quality in Pančevo was performed. Some of conclusions are that benzene represents the most critical pollutant in industrial and urban areas; and the main emission source of benzene is the NIS Refinery. However, a study showed that the automatic measurement sites were not representative of background exposure. Air quality monitoring in Pančevo is ongoing and the current values and reports are available on web sites for the City of Pančevo, Pančevo Institute of Public Health and the Serbian Environmental Protection Agency (under the Ministry of Environment and Spatial Planning).

The frequency and intensity of episodes in Pančevo where air quality limit values are exceeded are decreasing. These results are based on real time automatic air quality monitoring and on a programme of industrial activity based on special meteorological forecasts.

The Ministry of Environment and Spatial Planning drafted General Action Plan 2020 for Pančevo and gave it a high priority and the necessary funding.

## **Inequity in health and environment: minorities and Roma**

The Constitution of Serbia (54) guarantees rights to ethnic minorities in conformity with the highest international standards. Based on the latest (2002) census, Serbia has a population of 7 498 001 people (Kosovo<sup>4</sup> and Metohija excluded). Serbs make up 82.86% of the population, Hungarians 3.91%, Bosniaks 1.81%, Roma 1.44%, Yugoslavs 1.08%, Croats 0.94%, Montenegrins 0.92%, Albanians 0.82%, Slovaks 0.79%, Vlachs 0.53%, Romanians 0.46%, Macedonians 0.34%, Bulgarians and Vojvodina Croats 0.27% each, Muslims 0.26%, Ruthenians 0.21%, Slovenians and Ukrainians 0.07% each, Gorani 0.06%, Germans 0.05% and Czechs and Russians 0.03% each.

Every citizen is entitled to health care, and they exercise this right through the use of a health card, which may be obtained by presenting documentation and registering their place of residence. Since only a small number of Roma have personal documentation, obtaining a health card and access to health care (apart from emergency care) and welfare is a problem; therefore, many Roma remain beyond the reach of public poverty alleviation efforts. Moreover, many Roma settlements are located on undesignated land and are therefore illegal or have no formal address, making residential registration impossible. Among other things, such registration is necessary to obtain health insurance cards.

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<sup>4</sup> Reference to Kosovo in this publication, including in the bibliography, should be interpreted as: Kosovo (in accordance with Security Council resolution 1244 (1999)).

## **Sustainable Waste Initiative for a Healthier Tomorrow**

Socioeconomic inequalities and environment and health hazards are evident in the living and working standards of the Roma population in Serbia. The Sustainable Waste Management Initiative for a Healthier Tomorrow (SWIFT) Project is a comprehensive, sustainable approach that focuses on the determinants of social exclusion, poverty and health in Roma communities. It is a multilayered project, involving all the main stakeholders (support already pledged), to convert current informal Roma waste *scavenging* into an effective and credible means of income while tackling health and human rights issues.

### *Background*

There is growing recognition of the economic, social and environmental benefits of income generation activities in the informal sector in waste management, and considerable activity in many countries is now occurring to develop more supportive policies and to improve the productivity and working conditions of this informal sector. It can be highly counterproductive to establish new formal waste recycling systems without taking into account existing informal systems. The preferred option is to integrate the informal sector into waste management planning, building on their practices and experience, while working to improve efficiency and recycling rates, and the living and working conditions of those involved.

### *Informal waste recycling*

Informal recycling of materials from waste represents an important survival strategy for Roma, who have a long-standing history of waste collection and sorting. Roma adults and children can be commonly seen rummaging through communal waste bins and dumping areas, without protection, and therefore they are exposed to many health hazards. This scavenging is a large-scale operation and occurs throughout Belgrade, so much so that it is questionable whether the formal municipal waste collection capacity could cope with the added burden of waste, if Roma ceased these activities. Waste collectors are perceived as the poorest of the poor and marginal to mainstream economy and society. In many cases, they are subject to exploitation by middlemen.

### *Project activities*

The SWIFT Project proposes to build on the current, predominantly Roma work in the field of informal waste recycling, developing this work into an effective, established and credible means of income while tackling the associated and general health and social issues through:

- establishing a formal waste recycling centre (SWIFT Centre);
- integrating current informal waste recycling into regional waste management strategies;
- improving management and organizational capacity;
- improving efficiency and recycling rates; and
- upgrading the social, health and working conditions of those involved.

### *Methods*

The SWIFT Project focuses on three parallel and interrelated topical projects: income generation, social mobilization, and health and environment. Implementation will be through a joint United Nations programme in a top-down and bottom-up approach that involves multilateral stakeholders from government, nongovernmental organizations, the United Nations, local governance and the Roma community, with WHO acting as Project

manager. The main stakeholders have already been approached and have shown strong support; therefore, they are seen as partners in this proposal.

This Project provides a comprehensive and empowering approach that will result in sustainable job options and a healthier community and will also benefit the environment. Developing the health care system through the medical mediator initiative is underway, but this approach requires broader and greater awareness development in the medical sector.



## 4. Institutional set-up

### Conclusions

- Health system reform is proceeding in line with the country's transformation from a planned to a market economy.
- The Sector for European Integration, International Cooperation and Projects of the Ministry of Health plays an important role in the area of environmental health. It serves as the Serbian Children's Environment and Health Action Plan focal point, coordinates environmental health activities in different sectors and follows up on international initiatives. Also, it collaborates with WHO and the EU and is involved in harmonizing Serbian legislation with EU directives.
- In the Ministry of Health, the control of environmental health issues (such as food safety, chemical safety, drinking-water quality, environmental impact on health and risk assessment) are under the jurisdiction of sanitary inspection and public health services.
- The national and district institutes of public health are the main bodies in the health system responsible for assessing and monitoring health risks that result from environmental factors. They are the backbone of the public health services in Serbia and are under the direct supervision of the Ministry of Health, which is the main source of funding for public health services.
- The Laboratory for Human Ecology and Ecotoxicology in the Belgrade Institute of Public Health measures a large number of inorganic and organic compounds in samples of air, water, soil, sediments and biological materials. It is one of the most advanced laboratories in the field of environmental trace analysis in Serbia. It has some of the most sophisticated and advanced instruments on the market, in accordance with standard SRPS ISO/IEC 17025 on the general requirements for competence in laboratory testing and calibration.
- The new Law on Public Health recognizes environmental health as a distinct area, thus allowing the Network of Public Health Institutes to implement that approach within the current organizational structure. However, the Office of Public Health within the Ministry of Health has insufficient capacity to properly implement the Law.
- Competences and resources are shared among the institutes of public health, and there are variations in the types of services the different institutes of public health can provide. Coordination between the institutes of public health is functioning well.
- The number of people trained in environment and health is insufficient, and the number of specialists in environmental health is limited and insufficient. The number of trained inspectors is also insufficient.
- The health system needs to be strengthened to address occupational risks through a comprehensive occupational health service in Serbia.
- Surveillance and data sharing between the various sectors involved in environmental health issues needs considerable strengthening.
- Institutions and authorities that deal with environmental risk factors do not explicitly

consider the adverse effects of these factors on health as an argument for reducing environmental risks.

- Nongovernmental organizations that focus on environmental protection contribute to raising public awareness about the issues of environment rather than environmental health. Also, their focus is rarely on children's environmental health and well-being.
- The National Association for Public Health participates actively in implementing certain public health projects and programmes of the Ministry of Health and the institutes of public health, particularly those that deal with raising awareness about environment and health.
- There are three levels of authority in Serbia: republic, provincial and local. These three levels of government lack strong cooperation and coordination in the areas of environmental health inspection and control.

### **Recommendations**

- A specific dedicated unit or capacity responsible for the environmental health in the Ministry of Health or the Ministry of Environment and Spatial Planning would better serve the development and implementation of environmental health policy in the Government of Serbia.
- The existing capacities of the national and district institutes of public health should be further utilized, upgraded and strengthened.
- Improved and stable employment opportunities for environmental health professionals should be created.
- Environmental health should be considered a distinct discipline in the education and training of professionals through:
  - including environment and health topics in the education and training of public health professionals and environmental specialists;
  - establishing modern curricula for environmental health science in universities;
  - continuing postgraduate education for environment and health professionals; and
  - training doctors and nurses serving primary health care in environmental and occupational health to support preventive services at the individual and community levels.
- Occupational health services need to be strengthened by bolstering the core institutional capacity and human resources to deal with the occupational and work-related health needs of working populations, according to the WHO global plan of action on workers' health (57).
- A regulatory body dedicated to protection against radiation and a national registry of radiation sources should be developed.
- The organizational structure and communication mechanism between the sanitary, environment and labour inspection services need to be strengthened and streamlined.
- The Ministry of Environment and Spatial Planning is encouraged to provide municipalities with further financial and technical support for implementing the



requirements of EU regulations at the local level.

- Environment and health nongovernmental organizations, representing public and professional interests in environment and health policy-making processes, should be encouraged to become involved in intersectoral committees that deal with environment and health issues.

Until recently, environmental health issues were not considered a priority in the public policies of the Government of Serbia. The government responsibilities for this field were dispersed among various sectors and institutions, without sustainable cooperation, communication and collaboration. The government's participation in the European environment and health process coordinated by the WHO Regional Office for Europe, together with political support for the transposition of EU directives into Serbian regulations and laws in the past few years, has enabled several intersectoral projects and programmes that focus on a more horizontal approach to the health system in Serbia. Greater collaboration between various stakeholders and the establishment of joint bodies that target specific environmental health issues are now being initiated. The Sector for European Integration, International Cooperation and Projects of the Ministry of Health has played a key role in the area of environmental health, serving as the Serbian Children's Environment and Health Action Plan focal point and coordinating environmental health activities in different sectors in harmony with international initiatives.

## Political system and demography

Serbia became the successor state of the union of Serbia and Montenegro and retained its international legal personality after a majority vote for independence at a referendum held in Montenegro on 21 June 2006. In 2004, the Government of Serbia declared that association with the EU was its main priority, and in April 2008 Serbia signed the Stabilization and Association Agreement with the EU.

The population of Serbia has experienced a *demographic contraction*, with negative population growth since 1990. The country's population, including refugees, is characterized by ageing, smaller families, and declining numbers in rural and remote areas of the country, with 16% of the population older than 65 years of age. Table 3 gives some key information about Serbia

Table 3. Key information on Serbia

Category	Information
Official language(s) in Serbia	The Serbian language and languages of the national minorities in the areas inhabited by those minorities
Population density in 2002	96.8 people/km <sup>2</sup>
Contribution of the urban population to the total population in 2002	56.4%
Contribution of the rural population to the total population in 2002	10.9%
Average age of the population in 2005	40.6 years Men: 39.3 years Women: 41.8 years
Average level of education	9.3 years of schooling
Illiteracy in 2002	3.4% (older than 10 years)
Unemployment rate in 2008 <sup>a</sup>	14%

Women employed outside of their household in 2005	40.2%
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<sup>a</sup> *National survey on employment 2008 (58)*, [www.stat.gov.rs](http://www.stat.gov.rs), Also referred to as the Labour Force Survey  
 Shttp://webrzs.statserb.sr.gov.yu/axd/en/index1.php?SifraVesti=386&Link= accessed 18 February 2010

About 6.6% of Serbia's territory is designated as parks, reserves or landscapes under protection, with 5 national parks, 14 nature parks, 72 nature reserves, 17 protected landscapes, 43 cultural and/or historical landscapes and 312 natural monuments (59).

## Health sector

The Ministry of Health is the lead authority responsible for Serbia's health system, including policy and administration related to environmental determinants of health. The Network of Public Health Institutes is mainly funded by the Ministry of Health to do research, monitoring, and reporting.

The disaster preparedness and response system in Serbia is in the process of reorganization. Major steps are being undertaken to increase the preparedness of the health system, with support being provided by WHO to establish a national management structure for disasters management and capacity building during 2008-2009.

## Ministry of Health

The Ministry of Health administers the state health system, including: health care; mandatory health insurance and social insurance; training and specialization of health workers; health inspection; production and sales of drugs and medical devices; and sanitary inspection. It consists of the following sectors:

- Sector for Sanitary Surveillance and Inspection;
- Sector for Public Health and Programme Health Care;
- Sector for European Integration, International Cooperation and Projects;
- Sector for Organization of Health Services and Health Inspection;
- Sector for Health Financing and Health Insurance; and
- Sector for Drugs and Medical Devices.

The Ministry of Health also consists of the following institutes and fund:

- Serbia Institute of Public Health.
- Institute of Occupational Health and Radiological Safety
- Republic Health Insurance Fund.

The Ministry of Health has no department or unit dedicated to environmental health. Health risks due to environmental factors are handled by multiple players in the Ministry, mainly the Sector for Public Health and Programme Health Care, the Sector for Sanitary Surveillance and Inspection, and the Sector for European Integration, International Cooperation and Projects.

### *Sector for Sanitary Surveillance and Inspection*

The Sector for Sanitary Surveillance and Inspection is responsible for: protecting the population against infectious diseases; food safety and safety items of general use during production; distribution and importation; and public supply of drinking-water to the population. So far, inspections have been the main regulatory mechanism.

To obtain certification of product safety of water, food and products for general use, the institutes of public health laboratories and the Sanitary Inspectorate collaborate through an annual plan for inspection and random sampling of domestic and imported goods (in production and on the market). This plan has existed for 20 years, and reports show increased compliance. Current work in the Sector targets mainly communicable diseases, while noncommunicable diseases are addressed mostly by the Serbia Institute of Public Health checking for chemicals.

The activities of the Sector that relate to environment and health include the following.

- **Wastewater.** Activities in public areas are performed by communal inspectors in 170 communities.
- **Bathing water.** Once a week during the summer months, 240 swimming pools are tested for biological pollutants and chlorine by the institutes of public health. Periodic checks are also performed by the Sanitary Inspectorate. The law does not differentiate between bathing water and drinking-water where drinking-water quality standards are applied to bathing water.
- **Rural water supply monitoring.** All inspections on larger systems are performed at the national or republic level; however, small systems are not well controlled. Local municipal self-government communal inspectors are gradually taking responsibility for these smaller systems.
- **Border control and international health regulation.** Importers are obliged to provide a health and safety certificate for products. The sanitary inspectors perform controls on packages, transport conditions, expiration dates, among other things, and this work is supported through sampling and laboratory analyses. Based on favourable findings, the sanitary inspector issues an importation permit. There are 40 border inspectors within the five organizational units of the Sanitary Inspectorate, which covers all border and airport customs and controls for communicable disease among all passengers and vehicles. Information on countries affected by disease epidemics is provided to them by the Serbia Institute of Public Health in cooperation with WHO. All passengers travelling from these countries are placed on health surveillance and their information is passed along to the neighbouring health institution in the location of their residence. Inspection of live animals is performed by the Veterinary Inspectorate under the Ministry of Agriculture, Forestry and Water Management.
- **Food safety.** In accordance with the 2009 Law on Food Safety (Article 12, Paragraph 1, Item 5) (44), the sanitary inspector has complete control of food safety at all stages of production, processing and trade (wholesale trade and retail sales) for:
  - new foods;
  - dietetic products that can be put on the market;
  - children's food – substitutes for breast milk;
  - dietary supplements;
  - salt for human consumption;
  - production additives, aromas, enzyme preparations of non-animal origin and auxiliary equipment of non-animal origin; and
  - drinking-water in the original package (mineral water and spring water) and supplied to the public – in accordance with this Law and other laws and regulations on water.

For new foods, the Ministry of Health issues detailed regulations on conditions for production and sales of these foods, and how to exercise control of them.

Sanitary inspectors perform surveillance according to: the Law on Ministries (60, 61), the Law on Public Administration, the Law on General Administrative Procedures (62, 63), the Law on Sanitary Surveillance (64), the Law on Food Safety (44), the Law on Protection of Population against Communicable Diseases, the Law on Health Surveillance of Food and Items of General Use, the Law on Health Safety of Food and Items of General Use, and the Law on Water. They also use international health regulations as guidelines in their everyday work.

Cooperation of different inspectorates is established by the Law on General Administrative Procedures (62, 63), but the Government of Serbia is planning to draft and pass a new law on inspection surveillance in 2010, which will create close connections between different inspectorates.

The Ministry of Environment and Spatial Planning performs noise assessment and oversees the noise monitoring programme; noise assessment on the local level is performed by local institutes of public health, according to the programmes adopted by the local government. The Environmental Inspectorate of the Ministry of Environment and Spatial Planning is responsible for surveillance and monitoring of industrial activities. The Law on Environmental Protection (65) enables inspectors to react in most cases.

The Ministry of Environment and Spatial Planning monitors the waste landfills; also, the Ministry's inspectors are responsible for implementing the Law on Waste Management (49) and other laws and regulations that deal with waste. Codex Alimentarius standards are being used and considered in the process of drafting and passing new sub-laws and other regulations.

#### *Sector for Public Health and Programme Health Care*

The Sector for Public Health and Programme Health Care performs: monitoring and analysis of health indicators; analysis of the extent of chronic noncommunicable and communicable diseases; analysis of health risk factors, derived from the habits and behaviour of the population and environment; compilation of the projects and special programmes in the field of health care programmes; organization of important events on the WHO calendar; monitoring of the implementation of programmes for early detection of malignant diseases; and monitoring of the implementation of preventive actions in primary health care. Priorities are identified on the basis of the health survey (last from 2006), and environmental health is considered a general topic – for example, the Strategy on Public Health covers environmental health issues.

#### *Sector for European Integration, International Cooperation and Projects*

The Sector for European Integration, International Cooperation and Projects in the Ministry of Health plays an important role in the area of environmental health. It serves as the Serbian Children's Environment and Health Action Plan focal point and coordinates environmental health activities in different sectors, and also follows up on international initiatives. It contributes to the development of the Children's Environment and Health Action Plan, collaborates with WHO and the EU and is involved in harmonizing Serbian legislation with EU directives.

The Sector is the lead body for the National Committee for Environment and Children's Health, which was established in May 2008. The main task of this intersectoral working body is to create a Children's Environment and Health Action Plan, to ensure effective communication on environmental health issues with all relevant stakeholders – raising awareness among health and environment professionals of the environmental health risks to children, as well as among children, young people, nongovernmental organizations, together with policy-makers in all relevant sectors – and to perform activities related to capacity

building. Following review by the stakeholders and a series of workshops and public debates, the final Children's Environment and Health Action Plan for Serbia was adopted by the Government of Serbia in September 2009.

This Sector also coordinates and follows up the implementation of Technical Assistance to Health Care Waste Management, a project funded by the EU to develop a medical waste management system in all health care sectors (such as the primary, secondary and private sectors). Health inspectors perform checks on this medical waste management system.

Among other things, the Sector for European Integration, International Cooperation and Projects: designs and manages the implementation of projects, such as the instrument for pre-accession assistance; prepares and negotiates projects with WHO Regional Office for Europe representatives and representatives of other countries; and prepares and negotiates projects with international health and other organizations.

### *Sector for Organization of Health Services and Health Inspection*

The responsibilities of the Sector for Organization of Health Services and Health Inspection include: preserving and improving health and monitoring the health needs of the population, as well as organizing the health services; implementing the method for disposal of real estate owned by the state; providing staff and the scope and contents of their work; ensuring the maintenance of equipment, as well as keeping pace with medical technologies; inspecting the legitimacy of work and the legality of enactments in the health services; inspecting the quality of health protection monitoring; monitoring transplantations, transfusion medicine and mental health services; inspecting health institutions and private practices; inspecting the work of health service organizations in case of disasters and other emergencies, as well as in the case of war; and implementing the Law on Red Cross (65a) and the Law on Health Worker Chambers (65b).

### **Institutes of public health**

At the national level, Serbia has the Institute for Public Health of Serbia "Dr Milan Jovanović Batut", which is a member of the International Association of National Public Health Institutes. Serbia also has a network of 22 public health institutes at the regional level. These institutes provide support to local and national authorities in monitoring health and performing public health interventions; but they do not provide inspection services, as all inspectorates are part of the ministries. The public health institutes have significantly different service portfolios.

The Network of Public Health Institutes, composed of the national and subnational institutes of public health, is staffed by 3.3% (3700 employees) of all governmental health employees and provides technical support to the policy-making for (and monitoring of) environmental health topics. The Ministry of Health supports environment and health activities through funding for the institutes of public health.

The Serbia Institute of Public Health is mandated to perform:

- health promotion, including community health, health education and health care of vulnerable groups;
- control and prevention of communicable and noncommunicable diseases and improvement of emergency preparedness;
- monitoring of the influence of environmental risk factors on the population, control of food and drinking-water safety, sanitary surveillance, and control of compliance with

hygienic standards through data collected particularly by the Health and Sanitary Inspectorate;

- public health microbiology and clinical microbiology; and
- data collection on health and utilization of health services at the national level, producing health information for effective health reporting to authorities and the public, and maintaining databases of the basic resources of the health care system.

The Serbia Institute of Public Health has six centres and one department:

1. Centre for Health Promotion
2. Centre for Informatics and Biostatistics
3. Centre for Analysis, Planning and Organization of Health Care
4. Centre for Prevention and Disease Control
5. Centre for Hygiene and Environmental Health
6. Centre for Microbiology
7. Department for Research in Public Health

The main activities of the Centre for Hygiene and Environmental Health include: the assessment of environmental risks on human health; control of food safety; control of drinking-water safety; and control of sanitary surveillance and hygiene, with the goal of preventing and correcting environmental risk factors that can possibly affect human health adversely. The Serbia Institute of Public Health also coordinates the activities of the Network of Public Health Institutes of Serbia. Coordination of different institutes of public health is well established, and no overlap of competences between institutes of public health exists, as competences have been divided among the different institutes of public health.

The public health services are in transition in Serbia, and during this period the number of staff and the amount of funding has had to be reduced. To maintain funding, many district institutes of public health have started to provide commercial services, while increased funding has been supplied to the Serbia Institute of Public Health, the activities of which, therefore, do not rely on the demands of market.

In Serbia, the National Strategy for Public Health was adopted in 2009, as well as the Law on Public Health (56), and the Serbia Institute of Public Health contributed to both of their development. The Serbia Institute of Public Health is the national focal point for international health regulations. In 2004, an independent public health school was established at the Faculty of Medicine of the University of Belgrade.

Strengthening the Network of Public Health Institutes in the area of environmental health would be assisted by a move from the current mainly short-term project funding to longer-term programme funding, based on a regular budget. Greater financial support for the *prevention* agenda is recommended.

#### *Institute of Occupational Health and Radiological Safety*

The Law on Health Protection (66–69) defines the duties of the Institute of Occupational Health and Radiological Safety as:

- monitoring and studying working conditions;
- monitoring the epidemiological situation in the field of occupational diseases, work-related diseases and occupational accidents and suggesting measures for their prevention and elimination;

- planning, organizing, implementing and evaluating measures, activities and procedures in the field of occupational health protection;
- defining scientific–medical and doctrinaire attitudes in the fields of occupational health and health promotion and offering scientific–methodological assistance to implement them;
- promoting, coordinating and organizing activities within health institutions in the field of occupational safety and health;
- defining unique methods and procedures in programming, planning and implementing preventive measures for protecting workers;
- introducing and testing new medical technologies – as well as implementing new methods of prevention, diagnostics, treatment and rehabilitation – in the field of occupational health;
- monitoring contemporary accomplishments in the field of occupational health organization and suggesting health-related standards for improving and developing the field;
- studying occupational risk factors, as well as identifying, qualifying and evaluating them;
- performing medical and other examinations and measurements in connection with ionizing and non-ionizing radiation in health protection – that is, radiological health protection;
- performing scientific–medical procedures and activities related to identifying high-risk workplaces – namely, activities for which insured years of service are calculated with increased duration;
- examining and carrying out preventive medical surveillances of workers at high-risk workplaces;
- proposing and implementing criteria for evaluating capabilities for driving motor vehicles; and
- estimating working capabilities of employees suffering from occupational diseases, work-related diseases and the consequences of accidents at work and away from work.

Accordingly, the Institute of Occupational Health and Radiological Safety has three departments: medical, radiology and dosimetry (workplace monitoring and personal monitoring) and performs the following activities:

- workplace monitoring
- personal dosimetry
- environmental monitoring
- health monitoring of occupationally exposed personnel.

The Law on Protection from Non-ionizing Radiation (70) involves two institutes and a ministry for protection against radiation:

1. Institute for Occupational Health and Radiation Protection;
2. Institute for Nuclear Science, licensed for radioactive waste; and
3. Ministry of Environment and Spatial Planning (chief inspectorate), which has primary responsibility.

There is no strategic agency for regulating radiation in Serbia, but the Ministry of Science and the Ministry of Environment and Spatial Planning provide regulatory services through a total



of 15 inspectors. These ministries have contracts with such institutions as the Institute for Occupational Health and the Vinča Institute of Nuclear Sciences to monitor radiation in the environment. The Institute of Occupational Health and Radiological Safety monitors radiation-related health effects among occupationally exposed people or people exposed through accidents. There is also the Laboratory for Dosimetry within the Military Medical Academy in Belgrade, with a relatively small population within its control (about 200 people). About 1300 workers (90% health workers, 10% industrial workers) are occupationally exposed annually to radiation in Serbia.

The new Law on Ionizing Radiation Protection and Nuclear Safety (71) envisaged establishing a new regulatory body – the Agency for Ionizing Radiation and Nuclear Safety – in a period of 6 months, starting from adoption of the Law. There is no state register of the dose received by exposed workers, although authorized institutions performing personal dosimetry have their own databases. Also, there is no national registry of radioactive sources – authorized institutions that perform enforcement of measures for protection from ionizing radiation have their own databases. The Registry of Nuclear Material, the Registry of Radioactive Waste and the Ministry of Environment and Spatial Planning are in charge of the Registry of Radiation Practice Licences.

Active coal detectors are used for testing the concentration of radon in dwelling units. The method of measurement is based on radon adsorption on coal and measurement of gamma radiation of radon daughters (lead-214 and bismuth-214).

To test the concentration of radon in dwelling units, carbon filters were opened and exposed in closed rooms 3–6 days. These detectors were placed at a height of a metre above the floor and an equal distance away from the walls. Upon closing them, the measurement was carried out after restoring the balance between radon and its daughters (at least three hours) using a sodium iodide detector. The detector was calibrated by radon-226 of known activity and of the same geometry.

The measurements were performed in randomly chosen public dwellings (50 per year in Belgrade). Considering the measured concentration values of radon-222 in dwelling units in Belgrade, as well the flaws inherent in randomized sampling methods, the situation is not upsetting. The concentration of radon in 85.7% of apartments was lower than 200 Bq/m<sup>3</sup> in Belgrade in 2008, within normal limits for apartments. The concentration of radon in 8.6% of apartments was higher than 400 Bq/m<sup>3</sup>. Serbia has no risk mapping for radon.

## Environment sector

### Ministry of Environment and Spatial Planning

The Ministry of Environmental Protection and the Agency for Spatial Planning merged to form the Ministry of Environment and Spatial Planning in the summer of 2008, and the new entity consists of sectors for:

- urban planning, spatial planning and housing;
- construction, investment and land;
- planning and management;
- protection of nature;
- protection of natural resources;



- European integration, international cooperation and harmonization of regulations; and
- control and surveillance.

The Ministry of Environment and Spatial Planning does not have a special unit in charge of environment and health, and has no plans to establish an environment and health focal point. Competences in this field are divided among sectors and departments – such as those in charge of drafting legislation, waste management, chemical management, radiation, noise, use of groundwater, soil protection and environmental impact assessment – and through the development of intersectoral approaches, such as the Children’s Environment and Health Action Plan.

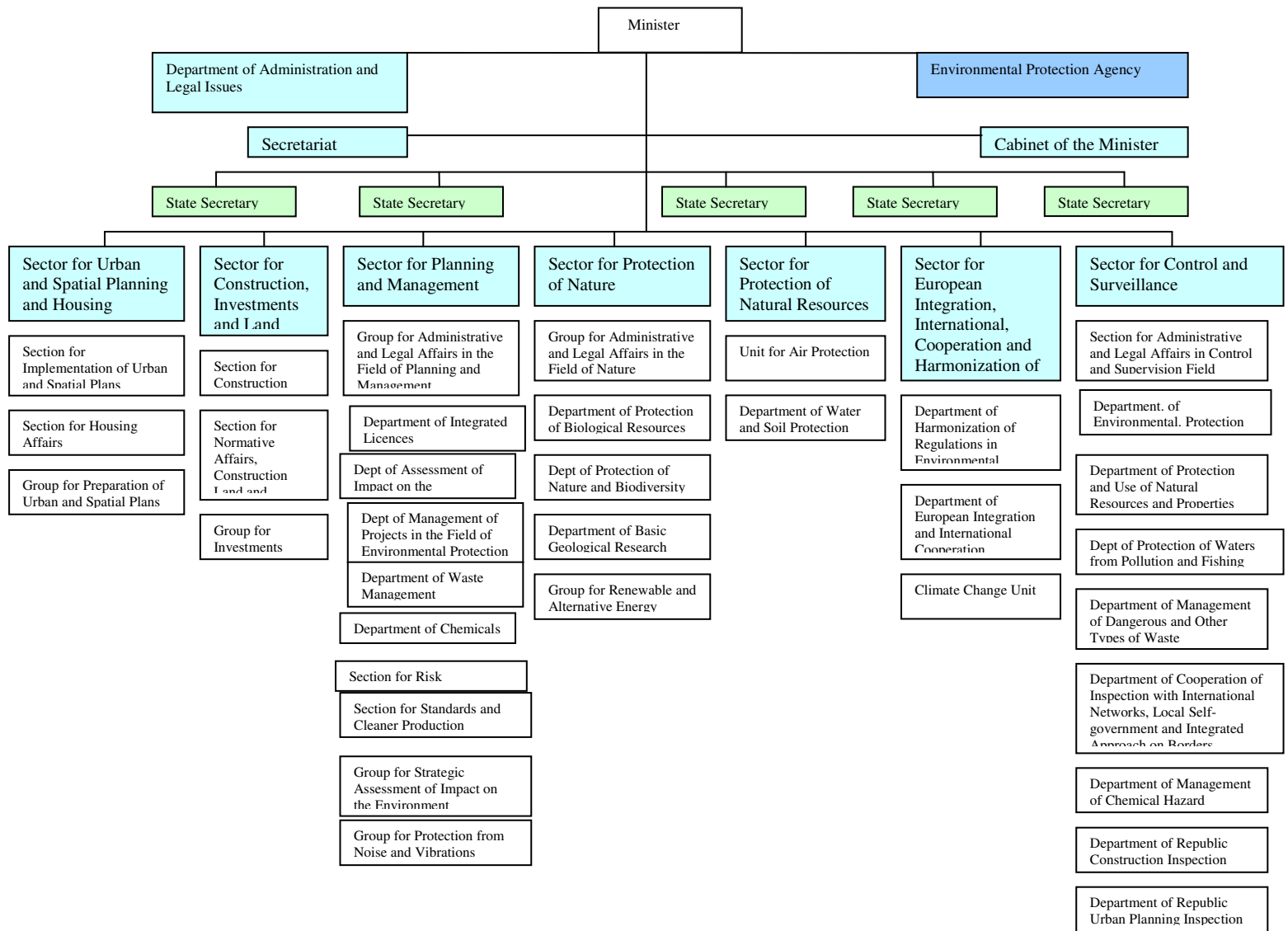
The Serbian Environmental Protection Agency produces an annual report on the state of the environment in Serbia, but formal, routine information sharing between the Ministry of Health and the Ministry of Environment and Spatial Planning does not exist. Information is shared on a request basis only or through information gathered from the annual report.

The Ministry of Environment and Spatial Planning is responsible for the development, implementation and reporting of the progress of Environment Strategy 2030, which was approved by the Government of Serbia in 2007. The Strategy is considered to be the overarching strategy for all activities in the environment sector. It is implemented through the environmental action plans, which are revised every three years.

The Ministry performs tasks of state administration that pertain to: spatial planning and urbanization; setting limits for the construction industry and for land use; regulation of housing; communal infrastructure and activities; organization of geological, cartographic and geodesic surveys and ecological research; inspection and supervision in the fields of urbanism, construction works and communal infrastructure; protection and sustainable development of natural resources (air, water, land, mineral raw materials, forests, fish, and wild plant and animal species); inspection and supervision in the field of sustainable use of natural resources and environmental protection; data collection on groundwater reserves; protection and enhancement of the environment, nature, animal and plant species; protection of the ozone layer; climate change policy development; cross-border pollution of air and water; determination and implementation of protection of natural areas important to Serbia; early warning of accidents; protection from noise and vibration, and ionizing and non-ionizing radiation; production and sale of poisons and other hazardous materials, with the exception of drugs and their precursors; management of chemicals; waste management, apart from radioactive waste; and approval of cross-border sales of waste.

The Ministry of Environment and Spatial Planning is the coordinating body for various international conventions, such as the Convention on Protection and Use of Transboundary Watercourses and International Lakes, the Convention on Transboundary Environmental Impact Assessment in a Transboundary Context, the Aarhus Convention and the Convention on the Transboundary Effects of Industrial Accidents.

The organization of the Ministry of Environment and Spatial Planning is shown in the following figure.



The Ministry of Environment and Spatial Planning has a department designated specifically for environmental impact assessments – the Department of Environment Impact Assessment – and for the accreditation of specialized companies performing environmental impact assessments. The environmental impact assessments are double checked by the Department of Environment Impact Assessment and presented for public discussion. The Ministry of Environment and Spatial Planning also checks the health component of the environmental impact assessment.

### *Environmental Inspectorate*

The Environmental Inspectorate is directly responsible to the Ministry of Environment and Spatial Planning, operates in all areas of environmental protection in Serbia, and performs both monitoring and enforcement. Its key task is enforcement of the law, with 115 employees covering most of the municipalities of Central Serbia and the Autonomous Province of Vojvodina. The Environmental Inspectorate also includes a specific group trained to respond to emergency chemical accidents. Inspections are performed as part of an annual plan or can be instigated through reports provided by the institutes of public health

Legislatively, the Law on State Administration (72–75) defines the rights and duties of inspectors. In case of violations, inspectors can issue orders and prohibitions within their own field of authority. They cannot impose fines, but can order and impose provisional measures, including bans, or order to seize installations in case of clear danger to human health and the environment. They can also propose prosecution by the courts. Only the courts can impose fines, prison sentences and other measures for environmental crimes.

The Law on Environmental Protection (65) and specific laws on environmental protection define the responsibilities and rights of the inspectors. The tasks of the Environmental Inspectorate, which are connected with hazards environmentally related to public health, follow the *Manual for environmental inspectors 2005*, which covers environmental legislation and minimum criteria for environmental inspection, including checklists, reports, orders and lawsuits.

The Ministry of Environment and Spatial Planning performs: protection and sustainable development of natural resources (air, water, land, mineral raw materials, forests, fish, and wild animal and plant species); inspection supervision in the area of sustainable use of natural resources and in the area of environmental protection and other areas; drafting of groundwater balances and standards for geological mapping; programming of research activities in the area of basic geological research pertaining to sustainable use of resources, and also detailed research activities for groundwater; provision of material and other conditions for realization of those programmes; environmental protection and nature protection; ozone layer protection; climate change observation; monitoring of transboundary pollution of air and water; determination and implementation of natural areas of importance for Serbia; setting the conditions for environmental protection in physical planning and construction; accident early warning; protection against noise and vibration; protection against ionizing and non-ionizing radiation; monitoring of production and trade in poisons and other dangerous substances, except drugs and their precursors; chemical management; waste management, except for radioactive waste; approval of transboundary trade in waste and protected plant and animal species.

The Environmental Protection Agency, being an administrative body within the Ministry of Environment and Spatial Planning, and being a legal entity, performs activities of state administration pertaining to: developing, adjusting and maintaining the national environmental protection information system (such as monitoring the state of environmental components and the register of polluters); collecting and compiling environmental data, processing them and reporting on environmental performance status and implementing environmental policy; developing procedures for environmental data processing and assessing them; maintaining data on best available techniques and practices and their implementation in the area of environmental protection; collaborating with the European Environmental Agency and the European Environment Information and Observation Network; as well as other activities prescribed by law.

In Serbia, the Ministry of Environment and Spatial Planning is planning to adopt 240 Integrated Pollution and Prevention Control Permits by 2015.

The Environment Inspectorate cooperates closely with the police, the Emergency Management Board, boarder guards, the Veterinary Inspectorate, local governments and custom offices (waste shipment). Cooperation between the environmental inspectorate and the health sectors is in need of greater efforts at collaboration.

At the international level, the Inspectorate has applied to be a part of the EU Network for Implementation and Enforcement of Environmental Law and is involved with the International Network for Environmental Compliance and Enforcement, Greenforce, INTERPOL, and the EU Network for the Implementation and Enforcement of Environmental Law's Cluster on Transfrontier Shipments of Waste.

#### *Sector for Control and Supervision: radiation*

Serbia does not have a specific radiological institute. The Ministry of Environment and Spatial Planning monitors ionizing radiation through accredited private companies. Its main partners in radiation monitoring are the Belgrade Institute of Public Health and the 11 other regional institutes of public health. Awareness of ionizing radiation is weak, and the development of an awareness programme and provision of public information are needed.

Radon is only monitored in water sources and in housing. For the regulatory officers testing indoor and outdoor radon content, as well as that in the working environment, there is a *Rulebook on requirements to be met by legal entities for carrying out systematic testing of the radionuclide content in the environment (76, 77)*.

Continuous automated monitoring for radiological accidents has begun in Serbia to prevent and reduce the harmful effects of radiation on peoples' health and security and on the environment.

There is no data base on sources of radiation. Also, there is no International Atomic Energy Agency regulatory authority information system to manage a regulatory programme.

Radioactive waste, such as medical equipment and lightning conduction rods are placed temporarily at the Vinča Institute of Nuclear Sciences

Adoption of the new Law on Ionizing Radiation Protection and Nuclear Safety (71), harmonized with EU directives, provided the legal basis for the establishment of an

independent regulatory body, the Agency for Radiation Protection and Nuclear Safety, and provided increasing efficiency of control and supervision over the safe application of radiation sources. The aim of adopting the Law is to introduce new, higher standards of protection from ionizing radiation, to provide nuclear and radiation safety, to establish complex regulations and allow more effective implementation of laws, to establish complete control over ionizing radiation sources and nuclear facilities, radiation and nuclear activities, as well as to manage radioactive waste. The Law's stated objectives will be best implemented through the Agency for Radiation Protection and Nuclear Safety.

*Sector for Protection of Natural Resources: Department for Water and Soil Protection – Water*

The Law on Environmental Protection (65) gives the Ministry of Science the authority to perform state administration functions that relate to preparing detailed groundwater research projects. In accordance with the Article 20 of the Law on Ministries (60, 61), the Ministry of Environment and Spatial Planning is responsible for the public administration of affairs related to:

- the protection and sustainable use of natural resources – one of the most important being water;
- preparing strategic documents, plans and programmes of research related to sustainable use of natural resources – water, in particular;
- preparing a groundwater balance sheet and programmes for detailed investigations of groundwater, as well as providing material and other conditions for the realization of those programmes; and
- Ensuring a system of environmental protection and enhancement that includes transboundary water pollution and early warning systems.

*Sector for Protection of Natural Resources: Unit for Air Protection*

The Law on Air Protection was adopted in May 2009 (78). According to this Law, the Ministry of Environment and Spatial Planning prepared drafts of subsidiary legislations, such as the Decree on requirements of air quality, the Decree on monitoring of air quality and the Decree on emission limit values of pollutants.

The Ministry of Environment and Spatial Planning is in charge of the state network for ambient air monitoring; the measurement itself is done by the public health institutes, based on the contracts they sign each year. According to these contracts, the public health institutes must provide air quality data to the Ministry of Environment and Spatial Planning in monthly and annual reports. Some of these institutions analyse the adverse effects on health of environmental risk factors. Some industrial entities self-regulate themselves, with measurements being performed by the public health institutes and other authorized organizations for measuring emissions. Also, automated sampling is in progress in Belgrade, Smederevo and Bor and in the Autonomous Province of Vojvodina.

Authorized professional organizations measure the effects of air pollution, noise and vibration on people, animals and vegetation using methods accredited by ATS (the Serbian Accreditation Body).

The Republic Hydrometeorological Service of Serbia and the public health institutes traditionally do air quality analysis, using methods defined in the *Rulebook on imission limit*

values (79–82). Reports on these measurements are submitted to the Ministry of Environment and Spatial Planning and are then sent to the Serbian Environmental Protection Agency, to produce the Annual Air Quality Report.

Authorized organizations for measuring emissions do so using methods defined in the *Rulebook on emission limit values* (83). Also, long-range transboundary air pollution memorandums of understanding have been signed with all neighbouring countries.

#### *Sector for European Integration, International Cooperation and Harmonization of Regulations – Climate Change Unit*

The Climate Change Unit is the government body responsible for coordinating climate change national policy, communicating with the Secretariat of the United Nations Framework Convention on Climate Change and other relevant institutions and organizations at the national, regional and international levels. It is also responsible for fulfilling obligations and commitments under the Framework Convention and the Kyoto Protocol, such as developing national communication, planning activities for promotion of the Framework Convention and the Protocol, raising awareness on the topic, and initiating and coordinating strategic documents in the field of climate change.

The Ministry of Environment and Spatial Planning is aware of the need for a vulnerability assessment. Taking into account that the whole western part of the Balkan region is vulnerable to climate change, it adopted the subregional Climate Change Framework Action Plan for south-east Europe in November 2008.

The Ministry of Environment and Spatial Planning is also assessing the effect of climate change on health in collaboration with other ministries responsible for environmental issues, including the Ministry of Health. One of the goals of this assessment is to prepare measures and activities that help identify and assess the influence of climate change on human health, as well as to promote activities and measures, at the national and regional levels, for adapting to climate change.

As a result of the Sixth Ministerial Conference on Environment for Europe, held in Belgrade in October 2007 and hosted by the Republic Hydrometeorological Service of Serbia (84), the Virtual Climate Change Centre for the south-east Europe subregion was established in Belgrade.

#### *Sector for Planning and Management: Department for Chemical Management*

The Ministry of Environment and Spatial Planning is the competent authority for managing chemicals. Following the process of harmonizing national legislation with EU legislation, the Law on Management of Chemicals (85) and the Law on Biocidal Products (86) were adopted in May 2009. The laws on poisons, chemicals and biocides are currently being reviewed for harmonization with EU legislation in similar areas. Besides the adoption of the two laws just mentioned (85, 86), the Law on Ratification of the Rotterdam Convention and the Law on Ratification of the Stockholm Convention on Persistent Organic Pollutants were adopted too.

The new Law on Management of Chemicals (85) envisages the establishment of an independent chemicals agency that would develop expertise and be a regulatory organization that performs public competences in compliance with the Law on Management of Chemicals and the Law on Biocidal Products. The agency will be a specialized authority that manages chemicals in a professional and organized manner and that implements other obligations

included in the EU pre-accession process. This agency is expected to be established in the next six months.

The agency will develop an integrated programme of chemical management and will promote replacement of the most dangerous chemicals with less dangerous alternatives and develop an information system for chemicals management. It will also develop relevant subsidiary regulations on, among others, classification, packaging and labelling of chemicals and will place bans and restrictions on products placed on the market and on the use of chemicals. Moreover, it will develop application of regulatory toxicology and ecotoxicology and will raise public awareness on the adverse effects of chemicals on human health and the environment.

It should be noted that certain steps have already been taken to manage chemicals soundly. The first steps towards establishing an integrated approach to managing chemical in Serbia were made through the development of the National Profile for Chemical Management within the Persistent Organic Pollutants Project financed by the Global Environment Facility and implemented with the help of the United Nations Environment Programme. The Project will assist in properly implementing the Stockholm Convention.

Furthermore, the Strategic Approach to International Chemicals Management Project – which aims to assess national capacities, identify problems and establish priorities for implementing this approach – has been finalized. The Project was financed by the Strategic Approach to International Chemicals Management Quick Start Programme Trust Fund and was implemented with the help of the United Nations Institute for Training and Research.

In addition, to improve capacities for safe management of chemicals, Serbia is implementing a capacity building project together with the Swedish Chemical Agency, which is financed by the Government of Sweden. Also, an advanced institutional capacity building project is being prepared that will be funded from the European Commission.

#### *Sector for Planning and Management – Section for Risk Management*

The Section for Risk Management is the government body responsible for reviewing and approving studies on risk assessment and conducting preventive measures against chemical accidents, with the aim of protecting people's lives, their health and the environment.

The Law on Environmental Protection (65, 87), amended in May 2009, contains provisions on accident prevention policy and accident risk assessment, and other provisions in line with the requirements of Council Directive 2003/105/EC amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II Directive) (88). Three by-laws, which will fully implement and transpose the Seveso II Directive, are being prepared.

#### *Sector for Planning and Management – Department of Waste Management*

Waste management in Serbia covers industrial, communal and medical waste, along with such others as household waste, commercial waste, and industrial waste. The Ministry of Health is responsible for medical waste.

The new Law on Waste Management (49) moves towards alignment with EU directives. The new law deals with the management of: expired batteries and large rechargeable electric cells (accumulators), waste oils, waste from electrical and electronic equipment, waste from



fluorescent tubes that contain mercury, waste containing polychlorinated biphenyls and/or polychlorinated terphenyls, waste that contains persistent organic pollutants, waste that contains asbestos, waste vehicles, medical and pharmaceutical waste, waste that contains titanium dioxide, and packaging. The Ministry of Health is preparing 34 separate by-laws for waste.

*Housing* is dealt with by the Department of Spatial Planning. Activities in the Division for Spatial Planning are related to: responsibilities in urban planning and spatial planning; establishing requirements for construction, communal infrastructure, surveillance in the field of urban planning and construction; as well as communal infrastructure and other activities prescribed by Law. The new Law on Planning and Construction was adopted in 2009.

### **Environmental Protection Agency**

The Environmental Protection Agency (SEPA) (89) was established in 2003 as an administrative legal entity within the Ministry of Environment and Spatial Planning. SEPA performs administrative tasks of state that pertain to: developing, harmonizing and handling the national environmental protection information system (such as monitoring the state of environmental factors and maintaining the register of pollutants); and collecting and unifying environmental data, processing them and compiling reports on environmental status and on the implementation of environmental protection policy. Other tasks it performs include: developing procedures for processing environmental data and their evaluation; keeping data about the best available techniques and practices and their application in the field of environmental protection; cooperating with the European Environmental Agency and the European Environment Information and Observation Network; and other jobs stipulated by legislation.

SEPA is engaged in establishing a functional National Automatic Air Quality Monitoring Network. It stems from a Government of Serbia decision and project and is funded by a grant: Europe Aid/124394/D/SUP/YU – equipment for automatic monitoring stations.

The *establishment of an information system and a unified register of polluters* is defined within the Law on Ministries (60) and the Law on Environmental Protection (65, 87) as an obligation of SEPA. This has been established, and it has introduced integrated assessment and reporting. SEPA provides information freely to the public on the Internet in the Pollutant Release and Transfer Register. This information system provides efficient identification, classification, processing, monitoring and recording of background values and environmental management activities in Serbia. The informational system facilitates the classification, maintenance, presentation and distribution of numerical, descriptive and spatial databases on the following data:

- environmental media quality;
- environmental monitoring;
- legislative, administrative and organizational strategic measures;
- scientific and technical information on planned prevention measures; and
- information exchange with other information systems.

SEPA's establishment also ensures access to other information systems and harmonization of all relevant information and data at the national and international level. The Agency keeps an



integrated cadastre of polluters, which can be used to monitor qualitative and quantitative changes in the environment and to undertake environmental protection measures.

Governmental bodies and local self-government units, authorized institutions, and polluters are required to submit a formal report on monitoring data to SEPA. Communication of data and information between all these sectors and levels of governance, however, remains problematic, because monitoring is divided between various institutions and communication is haphazard. Clarification of roles and responsibilities, together with the establishment of formal standardized reporting mechanisms, will greatly assist in data collection and the development of an evidence base for Serbia.

## **Other sectors**

The lessons learned from existing policies and interventions show that effective action to protect children's health from environmental threats requires a firm political commitment and close collaboration between health and environment authorities, as well as cooperation with other sectors, such as interior, finance and economy, transport, energy, and urban and rural planning.

### **Ministry of Interior**

The Ministry of Interior is the main arm of the law enforcement (policing, civil administration, etc.) in Serbia. It manages one of the two emergency centres in Serbia, one under the supervision of the Ministry of Interior and one under the Ministry of Defence, which causes some confusion of responsibilities. These two emergency centres are in charge of disaster preparedness and major accidents and hazards involving dangerous substances. The centres collaborate with the Ministry of Health and the Ministry of Environment and Spatial Planning to establish emergency preparedness plans. The Ministry of Interior also controls vehicle certifications for road worthiness.

### **Ministry of Infrastructure: transport**

The Ministry of Infrastructure is the administrative body for railway, road, water and air traffic. Its tasks include: safety and regulating and strategically developing the traffic system; constructing traffic infrastructure; administering internal and international transport and intermodal transport; administering legal relations of obligations and ownership; supervising inspections; issuing permits for use of traffic facility and infrastructure; pursuing measures for stimulation of research and development in the field of traffic; and other obligations stipulated by law. The Ministry's Department of Road Safety and Intermodal and Railway Transport has been involved in the Children's Environment and Health Action Plan for Serbia and the Belgrade Healthy City Project.

The new Transport Strategy for 2008–2015 was adopted in December 2007 and includes components for environmental protection and road safety. The Strategy aims to decrease the negative effects of transport on the environment, promote the creation of an environmentally friendly transport system, and focus on decreasing road fatalities. The modernization of road vehicles is a key activity of the Ministry of Infrastructure, with many vehicle models dating from the 1980s and running on leaded petrol. The issue of replacing older vehicles is linked directly to the delay in banning leaded petrol. The import of used cars is being limited to those that meet or better the EURO 3 emission standard and that are also less than 6 years old. The Serbian car manufacturing company Zastava Automobile was recently purchased by Fiat and

General Motors Corporation and is now producing Fiats and Opels with the plan to discontinue the old Zastava models.

Currently, there are two laws on road safety in Serbia: the 1982 Basic Secretary of Internal Affairs (Republic level) and the 1988 Federal Secretary of Transport (former Yugoslav level) laws. Some areas of conflict exist between these laws. The National Strategy for Road Safety is referred to in the Transport Strategy and is currently in the planning phase. Legal responsibility for road safety is shared between the Ministry of Infrastructure and the Ministry of Interior.

Mandatory safety measures for use with certain vehicles include: the use of crash helmets for motorbikes and the use of seatbelts. The use of crash helmets for motorbikes was enforced during the period 1988–2002. Enforcement of the use of seatbelts is increasing, but compliance is still low, where the estimated use of front seatbelts is 50–60%. With respect to children, there is no law on the use of restraining seats for them, but the law does state that children less than 12 years old are not allowed to travel in the front seat of a vehicle.

At the local level of government, activities to develop cycle path are being performed in many towns in Serbia, as well as in the capital, Belgrade. Belgrade is a member of Healthy Cities Association, and the City Secretariat for Transport is developing clean public transport by introducing biofuels and promoting electric-powered transport vehicles.

### **Ministry of Youth and Sports: education**

Youth in Serbia are identified as a national priority, and the definition of youth is persons between the ages of 15–29 years.

The Ministry of Youth and Sports is a new ministry, created in 2008. It functions as an umbrella for the specific functional areas of sports management and youth. A multisectoral approach that involves civil society was used to develop a Youth Strategy, which was adopted in May 2008 and has 11 strategic goals. Currently, a youth action plan is being developed.

The Youth Strategy's main goal is to motivate people to become more physically active in all aspects of life. This general goal has been broken down into specific goals, where education is an important cross-cutting approach and where a thematic group on environmental health exists. Child labour is referred to in the Strategy, and it gives special attention to three levels of sports: elite sports, school sports, and recreational sports as a healthy habit. The information and data available on youth and sports is limited, and research in this area would support and strengthen policy-making in Serbia.

The Ministry of Youth and Sports has supported the establishment of a youth organization that would encourage youth in civil society to propose, plan and implement beneficial projects. Youth are also represented through various national, subnational and local organizations. For example, nongovernmental organizations have developed special additional programmes on environmental health in some schools.

Among youth, awareness of environmental health is considered to be very low. Setting environmental health priorities is represented in various strategies, such as those for preventing violence and for minority youth.

## Ministry of Agriculture, Forestry and Water Management

The Ministry of Agriculture, Forestry and Water Management administers work that pertains to: developing strategies and policies for the agricultural and food processing industry; analysing the production and marketing of agricultural products; and ensuring food reserves in the country. It also monitors market price policy; manages structural and land policy in agriculture; stimulates agricultural production; protects and uses agricultural land; and provides rural development. Moreover, it provides expert agricultural services; provides information systems in the agricultural market; oversees production, certification and quality control of seeds and planting material; acknowledges and protects types of plants and species of domestic animals; and assesses and enforces biological safety, including genetically modified organisms. Furthermore, it preserves plant and animal genetic resources for food and agriculture for sustainable use; manages agricultural land in state ownership; maintains information systems and regulates agricultural land usage; allocates funds for monitoring the annual programmes for protecting land and species; and performs other jobs specified by law.

The *General Inspectorate* is the government body that supervises inspection of agricultural land, phytosanitary operations, and inspection in the internal and foreign trade of plants, seeds and planting material. It also performs other inspection jobs in the field of agriculture, forestry and water management, according to the law.

### *The Veterinary Administration*

The Veterinary Administration is a government body that deals with food safety and the quality of food products, raw foods and waste of animal origin through border veterinary inspection and veterinary services. More specifically, it provides expertise related to: health care of animals; veterinary and sanitary control in the production and trade of animals and animal products; control of facilities for producing animal feed and safe disposal of carcasses and waste of animal origin; control of production and trade of drugs and biological items for veterinary use, and other duties specified by law.

The Veterinary Administration is the main actor in the field of food safety in Serbia. It is responsible for monitoring food together with animal health, food hygiene, food surveillance, food safety and animal protection.

The Ministry of Agriculture, Forestry, and Water Management and the Ministry of Health have overlapping responsibilities for food of animal origin – for example, imports are inspected at the border by both of these ministries. This results in duplication of activities and causes serious delays, particularly if the results of sampling analyses differ between the ministries. Clarification of inspection roles and responsibilities and improved coordination between these ministries is being pursued.

One laboratory, the Meat Institute, is able to perform almost all analyses, including residual chemicals. Sampling performed by the Veterinary Administration is harmonized with EU requirements and the whole system is centralized.

Almost 100% of imported products are tested, and the cost of this work is paid by the importers. Importation of a product is not permitted until test results are available, and this can take up to five to six days. Accredited laboratories are mostly public, and they are numerous in number and expensive.

The new Law on Food Safety (44) will create a Food Safety Agency that will focus on integrating safety activities with EU standards. More funding is needed for equipments and staff training, and the food safety reference laboratories will need to be upgraded. Also, an electronic system for information management is needed to integrate information from laboratories, veterinary practice, the food industry, animal inspections and the animal disease notification system.

### *Plant protection and forestry*

The *Plant Protection Administration* is the government body that provides expertise related to: protecting plants from contagious diseases and pests; controlling methods, mechanisms, production and registration of fertilizers and pesticides and trade in them; and other duties specified by law.

The *Forest Administration* is a government body that provides expertise related to: forestry policy; preservation of forests; enhancement and use of forests and wild game; implementation of measures for protection of woods and wild game; control of seeds and planting materials in forestry, and other work specified by law.

### *Water*

The *Republic Directorate for Water* is a management body within the Ministry of Agriculture, Forestry and Water Management. As such, it performs state administrative activities and provides expertise in the area of water. Specifically, it provides water management policy; supplies drinking-water (except distribution); rationalizes the use of water resources; provides flood protection; implements water protection measures; monitors and maintains national and transboundary waterways; issues permits for water extraction and discharges; and performs other duties specified by law. The Directorate for Water deals with water supply and wastewater systems (collection and treatment) at the national and regional level, but does not have jurisdiction below the regional level; that is, it does not have jurisdiction for municipal water systems. The Directorate for Water ensures the distribution of water across the whole country according to local needs, through the 15 regional water supply systems in Serbia.

Competences with respect to water have been divided in recent years among different government institutions. The institutions that deal with water quality and management are the:

- Ministry of Health – Institutes of Public Health;
- Ministry of Agriculture, Forestry and Water Management
- Directorate for Water
- Institute of Farming, which takes water for farming from the rivers in the Autonomous Province of Vojvodina and measures the field run-off;
- Ministry of Science and Environmental Protection – Directorate for Environmental Protection;
- Republic Hydrometeorological Service of Serbia;
- Ministry of Public Administration and Local Self-government;
- Ministry of Capital Investments;
- Ministry of Mining and Energy; and

- Ministry of Finance.

In addition, the Ministry of Public Administration and Local Self-government is responsible for water utilities, including water supply and sewage treatment.

In the Autonomous Province of Vojvodina, the Provincial Secretariat for Agriculture, Forestry and Water Management is the key stakeholder in water under the supervision of the Directorate for Water. Communication and cooperation between these multiple stakeholders remain a challenge.

Two public water management enterprises exist in Serbia to manage water resources (including water catchments and water supply installations) for Central Serbia and the Autonomous Province of Vojvodina.

The Directorate for Water's work is guided by the documents *Strategic planning and management of water systems* (including wastewater treatment), *Water conditions*, and *Quality guidelines for drinking-water and wastewater*. All these documents are based on the Law on Water Regime (90), the Law on Water in Serbia (91), the Law on Spatial Planning (92), and the Law on Civil Protection (for building regulations) (93).

All water in Serbia is state-controlled (no private sector involvement), and all legal entities can apply for a connection to the water supply and waste management system. Currently, the Directorate for Water is reviewing the water supply and waste management plans of all municipalities in Serbia for upgrades. All urban and rural areas – down to the local level – are covered in this effort. The Directorate for Water conducts and pays for this review and for the development of upgrade plans. Such water and waste management activities undergo several phases of planning and approval (general blueprint, specific project description, main project, and approval and/or review). The Directorate for Water co-finances local water supply development up to 50% (60% in the case of poor and/or underdeveloped municipalities), with the balance being covered by municipalities and/or system users.

The two main obstacles to the work of the Directorate for Water are: (a) that, at the municipality level, public companies that are supervised by the Ministry of Public Administration and Local Self-government are in charge of water systems, but often lack the required technical ability to plan and apply for funding to improve the water and waste management systems; and (b) that revenues from water supply services are not high enough to sustain the system, due to traditionally low prices and a significant number of nonpayments (only 60% of customers pay their water bills).

Activities related to *wastewater* management in Serbia fall under the jurisdictions of the:

- Ministry of Agriculture, Forestry and Water Management and/or the Directorate for Water for licences and permits;
- Ministry of Public Administration and Local Self-government for operation and maintenance of wastewater treatment plants and wastewater infrastructure; and
- Ministry of Environment and Spatial Planning.

Public utilities are not responsible or required to apply to the General Strategy of Water Supply and Sanitation for Serbia. The existing Law on Water (94) requires development of a Plan for the Protection of Water Quality, which has yet to be developed.

All stakeholders need to be much more broadly involved in wastewater management planning and decision-making. The new Law on Water pays particular attention to this matter, using principles introduced in the Water Framework Directive and other EU legislation.

## Ministry of Mining and Energy

The Ministry of Mining and Energy performs the following state administrative tasks that relate to: mining, energy and the energy balance within Serbia; the oil and gas industry; safe pipeline transport of gas and liquid hydrocarbons; and nuclear energy plants that produce power or heating energy and produce or use or deposit radioactive materials. It also performs tasks that relate to: preparing the balance sheet for mineral raw materials; geological exploration that relates to exploiting mineral raw materials, except for underground water; preparing annual and midterm programmes for detailed exploration in geological exploration that relate to exploiting mineral raw materials; and providing material and subsequent conditions for the realization of those programmes. Moreover, it undertakes measures to secure the conditions for the functioning of the public enterprises in the fields within the scope of work of the Ministry; and it supervises ministry related fields and performs other activities specified by law.

Efforts to move towards alternative energy are in their infancy. However, such initiatives as a low-carbon-footprint hospital, eco-schools and assessment of wind farms have been developed.

The Ministry of Mining and Energy encompasses seven departments and one unit:

1. Department of Power;
2. Department of Oil and Gas;
3. Department of General Energy;
4. Department of Mining and Geology;
5. Department of Public Enterprises;
6. Department for Renewable Energy Sources;
7. Department for EU Integration and International Cooperation; and
8. Unit for Sustainable Development in Mining and Energy Sources.

In compliance with the transition to a market economy and harmonization with the EU, the Ministry of Mining and Energy created the new legal, institutional, and regulatory framework for the energy sector, to create a viable and efficient energy market environment through licensing, pricing, and control of energy services by an independent regulatory body.

Key elements of sector reform are:

- the Law on Energy (95), put into force on 1 August 2004;
- the Energy Sector Development Strategy of the Republic of Serbia by 2015, adopted in May 2005;
- the establishment of the Energy (Regulatory) Agency, according to the Law on Energy;



- the establishment of the Energy Efficiency Agency;
- the treaty that establishes the Energy Community (between the EU, south-eastern European countries and the Interim Administration Mission in Kosovo), signed in 2005, ratified in July 2006 (which among other things obliges the parties to implement EU *acquis communautaire* on energy and certain EU environmental legislation), and based on the principles of the European Community;
- the National Gasification Action Plan, adopted by the Government of Serbia in 2005; and
- the Programme for the Implementation of the Energy Sector Development Strategy, for the period 2007–2012, adopted by the Government of Serbia in January 2007.

The main milestone of the reforms was the new Law on Energy. It regulates: the generation, transmission, distribution and supply of electricity; the organization and functioning of the electricity market; the transportation, distribution, storage, trade and supply of petroleum products and gas; and the production and distribution of heat.

The Energy Sector Development Strategy defines five basic priorities. The first one is continuous technological modernization of existing facilities, systems, and/or sources in the following energy sectors: oil, natural gas, coal (including strip mining and underground mining), the power sector with production facilities (thermal power plants and hydropower plants), district heating companies and transmission systems.

The second priority is economical use of quality energy products and increasing energy efficiency in producing, distributing and utilizing energy by end users of energy-related services. The third priority is to use new renewable energy sources and new, more energy efficient and environmentally acceptable energy technologies and installations and/or equipment for energy utilization. The fourth priority is extraordinary or urgent investments in new power sources, based on new gas technologies.

The fifth priority is the long-term development and strategic regional priority of constructing new energy infrastructure facilities and electric and thermal power sources within the energy sectors of Serbia. This priority also includes developing an energy infrastructure, within the frameworks of regional and pan-European infrastructure systems connected with Serbian systems.

In line with the Law on Energy and the Energy Sector Development Strategy, the Ministry of Mining and Energy prepared the Programme for Implementation of the Energy Sector Development Strategy for the period from 2007 to 2012, which was adopted by the Government of Serbia in January 2007. This Programme defines the conditions, method and time schedule for implementing the Strategy. The Ministry of Mining and Energy is currently preparing secondary legislation on incentive mechanisms (feed-in tariffs) for wider use of renewable energy sources.

### **Ministry of Labour and Social Policy**

The Occupational Safety and Health Directorate was established in January 2006 – in accordance with the Law on State Authority and the provisions of the Law on Occupational Safety and Health (96) – within the Ministry of Labour and Social Policy. The Law on Occupational Safety and Health defines the duties of the Occupational Safety and Health Directorate.

The *Labour Inspection Service* is organized within the Ministry of Labour and Social Policy's Labour Inspection Sector and is managed by the Assistant Minister. The Labour Inspection Sector has 28 units in the administrative districts, including the City of Belgrade, and two units in Labour Inspection headquarters that deal with second instance procedures in the field of employment relations and occupational safety and health.

The Labour Inspection Sector has not been formed as a Labour Inspectorate yet. The Law on State Administration (72–75), the Law on Labour (47, 48) and the Law on Employment Relations in State Authorities (97) regulate the authority and duties of the Labour Inspection Sector. The scope of the activities of the Labour Inspection Sector includes inspection supervision in the field of employment relations and occupational safety and health. The Labour Inspection Sector employs 322 inspectors with the status of civil servants, and all of them have a university degree.

The occupational safety and health labour inspector supervises the implementation of regulations based on the Law on Occupational Safety and Health (96). It assesses and monitors technical and other measures that relate to occupational safety and health, as well as implements occupational safety and health measures prescribed by an employer's general act, collective agreement or employment contract.

If a labour inspector is informed about a fatal, severe, collective or occupational accident that causes an employee to be absent from work longer than three days, he or she is obliged to supervise an inspection as a matter of urgency at the spot of the accident and take appropriate measures to eliminate the cause(s) that led to the accident. Findings at the spot of the accident are entered into the report, a copy of which is given to the employer and competent state authorities. The amount collected by mandatory fines is transferred to the Budget of the Government of Serbia. Currently, there is no Occupational Safety and Health Fund.

### **Republic Hydrometeorological Service of Serbia**

The Republic Hydrometeorological Service of Serbia is a special organization within the state administration of Serbia and was established in 1848. As such it does not form part of any ministry and reports directly to the Prime Minister. The structure of the Republic Hydrometeorological Service of Serbia includes observatories in Niš, Belgrade (soon to be upgraded to a virtual climate change centre) and Novi Sad, and five operational Republic Hydrometeorological Service of Serbia centres. The Republic Hydrometeorological Service of Serbia performs the tasks of systematic monitoring, analysing and forecasting of the conditions and changes of weather, climate and water. The competence for water quality monitoring resides in the Republic Hydrometeorological Service of Serbia, together with the Serbia Institute of Public Health and other specialized organizations and institutes. Surface and groundwater quality, aquifers and reservoirs are monitored by the Republic Hydrometeorological Service of Serbia based on a two-year programme adopted by the government.

Furthermore, the Republic Hydrometeorological Service of Serbia issues weather, climate and hydrological forecasts (including health-relevant information called *biomet*). It also issues early notification and warnings about the occurrence of natural disasters and carries out international obligations in the field of meteorology and hydrology, including the exchange of meteorological, climate and hydrological data and information on registered disasters and catastrophes (fully compatible with the EU meteorological alarm system). In accordance with its jurisdiction defined by the Law (*Law on Hydrometeorological Affairs of Interest to the*



*Country* (OG FRY Nos. 18/1988 and 63/1990), the Republic Hydrometeorological Service of Serbia is the only source of official warning.

For the Service to participate in the EU's early notification and warning system during 2007, an electronic alarm system (the so-called Meteo Alarm and Hydro Alarm) was developed and became operative for notification and warnings on weather disasters for the territory of Serbia. This early warning system covers all weather and/or climate extremes and hazards that require preventive protection of human life (such as extreme temperatures, a high ultraviolet index, forest fires, droughts and floods) and is offered as a service to all interested ministries. Currently, such alarms are first issued to the Ministry of Interior, then the Ministry of Agriculture and the Ministry of Environment. There are currently two emergency management centres in Serbia with obscure responsibilities (one under the supervision of the Ministry of Interior and the other under the Ministry of Defence).

The Republic Hydrometeorological Service of Serbia coordinates the development and implementation of national multidisciplinary studies on the effects, vulnerability and adaptation of climate change within the national programme on implementing the United Nations Framework Convention on Climate Change. For a long period of time, the Republic Hydrometeorological Service of Serbia has cooperated successfully with the Ministry of Health, the Faculty of Medicine of Belgrade University and other health institutions in research on weather and climate's influence on human health. On the basis of the results of multidisciplinary research, the Republic Hydrometeorological Service of Serbia has developed methods and effectively issues biometeorological forecasts, and warnings are issued on extreme temperatures (heat waves and/or cold waves), heavy rain with the risk of flooding, severe thunderstorms, gale-force winds, forest fires, fog, freezing rain, snow blizzards, ultraviolet index, occurrence of increased transboundary air and water pollution and other severe meteorological, climate and hydrological events that have a detrimental influence on human health (36).

#### *The Subregional Virtual Climate Change Centre in Belgrade*

As a result of the Sixth Ministerial Conference on Environment for Europe, the Virtual Climate Change Centre for the south-east Europe subregion was established in Belgrade within the Republic Hydrometeorological Service of Serbia. In cooperation with the Regional Environmental Centre, the Virtual Climate Change Centre in Belgrade has developed and will facilitate and coordinate the implementation of the South-east Europe Climate Change Framework Action Plan for 2009–2015. Under this Action Plan, the first regional strategic priority is climate change and public health, safety and emergency preparedness.

The basic mission of the Centre is to support the countries of south-east Europe – through its operational, research, coordination and educational functions – in meeting the need for information on a continuous basis on subregional climate change projections, effects, vulnerability and adaptation options. Also, within the World Meteorological Organization Regional Association VI (Europe) Strategic Plan for the Enhancement of Meteorological and Hydrological Services in the Region, the Centre's functions and priorities are defined by the Organization's resolution on a Regional Climate Centre Network, which was established in September 2009.

## Municipalities and provinces

### *City of Belgrade*

The City of Belgrade has the status of a separate territorial unit, with its own local government and administration. Certain powers and functions have been delegated to the City administration, which consists of 14 secretariats and 4 specialized organizations (such as the Agency for Cooperation with NGOs and for European Harmonization).

In November 2007, Belgrade became a member of WHO's Healthy Cities Network, which is an indication of its focus on the field of environmental health. Current activities within the Network are the development of health indicators and appropriate interventions, involving the relevant secretariats.

The *Secretariat for Environmental Protection*, a City administration unit, has its own fundamental competences stipulated by the Law on Local Self-government (98) and the Law on the Capital City (99). It also has additional duties and responsibilities delegated by Serbia, and it deals with some obligations of Serbia, as defined by relevant by-laws – for example, the realization of the policy for protecting and promoting the environment in Serbia or the environmental impact assessment for certain projects and programmes in the local community within its territory.

The City of Belgrade established the *Agency for Cooperation with NGOs and European Harmonization* – funded by 1.6% of City budget – to promote effective communication, cooperation and coordination with civil society and to deal with European harmonization issues. The Agency aims to develop relationships with partners and stakeholders and to support them in implementing projects (either through funding or as a partner), to ensure they are in line with City and EU frameworks and plans. The Agency's activities have helped to improve and document the abilities of nongovernmental organizations. Among its priorities, the Agency also specifically addresses health inequalities and inequities, such as those of the Roma population.

Under the Law on Health Care (21), the responsibilities of the Belgrade *Secretariat for Health* are to: provide social health at the city level; manage health facilities and provide funds for health care programmes, including emergency care; and manage health care institutions. With regard to environmental health, this specifically includes monitoring the health status of the population, initiating special health care programmes that target specific populations and/or diseases, and planning and implementing programmes for preserving and protecting people's health from the adverse effects of environmental pollution (from, for example, air, water and earth, the disposal of waste materials, dangerous chemicals, ionizing and non-ionizing radiation, noise and vibration). It also includes conducting systematic monitoring – of food, items for general use, bottled water, drinking-water, and water used in the production and processing of food and for sanitary, hygienic and recreational use – for compliance with health and hygiene requirements. When developing health-related strategies, the Ministry of Health consults the Secretariat.

Another secretariat, the *Secretariat for Social Welfare and Child Protection*, is responsible for all activities related to children's institutions (such as day care, feeding, health and health care, education, and social care of children), war-veteran and invalid welfare (such as legal recognition of entitlement; provision of accommodation, home assistance, public feeding of

the homeless and day centres and social services), the operation of the City's social welfare centres, and supervision and inspection of social welfare activities.

Collaboration with other secretariats (mainly health and education) and nongovernmental organizations is often performed through projects on training on (and awareness-raising of) health issues, education and social welfare, with a special focus on disadvantaged populations.

Several programmes are performed as part of the Healthy Cities Association, to promote cycling, by developing cycling pathways, especially in the Municipality of New Belgrade. Also, permanent activities that improve road safety are done in cooperation with the Ministry of Interior.

Still another City secretariat, the *Secretariat for Environmental Protection*, was established as a City administrative unit in 1990. It performs certain tasks according its own fundamental abilities stipulated by the Law on Local Self-government and the Law on Capital, as well as additional duties and responsibilities delegated by Serbia and obligations of the Republic defined by relevant by-laws – for example, the realization of the adopted policy of protecting and promoting the environment in Serbia or an environmental impact assessment of certain projects and programmes in a local community on its territory. The activities of the Secretariat focus on two sectors: the Sector for Monitoring the Quality of the Environment and the Sector for the Protection of Nature and the Environment.

Specific activities of the Secretariat include developing and implementing environmental protection plans and specific interventions. They also include strategic environmental assessments for private and public urban planning projects, such as defining environmental criteria, including a health component. Moreover, they include environmental education; definition of protection, utilization and development of air, soil, flora, fauna and water; and protection from excessive noise, vibration, ionizing and non-ionizing radiation, and hazardous and harmful substances. Furthermore, they include defining the environmental protection criteria for urban planning and construction; issuance of permits for industrial plants in line with the Integrated Pollution and Prevention Control Directive; and defining environmental criteria in urban planning. These activities are performed by the Secretariat just for the confines of Belgrade, and the administrative acts brought during these activities are under the control of the Ministry of Environment and Spatial Planning through an appeals procedure.

The City is developing interventions for risk management of hot spots and is currently building capacity. The Secretariat performs strategic environmental assessments for private and public urban planning projects, and these assessments include a health component. Also, *integrated approval certificates* are issued prior to issuing approval for construction work, which are in line with the law on integrated pollution and prevention control. All Secretariat activities and reports are publicly available to ensure transparency, and the secretariat has a good collaboration with technical and scientific institutes in Belgrade and Serbia.

The City issues calls for proposals, all of which have a certain environmental component (and include funding). The Secretariat for Environmental Protection, in collaboration with different secretariats, has implemented:

- a project on forestation of Belgrade for physical recreation (jointly implemented with the secretariats for sports, education and health);
- recreation in parks (the Secretariat for Utilities and Housing Services);

- sports programmes for youth;
- school camps in nature parks;
- housing and community services; and
- the development of sports activities and programmes.

The *Secretariat for the Environment* performs assignments related to the protection and promotion of the environment through the realization of action plans and programmes. Some of its assignments are related to: ecological education; air, soil and water quality control and protection of this quality; and protection of flora and fauna. Still other of its assignments relate to protection from excessive noise and vibration; protection from ionizing and non-ionizing radiation; and protection from hazardous and harmful substances.

The Secretariat defines the criteria of environmental protection that have to be taken into account in urban planning and construction of facilities and plants. The Secretariat also issues working permits for plants; defines measures for protecting nature and natural goods, and using and developing it; and establishes special fees for protecting and promoting the environment, according to the polluter pays principle.

### *The Belgrade Institute of Public Health*

The Belgrade Institute of Public Health is a member of the Network of Public Health Institutes. It contributes to the professional and scientific approach to health and environmental protection and promotion for the City of Belgrade. The Institute has achieved standardization to SRPS ISO 9001:2001 (for quality management system requirements) and SRPS ISO 14001:2004 (for requirements for environmental management systems).

In the Institute's *Centre for Hygiene and Human Ecology*, multidisciplinary teams work on programmes for monitoring environmental media: water, air and soil in urban and rural settlements. They register, collect and evaluate data about health risk factors present in the environment and give recommendations for preventive and mitigation measures. The Centre also monitors the level of community noise.

The *Laboratory for Human Ecology and Ecotoxicology* in the Belgrade Institute of Public Health measures a large number of inorganic and organic compounds in samples of air, water, soil, sediments and biological materials. In Serbia, the Laboratory is one of the most advanced in the field of environmental trace analysis. It has some of the most sophisticated and advanced instrumentation on the market, in accordance with standard SRPS ISO/IEC 17025 (which specifies the general requirements for the competence to carry out tests and/or calibrations). It carries out sampling and analysis, instrument calibration, maintenance and international intercalibration.

The Institute's *Centre for Ecotoxicological Research* examines hazardous wastes, characterizes them and then provides recommendations for their handling and treatment. The Centre performs collection, recycling and final disposal of medical waste from other medical institutions.

Also, the Centre formed mobile ecotoxicological units, takes active part in the prevention of and preparedness for chemical accidents, and provides measures for remediation and sanitation. It has a contract with the Ministry of Environment and Spatial Planning to respond in the event of a chemical accident anywhere in Serbia.

The Belgrade Institute of Public Health is often called upon to assist other institutes of public health in the Network with their competences and receives compensation for these extra activities from the Ministry of Health.

The Ministry of Health and the Health Insurance Fund provide about 30% of all costs of the Belgrade Institute of Public Health, whereas the other institutes of public health receive between 50% and 70% of costs. This disparity is due partly to the higher operational costs of the city institutes of public health. The Ministry of Health funds about 14% of the Belgrade Institute of Public Health's environmental health activities.

*Provincial Secretariat for Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina, Executive Council*

The territorial organization of Serbia is regulated by the Law on Territorial Organization of Serbia (100) and the Law on Local Self-government (98). Under the Law and as an autonomous province, the Autonomous Province of Vojvodina has independent governance.

The Autonomous Province of Vojvodina lies in the northern part of Serbia and covers an area of 21 506 km<sup>2</sup>, which represents a quarter of Serbia's territory. It contains 84% of Serbia's arable land and is divided into three geographical units: Bačka, Banat and Srem. Each of the units is divided into districts (seven in total), and each district consists of a number of municipalities – 45 in total for the entire Province. According to the 2002 census, the Autonomous Province of Vojvodina has 2 031 992 inhabitants, who constitute 27.1% of the total population of Serbia and who are ethnically diverse.

The Provincial Secretariat has collected environmental monitoring and assessment data, but as yet the Autonomous Province of Vojvodina has not evaluated or interpreted the possible related adverse health effects on its population.

The organizational structure of the Secretariat for Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina includes four sectors:

1. Sector for Assessing, Monitoring and Studying Environmental Quality;
2. Sector for Natural Resources and Biodiversity Protection;
3. Sector for Cleaner Production and Sustainable Development; and
4. Sector for Economic–Legal Affairs, International Cooperation and Public Relation Inspection

In the Autonomous Province of Vojvodina, systematic monitoring began in 2002 when the Provincial Secretariat of Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina was established, and it has legal obligations to prepare an annual report for the Government of the Autonomous Province of Vojvodina on the state of the environment. A national registry of polluters exists, and the Province of Vojvodina is setting up contributions to this system. Regular monitoring comprises:

- monitoring air quality;
- monitoring the quality of aquatic ecosystems;
- monitoring soil quality;

- monitoring endangered plant and animal species and their communities (biomonitoring); and
- monitoring inhalatory allergens.

A study of biofuel production, a form of alternative energy, was performed. The study identified the possibility of alternative energy sources from husbandry and found good conditions to set up an installation for biofuel production. A plan has been developed.

A strategy on energy efficiency has been developed for the Autonomous Province of Vojvodina. It stresses the use of alternative energy sources. It also lists all the potential resources. Four to five projects have been developed and are awaiting financing. Among them, biomass is being looked at, and projects are being developed for implementation with the Ministry of Environment and Spatial Planning. The projects have been submitted for EU funds along with the instrument for pre-accession assistance.

### *Municipalities*

A process of decentralization is occurring, and a number of environmental competences are now dealt with at the municipal level. Municipalities now have responsibilities for urban planning, environmental protection and upgrading, and public utilities. Specific responsibilities of local secretariats for environmental protection include air quality, noise, communal waste, urban planning, the issuance of construction permits not covered at the national level, and environmental impact assessments and integrated permits.

Municipalities are in charge of environmental impact assessments, examining the effect of certain projects and programmes on the local environment. The studies for environmental impact assessments, however, are outsourced to private companies, although the assessment has to be approved by the municipality. Also, specific impact assessment procedures are not well integrated with the overall abilities at the local level, mainly because of the lack of educated staff. It should be mentioned that the performance of environmental impact assessments is a recently acquired and completely new area of responsibility for local governments (starting in 2005), so civil servants still lack sufficient experience to deal with environmental legislation.

### **Nongovernmental organizations**

Nongovernmental organizations that focus specifically on environmental health do not exist in Serbia. Most of these organizations focus on environmental management and protection and only at times relate this to adverse effects on health. Many nongovernmental organizations have a good history of mobilizing public opinion, but often have a short lifetime, receiving one-time peak funding for a single project and then disappearing upon its completion.

Public awareness of environmental health issues is usually high after accidents and reports on environmental health. Often, however, it is not expressed politically (in elections).

*Environmental Ambassadors* is one of Serbia's nongovernmental organizations. It is a formal association of experts in sustainable-development- and environment-related issues. It possesses a good record on organizing symposiums, meetings, training sessions and workshops. The members and founders of Environmental Ambassadors work with different stakeholders in the field of environment and sustainable development, including international organizations. It was established in 2004 and is accredited by the United Nations

Environment Programme and the European Bank for Construction and Development. It is also supported by Ministry of Environment and Spatial Planning, the Ministry of Health, and the Belgrade Institute of Public Health.

The *Ecolibri Bionet* – Centre for Biodiversity Conservation and Sustainable Development – is another nongovernmental organization. It is an independent, nongovernmental, nonpolitical, non-profit-making organization that focuses on biodiversity, conservation and sustainable development in Serbia (101). It is the only nongovernmental organization in Serbia that is a member of the International Union for Conservation of Nature. Among other organizations, it is also a member of the South East European Environmental NGO's Network, the Danube Environmental Forum for Serbia & Montenegro, and the Central & Eastern European Working Group for Enhancement of Biodiversity. It was founded in 1996 by a multidisciplinary expert team that included the authors of the monograph *Biological diversity of Yugoslavia with the overview of internationally important species*.

It is involved mainly in environmental education, publishing, work on biodiversity conservation, and implementation of projects on capacity building in the areas of nature protection, biodiversity conservation and sustainable use of natural resources. Currently, this nongovernmental organization is involved in the International Union for Conservation of Nature programme in central Europe, called Integration of Nature 2000 Agro-environmental Programmes and Rural Development. In 2008, the Ministry of Education accredited it for the Teacher Training Programme on Environment and Sustainable Development, a programme for teachers in primary and secondary schools.

*EkoCentre* is still another nongovernmental organization. It is a nonpolitical, nongovernmental and non-profit-making organization located in Belgrade. It performs scientific, educational and socially oriented environmental activities and has members who are well established at the University of Belgrade and in organizations and institutions responsible for protecting natural, cultural and other environmental assets.

*EkoCentre* is involved in scientific, educational and public campaigns and also the implementation of projects. In the field of education, it organized and guided more than one hundred two-day training seminars on health and environmental education for psychologists, pedagogues and teachers in elementary and secondary schools and youth clubs throughout the country, together with numerous round-table discussions on such topics as organic agriculture and healthy food preparation. About 75% of its projects are in collaboration with governmental bodies, with about 50% of its funding coming from the government and the remaining 50% from international projects.



## 5. Tools for management: policy setting and legal framework

### Conclusions

- The Constitution of Serbia specifies the right to a healthy environment and the duty to protect and enhance the environment.
- The Law on Health Care of 2005 specifies adoption of the national programme for protecting health from environmental pollution and its implementation. It also specifies monitoring and assessing the effects of environmental factors on human health.
- The Law on Public Health of 2009 recognizes environmental health as one of the areas of importance in public health activities.
- The Children's Environment and Health Action Plan was adopted by the Government of Serbia in 2009.
- There are many environment-related laws covering various industry sectors, hazards, and media. However, the majority of these laws are not harmonized with EU legislation and do not specifically address children.
- The harmonization of Serbian laws with EU legislation is an ongoing process and is an excellent opportunity to strengthen health systems to address environmental determinants of health.
- Long-standing obsolete and conflicting legislation and sub-legislation needs to be updated.
- The Poverty Reduction Strategy Paper and the National Strategy for Sustainable Development mention the importance of public health and environmental health affecting vulnerable groups, especially women and children.
- Children and young people are considered a priority in tackling environmental health determinants; children are also a priority in the state health policy, but this is not translated into specific legislation, actions and programmes.
- The National Strategy for Public Health is being developed. Environmental health is included in the strategy as one of the priority areas for actions linked to the Children's Environment and Health Action Plan and the National Environment and Health Action Plan.
- In the area of environmental health, lack of funds is one of Serbia's greatest challenges.
- There is no comprehensive policy on emissions from transport.
  - The central government has no specific funds earmarked for environmental health.
- The institutes of public health are funded by the Ministry of Health and the Ministry of Environment and Spatial Planning. The Serbia Institute of Public Health is mainly funded by the Ministry of Health. However, other local institutes of public health have to rely on revenues generated by fees paid for services. Project-based funding mechanisms are a threat to the long-term sustainability and independence of the institutes of public health.
- Many institutes of public health (except for the Belgrade Institute of Public Health) do not have modern laboratory equipment with which to monitor environmental samples.



- Municipalities can apply to the National Investment Plan (fed by revenues from the privatization of state-owned companies) to fund the implementation of upgrading plans for their water supply and waste systems.
- The poor condition of the infrastructure in the water sector and the insufficient coverage of costs of services provided result largely from an inadequate tariff policy.
- The *polluter pays* principle is fully exercised, due to the new regulation based on the principle.
- Funds for developing the health and environment sector effectively are generally lacking.
- The burden of disease and injuries related to environmental factors has not been estimated in Serbia.
- The economic arguments and/or health costs of the adverse effects on health of environmental pollution are rarely estimated or presented to the policy-makers for preventive measures.
- Due to the lack of reliable data, the health costs of environmental pollution are not sufficiently integrated into policy-making.
- Incentives to encourage the use of less-polluting motor vehicles are lacking.
- The burden of disease due to elevated blood lead levels in children has not been estimated in Serbia.
- Leaded petrol is not banned because of economic considerations. Restriction on leaded petrol will not occur until 2012.

### **Recommendations**

- To provide an overall vision and framework of approaches to environmental health beyond the Children's Environment and Health Action Plan, the National Environment and Health Action Plan should be developed with appropriate legal, organizational and financial mechanisms, to ensure the inclusion of environmental health in the relevant health and non-health acts.
- Obsolete legislation and sub-legislation should be modernized in the process of harmonization with EU legislation, and a specific focus should be introduced on environmental health issues.
- The capacity of legislation and enforcement in environmental health policies needs to be strengthened.
- Additional technical and financial support is required to strengthen capacity in environmental health policy tailored to the situation in Serbia. For example, the use of such opportunities as EU pre-accession funds should be explored.
- For longer-term planning and sustainable activities, programme-based funding is preferable to project-based funding.
- More systematic use of integrated economic analysis (such as cost–benefit analysis) in environmental health policy-making would be beneficial.
- The experiences of other countries that have used cost–benefit analysis of interventions in environmental policies and economic instruments should be evaluated and used.
- The review of environment-related taxes from the perspective of health expenses and

benefits should be strengthened.

- The protection of public health should have a greater presence and consideration in legislation related to the environment and economic development.
- Economic instruments should be applied to encourage enterprises to observe health and safety standards and to report all occupational disease.
- The establishment of a budget line allocated specifically to environmental health is recommended.

## The Constitution of Serbia

Serbia's Constitution (54), adopted in September 2006, states that "Everyone shall have the right to a healthy environment and the right to timely and full information about the state of the environment. Everyone, especially the Republic of Serbia and autonomous provinces, shall be accountable for the protection of the environment. Everyone shall be obliged to preserve and improve the environment."

The main developments in environment and health priorities for Serbia are defined in the National Strategy for Sustainable Development (42, 43) and the Children's Environment and Health Action Plan. These priorities are linked to the EU integration process by the transposition and harmonization of EU legislation and the implementation of the Stabilization and Association Agreement.

## Health laws related to environment and health

The National Public Health Strategy was adopted by the Government of Serbia in 2009, and the Law on Public Health (56) was adopted by the National Assembly in August 2009. Environmental health is substantially presented in these documents.

Articles 11 and 12 of the Law on Public Health identify the following environment and health public health activities:

- monitoring and analysing the status of the environment (such as water, air, soil, noise, vibration and waste);
- evaluating the adverse effect of the environment on health;
- assessing the risk the environment presents to health on the basis of the polluters cadastre;
- controlling hygiene standards in health care institutions;
- analysing environmental and other contributions for the health impact assessment;
- establishing expert premises and recommendations in occupational health;
- following up working conditions and the organization of the occupational health information system;
- planning preventive measures in such areas as occupational health.

Among the laws, by-laws, strategies and plans on health that currently influence environmental health are:

- the Law on Health Care of 2005 (21);
- the Law on Environmental Protection of 2004 (65) and of 2009 (87);
- the National Environmental Strategy;
- the Law on Pension and Disability Insurance of 2003 (102), amended 2009; and
- the Children's Environment and Health Action Plan (105).

The Law on Health Care of 2005 (21) covers all health risks in a general manner. Food safety is covered in the Law on Food Safety of 2009 (44), which transferred responsibility and competences in this area to the Ministry of Agriculture, Forestry, and Water Management. Articles 10, 13, 18 and 119 of the Law on Health Care refer specifically to environment and health. The Law specifies that social care for health at the national level also includes adoption of the national programme in the area of protection of health from environmental pollution (and its implementation) caused by noxious and hazardous matter in the air, water and soil, disposal of waste material, noxious chemicals, sources of ionizing and non-ionizing radiations, noise, and vibration. It also specifies the performance of systematic tests of food or provisions, items of general use, mineral drinking-water, drinking-water, and water used for the production and processing of foodstuffs and for sanitary and hygienic and recreational requirements; this is done to establish their sanitary and hygienic condition and the specified quality (through monitoring). It also includes systematic epidemiological and systematic environmental monitoring; systematic monitoring and testing of the effects of environment pollution on the health of people; and. systematic testing of the sanitary quality of foodstuffs, items of general use, and drinking-water.

According to the Law on Health Care, employers have a very important role in the entire health protection system. An employer is obliged to organize and provide for health protection of employees from his or her own resources, to create conditions for responsible behaviour when health is in question and for health protection of employees at workplaces.

The Law on Sanitary Surveillance (64) defines sanitary inspection and surveillance over *objects* and their near surroundings. Objects, as defined by the Law, are those facilities where certain actions are undertaken, such as public supply of drinking-water. The Sanitary Inspectorate, within the Ministry of Health, is responsible for implementing and enforcing the Law.

The Regulation on direct equipment, facilities, space and measures for prevention of dispersal of infectious diseases (103) prescribes procedures for legal and business entities that provide hygiene services to prevent dispersal of infectious diseases among all citizens, including children.

The Regulation on matters of general usage includes such articles as toys, household items and other things that children can reach and also includes measures necessary to prevent harmful exposure. A separate chapter in this Regulation includes toys for children. This Regulation dates from 1986 and is not harmonized with EU directives, but it is still in force; the Sanitary Inspectorate implements it.

The Law on Protection of the Population from Communicable Disease (104) is currently being redrafted, to be aligned and harmonized with the International Health Regulations.

The Law on Pension and Disability Insurance (102) defines compulsory insurance and compulsory insurance of people – namely the insured and their rights. The Law defines the people entitled to the same rights as the insured in case of disability and physical injuries caused by an occupational accident or occupational disease.

The Law on Occupational Safety and Health (96) regulates the occupational safety and health system in Serbia. By harmonizing this law with ratified International Labour Organization conventions and EU Framework Directive 89/391/EEC, as well as special directives derived from the Framework Directive, all guidelines originating from them have been accepted in a form adjusted to national conditions. Apart from this Law, the regulatory framework of the occupational safety and health system is integrated by several sub-acts. The Law defines people who have the right to enjoy occupational safety and health, as well as those categories of workers having special rights and obligations, and it stipulates the occupational safety and health measures to be applied to young workers, women carrying out activities at high-risk workplaces, disabled people and workers suffering from occupational diseases. Serbia ratified International Labour Organization Convention No. 182. According to the Law on Labour (47, 48), people under the age of 18 years are not allowed to perform the following duties:

- hard physical work;
- work underground, underwater or at considerable heights;
- work that exposes them to harmful radiation or poisonous, carcinogenic materials or that causes hereditary diseases;
- work that causes a health-related risk due to cold, warmth, noise or vibration;
- work longer than 35 hours a week – that is, 7 hours a day; and
- work at night.

Apart from protecting people younger than 18 years of age, the Law on Labour (47, 48) provides that people younger than 21 years of age may carry out especially hard physical activities, activities underground, underwater or at considerable height only with special findings of competent health institution that rule out the possibility that such activities are harmful to their health. The Law on Labour prescribes that pregnant women are not allowed to carry out activities harmful to themselves and to the health of the fetus, especially not at workplaces that require the lifting of heavy loads or workplaces where they are exposed to harmful radiation, extreme temperatures and vibrations. The Law on Labour also prescribes that overtime and work at night are prohibited for pregnant workers during the last eight weeks of pregnancy. The Law also prohibits overtime and work at night during the first 32 weeks of pregnancy if such work would be harmful to a pregnant worker or her fetus. The Law requires a written consent for overtime and work at night for parents having children up to 3 years of age.

Indoor air quality is currently regulated in workplaces by the Law on Occupational Safety and Health (96). The maximum allowable concentrations in workplaces are regulated by the *Book of regulations on maximum allowable concentrations of hazardous gases, vapours and aerosols in the working environment*, adopted in 1991. Since schools and kindergartens are also treated as part of the work environment for teachers and other employees, indoor air is controlled only where necessary.

The *Rules on defining occupational diseases (106)* define them as certain diseases developed during the period of insurance, caused by long, immediate exposure to working processes and working conditions by the activities performed by the insured. The Rules give the conditions needed to recognize the occupational diseases and lists them. According to the Book of Rules, 56 diseases are recognized as occupational diseases. As the Book defines a “closed list” of occupational diseases, there is no possibility that an unlisted disease be recognized as an occupational disease. The Law on Pension and Disability Insurance (102) provides for the insured to acquire the right to a disability pension in case of complete loss of working ability caused by an occupational accident or occupational disease, regardless of the duration of insured person’s years in service.

The amount of increase of insured years of service depends on the hardship, danger and damaging effects at work – namely, it depends on the nature of the activities and may be 50% at most. The *Book of rules on workplaces* covers the duties for which insured years of service are calculated with increased duration (107–110) and regulates workplaces for which insured years of service are calculated for increased duration and the amount of increase.

## **Laws for environmental and other sectors**

Environmental legislation in Serbia consists of a large number of laws and regulations – more than 100. Among other areas, these laws cover:

- planning and construction
- mining
- geological surveys
- water, soil and forest protection
- flora and fauna
- national parks
- fisheries
- hunting
- waste management
- safety of chemical production and trades in the market
- trade and transport of explosive and hazardous materials
- protection against ionizing and non-ionizing radiation
- nuclear safety.

The majority of these laws are harmonized with EU legislation. For example, in 2009 alone, the National Assembly adopted a package of 14 laws within the competence of the Ministry of Environment and Social Planning that were harmonized with EU legislation. But the majority of these laws do not specifically address children.

Progress in integrating children’s needs into multisectoral policies can be seen in the introduction of recent laws. For example, the Law on Consumer Protection (111) contains specific provisions that address child health. According to this Law, it is forbidden to sell toys and other products that may have harmful effects on children’s health. Also, toys and other articles that children can reach must have a visible warning about the potential dangerous effect of their use, as well as a warning about age limits. The Law forbids selling and serving alcoholic drinks and selling tobacco products to children under the age of 18 years.

## The Law on Environmental Protection

The 2004 Law on Environmental Protection (65) covers some actions very relevant to environmental health, such as:

- protection of air, water, land, soil, forests, protected natural areas and national parks, and protection from waste, ionizing radiation, noise and vibration;
- measures and conditions for environmental protection (prevention), in terms of national environmental programmes and plans, spatial planning and construction, conditions for operation of facilities and installations, environmental quality standards and emission standards (such as ambient and emission limit values), bans and limitations, environmental management systems, standards for technologies, products, processes and services, and environmental labelling;
- remediative measures;
- systems for issuing environmental permits and approvals;
- measures for protection against hazardous substances (in production, transport and handling);
- environmental monitoring (monitoring and information systems);
- access to information and public participation in decision-making;
- liability for environmental pollution;
- supervision; and
- penalties.

The following laws on environmental protection are relevant to health:

- Law on Ratification of the Kyoto Protocol of the United Nations Framework Convention on Climate Change;
- Law on Ratification of the United Nations Convention to Combat Desertification;
- Law on Ratification of the Convention on Environmental Impact Assessment in a Transboundary Context;
- Law on Ratification of the Convention on the Transboundary Effects of Industrial Accidents;
- Law on Transport of Dangerous Substances (112);
- Law on Production and Trading of Toxic Substances (113, 114);
- Law on Environmental Protection (65, 87);
- Law on Strategic Environmental Assessment (115);
- Law on Environmental Impact Assessment (116);
- Law on Integrated Pollution Prevention and Control (159);
- Law on Ionizing Radiation Protection and Nuclear Safety (71);
- Law on Protection from Non-ionizing Radiation (70);

- Law on Ratification of the Aarhus Convention;
- Law on Waste Management (49);
- Law on Protection against Environmental Noise (46);
- Law on Management of Chemicals (85);
- Law on Air Protection (78); and
- Law on Biocidal Products (86).

The following laws are being prepared:

- Law on Transport of Dangerous Substances
- Law on Railway Security.

Most new laws attempt to transpose the corresponding EU directives and their principles. They also ensure that provisions of the Convention on Environmental Impact Assessment in a Transboundary Context (the Espoo Convention) and its Protocol on Strategic Environmental Assessment are taken into consideration. According to the Law on Strategic Environmental Impact Assessment (115), all national and municipal plans and programmes should undergo strategic environmental assessment and should include public participation.

To implement the Law on Environmental Impact Assessment (116), a government decree determines the list of projects for which an impact assessment is mandatory or may be required in accordance with the relevant EU directives: 97/11/EC and 337/85/EEC. Public participation is also envisaged in all environmental impact assessment stages. All subsidiary regulations were adopted in 2005.

Other environmental laws and regulations to be harmonized, or already harmonized with EU legislation, cover: the introduction of genetically modified organisms; the protection of air, water, land, soil, forests and geological resources; the management of chemicals and biocidal products; waste management; protection against ionizing and non-ionizing radiation; and the management of noise and vibration.

Measures for protecting against hazardous substances include bans and limitations on: the production and trade of ozone-depleting substances and products containing such substances; and the export, import and transit of waste.

The Law on Environmental Protection (65, 87) is fully harmonized with Council Directive 2003/105/EC, which amends Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances (Seveso II Directive).

The new Law on Management of Chemicals (85) provides a proper base for sound chemicals management. The new by-law on classification and labelling will request labelling of hazardous chemicals, providing people handling these chemicals with adequate information about their properties and ensuring they are used safely and that the health of people and the environment are protected. Furthermore, it envisages introducing bans and restrictions on the production, placement on the market and use of chemicals that represent an unacceptable risk to people and the environment (chemicals listed in Annex XVII of the EU Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) Regulation (117), as well as persistent organic pollutant chemicals and volatile organic compounds). To control risk and

ensure that a particular dangerous substance is replaced by a suitable alternative substance, a list of substances that cause concern shall be published (those that must have authorization according to REACH). Regarding import and export of certain dangerous chemicals, the Law on Management of Chemicals (85) incorporates Rotterdam Convention procedures. Besides the chemicals listed in the annexes of the Rotterdam Convention, this procedure relates also to chemicals that fall under regulations that implement this Convention. Finally, to monitor the risk that chemicals represent to human health and the environment, systematic monitoring of the placement on the market and use of these chemicals is planned.

The provisions of the new Law on Biocidal Products (86) also provide a great deal of protection to human health and the environment when placing biocidal products on the market.

Public information and public participation in decision-making have been introduced in line with EU Directive 2003/35/EC on public participation (118).

### **Environmental standards**

Standards for water and air are better regulated and more frequently applied than emission standards, but most of the existing ambient limit values are not harmonized with relevant EU directives. Such harmonization is planned by adopting a decree on requirements on air quality by the end of 2009. Emission standards for air pollution have been established and, at the moment, sub-legislation is being developed and harmonized with the relevant EU directives. This process will be finalized by adopting the decree on emission limit values of pollutants at the end of 2009. The air emission limit values regulate power plants that use combustion, the processing of mineral raw materials, cement kilns, coke production, metallurgy, inorganic chemistry, organic chemistry and vehicles (cars, trucks and motorcycles). Emission standards for wastewater discharges are also under development, and their introduction is planned for the end of 2009. For certain products (such as petrol and diesel fuels) and emissions from vehicles, standards have been introduced, but they often differ from EU standards.

### **Environmental liability**

The environmental liability of polluters for environmental damage is regulated by the Law on Environmental Protection (65, 87) and in general by the Law on Obligations, which defines the general rules for the form and substance of agreements. The polluter pays principle and the liability of legal successors is stated in the Law on Environmental Protection. Any legal or physical entity that causes environmental pollution by its illegal or improper activities is liable for it, including the case of liquidation or bankruptcy. Changes in the ownership of companies or other legal entities or other changes in the ownership structure shall include an assessment and allocation of liability for environmental pollution and settlement of the debts of the ex-owner with regard to pollution or damage to the environment. The liability of polluters for past environmental damage caused by privatized companies is not fully regulated by the Law on Privatization (119–121).

### **EU *acquis communautaire***

Serbia is working to transpose the EU *acquis communautaire*. This is an excellent opportunity to strengthen health systems to address the environmental determinants of health. The National Programme for Integration into the EU includes the area of environment and health. The transposition process has been a major factor in the modernization of environmental legislation in recent years, notably with the adoption of such basic environmental laws as those on environmental impact assessment, strategic environmental assessment and integrated



pollution and prevention control, which are fully in line with the corresponding EU directives. Some progress is also being made on noise, chemicals and genetically modified organisms. The next step is to put in place appropriate by-laws, sophisticated mechanisms and tools, and specialized institutions to help enforce the transposed legislation.

The transposition of water legislation, however, is still lagging behind. The environment and the water administrations are not able to cope with the EU concepts and tasks, and need assistance from abroad.

### Environmental Inspectorate

Criminal acts are strictly proscribed by law. Legislation on criminal acts includes primarily the 2005 Criminal Code (122). The Criminal Code enables other laws that contain provisions against environmental crimes, such as the Law on Customs (123, 124), the Law on Protection against Ionizing Radiation (71, 125), the Law on Prohibition to Build Nuclear Power Plants (126), the Law on Mining (127, 128), and others. The Criminal Code contains a special chapter “Criminal acts against the environment”, which defines 18 environmental criminal acts. For these, fines ranging from CSD 10 000 to CSD 1 million (or up to 10 years of imprisonment) are prescribed, and for criminal acts with particularly serious consequences, the penalty is up to 12 years of imprisonment.

Other special laws with criminal provisions have not been codified by the Criminal Code. These laws include the Law on Genetically Modified Organisms (129, 130), the Law on Production and Circulation of Poisonous Substances (131–133), and the Law on Water (134–138).

The environment performance review (2007) by the Economic Commission for Europe (24) summarized the main institutional weaknesses in environmental protection, as shown below:<sup>5</sup>

- lack of horizontal coordination between the Ministry for Capital Investments’ National Agency for Spatial Planning and the Ministry of Science and Environmental Protection’s Directorate for Environmental Protection in the field of spatial and urban planning and construction;
- lack of consistent integration of environmental considerations and requirements in the process of adoption of spatial and urban plans and construction permitting;
- overlap of competences between the Directorate for Water and the Directorate for Environmental Protection in relation to water quality and water pollution;
- potential conflict of responsibilities between the Directorate for Forests, which performs forestry activities as an economic sector, and the Directorate for Environmental Protection, which is entrusted with the responsibility of protecting forest ecosystems.
- unclear responsibilities for protection of wild fauna in the context of hunting;
- inadequate and unclear division of competences between the Ministry of Mining and Energy and the Directorate for Environmental Protection in the field of geological research;

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<sup>5</sup>The names of the ministries and agencies mentioned are the ones that prevailed before the governmental change of May 2007.

- insufficient institutional coordination and coverage of environmental monitoring activities;
- inadequate and insufficient professional staff at all levels of public administration, including environmental inspectorates at the local level (especially for strategic environmental assessment, environmental impact assessment, and integrated pollution and prevention control, monitoring, and inspection activities); and
- educational institutions insufficiently prepared to train an adequate number of environmental experts.

## Water

The Law on Water (*134–138*), which is currently being implemented, covers water regimes, water management areas, responsibilities for water management (including issuance of water management legislation), water management activities, limitation of owners' and beneficiaries' rights, water cooperatives, financing of water management activities, and administrative inspection to enforce the Law. The legislation provides for various water management sub-laws on water resource conditions, water resource compliance and water resource permits. Until May 2007, these were issued by the Directorate for Water of the Ministry of Agriculture, Forestry and Water Management for surface water and the Ministry of Science and Environmental Protection (which was at the time in charge of geological issues) for underground water. Currently, the new Law on Water, which will be harmonized with EU legislation and also with environmental protection legislation, is under development in the Directorate for Water of the Ministry of Agriculture, Forestry and Water Management.

The national policy targets for water protection and water resource management are:

- to harmonize national water management legislation with the EU Water Framework Directive and to introduce emission limit values for effluent discharges, according to EU Directive 91/271/EEC on urban wastewater treatment (*139*);
- to ensure sustainable use of underground water aquifers and to establish protection zones for all current and planned water supply sources;
- to ensure that drinking-water in urban areas meets the quality standards of EU Directive 98/83/EC on drinking-water (*140*), to extend the centralized water supply to selected rural areas with especially unsatisfactory water quality, and to improve the standards and efficiency of laboratories for water quality monitoring;
- to harmonize national institutional competences for integrated water management; and
- to extend the sewerage system to cover 65% of the population by 2014, to provide wastewater treatment in agglomerations with organized sewerage systems that have a significant effect on the recipient water and especially on sensitive areas, and to upgrade or renew the operation of existing municipal wastewater treatment plants.

The major elements of the national policy and strategy for the water sector are defined in several strategic documents:

- the 2006 National Environmental Strategy;
- the National Strategy for the Conservation of National Resources;
- the Study of the Sustainable Development of the Water Sector in Serbia, drafted in 2003; and

- the Water Master Plan of the Republic of Serbia, approved by the Government of Serbia in 1991, with a timeline of 10 years.

The existing legislation is obsolete and is not harmonized with EU legislation – for example, the existing decree on categorizing and classifying surface water was adopted in 1978.

The Law on Public Utilities addresses “treatment and disposal of stormwater and wastewater”. Treatment and disposal of stormwater and wastewater means:

collection and disposal of sewage, stormwater, and surface water from public areas by means of sewers, drainage channels, or otherwise, treatment and release from the network, channels, drains, and other water disposal structures, sanitation of septic tanks, and collection of used waters from consumers’ connections onto the street network and removal via sewers, treatment, and release from the network.

Although certain clauses of the Law on Public Utilities and the Law on Water address the same or similar issues, they are complementary in terms of jurisdiction. Namely, activities of public utilities are organized by the municipality (or several related municipalities or communities), which sets up public utility companies for the purpose at hand, while responsibility for the general strategy of water protection resides with the ministry in charge of water management.

Priority should be given to the adoption of new Law on Water, which will be harmonized with EU Water Framework Directive 2000/60/EC (141). The missing standards for effluent (following Directive 91/271/EEC on urban wastewater treatment) should be introduced as well. Other EU directives on ambient air quality limit values, water quality, environmental noise (such as 96/62/EC, 1999/30/EC, 2000/67/EC, 75/440/EC, 88/68/EEC, 98/83/EEC and 2002/49/EC) should be introduced as soon as possible, due to the potential direct adverse effects on human health.

Other ministries involved in the management and protection of water include the following:

- Ministry of Environment and Spatial Planning
- Ministry of Public Administration and Local Self-government
- Ministry of Health
- Ministry of Infrastructure
- Ministry of Mining and Energy
- Ministry of Finance
- Ministry of Agriculture, Forestry and Water Management

The responsibilities of the various ministries are clearly defined by the Law of Government. Although the Law specifies responsibilities, in practice the situation is different. At times, responsibilities do not follow those prescribed by the Law; instead, they overlap between sectors.

The Republic Hydrometeorological Service of Serbia is in charge of: systematic monitoring and quality analysis of surface and underground water; and issuing warnings in case of accidental contamination of water. It also performs special monitoring for water contamination caused by such accidents. Responsibility for monitoring and control of drinking-water quality lies with the institutes of public health.

## Genetically modified organisms

Genetically modified organisms are regulated by the following laws and by-laws:

- Law on Genetically Modified Organisms (129, 130);
- By-law on restricted use of genetically modified organisms (142);
- By-law on content and data of register of genetically modified organisms and products from genetically modified organisms (143);
- By-law on trading with genetically modified organisms and products from genetically modified organisms (144); and
- By-law on introducing into production genetically modified organisms and products from genetically modified organisms (145).

The Ministry of Agriculture, Water Management and Forestry drafted a new law on genetically modified organisms that is harmonized with relevant EU directives. The new law defines the conditions for: the use of genetically modified organisms; deliberate introduction of genetically modified organisms into the environment; their production, handling, trade, transport, and labelling; or products containing them. The law also defines the conditions and measures for preventing and mitigating the potential harmful effects that result from the use of genetically modified organisms.

## Noise

The Law on Protection against Environmental Noise (46), adopted in May 2009, transposed EU Directive 2002/49/EC (146). It introduces *strategic noise mapping* and the preparation of action plans. The Law has the following goals: establishment, maintenance and improvement of the system of noise protection on Serbian territory; and determination and realization of measures in the field of noise protection that avoid, prevent or decrease the harmful effects of noise on human health and the environment. Other goals are: the determination of the limit values of the noise level in the environment in view of area, facilities and/or public (population) sensitivity, as well as in view of noise source; and determination of the level of noise exposure in the environment, by making noise maps based on uniform noise indicators and regulated methods for noise estimation in the environment. Another important goal of the Law is public access to the information about noise and its effects.

The levels of noise are covered by the Regulation on permitted level of noise in the environment (147). It regulates the level of noise allowed in the environment, methods of noise measurement, detailed requirements that have to be met by expert organizations for noise measurement, and content of permits for noise sources that are put on the market. This Regulation will be replaced in May 2010 by a new one that will harmonize with the Law on Protection against Environmental Noise (46).

Current regulations on protection against noise cover the construction of roads, railway tracks and airports and other sources of noise and require that the technical documentation contain technical solutions for protection against noise and vibration. Also, the problem of airplane noise is regulated by Law on Air Transport.

## Radiation

Control of radioactive goods during import, export and transit has been performed since 2003 in an organized manner at the border-crossing points of Serbia. The maximum levels of radioactive contamination are prescribed by the Book of regulations on maximum levels of radioactive contamination of the environment and decontamination procedures (148). During

import and transit, the goods are subject to mandatory dosimetric measurement control at the border crossing, while for certain types of goods it is also mandatory to perform gamma spectrometry.

In the process of harmonizing legislation with EU legislation, the Ministry of Environment and Spatial Planning prepared a draft of the Law on Ionizing Radiation Protection and Nuclear Safety, which was adopted by the National Assembly in May 2009 (71). Until the adoption of this law, the existing international and national standards had been applied in practice (such as those of the European Committee for Electrotechnical Standardization, the International Radiation Protection Association and WHO, and the Yugoslav Standard), but they did not have the capacity of laws. This lack of capacity obstructed solving recent problems on the installation and operation of mobile telephone base stations. Due to the lack of recent legislation, Serbia does not have authorized institutions for monitoring non-ionizing radiation. The control of sources of non-ionizing radiation is not systematic and is performed only at the request of interested legal and physical entities.

## Waste

The National Strategy for Waste Management, which is harmonized with EU legislation, was adopted by the Government of Serbia in 2003. The Law on Waste Management (49) is compatible with EU standards and was adopted by the National Assembly in May 2009. Its by-laws will define all limits that relate to environment and health.

Competences in the field of waste management are divided between the national and municipal levels. The main responsibility for waste management resides in the Ministry of Environment and Spatial Planning. The main feature of waste management legislation is that it does not cover all aspects of waste management within existing provisions of legal acts (law and regulations).

Some waste management issues are regulated, such as environmental impact assessment, emission limits, quality standards, management of waste, disposal sites, classification, packing and care of secondary raw materials, communal activities and concessions, but existing legislation is not yet in compliance with EU legislation, and it has not been fully implemented. Basic laws in the field of waste management include the following.

- Law on Waste Management (49). The Ministry of Environment and Spatial Planning is currently preparing the sub-laws for its implementation, planning its adoption at the end of 2009. Until the adoption of the legislation and/or sub-legislation, the old regulations will remain in force.
- Law on Environmental Protection (65). It prescribes that import of hazardous waste shall be prohibited. A permit for import, export and transit of waste shall be issued by the Ministry of Environment and Spatial Planning in compliance with the Law and other regulations. Serbia ratified (and is a party to) the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
- Law on Waste Management (49), Article 72. The Law clearly prescribes the requirements of the permit needed to export, import and transport waste.
- Law on Transportation of Hazardous Substances (149–152). The Law forbids the importation of hazardous waste from abroad that is intended to be disposed permanently or temporarily on Serbian territory. It is the duty of the legal depositor or the owner to ensure secure transport of dangerous substances.

The *new Law on Waste Management (49)*, which is harmonized with all relevant EU directives, contains provisions that relate to persistent organic pollutant waste and polychlorinated biphenyl and/or polychlorinated terphenyl waste. This law prohibits reuse and recycling of persistent organic pollutants and polychlorinated biphenyl and/or polychlorinated terphenyl waste, and prescribes the obligation of decontaminating such waste before disposing of it. The Law on Packaging and Packaging Waste was also adopted in May 2009.

## International obligations

Because of its geographical and hydrological location, Serbia is a key actor in the sustainable management of international water resources at bilateral and multilateral levels. A regulated international legal regime in the water sector is extremely important for all neighbouring countries, for the Danube riparian countries, and consequently for cooperation within the International Commission for the Protection of the Danube River and for the success of its activities. In the framework of the International Commission for the Protection of the Danube River, the Directorate for Water is responsible for implementing the Danube River Enterprise Pollution Reduction Project. The nutrient reduction plans that will be prepared as part of the Project will pave the way for the transposition of EU Directive 91/676/EC on the protection of waters against pollution caused by nitrates from agricultural sources (153) and will serve as a basis for a code of good agricultural practices. The ratification of the Danube River Protection Convention has also been the impetus for two key initiatives in the water sector: flood risk management planning and consideration of the transposition of the EU Water Framework Directive (2000/60/EC) into a draft of a law on water.

Bilateral cooperation agreements have been signed with Albania, Bulgaria, Hungary and Romania. The outcome of the implementation of these agreements has varied from country to country, and a general reassessment is needed that focuses on the conditions under which they were implemented, rather than on their content.

Serbia does not have bilateral agreements governing sustainable management of transboundary waters with Bosnia and Herzegovina, Croatia or the former Yugoslav Republic of Macedonia, although the Directorate for Water has done preparatory work.

Recognizing the importance of establishing a framework for multilateral cooperation, the Republic of Serbia ratified or approved several agreements:

- Danube River Protection Convention (Sofia, Bulgaria, 1994), ratified in 2003;
- Budapest Declaration (Tisza Water Forum), approved in 2001;
- Framework Agreement on the Sava River Basin, approved in 2002; and
- Convention regarding the Regime of Navigation on the Danube, approved in 1948.

## Norms and standards

Domestic drinking-water standards are in compliance with WHO guidelines and EU Directive 98/83/EC on drinking-water (140). Responsibility for hygienic control of the quality of drinking-water in Serbia rests with the local institutes of public health. Control is conducted in compliance with the Regulation on hygienic regularity of the quality of drinking-water (154). The control of the quality of surface water has been systematically treated from the aspect of the quality of recipient water, which does not require the control of the effluent.



It is necessary to ensure that drinking-water in urban areas meets the quality standards of the EU Drinking Water Directive. It is also necessary to extend the centralized water supply system to selected rural areas that now have unsatisfactory water quality.

### **Soft laws: strategies and action plans**

The term *soft law* refers to quasi-legal instruments that do not have any legally binding status and that are *weaker* than traditional law, referred to as *hard law*.

Serbia took the first steps towards the development of a national environment and health action plan in 2003. Although a draft national environment and health action plan was developed, it was never adopted. Subsequently, the Children's Environment and Health Action Plan is now considered as a good starting point for the National Environment and Health Action Plan. To create a national children's environment and health action plan, the Government of Serbia, by a decision made on 9 May 2008, formed the National Committee for Environment and Children's Health. The main task of this intersectoral committee has been to:

- create the Children's Environment and Health Action Plan;
- form a good climate to present it in an understandable way to all relevant stakeholders; and
- perform all necessary activities related to capacity building in this area – for example, raising awareness among health and environment professionals of the environmental health risks to children, as well as among children, nongovernmental organizations for young people, and policy-makers in all relevant sectors.

The Children's Environment and Health Action Plan was adopted by the Government of Serbia in September 2009.

As one of its main objectives, the Poverty Reduction Strategy Paper emphasizes the importance of improving the health conditions of vulnerable groups within health sector reform. It states that the poor, especially women and children, are most affected by environmental problems. This is emphasized and is one of the most important challenges in implementing the strategy.

The National Strategy for Sustainable Development (42, 43) contains chapters that cover public health and environmental risk factors, including climate change, waste, chemicals, accidents, radiation, noise and natural disasters, such as floods, landslides, fires and earthquakes. Chapter 4 of the Strategy, on "Socioeconomic conditions and perspectives", notes the following in Point 7 (Public Health).

Children and young people are particularly exposed to negative impacts of the environment. In the periods of development they have the so-called "windows of susceptibility" through which they are affected by harmful impacts of the environment which have a negative effect on a highly sensitive young organism. Serbia accepted during the Fourth Ministerial Conference on Environment and Health in 2004 the duty arising from the Budapest Declaration to adopt the National Children's Environment and Health Action Plan (CEHAP).

In the National Strategy for Youth (155, 156), there is special chapter that deals with the health of young people and environmental determinants (Chapter 3.11) and the adverse effects of the environment on the health of young people. The way environment and health is addressed in this Strategy is as follows.

The environment is one of the important determinants which affect [the] health of young people. The processes of examining and monitoring the impact of the environment on the health of [the] population, particularly children and young people in Europe, started at the end of 1980's. Our country, which did not follow these activities, has a long way to pass to develop connections and create capacities for a modern, multisectoral approach to this area. [The] ENHIS database on environment and health, which is applied in the EU countries, monitors 29 indicators of the environment and health, of which some refer particularly to children and young people as the most vulnerable part of population. In Serbia approximately 75% of these indicators is monitored, although irregular reports of our country to the World Health Organization caused [the] appearance of only five indicators of the environment and health on the international presentation and information exchange. Four main recognized threats from the environment to the health of young people are: lack of access to safe drinking water and suitable sanitary conditions, injuries in connection with physical activity and traffic, air pollution (indoor and outdoor air pollution), hazardous chemicals and occupational risks.

To define the comprehensive policy towards children through 2015, the Government of Serbia established, in 2002, the multisectoral National Council for Children's Rights. The Council prepared the Strategy on Tobacco Control and the National Action Plan for Children.

The Strategy on Tobacco Control (adopted in 2007) emphasizes actions needed to prevent the future initiation of smoking among young people and to reduce exposure to second-hand tobacco smoke – in particular, among children and youth, in schools and homes. The ongoing project Education through Life Skills – performed by the ministries of education and sports and health and UNICEF – aims to train teachers and children to recognize the basic principles of healthy lifestyles and prevention of illness, including the harmful effects of smoking. The 2005 Law on Tobacco (*157*) bans selling tobacco to minors, and there are constant media campaigns to enforce the Law. A new project has been planned that targets pregnant women in primary and secondary health care services.

The National Action Plan for Children, which was adopted by the Government of Serbia in 2004, defines key programmes that should be undertaken by it and society as a whole for the best interest of children and youth. Within strategic goal 2 of the Plan – Establishing conditions for optimal development of each child – specific objectives address, “Establishing [a] safe, enhancing, non-violent environment for children's growth”.

The Government of Serbia is a party to the United Nations Framework Convention on Climate Change, but the First National Communication to the United Nations Framework Convention on Climate Change has not been prepared yet. Serbia participates in the initiatives of the United Nations Convention to Combat Desertification, although it is not a party to the Convention. Serbian representatives – as observers – attended the Second Technical Workshop on the establishment of a subregional centre relating to drought in south-eastern Europe in the context of the United Nations Convention to Combat Desertification, which was held in Sofia, Bulgaria, in April 2006. Each participating country was invited to develop national guidelines for implementing a national drought strategy, a task that Serbia has not tackled yet.

The National Environmental Strategy is one of the most important strategic documents that relate to the environment. Basic points include preventive and precautionary measures for health and the environment; specific chapters refer to pollution of water, air, soil and other components of the environment and contain references to adverse effects on health. One chapter is dedicated to the adverse effects of a degraded environment on health.



## The 16 environmental action plans in the National Environmental Strategy

The National Environmental Strategy contains the following 16 specific action plans:

1. advancement of spatial planning and landscaping
2. protection of soil
3. protection of water
4. protection of air and the atmosphere
5. protection of forests
6. protection of ecosystems
7. protection of natural goods
8. waste management
9. management of chemicals
10. protection from ionizing and non-ionizing radiation
11. protection from accidents
12. protection from noise and vibration
13. sustainable energy management
14. development of information systems
15. development of scientific research and education
16. development and application of economic instruments.

The National Environmental Strategy envisages short-term (2006–2010) and medium-term (2011–2015) reforms in environmental legislation and institutions. For legislation, the goal is: to develop a comprehensive environmental legal system, by adopting sectoral laws and implementing legislation; to improve law enforcement monitoring; and to increase the capacities of the judiciary system. Legislation relevant to the environment should be further revised and gradually harmonized with the EU environmental *acquis communautaire*.

With regard to institutional reforms, the aim is to improve the horizontal coordination of environmental policy and the integration of environmental requirements into other policies. Towards this aim, the 16 specific environmental action plans noted above will be developed jointly by the ministry responsible for environmental protection and by the ministries in charge of special areas. The preparation for these plans is under way.

The National Environmental Strategy also recommends the creation of a strong ministry of environmental protection, the strengthening of SEPA, the strengthening of the capacity of all ministries to integrate environmental issues into sectoral policies, and the strengthening of the National Council for Sustainable Development and the environmental inspection body. The goals of the National Environmental Strategy are based on identified gaps and priorities. These goals aim to make the whole system more consistent, transparent and compliant with EU requirements. The process of revision of the National Environmental Strategy is underway.

## Further Serbian strategic documents on public health

Sectoral strategies and other major policy documents adopted or initiated since 2002 include the following:

- National Strategy for Waste Management (2003);
- National Strategy for Sustainable Development (2005, 2007) (42, 43);
- National Strategy for Youth (2005, 2007) (155, 156);
- Poverty Reduction Strategy (2003);
- Water Resources Development Master Plan of Serbia 2002–2012 (2003);

- Strategy for Development of Agriculture in Serbia (2005);
- Energy Sector Development Strategy (2005);
- Strategy for Development of Forestry (2006);
- Study of Sustainable Development of Serbia's Water Sector (2006);
- Strategy for Development of Tourism (2006);
- National Strategy for Economic Development of Serbia 2006–2012 (2006);
- Strategy for Official Statistics (2006);
- Strategy for introducing Cleaner Production in Serbia (2009); and
- Strategy for Youth Development and Health (2006) (158).

Still under preparation are the following sectoral strategies and other major policy documents:

- Fishery Strategy
- Strategy for Sustainable Use of Natural Resources and Goods
- Strategy for Biodiversity, Action Plan and National Report
- National Plan of Action for Children.

## **Economics and funding**

Serbia faces a number of challenges in funding environment and health needs. Environment and health policies cannot be effectively implemented without funding from an associated formal funding mechanism. Lack of funds is one of the main constraints on developing Serbia's environment and health sector.

The funding picture, however, does have some bright spots. Funding for environment and health is increasing at both the national and provincial levels. The institutes of public health are also actively and successfully obtaining additional funds from international donors.

Some areas need improvement. For example, there are no specific central government funds earmarked for environmental health. Also, only 0.3% of the total Autonomous Province of Vojvodina budget was set for environmental issues, but not issues specific to environmental health.

The institutes of public health are funded by the Ministry of Health and the Ministry of Environment and Spatial Planning. The Serbia Institute of Public Health is mainly funded by the Ministry of Health. However, because of insufficient funding, many institutes of public health (except for the Belgrade Institute of Public Health) use outdated laboratory equipment to monitor environmental samples. Other local institutes of public health have to rely on revenues generated by fees paid for services that respond to market demands. The Belgrade Institute of Public Health was successful in investing in laboratory facilities and human resources from the income generated by market-oriented services.

Funding mechanisms affect the sustainability of institutes of public health work on environment and health challenges. For example, project-based funding mechanisms are a threat to the long-term sustainability and independence of the institutes of public health.

Improving funding for the water-management infrastructure is a challenge. Municipalities can apply to the National Investment Plan (fed by revenues from the privatization of state-owned companies) to fund the implementation of plans to upgrade their water supply and waste

systems. The poor condition of the infrastructure in the water sector and the insufficient coverage of costs of services provided result largely from an inadequate tariff policy.

Although the government has limited sources for funding, the polluter pays principle has not been exercised to recover the cost of public environmental health services incurred because of these polluters. This is due to the lack of relevant by-laws to implement it. As a result, there is a general lack of available funds to develop the health and environment sector effectively. As a first step, a budget line specifically allocated to environmental health needs to be established.

The economic effect of the burden of disease and injuries related to environmental factors has not been estimated in Serbia. Economic arguments and/or health costs of the adverse effects on health of environmental pollution are rarely estimated or presented to policy-makers, so there is no foundation upon which they can evaluate preventive measures. Due to the lack of reliable data, the health costs of environmental pollution are not sufficiently integrated into policy-making. Economic policy is not considered to be a tool to improve environmental health. For example, incentives to encourage the use of less-polluting motor vehicles are lacking.

The burden of disease due to elevated blood lead levels in children has not been estimated in Serbia. This has slowed the process of phasing out the harmful uses of lead. For example, leaded petrol is not banned in the economic interests of the car-making industry in Serbia. Restrictions on leaded petrol will not begin until 2012.

Greater systematic use of integrated economic analysis – for example, cost–benefit analysis – in environmental health policy-making is needed. Also, the experiences of other countries that have used cost–benefit analysis of interventions in environmental policies and economic instruments should be evaluated and used. The protection of public health should have a greater presence and consideration in legislation related to the environment and economic development.

The law on health and safety at work does not have a compulsory clause about the responsibility of employers to provide healthy and safe workplaces for their employees. Employers do not see the cost of preventing accidents and occupational diseases as an essential investment in a productive and healthy workforce. Economic instruments should be applied to encourage enterprises to observe health and safety standards and to report all occupational diseases.

## 6. Intersectoral collaboration

### Conclusions

- All governmental regulations go through an intersectoral consultation process (involving all ministries) before being sent for approval to the government.
- The Sector for International Cooperation of the Ministry of Health coordinates environmental health-related activities with other ministries.
- Health arguments are taken into consideration by other sectors mostly through informal networking, rather than through official responsibilities.
- In general, a coordinated communication strategy is lacking, and dissemination of data and reporting between all levels of authority – the national, provincial and municipal levels – is haphazard.
- Province-level policy-makers are usually not invited to participate in the drafting of environmental health-related legislation, although they could provide very valuable inputs about environmental health problems at the local level.
- Communication and collaboration between the government and nongovernmental organizations is improving.
- Intersectoral and multisectoral cooperation on environmental health issues between health, environment, transport, and other relevant sectors needs to be strengthened.

### Recommendations

- The Ministry of Health's role in leading and coordinating environmental health policy that involves health and non-health sectors should be strengthened.
- The responsibility, accountability and representation of the various sectors in environment and health policy-making need streamlining.
- A specific assessment of roles, responsibilities, monitoring, data collection and coordination that relate to environmental health would assist in identifying strengths and weaknesses. This assessment could then be used to address challenges and identify mechanisms to improve and streamline the current organizational arrangement.
- Nongovernmental organizations should be systematically and regularly invited to participate in the process of developing policy.

The health status of the population is largely determined by environmental factors that affect exposure to risks, by lifestyles and by behaviour. Health policy should therefore aim to interact with policies and decision-makers in sectors other than health. The importance of intersectoral cooperation in developing effective policy responses to today's public health challenges has repeatedly been recognized by decision-makers of the national governments of the EU and the whole WHO European Region and has recently been recognized in the Tallinn Charter: Health Systems for Health and Wealth (1).

Intersectoral collaboration takes place and has to be ensured at different levels of policy-making: in the drafting of national legislation, policies and strategies; in the regulatory process through shared monitoring; in the evaluation process and approaches; and in implementing

preventive activities. This applies to the various environment and health issues and priorities. Also, intersectoral committees can play a major role in steering, monitoring and implementing ongoing policy processes.

Intersectoral collaboration takes place in joint prevention programmes. It has been very successful in health promotion campaigns in which the Serbia Institute of Public Health worked with the media, the Network of Institutes of Public Health, municipalities, primary health care centres, and the education sector. The following campaigns were carried out in relation to World Health Day.

Several other developments require a multisectoral and stakeholder approach to policy enforcement. In occupational health, the representative of the Occupational Safety and Health Directorate participates, among other representatives, in creating harmonized standards within the Institute for Standardization of Serbia.

Another example is the lack of cooperation between the Republic Hydrometeorological Service of Serbia and the Ministry of Health. At the moment, heat-wave warnings are not linked to the health sector, although they are linked to the Ministry of Environment and Spatial Planning and the Ministry of Agriculture, Forestry, and Water Management.

In general, a coordinated communication strategy is lacking, and dissemination of data and reporting between all levels of authority –national, provincial and municipal – is haphazard.

In summary, in Serbia, improved and enhanced cooperation within the sectors can be observed, and improved communication can be noted between governmental and nongovernmental institutions. The responsibility and representation of the various sectors, however, needs to be better streamlined. In general, intersectoral cooperation still appears to be more efficient on a personal level, through personal contacts between the institutions.

## 7. Tools for action

### Conclusions

- There is a shortage of specialists in the areas of environmental epidemiology, toxicology, and health policies.
- The National Health Survey is performed by the Serbia Institute of Public Health every five years, but environmental health topics are not covered systematically and comprehensively.
- There is a lack of equipment and capacity to effectively monitor and respond to environmental health issues and concerns.
- Monitoring is performed individually in the health or environment sectors, but there is a lack of combined data on health and the environment.
- The laboratories of the institutes of public health are not equipped properly to measure all relevant pollutants. For example, PM<sub>10</sub> and ozone are not measured in most of these laboratories as of 2008 (except for those in Novi Sad, Niš and Belgrade).
- There is little public awareness of environmental risk factors, such as environmental tobacco smoke and noise.
- There is no recognized national centre of environment and health expertise capable of developing and upgrading national programmes, and of providing training, capacity building and a high-quality assessment of environment and health.
- Environmental health, per se, is not strong in the education and training curriculum of health and environment professionals, but is rather incorporated into thematic topics.

### Recommendations

- Environmental impact assessment procedures should be strengthened further. The legal framework for environmental health impact assessments needs to be further developed.
- Health impact assessment procedures should be further developed. In view of the new Public Health Strategy, knowledge and application of health impact assessment methods need to be improved.
- The use of strategic environmental assessments should be expanded.
- The two official rule books for air currently in use for monitoring emissions require revision and updating.
- Greater public information about the right to health information, environmental information and the burden of disease attributable to environmental risk factors should be provided.
- Public participation in decision-making should be encouraged further.
- The further development and implementation of the National Environmental Health Information System, building on the work already performed with the ENHIS, should be prioritized.
- The training of environmental health specialists, including international training for a

limited number of specialists, and participation in international research projects need to be intensified.

- The Ministry of Health should increase the resources available to the departments of the Network of Institutes of Public Health that address environmental health issues, to improve the assessment and investigation of adverse effects on health and the development of a communication structure for feedback to the regions and districts reporting.
- Structures for communicating about the status of environmental risk factors should also be supported and financed by other sectors.
- Information and awareness raising for the public should be promoted.
- A legally responsible authority is required for regular inspection of rural water supplied by nonpublic providers.
- Greater communication and coordination in the water sector is required between the institutes of public health, the Hydrometeorological Service and the Directorate for Water. Also, the responsibilities for monitoring water should be streamlined between different ministries.
- Legislation should be developed for wastewater.
- A procedure for sharing data on environmental monitoring and human exposure with the health sector should be established.
- The participation of province-level stakeholders in drafting environmental health relevant regulations could provide valuable inputs, due to their familiarity with environmental health problems at the local level.
- A national centre of excellence for environment and health assessment should be created.
- An integrated registry for chemicals should be developed. The register for chemicals and chemical monitoring should be composed of the Chemicals Registry, Biocidal Products Registry, as well as data on plant protection products.

## Environment impact assessment and health impact assessment

The *environmental impact assessment*, based on the Law on Environmental Impact Assessment (116), has been the most efficient regulatory instrument since it was implemented in Serbia over 15 years. With this instrument, any pollution originating from future facilities and other activities is foreseen and can be prevented. As it comes after all the other permits are granted, it represents the *final check*. It is also possible to use it on projects and facilities that are already complete. Serbia is also implementing the Law on Integrated Pollution Prevention and Control (159); it is essential for the control of large installations, which present the greatest potential danger to the environment, in general, and to water, in particular.

The national law on Environmental Impact Assessment (116) specifies which construction projects require assessment, depending on the governmental level of approval required (local or national), the province affected (for national approval) or the local authorities (for local approval) order and review and/or approve.

A strategic environmental assessment is conducted generally before a corresponding environmental impact assessment is undertaken. This means that information on the environmental impact of a plan will be able to cascade down through the tiers of decision-making and be used in an environmental impact assessment at a later stage.

The Provincial Secretariat of Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina has started to perform strategic environmental assessments, which consist of several phases and result in the adoption of a decision on endorsement of the *environmental impact study*. The study identifies harmful effects of projects on the environment, as well as measures and conditions to prevent, alleviate and eliminate them. The Autonomous Province Secretariat reviews, interprets and approves strategic environmental assessments and environmental impact assessments, but does not directly perform them; instead, the Ministry of Environment and Spatial Planning authorized organizations and/or institutions perform them.

Also, the Secretariat issues preventive measures to inhibit pollution from industry, waste management, agriculture and husbandry. It approves studies and provides and ensures strategic environmental assessments are performed for various plans and programmes, particularly those related to urbanism and/or architecture, and construction. Assessments are performed at every level of authority, and the level is defined by the type and size of the proposal, together with the Secretariat for Urban Planning, Architecture and Construction, to provide an integrated permit for construction. The Institute of Urbanism Vojvodina is involved in their performance, and consultations are made with relevant sectors to review the legal compliance of projects. These assessments are performed in full compliance with EU directives.

A health impact assessment (performed using EU guidelines) of air pollution in Pančevo was performed by the Institute of Public Health in Pančevo and financed by the Province during the years 2002–2005. Measurements of soot were taken, but their interpretation was limited due to the lack of basic health data and limited environmental data. Based on this, the Secretariat recommends that the health impact assessment methods should be further developed and implemented.

## Monitoring

Monitoring of environmental health parameters can be used to indicate the level of compliance with a standard, but can also be used for assessing trends over time. Every five years, the country's institutes of public health perform the National Health Survey. The next survey will take place in 2011. There is a need to include environmental determinants of health in the National Health Survey.

Environmental hazards are identified and monitored by SEPA. Also, the Environmental Protection Inspectorate endeavours to ensure the maintenance of the environment, as prescribed by the Law, by performing planned activities and by responding to reports from the public and also to accidents that can adversely effect the environment.

The ENHIS is considered to be a driving force for the analysis of the environment and health situation in the country. The analysis is, nevertheless, mainly done at the national level, due to the lack of data on the regional and local levels.



Municipalities are required to monitor the environment. The institutes of public health monitor air and water at the provincial level, which is financed by the local authorities, and they usually provide data upon request.

The Local City Secretariat for Environmental Protection of Belgrade is responsible for monitoring in the City of Belgrade. It measures and manages activities related to the protection of natural resources, the quality of the environment and the health of the population. Specifically, it deals with:

- developing and implementing environmental protection plans;
- environmental education;
- environmental control and protection of air, soil, flora, fauna and water quality;
- protecting against excessive noise, vibration, ionizing and non-ionizing radiation, and hazardous and harmful substances;
- defining the environmental protection criteria for urban planning and construction; and
- issuing working permits for industrial plants.

The Autonomous Province of Vojvodina monitors the quality of the environment and, among other things, data can be used for: defining protective measures; identifying polluters; making appropriate and timely decisions; creating an information system; responding to accidents and informing the public. Systematic monitoring commenced in 2002 when the Provincial Secretariat of Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina was established. The Secretariat has the legal obligation to prepare an annual report for the Government of the Autonomous Province of Vojvodina on the state of the environment.

The Autonomous Province of Vojvodina also contributes to the national registry of polluters. A list of its regular monitoring activities appears in the section on “Provincial Secretariat for Environmental Protection and Sustainable Development, the Autonomous Province of Vojvodina, Executive Council”.

## **Injuries**

Serbia has no central register for children’s accidents, although a national injury database is currently being developed by the Division of Occupational Health and Radiation Safety of the Ministry of Health.

With regard to road traffic accidents, the information system relies on the data on accidents collected by the police. This information, however, is not detailed enough to allow for localized interventions that address accident hot spots.

## **Air**

In Serbia, the monitoring of air focuses on its ambient quality. Such monitoring does not cover all priority areas; and self-monitoring and compliance monitoring, in particular, are inadequate and of limited scope. The Government of Serbia established the National Programme for Air Quality Control for a two-year period. The Programme was established in 1993. The most recent one was for the period 2006–2007 and was proposed by the competent environmental administration body under the Decree on the establishment of the Programme for Air Quality

Control in 2006 and 2007. The Programme for Air Quality Control was established on the basis of the Regulations on limit values, emission measuring methods, selection of sample spots criteria and data collecting, EU documents, and *World Meteorological Organization* and WHO recommendations. With respect to basic air quality monitoring principles, air quality control in Serbia is harmonized with EU Directive 1999/30 EC (160).

To predict the movement of urban air pollution – such as that of Pančevo's industry and of so-called planned air pollution – the Republic Hydrometeorological Service of Serbia provides weather forecasts and trajectories. It has a substantial and detailed web site in English and certain industries and/or ministries are provided with passwords to access its internal intranet. The Hydrometeorological Service also provides 30 day forecasting for local weather.

The Belgrade Institute of Public Health monitors the following air pollutants (for the average periods noted):

- sulfur dioxide, nitrogen oxides, nitrogen dioxide (24 hours);
- ozone (1, 8 and 24 hours);
- carbon monoxide (30 minutes and 1 hour);
- benzene, toluene, ethylbenzene, and xylenes (1 and 24 hours);
- polycyclic aromatic hydrocarbon 3,4 benzo[a]pyrene (BaP) (monthly);
- soot and total deposited matter (24 hours);
- suspended particulate matter mass concentration (24 hour); and
- lead, cadmium, zinc, manganese, nickel, mercury and chromium (monthly).

The above group of substances, widespread in ambient air, was selected because of its adverse effect on human health.

The laboratories of the Belgrade Institute of Public Health are not sufficiently equipped to measure all relevant pollutants. For example, most of the laboratories in the Network of Institutes of Public Health have not measured PM<sub>10</sub> and ozone since 2008 (except for Novi Sad, Niš and Belgrade).

Sub-laws directly effect this reporting, and monitoring requirements need to be defined more clearly to include other measurements. Air quality control is not covered by the Decree on the establishment of the Programme for Air Quality Control in 2006 and 2007. In the National Programme for Air Quality Control, some local measurement points are not part of the national measurement network. The Law on Air Quality does not include the national measurement network, but it will be covered by the new Air Quality Control Programme, which will be adopted at the end of 2009.

Monitoring air quality is performed as part of a national programme implemented by the Ministry of Environment and Spatial Planning. Of the 23 automated measurement points being established, 8 are managed by SEPA (under the Ministry of Environment and Spatial Planning), 7 by the Secretariat for Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina, 4 by the City of Pančevo, 3 by the City of Belgrade, and 1 by Bor Municipality. Sulfur dioxide is currently being monitored, and PM<sub>10</sub> will be

monitored shortly using real-time measurement data. The new monitors (placed in service June 2008) can be upgraded to measure PM<sub>2.5</sub> and PM<sub>1.0</sub>.

SEPA has responsibility for the establishment and operational functioning of the National Automatic Air Quality Monitoring Network, with 28 new air quality monitoring systems, which include a calibration laboratory, an analytical laboratory and a mobile air quality monitoring system. The middle of September 2009 is the planned delivery date for equipment.

Pollen is measured as part of a SEPA project to control *Ambrosia*, but this common ragweed is still not included in the Law on Weeds. SEPA is mapping the distribution the ragweed.

## Chemicals

Chemical contaminants in soil are measured periodically, and the results and measurements are under the jurisdiction of the Ministry of Agriculture, Forestry and Water Management. Also, the institutes of public health measure lead, pesticides and polychlorinated biphenyls in soil. However, there is a lack of adequate legislation to control hazardous substances in soil. Until the adoption of the new Law on Food Safety (44), the monitoring of chemical contaminants in food and water was regulated by the Law on Health Quality of Food and Matters of General Use (161, 162) and by Regulations on the quality of drinking-water.

## Noise

Noise levels are governed by the Regulation on permitted level of noise in the environment (163). This Regulation will be replaced in May 2010 and will be harmonized with the new Law on Protection against Environmental Noise (46). Monitoring noise levels is covered in several major cities only, by the city public health institutes. Children are not specifically mentioned in existing legislation, since it is not harmonized with EU regulations.

## Physical hazards

Exposure to ultraviolet light and radon gas are among the physical hazards monitored. The ultraviolet index is regularly monitored by the meteorological services, and the results are reported daily in newspapers and on TV. This is a notification for parents and health services. Also, there is a cancer registry in the Belgrade Institute of Public Health that registers cancers in all age groups.

Radon is associated with leukaemia among children in high- and middle-income countries. During the period 2003–2004 the Physics Department of the University of Novi Sad developed a radon map, and studies in many parts of Serbia have shown no health risk from radon in most of the locations analysed.

## Capacity building

The subject of environmental health is taught as a topic in the School of Public Health, the Faculty of Medicine, and the Faculty of Pharmacy of the University of Belgrade. Also, the Institute of Occupational Health and Radiation Safety is expanding its training, research and service activities in the area of environmental health. Accredited courses (five from the institutes of public health) for medical professionals cover environmental health, which is also part of continuing medical education.

In general, the interest in environment and health in the medical curriculum and in the framework of public health studies appears to be rather weak, with mention of the subject emphasizing purely scientific aspects and not preventive approaches. Also, the curricula for medical students have limited content on preventive approaches to public health. This lack of high-level educational and training capacity has resulted in a scarcity of environmental health specialists in Serbia.

Educational curricula need to be changed to integrate environment and health modules and to improve the quantity and the quality of trained environment and health professionals. Training courses for senior professionals in environment and health risk factors, principles and management should be developed to overcome the lack of experts in this field. Also, due to the lack of modern laboratory facilities, the training in toxicology at the Faculty of Pharmacy of the University of Belgrade is rather theoretical.

The need to strengthen environment and health education applies also to primary and secondary schools. Moreover, the Ministry of Education is not actively involved in the educational campaigns on environmental risks.

## Communication

Public participation in setting policy for environment and health is very important. To ensure public participation, an adequate level of information is required. Freedom of information and availability of information are basic societal rights. Serbian citizens have the right to ask for and gain access to information on the environment and the health status of the population, and such information is also freely offered. For example, when threshold values of monitored parameters are exceeded, this is reported in the media (PM<sub>10</sub>, for example). Also, SEPA issues regular reports on the environment. Moreover, a report on the status of the environment of Serbia is published every 12 years. This can be found on the SEPA web site, in English.

To link with the European Environmental Agency and the European Environment Information and Observation Network, the Provincial Secretariat of Environmental Protection and Sustainable Development of the Autonomous Province of Vojvodina collects data on the quality of air in the Autonomous Province of Vojvodina and relays the processed data to SEPA.

Some areas need improvement. For example, communication within the Government of Serbia, and between different levels of authority, needs to be improved.

The availability and sharing of data are important aspects of communication. As some exposure data are published on the web site of the institutions, this information is accessible to the health and other sectors and authorities. However, there is no established procedure to share data on exposure collected in the environment sector with the health sector. Health promotion campaigns are good examples of successful communication between the experts, the government, and other stakeholders. These campaigns have been recognized as a good model for other countries in the Region.

Public interest in environment and health status has increased in recent years. Nevertheless, the general public still lacks knowledge about many major environmental hazards. For example, there is little awareness of environmental tobacco smoke and air pollution caused by transport, and the effects of climate change have only recently become known.

A survey undertaken several years ago on knowledge about the risks of water quality showed that only 50% of the people interviewed knew about possible risks. As such events as World Water Day show, the population is increasingly interested in having water tested.

The publication and campaign activities of governmental institutions and nongovernmental organizations have contributed to the raised public awareness of environmental health. With regard to occupational safety and health, the Ministry of Labour and Social Policy and the Institute of Occupational Health and Radiation Safety organized campaigns and events in April and October 2008.

In general, the ministry and institute levels both lack funding for communication activities. For example, when the Public Health Authority is consulted by the press – say, when it introduces a smoking ban – no budget allocation exists for developing targeted communication strategies.

Public information and education on environment and health risks will be essential for ensuring the successful implementation of environment and health policies. Also, the role of journalists and media as important partners in the development of communication strategies should be strengthened in Serbia.

**Lessons on capacity building of health care waste management: a success story**

Due to limited infrastructure during the transitional period in Serbia, the concept and practice of general and health care waste management was not developed until recently. Therefore, building administrative, infrastructural, technical knowledge, and cultural capacity in the waste management of health care sector were needed urgently.

Two projects, supported by the Government of Germany and the EU, built capacity in the administrative and practical system for waste management in Serbian health care institutions. In addition, the Ministry of Health, the Ministry of Environment and Spatial Planning and the Ministry of Agriculture, Forestry, and Water Management also supported the projects. Through these projects, 78 shredders for infectious materials and other essential equipment were installed in health care institutions in Serbia. Also, the vehicle drivers, the staff, and health care workers were trained in safe management of waste.

At first, because of the cost of installing donated equipment, installation did not go smoothly. Direct communication with the directors of 72 institutes, however, solved the problems. Also, although incineration is no longer used as a waste disposal method in Serbia, some problems with cytotoxic, chemical and pharmaceutical waste still remain.

The issue of sharps injuries – percutaneous injuries with sharp objects – that can lead to an increased risk of infection with bloodborne pathogens from blood and other body fluids was also addressed through these capacity building projects. A questionnaire revealed that on average one instance of such accidental injuries occurs each year to health care workers. One training module on how to prevent sharps injuries was developed and used. For better compensation, prevention, and management, the establishment of a surveillance programme on sharps injuries among the health care workers was needed.

Due to cooperation between the Ministry of Health and the Ministry for Environment and Spatial Planning, and with the support of the project team, the Sub-law on Medical and Pharmaceutical Waste Management was developed.

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Following the Fourth Ministerial Conference on Environment and Health in Budapest in June 2004, and the commitments made by Member States to reduce children's exposure to environmental hazards, countries are seeking support in implementation. WHO/Euro has initiated a project to provide the evidence base for developing and implementing such actions through detailed Environment and Health Performance Reviews (EHPRs).

The EHPRs are country-based interdisciplinary assessments that WHO/Europe carries out at the request of Member States. Through the EHPRs, Member States receive support in the reform and upgrade of the overall public health system. They identify the most important environment and health problems, evaluate the public health impact of environmental exposures and review the policy and institutional framework taking into account the institutional set-up, the policy setting and legal framework, the degree and structural functioning of intersectoral collaboration and the available tools for action.

Based on this analysis, as an integral part of the planning and management of environment and health services the EHPRs provide guidance for strengthening environment and health policy making and for planning preventive interventions, service delivery and surveillance in the field of environment and health.

The present report conveys a clear picture of the current environment and health situation in Serbia. It evaluates strong and weak points of environmental and health status in Serbia and brings recommendations from independent experts.

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