

## 4. Impact of air pollution and measures taken in the Phare countries

### 4.1. Impacts of air pollution

The main consequences of exposure to ambient air pollutants are increased morbidity and mortality in humans (particularly the sensitive groups of population), damage to vegetation and ecosystems as a whole, and also building deterioration and damage to materials. The impacts of air pollution on health and population exposure assessment are the most important goals of air pollution assessment. As an example, the effects of long-term exposure to suspended particulate matter are generally considered to be the most important health effect of ambient air pollution causing perhaps 41 to 152 thousand extra cases of respiratory diseases per year in the EU. These effects occur at various concentration levels including concentrations considered as 'low' (Brunekreef, 1997). The higher mortality or morbidity rates create public and private costs that could be avoided in the future by directing the development of society towards cleaner air and lower exposure levels.

As the range of impacts is extensive and information on general aspects can be found in abundant scientific literature, this report will not consider these general effects in detail but will focus on specific examples from the Phare countries. Though data and information of this type are rather difficult to collect for the Phare countries the following information tables are presented as an illustration of possible impacts on human health and vegetation in the region.

World Health Organisation (WHO) health statistics (<http://www.ch/>) for the Phare countries — mortality rates (probability of dying) life expectancy at birth and health expenditures — reveal that the life expectancy varies widely within the Phare countries for males — from 62 years in Latvia to 71 years in Bulgaria FYROM and Slovenia. For females the range is narrower — from 74 years in Romania to 78 years in Slovenia. In comparison with EU countries, the life expectancy both for males and females in the Phare countries is shorter. The population health status is influenced by many factors. Although the dominating risk factors of the most frequent severe diseases are related to various host characteristics (e.g. genetic predisposition, individual susceptibility) and behavioural and lifestyle factors a number of environmental factors may and probably do adversely influence the health of population. It is extremely difficult, if not impossible, to estimate the contribution of air pollution among these factors.

With regard to the effects on vegetation and ecosystems data on the impacts on trees are considered. In Table 4.1 and Table 4.2, defoliation of conifer and broadleaf trees (as one of the whole range of the health status parameters recorded to study the impact of air quality on trees) is presented for different Phare countries for single years of the period 1988–96. While the proportion of the worst defoliation represented by class 4 has decreased an increased proportion of classes representing lower defoliation is observed. As a result total defoliation is increased. For Albania, Bosnia and Herzegovina and FYROM, data are not available for the whole period under review.

Table 4.1 Defoliation of conifers (Statistical compendium, 1996)

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996
Bulgaria	7.6	32.9	37.4	26.5	25.5	26.9	25.0	41.4	46.5
Czech Republic	37.5	:	46.9	46.3	57.9	51.5	59.0	60.7	74.9
Estonia	9.0	28.5	20.0	28.0	29.5	21.2	16.0	14.2	14.6
Hungary	9.4	13.3	23.3	17.8	20.1	20.1	21.2	18.7	17.8
Latvia	:	:	43.0	:	45.0	41.0	34.0	23.0	24.8
Lithuania	3.0	24.0	22.9	27.8	17.5	29.2	26.3	26.6	12.9
Poland	24.2	34.5	40.7	46.9	50.3	50.8	55.6	54.5	40.5
Romania	:	:	:	6.9	10.9	16.6	15.5	15.2	10.4
Slovak Republic	52.7	59.1	55.5	38.5	44.0	49.9	50.3	52.0	41.0
Slovenia	:	:	34.6	31.3	:	27.0	19.0	33.6	26.0

Note: % of trees in defoliation classes 2–4.

Table 4.2 Defoliation of broadleaf trees

Country	1988	1989	1990	1991	1992	1993	1994	1995	1996
Albania	:	:	:	:	:	:	:	:	:
Bosnia and Herzegovina	:	:	:	:	:	:	:	:	:
Bulgaria	8.8	16.2	17.3	15.3	18.0	16.6	34.4	32.7	33.0
Czech Republic				37.6	29.2	54.4	48.0	30.6	34.0
Estonia						1.1	2.0	1.1	5.3
FYROM	:	:	:	:	:	:	:	:	:
Hungary	7.0	12.5	21.5	19.9	21.8	21.2	21.8	20.2	19.5
Latvia	:	:	27.0	:	19.0	17.8	15.0	10.0	11.4
Lithuania	1.0	16.0	15.8	14.9	17.6	23.8	23.3	20.8	12.2
Poland	7.1	17.7	25.6	34.8	40.4	49.9	51.5	46.7	37.4
Romania	:	:	:	10.4	18.4	21.4	22.9	23.1	18.7
Slovak Republic	28.5	41.8	31.3	21.1	30.0	29.1	35.6	35.8	28.0
Slovenia	:	:	4.4	5.8	:	11.0	13.0	19.3	15.0

Note: % of trees in defoliation classes 2–4.

The condition of the tree crown reacts to various stress factors and therefore shows a great variety of developments depending on site conditions and species. Symptoms are often not specific — in particular chronic air pollution does not result in specific symptoms — but careful synoptic studies in connection with other monitoring data contribute to the assessment of air pollution and other stress factors.

The highest defoliation scores were reported in parts of central and eastern Europe. In particular conifers pine and spruce (*Pinus silvestris*, *Picea abies*) and beech (*Fagus sylvatica*) had the highest defoliation scores in the Czech Republic southern Poland northern Slovakia and Romania. In view of the coincidence of these areas with regions of highest levels of air pollution, the damage in these areas has largely been attributed to higher air pollution deposition fluxes. A recent improvement in the crown condition of conifers, *Pinus silvestris* and *Fagus sylvatica* in northern Poland and parts of the Czech Republic, is attributed to a decrease in air pollution and favourable weather conditions. This may also be the case in Romania where tree crown condition is also improving ('Forest Condition in Europe', 1998).

#### 4.2. Measures taken in the Phare countries

As mentioned in Chapter 1, environment-related actions taken in different Phare countries during the 1990s vary considerably. Policies were formulated and action plans developed but their realisation was very much dependent on the socioeconomic conditions in the given country. In most of the countries, new institutions have been created both in the form of organisations and legal arrangements. In relation to general environmental issues, a short

overview is given below on a country-by-country basis. Where explicitly available some specific air quality related measures are also listed.

### **Albania**

The primary body responsible for environmental issues is the Albanian Committee for Environmental Protection established in 1992. New environmental legislation, the Law on Environmental Protection was passed in 1993. A national environmental action plan was also developed in 1992–93 based on a study of environmental strategy carried out by the World Bank and the Committee for Environmental Protection. Financial support from a Phare project, 'Environment Albania, 1997', is expected to facilitate a study which will develop a future strategy for air pollution monitoring all over the country.

### **Bulgaria**

National programmes for the reduction of emissions of greenhouse gases and sulphur oxides are under development. In cooperation with the World Bank, Bulgaria is finalising a pollution abatement programme which includes implementation of several projects involving technological reconstruction and innovations aimed at phasing out leaded gasoline, heavy metal pollution from copper smelters and conversion of central heating from coal/oil to gas.

### **The Czech Republic**

Between 1990 and 1994, the production of energy shifted from the use of fossil to renewable fuels, although coal and lignite are still the most important sources of energy in the Czech Republic (59 % in 1992). Consequently, the relative output of emissions from the energy industry has fallen. Air pollution is still considered to be the number one environmental problem in the country. Therefore, an air recovery programme was adopted and measures to reduce emissions are being implemented in most large coal-burning power stations. Some units have been shut down. Gasification projects in municipalities are also proceeding rapidly.

The restructuring of the industrial sector has also resulted in a reduction of emissions. Since 1986, the consumption of ozone-depleting substances has decreased by 88 %. Current legislation stimulates industry to take remedial measures and to invest in environmental improvements. Emission limits have also been established by law and the 1998 deadline for compliance with prescribed emission limits is projected to be met by approximately 75 % of polluters. However, the provisions concerning air pollution are inadequate for providing sufficient incentives for some industries to reduce emissions and/or introduce pollution control techniques. In addition, the national economy continues to demand more energy. Coal and all kinds of energy sources are subject to a reduced level of value-added tax and the price of energy and energy carriers is very low. Incentives to encourage energy saving and to apply modern energy efficiency technology are also inadequate.

### **Estonia**

In 1995, the Estonian Parliament adopted the Act on Sustainable Development to guide the country into the next century. In accordance with this act, the national environmental strategy was developed in 1996 and the elaboration of a national environmental action plan has begun. In 1996, a National Commission on Sustainable Development led by the Prime Minister was also established.

### **Hungary**

A national environmental programme reflecting all the major recommendations of Agenda 21 was approved by Parliament in September 1996. With respect to air pollution, a national initiative called the cross-sectoral air pollution control programme was launched in 1993. In Hungary, all ozone-depleting substances (ODS) are imported as the country has no facilities for their production. The national programme for ODS phase-out was prepared by the Ministry of the Environment and Regional Policy.

Emissions from traffic are now the major source of air pollution, while those from industry have decreased over the last two years, mainly due to the economic recession. The Hungarian Government has urged local governments to prepare traffic control measures which contribute to emission reduction. A city bus greening programme has been introduced to focus on the replacement of old bus engines with environmentally sound ones which meet

EU emission standards. Protection of the atmosphere improving air quality and promoting the reduction of harmful atmospheric emissions are high-priority areas of the new national environmental programme. This programme lists key sectoral policies and indicates the most essential regulatory tasks.

#### **Latvia**

The Environmental Protection Committee was established in June 1990. The fundamental law on environmental protection is the Environmental Protection Act which was passed in 1991. Latvia completed its national environmental protection plan in 1994.

#### **Lithuania**

In 1996, the Lithuanian Parliament adopted its first national environmental strategy.

An Environmental Protection Department was established in 1990 and a new framework law on environmental protection was adopted in January 1991.

#### **Poland**

In Poland, the national environmental policy was adopted by Parliament in 1991 and the national environmental policy implementation programme to the year 2000 passed in 1995. Medium-term priorities set by the national environmental policy include: (a) reduction of sulphur dioxide emissions nitrogen oxide (NO<sub>x</sub>) particulate matter and increase of the average efficiency of particulate removal; (b) reduction of volatile organic compounds hydrocarbons heavy metals and other pollutants; and (c) initiation of activities aimed at counteracting global climate change in step with international community efforts. Long-term priorities include: (a) full elimination of individual coal furnaces in urban areas and health resorts; (b) introduction of catalytic converters in all cars produced and used; (c) reduction of SO<sub>2</sub> and NO<sub>x</sub> emissions; (d) elimination of freons and halons from use; (e) reduction of carbon dioxide (CO<sub>2</sub>) emissions to the level agreed upon at the international forum.

However, it will be difficult to reduce greenhouse gas emissions in the long-term because of the fast growth in the Polish economy during the transformation period and the fact that national power production will be based on coal for a long time. This is in spite of improvements in energy efficiency in power production and industry and changes in the structure of fuel use towards increased use of gas.

#### **Romania**

After the transition period started as a first step an environmental strategy paper was prepared. Its long-term objective is the creation of a framework which will foster a long-term economically sustainable acceptable environment. In addition, a national environmental action plan was launched in 1996 as part of the Sofia process. To address issues of environmental protection in 1990 — for the first time — the Ministry of Water Forests and Environmental Protection was established.

#### **The Slovak Republic**

By 1997, over 15 laws and 700 regulations had been introduced in the Slovak Republic. The strategy of environmental policy approved in 1993 is the cornerstone of the Slovak Government's environmental policy. It is based on the principles of the 1992 Rio and the 1993 Luzerne conferences incorporating elements of sustainable development. The Slovak Republic participates in the environmental action planning process.

In 1993, the Slovak Republic initiated the national climatic programme and the national programme for reducing emissions of greenhouse gases. The consumption of ozone-depleting substances has decreased during the mid-1990s. An additional decrease in their consumption will require the gradual replacement of compressors in cooling equipment and the substitution of some technologies. The government's short-term objectives for pollution control include the introduction of a ban on halon use effective from 1994 and a ban on partially halogenated hydrocarbons carbon tetrachloride and partially halogenated bromo hydrocarbons effective in 1996.

**Slovenia**

The 1993 Environmental Protection Act is the legislative base for implementing the principles of sustainability. The government promotes policies and programmes in the field of environmentally sound and efficient transportation. In order to have a less polluting and safer transport system transportation technologies impacts on the environment and safety have been addressed comprehensively. The relative cost-effectiveness of alternative systems and the establishment of mass transit systems have also been partly addressed. Since 1992, 50 regulations related to environment have been adopted by the Ministry of Transport.