

**Air  
and the  
Environment**



# Air and the Environment

Per Elvingson and Christer Ågren



**The Swedish  
NGO Secretariat  
on Acid Rain**

## Air and the Environment

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## Foreword

The effects of air pollutants on people and the environment are considerable. Damage to health, changes in global climate, acidification of fresh waters, corrosion of materials, erosion of cultural treasures, losses in biodiversity and in agricultural crop yields, are some of the more obvious effects.

The aim of this publication is on the one hand to single out the causes and extent of the problems of air pollution and climate change, and on the other to describe the available remedies. Since the polluted air moves freely across national frontiers, international cooperation is a prerequisite for success in countering these problems.

Especially important but often overlooked are the connections between aspects of this issue that tend to be treated separately. Looking at solutions in particular, it is found that concerted action is needed – amounting in brief to a cessation of the use of fossil fuels. Since a total changeover will take time, specific measures will have to be directed in the short term towards reducing atmospheric emissions. Deferring action may turn out to be very expensive indeed.

It is our hope that this publication will prove a useful source of information for anyone wishing to gain an overview of the problems of air pollution and climate change. Appropriate individual behaviour as well as wise political moves will be highly dependent on the public being well informed.

Göteborg, January 2004

*Per Elvingson*  
*Christer Ågren*

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# The air we breathe

**E**ven at low concentrations some pollutants in the air have major effects on people and the environment. Today, these effects on our health are an increasingly urgent incentive to take action.

Breathe in. What is it you inhale? Air of course. But what is air – apart from something that we consume several million litres of each year?

One-fifth oxygen, the rest nitrogen, would probably be the answer of most people who have given it any thought. And they would be right – almost. But around one per cent of air is made up of other gases. Mostly this is argon, a harmless gas that does not react with anything at all. It is the remaining fractions of the last per cent – a small drop in the ocean of air – that this book deals with!

## **HEALTH, ACIDIFICATION, THE GREENHOUSE EFFECT... AND HEALTH AGAIN**

Air pollution is not a new phenomenon in mankind's history. Even for cavemen, lighting a fire undoubtedly had its drawbacks. Historical records contain accounts of plant damage caused by air pollution from smelting works during the time of the Roman Empire, right at the start of our modern calendar. Serious health problems caused by domestic coal fires in London were also described at the end of the thirteenth century.

Until the industrial age truly arrived, air pollution was generally a very local problem. If anything was done to reduce emissions it was in order to improve people's health. In that respect tall chimneys were clearly a blessing – the pollutants were diluted and just “disappeared”.

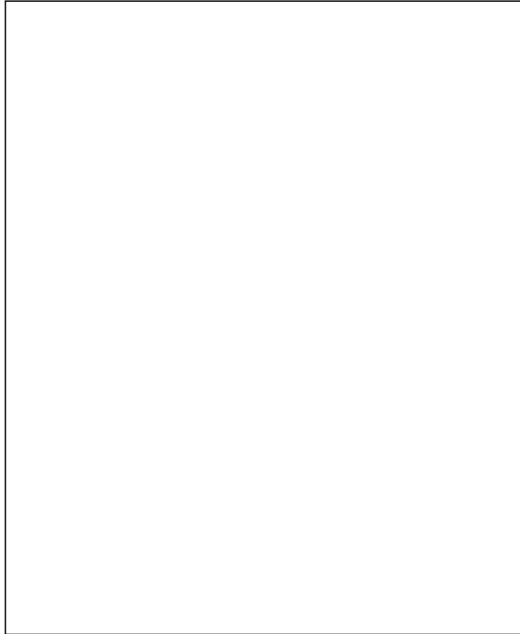
By the end of the 1960s it became apparent that, despite appearances, the atmosphere is actually a fairly thin layer around the Earth and is far from a limitless dumping ground – sooner or later most emissions fall back to Earth.

This realization was partly triggered by growing acidification problems, which led to a sharp fall in fishing yields in many lakes and waterways in Scandinavia, and turned out to be the result of long-range movement of air pollutants.

At the end of the 1980s the question of air and the environment became a worldwide issue when climate change and the thinning of the ozone layer were placed high on the political agenda. The fact that mankind's emissions could have an effect on the climate had however been known since the end of the nineteenth century.

As air issues became a worldwide concern the regional air pollution issues became more complex – now it was no longer just about the acidification of lakes, but also about soil, damage to forests, eutrophication and ground-level ozone.

Over the past decade, health issues have once again come into focus at local and regional level. In particular the effects of particles and ground-level ozone on our health have attracted growing publicity.



Building tall chimneys was an early – although not particularly long-term – solution to local air problems.

## **A QUICK GUIDE TO USING THIS BOOK**

One of the ambitions in writing this book was to draw attention wherever possible to the important and often overlooked links that exist between problems that are usually considered independently.

The book therefore starts with two chapters that aim to give a collective picture of how air pollutants influence nature and people.

These are followed by four chapters which each describe one problem area: climate effects, acidification, eutrophication and ground-level ozone. Each of these chapters looks at the air pollutants that are involved, what happens chemically and physically, how far emissions need to be reduced in order to rectify the problems and how things might turn out in the future.

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The two final chapters return to the wider perspective. The penultimate one deals with the opportunities to take action. This shows that the problems can be solved and that we would profit by doing so. One key issue is reducing the use of fossil fuels. The obstacles to taking action are also discussed. The final chapter reports on what is happening at the political level.

Because the main aim of this book is to give a broad picture and pass on a basic knowledge there are few references in the body of the text. The most important sources, and references to more in-depth information, are instead given at the end of the book. More detailed source references can be obtained from the Swedish NGO Secretariat on Acid Rain.

Unfortunately there is not space for all the interesting aspects even in a book as thick as this! Among other things, the problems of heavy metals and persistent organic pollutants – which occur partly as air pollutants – have been excluded.