URBAN AIR QUALITY MANAGEMENT

TOOLBOOK

UNITED NATIONS ENVIRONMENT PROGRAMME
UNITED NATIONS HUMAN SETTLEMENTS PROGRAMME

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Why Do We Need Urban Air Quality Management?

On our planet, the air we breathe is one of the most important things around us. It is a vital natural resource on which all life depends. Clean air is something that we all need for good health and the well-being of humans, animals, and plants. Sadly, however, our atmosphere is being continuously polluted. Bad air quality affects human health as well as other environmental resources such as water, soil, and forests. Thus, air pollution also hampers development. Larger cities with highly concentrated industry, intensive transport networks and high population density are a major source of air pollution.

Many cities around the world, particularly in developing countries, are experiencing rapid growth. Yet, in the absence of adequate environmental policy and action, this growth is occurring at a considerable, and often increasing, economic and social cost. More people, more industry, and more motor vehicles cause ever-worsening air pollution which poses a serious environmental threat in many cities. The World Health Organization (WHO) and other international agencies have long identified urban air pollution as a critical public health problem. Many developing countries and emerging economies, for example China, Indonesia, and Mexico, have therefore included air pollution into their list of priority issues to be tackled.

The grave consequences of air pollution on public health are measured not only in terms of sickness and death, but also in terms of lost productivity and missed educational and other human development opportunities. Thus, degradation of air quality not only hinders economic growth by imposing significant additional operating costs on business, industry, households, and public services – it also means that the quality of life in these affected cities is spiralling downwards. Likewise, air pollution accelerates deterioration of buildings and historic monuments. A reputation for bad air pollution certainly deters investments from the outside. Air pollution puts a strain on sustainable urban development, which includes economic growth, social inclusion, human well-being, and the environment.

Aside from its severe local effects, urban air pollution also has profound regional and global impacts. Urban emissions are major contributors to the problems of ozone layer depletion and ground level ozone, global warming and climate change (through CO2 emissions). Urban air pollution also causes respiratory disease and property damage. Meeting these challenges at the global level requires that the air quality in cities be monitored and improved.

The technical aspects of urban air pollution are well understood while the necessary technologies for improving air quality are available on a larger scale. Compared to earlier times, today's citizens are generally better informed about the kind of air pollution they are exposed to and are increasingly unwilling to let the problem continue, let alone worsen. A growing political commitment to improve air quality can be observed in many cities. In order to convert these new attitudes into action, decision makers require a systematic approach to managing a city's air quality that also deals with the complex and difficult issues connected to the problem.

An effective environmental planning and management process will help decision makers to formulate and implement realistic and effective strategies and action plans to improve air quality. These strategies and action plans have to systematically address the short and long-term causes of urban air pollution and help the city to achieve a sustainable growth pattern. The Environmental Planning and Management (EPM) process, developed through the UNHABITAT/UNEP Sustainable Cities Programme (SCP), has proven to be an adaptable and robust approach applicable to urban settlements in developing countries and emerging economies. This urban air quality handbook and toolkit is based on the principles of the EPM process and has been adapted to fit the various needs and resources of urban politicians, managers, and practitioners.

How to use this Toolbook (Handbook and Toolkit Combination)

Work on understanding and dealing with air quality issues has progressed significantly. There is a rapidly growing global pool of knowledge, including the development of useful and powerful analytical tools. Unfortunately, much of this information and knowledge is not readily accessible and is often not geared towards the needs of urban managers in developing countries. These tools are often highly technical and not available in user-friendly formats. Because the tools have been developed in technically advanced countries, they require highly sophisticated applications and large amounts of reliable data. The approach and outputs of many of these tools do not provide information that is readily usable by urban managers or relevant stakeholders.

The Sustainable Cities Programme of the United Nations Human Settlements Programme (UNHABITAT) and the United Nations Environment Programme (UNEP) seek to fill this 'applicable knowledge gap' by providing this simple Handbook and Toolkit combination. Its general purpose is to give cities a kit of informative and analytical tools that will be of genuine help in implementing the air quality management process. The Handbook describes the general process of urban air quality management. At relevant points in that process, simplified tools are referred to. These tools are drawn from 'good practice' around the world and are presented so that they can be applied in a variety of contexts, specifically those of developing countries. The tools – for example, city case studies, spreadsheets, simple mathematical models, maps, etc. - are meant to support strategy development, action planning, and implementation of proven practices to deal with air quality issues.

Who Should Use This Toolbook/CD-ROM

The information in this Toolbook (the contents of which are available in an interactive CD-ROM) is developed for use by advisers to policymakers and non-technical stakeholders in developing countries rather than air quality experts. Users should have some knowledge of policy development at the municipal level, demographic and health data collection and analysis, and the use of Excel spreadsheets. Expert knowledge of air quality models and complicated air quality monitoring equipment is not necessary.

The general purpose of the Handbook is to give urban managers in developing countries an overview of the general process of urban air quality management. The tools found in the Toolkit portion of the Toolbook/CD-ROM - for example, the case studies, spreadsheets, simple mathematical models, and maps - are designed to give an indication of the seriousness of air pollution in order to encourage policymakers and stakeholders to support strategy development, action planning, and implementation of proven practices to deal with air quality issues.

The calculations of the models and spreadsheets are not conclusive or absolute, but they do allow air quality managers in developing countries with limited demographic and geographical information to obtain indicative estimates of, for example, health effects of air pollutants.

This hard copy (text) version of the Toolbook is available for those unable to access a computer and/or appropriate software needed to run the interactive Air Quality Management CD-ROM. Optimally, the Air Quality Management Handbook and Toolkit combination should be accessed via the CD-ROM to ensure the full interactivity of the models and spreadsheet applications.

The Handbook

The Handbook presents the air quality management process in a systematic sequence of activities. This sequence, referred to as the Environment Planning and Management (EPM) process, is based on the experience of cities around the world and represents a realistic

approach to the complex tasks of urban environmental planning and management. The Handbook is organized into the EPM sequence in the following order:

Chapter 1: Improving Information & Expertise for Air Quality Management

1.1 Preparing Basic Overview Information
1.2 Involving the Stakeholders
1.3 Clarifying Issues
1.4 Prioritizing & Selecting Air Quality Issues

Chapter 2: Improving Strategy Formulation & Action Planning

2.1 Formulating Management Strategies
2.2 Strategies for the Different Activity Sectors
2.3 Consideration of Implementation Options & Resources
2.4 Building Broad Based Consensus
2.5 Coordinating Air Quality Management & Other Development Strategies
2.6 Developing AQM Action Plans

Chapter 3: Improving Implementation & Institutionalization

3.1 Using a Full Range of Mutually Supportive Implementation Capabilities
3.2 Mobilizing Political Support & Resources
3.3 Strengthening System Wide Capacities for AQM
3.4 Institutionalizing Participation & Coordination
3.5 Monitoring & System Feedback

The Handbook does not deal with the EPM process in *general*. Instead, it concentrates on how the EPM can be *specifically* applied to urban Air Quality Management (AQM) in developing countries. It does this by presenting the sequence of activities in a clear and straightforward manner and by focusing on feasible remedies.

The Toolkit

The value of this Handbook is greatly enhanced by its being directly linked to a supporting volume, the *Toolkit*. The Toolkit is a simplified and user-friendly compilation of technical information and analytical 'tools' designed specifically for application to Air Quality Management. Throughout the Handbook, the connection between management activities and the tools is emphasized. At relevant points in the text, reference is made to the particular tool providing a better understanding of the activities that are being undertaken and a key to the appropriate analytical procedures. In this way, the tools assist and inform decision-making.

The Toolkit elaborates particular points in the AQM process and shows how the supporting analysis can be done. For example:

- To assist in preparation of an Air Quality Profile, a step-by-step explanation and example are given in the Toolkit

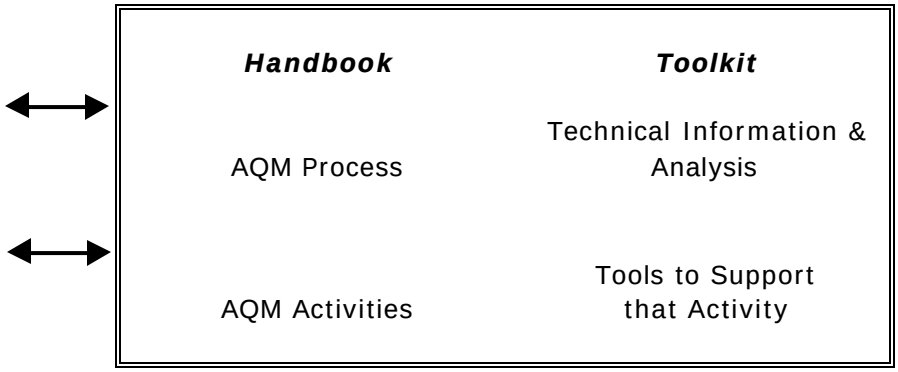
- To assist in the prioritization and clarification of issues, there are tools that provide information on types, sources, and consequences of air pollution (including relevant international standards) along with the benefits of addressing different pollutants and/or sources

- To assist in strategy formulation, various options for managing different types of air pollution from different sources are described with advantages, disadvantages and examples. There are also decision support tools such as spreadsheet models, discussions and cost-effectiveness analyses of strategies to help identify least-cost but maximum-benefits considerations.

- To assist in understanding, there are tools explaining the technical terms and concepts used in air quality management and indicating sources of additional relevant information.

Handbook-Toolkit Combination

The objective of the Handbook and Toolkit (known in combination as the Toolbook) is to provide a practical guide to cities in developing countries. Validated management methods are used in the Handbook, along with established models in the Toolkit. While science-based, this CD-ROM is neither overly scientific nor exhaustive, but rather a simple, action-oriented application. The Handbook-Toolkit combination is valuable because the management process is directly linked to the various 'tools' necessary for technical analysis and decision-making in each stage. This organization strengthens the overall Air Quality Management process by ensuring that the technical aspects are not separate from planning and management. The two are, in fact, integrated into it. As a result, this approach to Air Quality Management can avoid the common split between managers and decision-makers on the one hand, and scientific and technical analysts on the other hand.



How to use the CD

The content of this AQM Toolbook is best accessed through the interactive CD-ROM, which contains all related documents. The CD-ROM functions similar to a website, whereby the Handbook and Toolkit sections are linked to each other as web pages are linked on the internet.

Links to Spreadsheets and Models within the Tools also allow you to perform your own modelling of air quality issues. In addition, the CD-ROM contains case studies, supporting software, and third party documentation.

1 Improving Information and Expertise for Air Quality Management

Information is essential for successful Air Quality Management. For an issue specific working group on Air Quality to progress effectively through the Environmental Planning and Management process, a sufficient amount of relevant and reliable information is necessary at each stage. Information must be properly analysed and understood so that technical dimensions of the problems are known and the feasibility of various approaches is appreciated.

Cities have found that information about air quality and related problems is often limited, at least in terms of what is readily available. Useful information and expert knowledge often exists but is not readily accessible. It is typically found in many different forms in many different organizations and groups. These organizations and groups usually do not easily share with one another. In practice, working groups generally find that they do not need to generate much new information. Their real task is to better identify the available information and expertise, bring them together and restructure and reformat the information to make it easily applicable to the needs of the working groups, the Air Quality Management process, and their specific urban situation. Despite the highly technical nature of some of the information, it is generally possible to create a user-friendly form relevant for Air Quality Management activities.

1.1 Preparing Basic Overview Information

The first tangible output of the EPM process in a municipality usually is the development of an Environmental Profile (EP). Key stakeholders from different sectors – private, public, and community – are involved through a consultative process in the preparation of the Environmental Profile and in identifying the environmental priority issues facing the municipal areas. The main objectives of the EP are to clarify the environment-development interactions in an urban setting. A City Consultation follows the preparation of the profile where stakeholders from all levels of government and relevant sectors come together to deliberate and agree on environmental priority issues confronting their local authority. The Environmental Profile focuses on the environment from an urban development point of view. It reviews the use of the city's environmental resources by different users (e.g. resource depletion), and the impact of city activities upon the different environmental resources (e.g. pollution impacts).

The first chapter of the EP (City Introduction) discusses the city’s setting. It contains information such as the geography, location and most relevant features of the settlement.