



# GLOBAL ATMOSPHERIC POLLUTION FORUM

---

Dear Malé Declaration Colleagues,

We would like to brief you regarding the Forum's activities in connection with the forthcoming Third Session of the Regional Stakeholders cum Coordination Meeting for the Malé Declaration to be held in Bhutan in September 2006. This is a follow up to the introduction that you received to the Forum's activities on air pollution issues in Delhi last year.

The first part of this document covers the Forum's Programme and Priorities 2007 – 2009 and the second its Research and Development Programme for 2007-2009. We hope that you find these documents informative and we look forward to answering any questions you may have on the activities of the Forum and how your country can benefit from them when we meet in Bhutan.

Yours Sincerely

The Forum Secretariat



**GLOBAL  
ATMOSPHERIC  
POLLUTION  
FORUM**

---

**PROGRAMME AND PRIORITIES**

**2007– 2009**

**Mitigating the Impacts of Air Pollution on Health,  
Ecosystems and Economic Development at Regional  
and Global Scales**

The aim of the Global Atmospheric Pollution Forum is to promote innovative solutions to the challenges of air pollution at regional, hemispheric and global scales. The Forum brings together relevant governmental and non-governmental bodies, including UNEP and the LRTAP Convention, and regional air pollution policy networks and research initiatives. It stems from recognition that better co-ordination at regional, and ultimately hemispheric and global scales, is now essential to adequately address air pollution and its linkages with other major issues such as sustainable development and climate change.

## 1. Air Pollution: A Global Challenge

While some air pollutants are transported only relatively short distances from their emission source others travel at regional, hemispheric and global scales, and can in some cases undergo chemical transformation before deposition. Their impact on health and the environment has, for the most part, been recognised for some time, but more recently it has also become clear that there can be extensive impacts on economic sustainability and the prospects for development, particularly in poorer areas.

In Asia and the Western Pacific regions, for instance, urban outdoor air pollution is now estimated to be responsible for about half a million advanced deaths each year. The poor are particularly at risk, having fewer opportunities to avoid exposure to health damaging pollutants. The impact of air pollution on economic activity, particularly in the poorer regions, is also substantial. At the same time ozone, which can only be effectively tackled at regional and hemispheric scales, has been observed to reduce crop yields in some sites in Asia by as much as forty per cent, as well as directly affecting human health. Its projected increase over the next few decades could have a significant impact on the prospects of poorer regions, both directly and through its contribution to climate change.

Experience, most notably from the UNECE LRTAP Convention and the work of UNEP, has shown that to tackle the impacts of such pollution requires international co-operation within appropriate regional groupings, drawing on advanced scientific understanding and involving the development of cost-effective burden sharing strategies.

Networks, reflecting their own regional circumstances, have begun to emerge opening major opportunities for progress. For instance, important inter-governmental regional initiatives, and scientific and urban air quality networks have already emerged in Asia, although they require further strengthening and support to allow them to achieve real progress in reducing impacts. In Africa and Latin America, the inter-governmental agreements that can support regional processes are lacking and this presents a problem for the sustainability of regional science-policy initiatives in those regions and limits the extent to which effective capacity building can be organised.

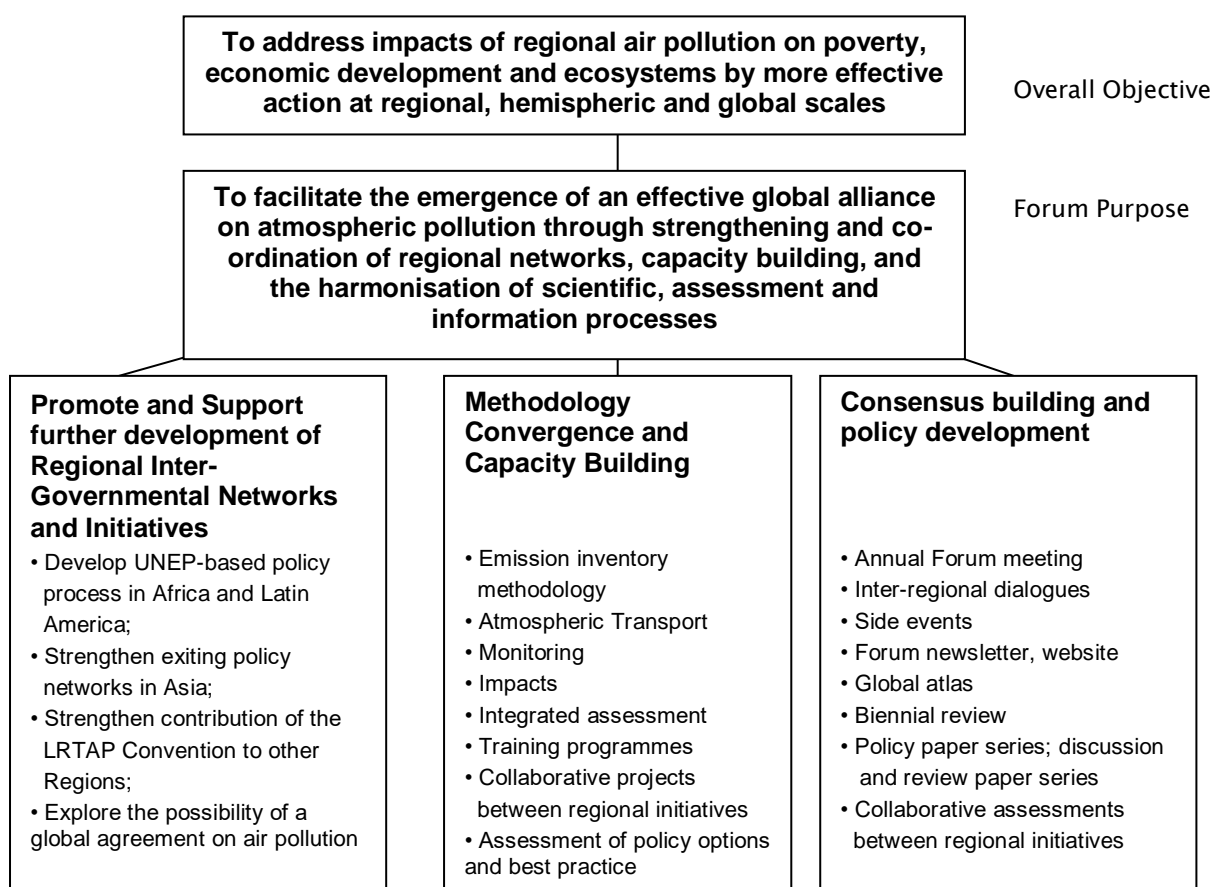
## 2. Objectives of the Forum

Faced with these challenges, the overall objective of the Forum is to encourage more effective action on air pollution at regional, hemispheric and global scales, and thus to help reduce its impact on poverty, the vulnerable, economic activity and ecosystems. Ultimately, its aim is to facilitate the emergence of an effective global alliance on atmospheric pollution through strengthening and co-ordinating regional air pollution policy networks, and harmonizing scientific, assessment and information processes.

This requires action at three levels:

- **Strengthening inter-governmental networks at the regional scale** to make possible development of more effective co-operative programmes and enhance the capacity for action at the hemispheric and global scales.
- **Harmonizing information and assessment processes within and between the regions and building capacity to use them where this is lacking.** This will involve development of common guidelines on such matters as emissions and impact assessments, and a substantial enhancement of capacity to utilize these in the regions outside UNECE where they are relatively weak.
- **Promoting debate and building consensus among policy, scientific and NGO communities on key atmospheric policy challenges as a basis for more effective joint action at regional, hemispheric and global scales.**

These objectives, and their relationship to specific work elements in the programme between 2007 and 2009, are illustrated in Figure 1 below.



**Figure 1** Objectives of the Global Atmospheric Pollution Forum

### 3. Work of the Forum so far

In its first two years the Forum has begun to make a contribution, and has established foundations on which it can build the three year programme outlined in this paper.

- *Development of Regional Inter-Governmental Networks and Initiatives:* Following an initiative of the Forum the Executive Body of the LRTAP Convention in December 2005 agreed to explore opening the Convention to membership by non-UNECE states and collaborating more positively with other networks. In May 2006 a discussion paper was launched at CSD in New York which explored how regional networks could be strengthened and provides the basis for progress at hemispheric and global scales.
- *Methodology Convergence and Capacity Building:* As the first substantive step in harmonizing systems, a Forum Manual on Emission Inventory Preparation at regional level has been prepared with support from the US EPA and the BOC Foundation. The project involved a consultation process with all developing country regions, IPCC and the LRTAP Convention, to ensure that the product was tailored to their needs. The emission inventory and workbook are now ready for wider dissemination and versions are already in use in the South Asian countries of the Malé Declaration and southern African countries of APINA as part of the Sida funded RAPIDC Programme. This consultative approach can now be used as a model for the other areas of methodology convergence which will be addressed in the 2007-2009 activities described below.
- *Consensus building and policy development:* As well as monitoring relevant developments through the Forum Newsletter and working with IUAPPA on the publication of the Global Atlas of Atmospheric Pollution, the Forum is supporting UNEP in the development of the Environment Watch concept. Through its first series of inter-regional dialogues - consultation meetings and seminars between representatives of different regional networks - a systematic process for creating linkages and consensus among the different regional networks is now in place.

#### 4. Programme and priorities 2007-9

Building on these foundations work in the three areas identified above, during 2007-9, will include the following:

##### (i) Promote and Support further development of Regional Inter-Governmental Networks and Initiatives

The Forum will contribute to strengthening the international policy processes that enable impacts at the regional, hemispheric and global scales to be more effectively tackled. Strengthening of the Asian, Latin American and African groupings would make possible more effective dialogue with Europe and North America within the Forum and offer enhanced opportunities for air pollution to be considered at the hemispheric and global scales.

##### (ii) Methodology Convergence and Capacity Building

Harmonized approaches will be pursued to the technical aspects in the air pollution policy cycle: emissions, atmospheric transfer, impacts and policies, all of which are essential to underpin an effective policy process. Achieving measurable progress will require making the capacities and experience developed over a lengthy period within the UNECE more accessible to regions where the activities and knowledge are less advanced. South-South linkages can be very important to allow different regions at the same stage in their development to compare their approaches and solutions. The activities will focus on identifying and harmonising best practice in key technical and scientific areas and developing indicative guidelines for investigation which can provide a basis for capacity building at the regional scale and co-operation at the hemispheric and global scales.

Specific outcomes will include:

- Continuation of the harmonization programme on emission inventories, already initiated with the support of USEPA and the BOC Foundation, where existing emission inventory approaches have been used to develop a user-friendly manual and work book of appropriate complexity that can be used in any part of the World and is fully compatible with EMEP/CORINAIR and IPCC approaches;
- Replication of the approach in respect of monitoring and impact assessment;
- Publication of indicative guidelines on the above;
- Trialling of all the above within capacity building programmes in developing countries through training and collaborative projects.

### (iii) Consensus Building and Policy Development

Progress will also require progressive emergence of a broader consensus at the regional and inter-regional scale, on the scientific, technical and policy aspects of tackling the impacts of long-range transport of air pollution.

The Forum's programme here will include:

- Carrying forward the established series of 'inter-regional dialogues', bringing together scientists and policy makers from different regions;
- Expansion of the website and newsletter, and following-up the Global Atlas of Atmospheric Pollution with biennial reviews of developments and issues in regional air pollution;
- An annual meeting of the Forum to allow all regions to exchange views and contribute to the development of the work plan;
- A series of collaborative assessment activities will synthesise, discuss and draw conclusions about some key issues regarding atmospheric pollution, and its effects, and their linkages to related issues, particularly climate change.

THE FORUM WORKPLAN IN SUMMARY: KEY OBJECTIVES AND WORK AREAS  
2007–2009

Objectives	Promote and Support further development of Regional Inter-Governmental Networks and Initiatives	Methodology Convergence and Capacity Building	Consensus Building and Policy Development
<b>Activities</b>	<p>Support moves towards a regional inter-governmental network and policy agreement in <b>Africa</b>, within the framework of UNEP and with technical support from APINA and CAI-SSA</p> <p>Support moves towards a regional inter-governmental network and policy agreement in <b>Latin America</b>, within the framework of UNEP and with technical support from IANABIS and CAI-LA</p> <p>Support moves which strengthen, and enhance co-operation among, the existing regional and sub-regional initiatives and agreements in <b>Asia</b>: ABC, the Malé Declaration for South Asia, EANET In East Asia, the ASEAN Haze Agreement, and CAI-Asia</p> <p><b>Support, and promote where appropriate, bi-lateral agreements</b> and other links between the Convention on LRTAP and other regional initiatives to promote capacity transfer and co-operation</p> <p>Explore the possibility of a <b>global agreement</b> on air pollution</p>	<p>Promulgate, and further develop the forum's <b>emission inventory guidelines</b> and support pilot applications and relevant capacity building (including translations and peer review)</p> <p>Facilitate co-operative projects which enable the experience of the <b>Convention on LRTAP</b> to contribute to the knowledge development of other emerging science-policy networks and initiatives</p> <p>Develop harmonised <b>guidelines for monitoring</b> and analysis together with appropriate partners and use with <b>atmospheric transport methodologies</b></p> <p>Develop <b>guidelines for impact assessment</b> on health, agriculture, ecosystems and their services and materials</p> <p>Critical assessment of <b>policy packages</b>, best practice and the transferability of air pollution prevention and control measures</p> <p>Undertake <b>case studies</b> to enhance international cooperation on key technical and policy issues</p>	<p>Implement a Forum communications strategy on regional and global air pollution issues and developments including a regular <b>newsletter</b>; <b>Biennial status review</b>; and extended <b>Website</b></p> <p>Promote collaborative assessments and publish results in form of a <b>series of policy papers and discussion and review papers</b>, in particular on:</p> <ul style="list-style-type: none"> <li>- climate change and regional air pollution</li> <li>- linking regional and urban air pollution assessment and policy</li> <li>- Global assessment of crop effects</li> <li>-Global assessment of health effects</li> <li>- Comparative assessment of air pollution abatement policies and methods.</li> </ul> <p>Continue series of <b>Inter-regional dialogues and Side events</b> – as and when appropriate</p> <p>Annual <b>Forum meeting</b> (suggested back to back with UNEP GC meeting)</p>

## 5. A Challenge for Everyone

While the Forum's programme will mainly involve the regional air pollution networks, its key stakeholders must ultimately be the people around the globe that are most affected by air pollution, in particular those in poverty and therefore least able to avoid exposure to pollution and those most vulnerable to the impacts on food resources of both air pollution and related climate change.

Governments need to be engaged at all scales: policies at the national and regional scales must increasingly feed through to action at urban and city scale. Research institutions in all regions are also important stakeholders, both in developing understanding of the basic science and in developing and transferring capacity.

The international NGOs can help facilitate the process of developing a global approach through their direct engagement with the problems and links to both inter-governmental agencies and research institutions.

An international advisory board will provide advice to the Forum through regular informal contact and through advisory board meetings. The Board includes internationally eminent persons who can provide the advice and linkages required for the Forum to develop effectively.

The Forum programme in 2007-9 will be implemented primarily through collaboration between UNEP, the LRTAP Convention, the regional Clean Air Initiatives, IUAPPA and SEI but real progress will depend upon the engagement of all these interests.





**GLOBAL  
ATMOSPHERIC  
POLLUTION  
FORUM**

---

**RESEARCH AND DEVELOPMENT PROGRAMME**

**2007– 2009**

**Mitigating the Impacts of Air Pollution on Health,  
Ecosystems and Economic Development at Regional  
and Global Scales**

# 1. Collaborative Projects on Methodology Convergence and Capacity Building

This annex describes more fully the component projects designed to provide a technical basis for effective co-ordination between regional networks and the transfer of skills and capacities to developing regions. The first such project – on harmonization of emission inventories - is now approaching completion, and provides the working model which will be applied to other areas of necessary technical co-operation – monitoring systems, impact assessment on health and environment, and the assessment of abatement methods.

In all cases the objectives are the same: to provide a basic toolkit of methods that can be simply adapted and applied by regional networks and pollution authorities in developing areas, despite their financial constraints, to tackle their problems; and to provide the common, harmonized systems necessary for joint action between regions to address the impacts of inter-regional, hemispheric and global pollution.

## 1. Emission Inventory Project

As air pollutant emissions management has increasingly to be conducted at wider geographical scales (including regional and hemispheric), the development and adoption of compatible approaches by different regional networks becomes essential. In particular, convergence of approaches for compiling emission inventories will enable the efficient transfer of information and expertise to assist the efforts of those regions with less experience. To this end, an international framework, including an emission inventory preparation manual and Excel-based workbook, was developed under the auspices of the Forum within a project entitled '*Developing and Disseminating International Good Practice in Emissions Inventory Compilation*'. This project, completed in July 2006, brought together regional air pollutant emissions experts from Asia, Africa, Latin America and Europe in order to compare current approaches to compiling emissions inventories and to develop consensus on good practice. The Forum's Air Pollutant Emissions Inventory Manual and Workbook (Version 1) are now available for dissemination and trialling within developing country regions. As part of this project, an international workshop was held and various suggestions for future work identified, which are now being pursued by the Forum:

*Revisions of Forum Manual and Workbook* – A number points were identified for future action to improve the manual and workbook and it was agreed that a process for regularly updating the manual should be developed.

*Promotion of Forum Manual to air pollution networks* - In order to help regional air pollution networks to enhance their capacity to compile good quality emission inventories, mechanisms for promoting and disseminating the manual to them will be found. A Forum website will be set up (with links from UNECE/ LRTAP and UNEP websites) with information on, and access to, both the Forum Manual and Workbook. The Forum will also attend the *Task Force on Hemispheric Transport of Air Pollution* meeting in Beijing in October 2006 to give a seminar describing and promoting the Forum Manual and to promote linkages with potential users from regional networks.

*Capacity building/training in the use of the Manual* - Variants of the manual are already being used by the APINA (Air Pollution Information Network for Africa) countries of southern Africa and the Malé Declaration countries of South Asia, and training has already begun within these two networks under the auspices of the Sida-funded Regional Air Pollution in Developing Countries (RAPIDC) programme. Training within other networks and in other regions will now be pursued.

*Projects* – the need for various projects to improve emission factors (EFs) of particular relevance to developing countries has been identified and will be pursued, including emission factors for: mobile sources; waste combustion (especially open-burning of municipal waste); ammonia emissions from agriculture; biomass burning (fuel and crop residue, vegetation fires); and particulate matter emissions (especially fugitive emissions from agriculture, mining and quarrying, minerals industry etc.). In the longer term, improved methodologies for quantifying emissions from natural sources, e.g. dust from degraded areas, NMVOCs from natural vegetation, NO<sub>x</sub> from soils etc. would be very useful.

## **2. Harmonised Guidelines for Monitoring**

One of the early lessons from UNECE LRTAP Convention in Europe was that the development of effective policies to address air pollution needs to be based on data of adequate quality for the purpose. The development of policies to address air pollution within developing countries and between countries is often hindered by the questionable quality of available data, and an inability to compare different databases within or between nations due to a lack of comparability in the monitoring methodologies. The UNECE experience was that harmonisation, but not standardisation, of monitoring methodologies was an important step forward that enabled the policy process to develop with confidence in the underlying assumptions.

Nations at different stages of development have different capabilities and infrastructure to support air quality monitoring. This project will develop a handbook of reliable methods of air quality monitoring for the range of air pollutants commonly monitored, with detailed procedures and quality assurance steps, for nations at different levels of capacity. These will range from cheap simple technologies, such as passive samplers, through more advanced technologies such as active samplers to relatively sophisticated automated methods, with discussion of the requirements, advantages and disadvantages of each.

The project will assess methods of monitoring of air quality used in various parts of the world, and the ease of use and reliability of these methods for producing data of adequate quality for management decisions. It will compile best practice methods for nations at different stages of development and the guidelines will be communicated to the Global Forum, put on its website for wide global availability and copies sent to key people in government agencies around the world.

The project will use the process already successfully applied on emission inventories:

- bringing together experts of the relevant regions to assess existing monitoring guidelines and practices;
- identification by the technical secretariat of harmonized guidelines and operational practices;
- preparation of a workbook which can then be used, subject to adaptation to meet local circumstances, in any region;
- a workshop of the experts to ensure consensus and resolve matters of disagreement;
- trialling in developing regions.

### **3. Methods of Impact Assessment**

#### **(I) Guidelines for investigations of effects of air quality on health**

There is growing global recognition within government health and environment agencies of the need for national assessments of the burden of air pollution on the health of the population. These assessments are critical to convince decision-makers that national expenditure to improve air quality will have benefits for the population of a country. In developed nations, many of these studies have been and continue to be conducted to improve understanding and assist decision-making about the costs and benefits of proposed measures to reduce air pollution. While there is considerable interest in this issue in developing countries, there is limited information available about how to initiate these studies, whether the methods or results of studies conducted in developed countries are applicable to their country, and hence whether expenditure to improve air quality will have benefits for the population.

There are many simple studies that can be conducted by environmental health personnel in developing countries. Many of these study designs have been successfully implemented in a range of countries, and can act as a starting point for national investigations in developing countries into the effects of current air quality on health.

This project will review a range of examples of different types of studies conducted by environmental health personnel in developing countries, and provide guidance on the implications of these studies and in particular what is required for their successful replication, including resources, personnel and methodologies. This project will compile best practice guidelines to assess the impacts of air pollution on health in developing countries at different stages of economic development and the guidelines will be made widely available, both directly and through the website, with copies sent to key people in health and environment agencies of developing countries around the world

#### **(II) Guidelines for Assessing Impacts on Crops and Vegetation**

Knowledge concerning impacts of key air pollutants on crops in Asia, Africa and Latin America is poor. However, various initiatives, projects and institutional capacity to undertake research are emerging. The problem is that these efforts are uncoordinated and opportunities to combine results, data and knowledge are being lost. The Air Pollution and Crop Effects Network (APCEN), formed through the use of RAPIDC funding from Sida, is promoting coordination of the crop effects research across Asia and Africa and has had several network meetings with representatives from each of those regions as well as some representation from Latin America. A focus for the Forum will be to enhance the APCEN activities in Latin America so that they match the effort in Asia and Africa.

It is proposed, under the Forum, that the APCEN network be used to further the global understanding of the threat that tropospheric ozone and sulphur dioxide pose to crop yield and quality, and the subsequent socio-economic impacts with a focus on vulnerable groups. APCEN will work with the research institutes in its network and through the different regional initiatives, some of which it is already working with (the Malé Declaration and APINA). Specifically, over the next three years it will set up and coordinate collaborative projects that cover Asia, Africa and Latin America making appropriate linkages with the expertise and methods developed within the Convention on LRTAP. These will include:

- Extension of the bio-monitoring using clover clones sensitive to ozone to establish the relative severity of ozone exposure in different parts of the World;

- Expansion of the use of ethylene diurea (EDU) studies to investigate the influence of ozone on the yield of key crops in the different regions;
- Coordination of joint experiments conducted at different existing experimental facilities in order to improve knowledge of dose-response relationships for key crop varieties;
- Development of methods for socio-economic assessment of impacts of air pollutants on crop yield and nutritional value.

The first stage of the work programme, during 2006, will be the further development and consolidation of the network and agreement among the parties on the detailed work programme. This will be undertaken at the APCEN meeting in September 2006.

### **(III) Guidelines for Assessing Impacts on the Built Environment**

The impacts of air pollutants on man-made materials and cultural heritage are well documented in Europe and the dose-response relationships between materials and corrosive pollutants are well established. The economic costs of corrosion damage to man-made materials and structures can be considerable and objects of cultural heritage damaged by air pollutants can never be replaced. Knowledge of these effects and associated costs is scarce outside Europe and North America, and the Forum aims to build on existing efforts to harmonize assessment procedures to address this issue in all regions. This will be achieved by expanding the activities of the Corrosion Network (CORNET) that was established as part of the Sida funded RAPIDC programme. CORNET, co-ordinated by the Swedish Corrosion Institute and regional partners, has established a network of sites across Asia and southern Africa that conform to those established in Europe under the LRTAP Convention. Thus, in Asia and southern Africa standard materials are being exposed and assessed and dose-response relations determined in an effort to move towards a complete economic assessment of corrosion impacts in these regions. The Forum will now collaborate with CORNET to expand its activities into other regions, especially in Latin America and in parts of Africa not already covered.

### **4. Rapid Urban Assessment of Air Pollution and Health**

In many countries in the developing world there is an appreciation of the need to take action to address air pollution, but also a lack of institutional capacity which seriously inhibits progress. It usually takes many years and very considerable investment to develop national capacities in emissions inventory development, monitoring, modelling, assessments of impacts, policy option development, cost-benefit analyses, and policy implementation, following the models implemented by developed nations. However, many developing countries around the world cannot afford to wait for this development sequence to reach a suitable level of capacity, since decision-makers already recognise the severe impacts of air pollution on health in the large cities of Asia, Africa and Latin America.

An alternative approach has been pioneered by SEI and the World Bank independently. This approach involves using less sophisticated techniques than those used in the developed nations to estimate emissions, run simple dispersion models and simple monitoring techniques, and use available information to estimate impacts, policy options and cost benefit analyses. These relative simple but effective techniques can be used to strengthen these capabilities in government agencies in the relevant countries. Much of this work has been pioneered by the World Bank at a basic level using simple Excel-based spreadsheets to provide simple interactive capabilities for national agencies to investigate outcomes of policy options. SEI and IVL have developed simple but effective techniques

of estimation of emissions and dispersion models. If these techniques can be brought together they provide a powerful and useful tool able to be used in agencies in developing countries to conduct preliminary assessments of impacts of air pollution on health and options for addressing these impacts.

## 2. Collaborative Issue Assessments on Consensus Building and Policy Development

The Technical Co-operation sub-programme described in the previous section needs to be complemented by joint assessments of certain key cross-cutting issues, to promote consensus, engage the support of all the relevant parties and to provide a basis for subsequent co-operative action.

Consultations within the Forum pointed to four areas:

- Adaptation to climate change and pollution
- Global assessment of crop effects
- Global assessment of health impacts;
- Air Pollution at Regional and Urban Scales: Quantifying and Managing Interactions and Effects
- Comparative assessment of air pollution abatement policies and measures

In practice, however, the issues on crop damage and adaptation to climate change and pollution are so closely related that they are best pursued as one project.

### 1. Adaptation to the Impacts of Climate Change and Air Pollution

While this programme concentrates on the more immediate impacts of air pollution, the close scientific and policy linkages to climate change will need to be taken continuously into account. The links in terms of common science and data and shared systems have always been clear, but it is now recognised that the links extend equally to policy

Collaborative assessments are needed in two areas: most immediately on the co-benefits for developing countries of abatement measures for pollution control and climate change mitigation, but more generally also on adaptation to the combined impacts of regional pollution and climate change.

The opportunity for co-benefits is of particular importance in many developing regions where there is suspicion of climate change policies, but where the importance of abating air pollution is recognised. Most work on co-benefits has however been undertaken with developed world perspectives and priorities. This now needs to be widened to reflect the perspectives and priorities of developing countries.

To the extent that resources and capacities allow, this work will need to be complemented by wider collaborative assessments on how to adapt to the threats, risks and challenges posed by the interaction of climate change and regional air pollution.

This will be a major issue for developing countries over the coming years. Climate change poses enormous risks to developing countries, including climate drying in some regions, increased flooding and inundation in others, rising sea levels and incidence of severe storm events and increased risks to

health from a changing climate. These challenges will involve adaptation to impacts on agriculture, water resources, energy, sewerage and other essential infrastructure and provide further stress to sustainable economic development.

Surface ozone is a regional air pollutant growing in concentration in many developing countries around the world. Mean surface ozone concentrations are predicted to increase by about a quarter by 2020 in much of South and East Asia. A number of important crops are adversely affected by ozone at current concentrations, and recent studies predict East Asia is about to experience reductions in crop production due to increasing ozone, with major yield losses for wheat, rice, corn, and soybean. Impacts of other regional air pollutants, including acid deposition and the atmospheric brown cloud could also be important within the next decade.

Due to the dependence on agriculture and water resources in developing countries to support local livelihoods and economic development, the expected crop yield reductions caused by climate change and regional air pollution will have major social, economic and environmental consequences. Capacity building for assessments, communication and adaptation to these changes needs to be factored into development planning.

National governments are asking for assistance to provide guidance on how they can assess the likely impacts of climate change and regional air pollution on their nations, to assist them to adapt their populations to the likely impacts, and reduce vulnerability. This assessment will bring together experts on effects of climate change and air pollution, specialists on adaptation and vulnerability, with key decision-makers from governments to discuss likely impacts, measures to reduce vulnerability, national assessments and policy options. The results will be collated and communicated to the Global Forum, national and international organizations and other stakeholders in adaptation to climate change and regional air pollution.

## **2. Global Assessment of Current and Future Impacts of Air Pollution on Health**

Although current levels of air pollution impose an enormous burden on health, especially in developing countries, and particularly on women and children, action to address air pollution in developing countries is patchy. This is due to several related reasons, but at its core is a lack of communication and understanding of the issue. Over the last three decades, air pollution issues have evolved from local and national issues to regional and global issues, but there is limited assessment of air pollution as a global issue, largely because, until recently, the data required were generally not available outside of the developed nations.

With improvements in, and growing use of air quality monitoring technologies, improved knowledge of dose-response relationships for air pollution and health, and growing interest in effects of air pollution on health in the large cities of developing countries, it is now possible to bring together the dispersed data from many parts of the world to provide a global assessment of impacts of air pollution on health. This would build on the growth in knowledge and data availability since the WHO study which was based on the limited data available from the 1990s. This project will largely focus on the most important pollutant from a health perspective, particulate matter, and use geographic information system techniques to bring together dispersed databases on air quality in cities, population data, dose response equations and future projections for air quality and population data, to assess current impacts and future impacts based on various scenarios.

This type of global approach has been used successfully by SEI to highlight the potential impacts of acidic deposition on terrestrial ecosystems in Europe and at global scale. The regional networking and international cooperation that accompanied the development process of the global map of ecosystem

sensitivity to acidic deposition was the initial step in establishing the regional air pollution networks that eventually became the Malé Declaration and APINA.

With good communication, a global assessment of impacts of air quality on health will bring to the attention of decision makers around the world, the gross disparities between nations, even at similar levels of economic parity, raise awareness and questions within national governments, and increase the likelihood of national action to address the issues. The communication of this assessment is critical to achieving its goals, and the Forum will use the networking and international cooperation required to produce such a global map to establish a network for dissemination.

### 3. Air Pollution at Regional and Urban Scales: Quantifying and Managing Interactions and Effects

Addressing health and poverty problems in mega-cities and other large urban areas requires effective policy intervention at both the urban and the national/regional scale. If interventions are not implemented at the right scale – or complemented by supportive action at other relevant scales - they are unlikely to be effective.

While in some regions some significant progress is being made in it is hampered by three difficulties:

- While traditionally most urban air pollution is the result of local emission sources, background levels of key health and welfare related pollutants (notably ozone and sulphates) are rising, are diminishing the capacity of authorities at the urban scale to intervene effectively;
- For some countries in the developing world – most notably Latin America but also Africa – difficult choices are faced as to how far policies are geared towards health improvement in cities or environmental degradation at the regional scales. No policy framework exists which can identify policy trade-offs, inter-linkages and co-benefits;
- In the developing world - particularly rapidly growing cities subject to massive influx of population from rural areas - urban governance and planning structures have seldom been designed to take account of the needs of effective pollution control policy, undermining the capacity to implement the measures needed.

Working with the Clean Air Initiatives of Asia, Africa and Latin America, the Forum will undertake a review to clarify these interactions, and in particular, to explore how urban, national and regional governance structures can be adapted to allow air pollution control policies to be more effective in the mitigation of health and welfare impacts.

The Forum is particularly well-placed to pursue this since, not only does it include the relevant regional organisations, but it also includes the Clean Air Initiative – Asia, which includes a wide network of relevant cities and the most relevant collections of available data on the issue.

### 4. Assessment of Air Pollution Prevention and Control Policies

Over many decades a range of policies have been developed and implemented in developed and developing countries to abate air pollution. Some policies have been very successful, and other less so. However, there has been limited assessment of best practice, the record of success or otherwise of these policies, and what was required for successful implementation. The government and non-government organisations involved have generally not recorded their experience with policy implementation. As a consequence, it is common to see the same mistakes being repeated with



regularity. The Global Forum can show leadership in helping nations to learn from the experience of others.

Within the framework of this programme, highly experienced people from air quality agencies in developing countries will first be commissioned to collate case studies of implementation of policies with varying degrees of success, and these would then be disseminated and reviewed. The Forum would then aim subsequently to develop this into a continuous process of collaborative policy assessment and review of regional air pollution strategies among the participating networks and organisations of the Forum, and more generally to relevant national and international bodies.