

Report of the Training Workshop on “Health Impacts” under the Malé Declaration held at UNEP RRCAP, Bangkok, Thailand during 19 to 22 February 2007

Background

Health Impacts assessment was one of the priority areas identified for capacity building under Phase III implementation of the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia. To address the capacity building needs in this area, the first training workshop on Health Impacts was held in Bangkok during 19 to 22 February 2007. The agenda is enclosed as Annexure 1.

Participants

Eleven participants from six countries attended the training workshop. They were drawn from the Government agencies dealing with environment and with health issues. The List of Participants and Resource Persons is given as Annexure 2.

Presentations

Day 1: February 19

The presentations on the first day started with an introduction to the Malé Declaration activities and to the workshop by Mr. Mylvakanam Iyngararasan, Head, Early Warning, UNEP RRC.AP. The presentation is attached as Annexure 3. This was followed by opening remarks by Dr. Dieter Schwela, Stockholm Environment Institute, York and Dr. Frank Murray, Murdoch University. There was a round of self introduction and discussions regarding the participant’s expectations from the workshop. They also discussed on how to ensure that the inputs given during the training is retained within the country and about specific priorities for each of the countries.

After the inaugural session, Dr.Schwela, SEI-Y, started with a session on “Source types and emissions inventories”. The different air pollution source types and the key pollutants were explained. He detailed the various methodologies for doing source apportionment and emission inventories, with examples. The procedure for rapid assessments was explained, along with their advantages and disadvantages. The relevance of these activities and their inter-linkages was illustrated within a simplified air quality management model. The air quality management model was repeatedly referred to during the course of the training, which helped in providing the strategic overview. The presentation is attached as Annexure 4.

The next session by Dr.Schwela was titled “Typical concentrations of air pollutants, air quality guidelines and standards”. To give a feel of the range of concentrations of the key air pollutants, he gave examples of their indoor, ambient and background levels in different settings. The rationale and objectives of setting air quality standards was highlighted. The criteria documents used were mentioned and the criteria applied for non-

carcinogens and carcinogens and for selection of uncertainty factors and averaging times were explained. Dr.Schwela stressed the understanding of basic concepts and the distinction between them, such as: standards, guidelines and guideline values; absolute safety and acceptable risk; adverse and non-adverse effect; and the unit risk model. The session helped to highlight the factors to be considered, the policy options and the challenges in setting air quality standards. At the end of the session, there was a discussion on how air quality standards are set and enforced in the Malé countries. The presentation is attached as Annexure 5.

The next session was by Dr.Frank Murray on “Overview of types of air pollution”. Air quality trends continued to deteriorate, though some cities have dampened the growth of SO₂ and particulate levels. The impacts and costs of air pollution were explained with examples. He explained the Kuznets curve, linking progress in environmental management to the stage of development. A quick scan was made of the history of air pollution management and of epidemiological studies. Highlighting recent studies in the west, he brought out the well established relationships between the common ambient air pollutants and health impacts. Similar studies in Asia are gradually enriching the knowledge base. He stressed that the choice of policy options should be based on proper assessment and cost-benefit analysis. The presentation is attached as Annexure 6.

Day 2: February 20

The second day started with a session titled “Objectives, data quality objectives, design of monitoring programmes, QA/QC, data interpretation and dissemination”, by Dr.Schwela. After introducing the various objectives of monitoring and data quality, Dr.Schwela went into the design of a monitoring programme and its operational sequence. He then explained site selection considerations, types of monitoring stations and their typical area of representativity. Dr.Schwela stressed the importance of Quality Assurance and Quality Control (QA/QC) in the overall programme design and detailed the organizational and operational features of QA/QC programmes. Other aspects that were touched upon include: network design and management, equipment selection, site visit functions, and data analysis, review, and validation. He stressed that the inputs that went into the monitoring programme would be of little value, unless the project managers convert the data into useful information for decision makers and public and make them “feel the issue”. The typical data handling and reporting systems and the various methods of presenting data were then highlighted. The presentation is attached as Annexure 7.

The next session was by Dr.Murray on “Ambient Air Monitoring: Objectives and Monitoring Devices”. The various objectives for monitoring were explained. A clear and well stated monitoring objective and data quality objective would help in efficient resource utilisation, effective quality assurance and optimal network design.The commonly monitored air pollutants, methods of sampling, and sampling frequencies were described. He explained and compared the instrumented samplers: passive samplers, active samplers, analysers and remote sensors. Their advantages and disadvantages were brought out and examples given. He also introduced bio-monitoring techniques. The

monitoring methods and instrumentation need to be appropriately chosen to achieve the objectives. The presentation is attached as Annexure 8.

The third session of the day was by Dr.Schwela titled “Exposure, measurement and estimation of health impacts”. In this session he introduced the impact of air pollution at various scales of operation, the direct and indirect impacts on human health and the typical causes of air pollution related morbidity and mortality. The interrelationship between sources and pathways was explained with the example of lead. Basic concepts such as exposure, intake, uptake and dose were explained using the example of the respiratory system. He then detailed the various human health effects and the principal agents causing them. Dr.Schwela gave various examples of short term and long term exposure studies from Asia and outside and explained the criteria used for establishing causality. The presentation is attached as Annexure 9.

To consolidate the learning, Dr.Schwela then led a group exercise titled “Fog in greater Lcity, Ccountry”. The participants were split into four groups, for doing the group exercise. The exercise aimed at practice to develop a well-designed plan of action to be executed under an environmental emergency. It also helped the participants in understanding the way of presenting the analysis in a way suitable for decision making and quick action. At the end of the session, each group presented their findings and the results were discussed. The exercise is attached as Annexure 10.

Dr.Murray then gave an introduction to the Simple and Interactive Models for Better Air Quality(SIM Air) software. SIM Air has been developed by the World Bank as a simple tool for developing air quality management options. Dr.Murray explained its main components and functions: emissions, dispersion, Source Receptor relationships, exposure assessment, and economic analysis. He explained the inputs and outputs for each of these, with typical computations used and examples of model calculations. He detailed the procedure for using Sim Air: developing the baseline Emission Inventory, forecasting demand, developing the distribution schemes, dispersion modeling and Source Receptor relationships, evaluation of impacts, source apportionment, listing of control options and trying out different control options. The advantages and disadvantages of the model were highlighted. He also mentioned other useful tools for analysing air quality issues. Dr.Murray then gave exercises to make the participants get familiar with SIM Air. The presentation is attached as Annexure 11.

Day 3: February 21

The first session of the day was from Dr.Murray on “Effects of air pollution on the environment”. He explained the Primary (human health) and Secondary (human welfare) values that were being protected by implementing air quality management policies. He also described the variables affecting exposure and response, the reasons for differing air quality standards around the world, and the spatial variability of pollutants. He then went on to describe the environmental impacts of SO₂, nitrogen oxides, photochemical smog, ozone and acid rain. Forest decline was observed globally due to acid deposition and various interactions between acid deposition, ozone, climate stress, nitrogen compounds,

and soil factors. He stressed the importance of enforcing secondary standards, which very few countries have done. The presentation is attached as Annexure 12.

Cost Benefit Analysis (CBA) of air pollution was the theme of the next session by Dr.Schwela, titled “Economic Aspects”. CBA monetizes and compares the benefits of avoided health and environmental impacts with the costs of action. This is in slight contrast to Cost-Effectiveness Analysis (CEA), where only the costs of action are monetised. The steps of a CBA process and the various factors to be considered, was explained. Dr.Schwela explained the usefulness of sensitivity analysis and uncertainty analysis, for improved decision making. He stressed the importance of considering costs and benefits that cannot be monetized, along with the monetized costs and benefits. The presentation is attached as Annexure 13.

The topic of Indoor Air Pollution (IAP) was then dealt by Dr.Schwela in a short session. He listed the major air pollutants from IAP and their health effects. Among the health impacts, Acute Respiratory Infections (ARI) and Chronic Bronchitis are most prevalent. Examples were given to highlight epidemiological evidence of the association between indoor air pollution and child ARI. The possible interventions for preventing and controlling IAP were also mentioned. The presentation is attached as Annexure 14.

Later in the afternoon, the participants visited an air quality monitoring station of the Pollution Control Department of Thailand, located at the PCD Head Quarters in Bangkok. PCD officials explained the instrumentation and the system followed at the station.

Day 4: February 22

On the final day, Dr. Murray led a workshop on prevention and control of air pollution. He introduced ten broad principles, which could guide the design and implementation of air quality management programmes. He then went through the different policy options: Regulatory instruments, economic instruments, self-regulation and co-regulation and education and information. He described the history of each of them, their advantages and disadvantages, interspersed with examples and anecdotes. Most developed countries are now embracing other forms of regulatory approaches, instead of the traditional Command and Control policies. Market approaches and economic instruments have been tried out in many places, with supporters and detractors of these approaches. Proactive policies by organizations have resulted in Self regulation and Co-regulation. Within this, he discussed the increasing popularity among corporates to demonstrate Due Diligence, framing corporate environmental policies and implementing Environmental Management Systems. As an example, he described the process of ISO 14001. He then went on to Environmental Impact Assessments (EIA), detailing the history, objectives and the process of EIA. At the end of the session, there was a discussion on the experience with air pollution control in South Asia. The presentation is attached as Annexure 15.

Shortly after lunch, the course evaluation and the closing ceremony was conducted. Mr. Iyngararasan, Dr.Schwela and Dr.Murray made closing remarks, summarizing the outcome of the workshop.

Next Steps

It was suggested that a follow up workshop be held during October, 2007. The resource persons discussed with the participants on the tasks to be completed before the next workshop. They agreed on the following:

- Participants would collect reports of studies conducted in their country on effects of air pollution on health. They should provide a short written report summarising these studies to be included in the final report of this project. During the next workshop, the participants are expected to make a short presentation on these studies.
- The participants have to populate their copy of SIM Air with available data from their city and run SIM Air to estimate effects of air pollution on the health of the residents. They have to prepare a short presentation summarising their findings, to be delivered during the next workshop.

Training Workshop Experience and Evaluation

On the last day of the workshop, an evaluation form was filled in by the participants. The summary of the responses is given in Annexure 16. Overall 58 % of the participants rated the workshop as excellent and 42 % rated it as good, within a grading range of excellent, good, average, unsatisfactory and poor. The presence of participants from both environmental and medical specializations enriched the proceedings. Adequate emphasis was given for discussions and group exercises. The major suggestions that came were: more case studies from Malé countries, ensuring participation from all countries, more practice oriented activities and demonstration of the monitoring instruments. The new topics suggested were: how to do an epidemiological study, more on impact assessment and modelling, biomarkers, and policy development and advocacy.