P R O C E E D I N G S

The network meeting 2005 on the Malé Declaration on 'Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia' was held in Delhi on 13 October 2005. The network meeting 2005 was organised in order to review the progress made since the 2004 network meeting which was held in Tehran on 11 October 2004, and to discuss the implementation plan for phase III of the Malé Declaration. The meeting was attended by the Ministries of Environment (NFP) and National Implementing Agencies (NIA) of the participating countries, members of Monitoring Committee (MoC), South Asian Cooperative Environment Programme (SACEP), Stockholm Environment Institute (SEI), United Nations Environment Programme (UNEP) and an independent facilitator. A list of the participants is enclosed in Attachment II.

The meeting was organized by UNEP/RRC.AP, in collaboration with Central Pollution Control Board (CPCB), India, SACEP and SEI. The meeting was funded by Sida as a part of the Programme on Regional Air Pollution in Developing Countries (RAPIDC).

1. Inaugural Session

The network meeting 2005 for Malé Declaration was inaugurated on 11 October 2005. The inauguration was addressed by H.E. Namo Narain Meena, Hon. Minister of State for Environment and Forests (MoEF), Dr. V. Rajagopalan, Chairman, Central Pollution Control Board (CPCB, Dr. B. Sengupta, Member Secretary Central Pollution Control Board, Dr. Arvind Anil Boaz, Director General, South Asia Cooperative Environment Programme (SACEP), Dr. Johan Kuylenstierna, Director, Stockholm Environment Institute at York and Mr. Surendra Shrestha, Regional Director, United Nations Environment Programme (UNEP).

Mr. Shrestha briefly elaborated environmental degradation and its impacts on security of food, waster and energy. He mentioned that our challenge is to sustain economic growth whilst addressing environmental degradation and social issues such as poverty. He expressed the need for the scientific networks and expertise to inform policy makers on the preventive measures. He said that the Declaration provide a forum not only for transboundary air pollution issues but also for major environmental issues in South Asia. He highlighted the commitments of UNEP in facilitating the Declaration programme. Lastly, he thanked all the participating countries and agencies for their commitments and active cooperation to the implementation of Declaration.

Dr. Arvind in his speech stressed the need for effective institutional mechanism and networking to address the transboundary air pollution problem. He said that South Asia has moved ahead in addressing transboundary air pollution with the adoption of the Malé Declaration in 1998. He appreciated the collaboration among interested partners under Phase I and Phase II implementation of the Malé Declaration.

Dr. Kuylenstierna said European experience and knowledge from scientific research show that the very fine particulate matter causing much of the reduction in life expectancy and quality of life is a regional and not just an urban problem. He also said that other regional air pollution problems such as damage to crops by ozone pollution and to ecosystems and biodiversity by acidification or eutrophication emphasise the need to tackle air pollution at regional, as well as national and local scales. He emphasized the technical support being offered by SEI to the Malé Declaration as part of the RAPIDC programme.

Dr. Rajagopalan, in his address, pointed out that transboundary pollution should be looked in a collaborative manner and not in isolation. He also stressed the need for monitoring and controlling Hazardous Air pollutants (HAP) which are posing more health related problems including cancer. While referring to the role of CPCB, he pointed out that CPCB is carrying out studies on air pollution source apportionment, air quality modeling, online data transmission etc. and can share its experiences with the countries in the region.

The Hon'ble Minister of State for Environment & Forests, Shri Namo Nararin Meena, in his inaugural address, stressed the importance of generation of air quality data including continuous measurements and real time dissemination to stakeholders. He also referred to the implementation of various pollution control measures being undertaken by CPCB. He said that through the Malé Declaration Programme, the participating countries have initiated the process of appreciating issues arising from transboundary air pollution. He appreciated the continued involvement of UNEP in this program.

Dr. Sengupta appreciated the efforts being made by various organizations for the prevention and control of transboundary air pollution. He also highlighted the reduction in air pollution achieved in India through various control measures like introduction of unleaded petrol, CNG vehicles, stringent emission standards, clean fuel etc. He thanked all the participating countries, SACEP, SEI, and UNEP for organizing this important meeting under the Malé Declaration.

2. Review on progress made

Mr. R. Rajamani, former Secretary of Ministry of Environment and Forests, Government of India was invited to facilitate the proceedings. In his introductory remarks, Mr. Rajamani gave an overview of the progress of the Malé Declaration implementation. Phase 2 had concentrated on capacity building for monitoring, but now the focus should be on impact assessments. He highlighted the delay in obtaining sufficient monitoring data for impact assessments and the urgency to bring out policy options for decision makers.

The first presentation of the day was by Mr. Mylvakanam. Iyngararasan of UNEP/RRC.AP starting with an overview of the activities carried out during the first two Phases of the Malé Declaration, Mr. Iyngararasan then detailed the activities since the last network meeting in 2004. He highlighted the areas to be covered during Phase 3 and

reviewed the data submitted by the member countries. The activities carried out since the 2004 network meeting included: preparing the implementation plan for Phase III; conducting a national stakeholders workshop for Pakistan in December 2004; the establishment of 4 new monitoring stations in Bangladesh, India, Iran and Pakistan; the provision of AAS for Bangladesh, Sri Lanka, Bhutan and Nepal; the establishment of a new meteorological station in Nepal; the installation of a regional on-line database for the internal use of the network partners; and preparation of a technical manual. In Phase III, existing initiatives in networking and data monitoring capacity building need to be augmented. In addition, new activities would be started, such as: impact assessment studies, modeling and scenario building. Phase III also needs to fulfill the long term objectives of the Malé Declaration, by promoting prevention oriented strategies. The need to integrate the Malé Declaration activities within the regular programmes and budget of the Government was essential for the long term sustainability of the project. Commenting on the data received, he highlighted the lack of complete data sets from the countries. The quality of the data provided, also needs to be checked. In some of the data provided, the cause of sudden variations in trends needs to be identified. In most countries, there was a shortage of meteorological data. He suggested that each NIA present to the policy makers, a one page brief of the status and need of the monitoring activity, to win Government support for the activities. The presentation is attached as Annexure III. It was commented that the online database available at present is too raw to be given to policy makers or opened up in the public domain, and could for the time being be limited to the use of the network members.

Dr. Johan Kuylenstierna, of SEI, York, presented the detailed implementation plan for Phase III. The main goal of Phase III activities are: enhancing the existing network; strengthening monitoring capacity; developing emission inventories and scenarios, to carry out impact assessments; improve impact assessment capacity; support decision making for prevention and control of air pollution; and for awareness building of air pollution. The main activities for each of these goals were mentioned, with their terms of references, and requirements in terms of personnel and equipments. He concluded many activities in Phase III would involve training and it is important to select qualified, committed and enthusiastic personnel for the training. The presentation is given as Annexure IV. During the discussions that ensued, the importance of good quality inventory for scenario building, and the need to build capacity of institutions rather than individuals, was emphasized. To prioritise the factors to be considered for scenario building, it is important to start interacting with expert institutions in the region and to identify the work that has been done by them. The need to finalise the data that has to be collected was highlighted, keeping in view its various end uses.

Mr. Rajamani, suggested that the network meeting should formally convey its condolences to the Governments of India and Pakistan for the loss of lives in the recent earthquake in Kashmir.

3. Country presentation

Bangladesh: Mr. Quazi Sarwar Imtiaz Hashmi gave a presentation of the progress made in Bangladesh (Annexure V). The highlights of the presentation and major discussions were:

- A temporary site with passive sampler and rainwater collector has been operational since 19 July 2004. The permanent site is being established.
- The analysis of the data obtained from the passive samplers showed little variation in SO_2 & NO_2 levels
- An Atomic Absorption Spectrophotometer (AAS) will be installed in DoE's Khulna Divisional Office soon
- The main challenge has been to obtain a power supply for the permanent monitoring station and to retain trained manpower.
- The next 3 year plan includes: making the permanent monitoring station fully functional; developing the laboratory under Khulna Divisional Office of DoE; formation of a local level Monitoring Committee; establishing a new station, if funds are available; and conducting impact assessment studies.
- The following institutions were suggested for the impact assessment studies: National Institute of Social & Prevention Medicine (NIPSOM), Mohakhali, Dhaka for health impact studies; BSMR Agriculture University, Shalna, Gazipur for crop impact studies; Department of Chemical Engineering, Bangladesh University of Engineering & Technology (BUET), Dhaka for corrosion impact studies; and Soil Research Development Institute (SRDI), Savar for acidification studies
- In the 3rd phase some amount of budgetary support from the Government would be available.
- The network team is working closely with the meteorological department.
- The priority for the impact assessment studies would be on health impact assessment, followed by crop impact assessment

Bhutan: Mr. Nedup Tshering presented the status of implementation of the Malé Declaration in Bhutan (Annexure VI). Summary of the presentation and major discussions include:

- Monitoring has been carried out since December 2003 at the remote Gelephu site.
- The main challenge has been to obtain power supply for the permanent monitoring station and to retain trained manpower.
- The next 3 year plan includes: decentralization of responsibilities; improving monitoring methods and data management; developing an emissions inventory and model; developing the facility to carry out speciation and biological monitoring system in new stations
- The following institutions were suggested for the impact assessment studies: MOH for health impact studies; MOA for crop impact and acidification studies. There has to be a coordination meeting before finalizing the studies to be carried out.
- There are sufficient meteorologists, who are now under the Ministry of Trade and Industry.

India: The progress of the project in India was presented by Mr. J. S. Kamyotra and Dr. Rita Saha (Annexure VII). The main points include:

- The site has been established at Port Canning in the Sunderbans, close to the Bangladesh border. It has the advantage of being installed in the campus of the Central Soil and Salinity Research Institute under ICAR and hence lot of basic infrastructure is available, including a permanent meteorological station of the Regional Meteorological Centre, Pune. It can also use the services of resident scholars for continuous monitoring.
- Apart from data related to air quality, data on soil, vegetation and water quality are also being monitored here. The data presented showed that all parameters are within the national standards, except RSPM. The breach is occurring during the winter season (November to January). In the preliminary analysis, some correlation has been established between meteorological data and the RSPM values, though the exact reason has not been identified. Possible causes could include local factors such as emissions from fishing vessels and biomass combustion. Regarding soil and water data, the high nutrient values need to be checked.
- The plan for the next 3 years include: stakeholders meeting, training programme on wet deposition monitoring and Advisory Committee meetings. The background stations being established as a part of the CPCB network, could also be used for the Malé network. In the future, CPCB is planning to use modeling studies for site selection.

Iran: The progress made by Iran was presented by Mr. Sadredin Alipour (Annexure VIII). The major issues presented and discussed include:

- The monitoring site at Chamsari in Ilam province was formally inaugurated in August 2005. The total cost was around $ 50,000 for the construction, power supply and water supply, most of it being contributed by the Local Government. The data of dry deposition and wet deposition is being monitored now. This was presented in the meeting.
- An advisory committee has been set up.
- The main challenges/difficulties faced by the project team include: the difficulties presented by the remoteness of the site, and the need for more monitoring sites because of the large area of Iran.
- The plans for the future include: to start monitoring additional parameters such as O_3, VOC, UVB etc, the need for new stations, initiation of a Strategic Environmental Assessment (SEA) Project and a corrosion assessment project.
- 2 national stakeholder meetings were held during 2004-05.
- The priority for impact assessment studies would be for pollution from the oil and gas sector and then for acidification.
- It was noted that no specialist from disciplines related to health has been represented in the Advisory committee. The representatives from Iran agreed that this could be corrected.

Maldives: Mr. Ahmed Muslim presented the status of activities in Maldives (Annexure IX). The major issues presented and discussed include:

- Earlier the Ministry of Environment was the NFP and the NIA. Now the Ministry remains as the NFP, but the Department of Meteorology has become the NIA.
- The monitoring station has been set up at Haanimaadhoo climate observatory, in the north.
- The plan for the next 3 years include: setting up a new station in the southern island of Gan, need to install some of the instruments for the Malé project that are already with them, and establishing vehicle emission monitoring stations in densely populated islands.
- The Gan station is being established as part of the Atmospheric Brown Cloud project and hence no additional funding is required for its establishment. The HVS equipments will be established in Haanimaadhoo station, as well as in Gan.

Nepal: The project in Nepal and its progress was presented by Ms. Bidya Banmali Pradhan (Annexure X). The highlights include:

- The Ministry of Population and Environment which was the National Focal Point, has been restructured into the Ministry of Environment, Science and Technology (MOEST).
- The monitoring site has been established at Rampur, Chitwan. The data have been continuously monitored from the passive sampler from 2003 onwards. The data from the HVS are available only for 2003 and 2005. The data for 2004 are only partially available, due to political disturbances. From 2005 onwards, the data for both passive sampler and HVS are being continuously monitored. The measurements and infrastructure for the ABC project, installed at ICIMOD HQ, is complementing that of the Malé activities.
- In the data presented, there was unusual variation in for NO_2. The reason for this variation has not been explained. To weed out disturbances from NO_x emissions from vehicles, it was suggested to follow procedures to put passive samplers on road sides and other critical areas. Additional samplers could be provided for this purpose.
- The challenges faced by the Nepal team include: difficulties due to the strikes, political instability, communication with the institute, irregular power supply, shortage of fund from the Ministry, and difficulty in calibrating the equipments.
- Future plans include the establishment of two new stations at Birjung and Pokhara, development of emission inventories, conduct of modelling and impact assessment studies.
- The following institutions were proposed for the impact assessment studies: ICIMOD for emission inventory and modelling, IAAS for agricultural, health and acidification impact studies, and IOE for corrosion impact studies.
- IVL, Sweden mentioned that it would be enough to follow procedures and keep the samples in the sealed bags to prevent it from being corrupted. UNEP mentioned that the calibration set had been sent with all other equipments, and could be used for calibrating the equipment.

Sri Lanka: The status of the project in Sri Lanka was presented by Mr. C. K. Amaratunga (Annexure XI). The highlights are:

- Monthly passive sampling at the selected site at Dutuwewa started from August 2003 and weekly Wet Deposition monitoring started from November 2003. A site was selected for Automated Monitoring 1-1.5 km east of the Malé Monitoring Site at Dutuwewa. The Ambient Air Quality was monitored using this Automated Monitoring Equipment during the South-West Monsoon in July, 2004 and during the North-East Monsoon in January 2005. These data was presented during the meeting.
- The reason for the high variation of pH shown in the data collected (variation from 4 to 8), has not been identified. This variation has to be related to the meteorological and other data. It could be influenced by many factors, like the presence of soil being carried by the winds. It requires 2 to 3 years' data for making any conclusions. It was suggested that it would help to share with network members such unusual variations in data.
- The main challenges being faced are the unsteady power supply at the site, the high transportation cost involved in reaching the site and difficulties due to the presence of monkeys.
- The plans for the next 3 years include: ozone passive sampling, passive sampling at the new site selected (Horton plains), and start of dry deposition monitoring (PM_{10})
- A stakeholders meeting is being held every month, which is meant for all air pollution initiatives.
- The retaining of the staff trained for the Malé Declaration implementation is not a problem, but it would be better if some more staff are trained.

General Comment on country data: Mr. Sagar Dhara of the Monitoring Committee made the following observations regarding the data presented:

- Most of the sites chosen are rural.
- The quality and quantity of data needs improvement. QA/QC checks were done for two of the countries, which showed that it failed to meet the standards set for the Malé project.
- Data discipline has to be improved, which normally takes 4 to 5 years.
- Much more meteorological data are required for which more anemometers, rain gauges etc need to be installed.

4. Review of Technical Manual

Mr. Sagar Dhara gave a quick overview of the Technical and Users Manual prepared for the Malé Declaration monitoring activities. The manual has been prepared to suit the needs of a large number of potential users. Feedback from users is required for improving the contents and the form. It has been divided into 5 sections: basic concepts and theory, instrument installation, analytical methods, data management and deposition computation. Since all the sections are not required by everyone, the division into 5 separate sections helps in reducing the overheads. But the structure of the manual is open for change. A CD is being planned with most of these materials. A manual on standard

operating procedures and data manipulation is also being planned. During the discussions, it was mentioned that there was a need for checking the reliability of the passive samplers being used. During phase 3, passive samplers of other makes will be compared with the IVL make. The manual will be revised before the next meeting and to include sections for soil, vegetation and water monitoring in it. The presentation is attached as Annexure XII.

Ms. Karin Sjoberg, of IVL, Sweden then gave a brief presentation on air quality monitoring for the Malé Declaration, citing examples from Europe. She gave examples of its applications for trend analysis, model validation, source apportionment and source identification. The presentation is attached as Annexure XIII.

5. Concluding Session

Mr. Pradyumna Kumar Kotta of SACEP briefed the gathering about the recently held Governing Council of SACEP at Thimpu, where the progress of the Malé Declaration was reported. Mr. Kotta noted that all the countries has problem in capacity building and in finances. Dr. Kuylenstierna of SEI stressed that the existing set up in the countries needs to be strengthened and the implementation of the third phase be carried out with commitment and enthusiasm. Talks have to be carried out soon, with the institutes for the impact assessment studies. Attempts should be made to get more external resources. Mr. Iyngararasan of UNEP RRC.AP mentioned that the Malé Declaration activities need to be mainstreamed in the Government plans and budget. The activities being carried out in each country for similar air pollution projects could be synchronized to avoid repetition. The scope of the Malé Declaration could be expanded beyond transboundary pollution. He suggested that in future it may be better to hold the stakeholder meeting first, before the core group meeting, so that the views of the stakeholders could be taken into consideration by the core group meeting.

Mr. Rajamani regretted the slow pace of the project implementation in some respects. He cautioned against complacency creeping in to the project. Data flow and analysis needs to be speeded up and the third phase activities should start soon. He suggested that in the next meeting, attempts should be made to ensure the attendance of high level participation from the National Focal Point. Regular meeting of National Advisory Committee was recommended. Impact assessment of corrosion is important in the South Asian context, but has not been highlighted by any of the NIA's. For the progress of the project, good quality data needs to be generated fast. Useful indicators could be developed from the data. Long tem sustainability of the project could be ensured by the countries taking ownership of the project and reflecting it in the budget allocations. The NFPs and NIAs have to sell this to the policy makers proactively.