

Fourth Session of the Regional Stakeholders cum Coordination Meeting

REPORT OF THE SESSION

Introduction

1. The Fourth Regional Stakeholders cum Coordination meeting of Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia was held in Bandos, Maldives during 2 –3 October 2007. The agenda is enclosed as Attachment I.
2. The meeting was attended by the National Focal Points (NFP) and National Implementing Agencies (NIA) of Malé Declaration as well as representatives from various stakeholders groups and ongoing initiatives on air pollution at national, sub-regional, regional, and global levels. A list of the participants is enclosed in this report.
3. Mr. R. Rajamani, former Secretary of Ministry of Environment and Forests, Government of India chaired the meeting as the Regional Facilitator.

Introduction by the Regional Facilitator

4. The meeting started with an introduction by the Regional Facilitator for the Malé Declaration, Mr. R. Rajamani. In his introductory remarks, he commended the progress made so far in Phase 3 of the implementation of the Malé Declaration and hoped that there would be more rapid progress in future. Mr. Rajamani highlighted that the countries could make use of UNEP's regional environmental knowledge hub or e-KH. He emphasized the need to move from monitoring and impact assessments towards mitigation and the implementation of cleaner and preventive technologies. He mentioned the need for the countries to consider moving towards a convention base on analysis of data which has started coming in. The importance of the countries taking ownership of the Malé Declaration was stressed, with more financial contribution from them.

Session 1: Progress reporting on Malé Declaration

5. Mr. Mylvakanam Iyngararasan of UNEP RRC.AP presented the progress of the implementation of the Malé Declaration. He briefly mentioned about the Phase I, Phase II, and the activities that are being carried out in Phase III. The Secretariat reported the Progress of Malé Declaration after the Eighth Session of the Intergovernmental Meeting (IG8) which was held in September 2006 in Thimphu, Bhutan. Some of the activities included: training workshops on: emission inventory and scenario generation, health impacts, crop impacts, corrosion impacts, refresher course, rapid urban assessment; establishment of new monitoring site in Pakistan; initiation of inter-lab comparison and passive sampler inter-comparison and development of protocols for them; case study initiated on health impacts in Bangladesh; study initiated on crop impacts in 5 countries; case study initiated on health impacts in Bangladesh; ongoing corrosion impact studies in 4 cities; rapid urban assessment case study going on in Kathmandu; National stakeholder forum held in Sri Lanka; youth network

meeting and activities; sharing of problems and providing prompt solutions. Details are provided in the document “Malé Declaration/RSC4/1/1”.

6. Dr. Johan of SEI presented a brief overview of the structure of the RAPIDC program and its linkages to the Malé Declaration. He gave an example of the studies in South Asia under RAPIDC's Composition of Acid Deposition (CAD) network and how the results help in informing the implementation of the Malé Declaration. He then described the results of the various activities that are being carried out under the Malé Declaration and interpreted the available results. Details are provided in the document “Malé Declaration/RSC4/1/2”.
7. National Implementation Agencies (NIAs) participating in the Malé Declaration, presented the progress in the implementation of Malé Declaration in their respective countries.
8. Mr. Q. S. I. Hashmi presented the status of implementation of the Malé Declaration in Bangladesh. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/3”. Summary of the presentation include:
 - Monitoring is being done at Shatkhira station, with support from the lab at Khulna. This includes air concentration analysis by Diffusive Samplers, Rain water analysis by AAS and monitoring of meteorological parameters
 - A meeting of the National Advisory Committee (NAC) was convened in July 2007.
 - Health impact assessment study initiated among schoolchildren in and the Crop impact assessment study in Bangladesh Agricultural University(BAU) campus in Mymensingh are progressing.
 - Awareness programmes on impacts of air pollution through print, electronic and other media would be completed by end of 2007.
 - Measures have been taken to Control Emissions of Air Pollution, especially from transport sector
 - Plans for next 3 years including: Operationalising an existing monitoring station at Shamnagar; site selection for a new station is being done; further impact assessment studies and awareness programmes are proposed.
9. Mr. Tandi Dorji presented the status of implementation of the Malé Declaration in Bhutan. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/4”. Summary of the presentation include:
 - Current status including the new project manager in NIA; data availability and examples of data trends; and institutional structure
 - An environment information system will be launched soon. The data from the Malé Declaration monitoring sites will be included in the information system.
 - High Volume Sampler is operational in Thimphu, which is an urban site.
 - Measures taken so far to control emission
 - Plans for next 3 years include: establishing passive samplers in 2 sites at Thimphu and Punakha ; impact assessment studies on crops, health and corrosion proposed.
10. The progress in India was presented by Dr. Prashant Gargava. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/5”. Summary of the presentation include:

- Thrice a week monitoring being done at Port Canning station, for SO₂, NO₂ and RSPM. RSPM values are found to be high.
 - Corrosion impact assessment study has been initiated near the Taj Mahal, with the exposed samples being sent for analysis every 2 months.
 - Other activities being carried out by CPCB and the major initiatives taken in Air quality management were mentioned, including vehicular and industrial pollution control, expansion of monitoring networks and dissemination of data
 - Overall a decreasing trend of ambient SO₂ levels have been observed in many cities and this has been corroborated.
 - Plans for next 3 years include additional source apportionment studies in few cities, epidemiological studies, corrosion study, strengthening real time monitoring of industries and the monitoring network.
11. Mr. Masood Zandi presented the status of implementation of the Malé Declaration in Iran. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/6”. Summary of the presentation include:
- Progress so far in Iran was reported, including the data collected and their trends,
 - Measures taken to control emission in transport, and industry was highlighted
 - Plans for next 3 years was also mentioned including strengthening capacity for monitoring, and conducting impact assessment activities
12. Mr. Abdul Muhusin presented the status of implementation of the Malé Declaration in Maldives. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/7”. Summary of the presentation include:
- The monitoring station under Malé Declaration is co-located with that of the project Atmospheric Brown Cloud (ABC) at Haanimadhoo.
 - Ozone monitoring was initiated from May 2007. Data trends were presented. Particulate concentration peaks during north east monsoon.
 - The main difficulty being faced is lack of trained manpower in the field of atmospheric chemistry; and lack of technical expertise for repair and maintenance of equipments.
 - Future plans include human resources development and awareness programmes on air pollution and establishing a new station at Gan under the project ABC
13. Ms. Bidya Banmali Pradhan presented the status of implementation of the Malé Declaration in Nepal. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/8”. Summary of the presentation include:
- At the monitoring station at Chitwan, HVS, Passive sampler, wet and bulk collector and an automatic weather station is available.
 - Emission inventory has started and preliminary results were shown
 - Rapid Urban assessment of Kathmandu Valley has been initiated, with one- week training. Dust track instruments are also being used in parallel to monitor PM1 & PM2.5
 - A study on corrosion impacts is being carried out
 - Biomonitoring, using clover plant, is being conducted at the Chitwan Agricultural University.
 - Measures to control emissions of air pollutants include improvements in brick kiln technology, electric vehicle implementation and improvements in transportation.

- Future plans include Health Impact Study, adding 2 more stations at Pokhara and Birgunj , awareness programmes, acidification study and modeling activities.
14. Mr. Asif Khan presented the status of implementation of the Malé Declaration in Pakistan. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/9”. Summary of the presentation include:
- He introduced air quality issues in Pakistan, with SPM a major issue leading to haze and fog and health issues.
 - Mentioned actions being taken under Pakistan clean air programme (Pcap)
 - Monitoring Station has been installed at Bahawalnagar with the cooperation of the Pakistan Meteorological Department (PMD). Training has been imparted to PMD
 - Trends of the data obtained was shown and compared with other countries.
 - Recommendations were given for future activities
15. Mr. Jayaratne presented the status of implementation of the Malé Declaration in Sri Lanka. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 1/10. Summary of the presentation include:
- Monthly monitoring of sulphur dioxide and nitrogen dioxide using passive samplers and weekly monitoring of wet deposition monitoring is being done at [Dutuwewa](#). PM 10 sampling is not being carried out because of power supply problem.
 - Problems encountered include: non durability of plastic material of the lid and the funnel holder of the wet only collector and funnel of bulk collector
 - Crop impact assessment will start soon; corrosion impact study has already started.
 - Several measures have been taken to control emissions such as enforcement of vehicle emission standards, improvement of fuel standards and establishing vehicle emission testing centres.
 - On going activities to control emissions include: Steps to legalize source emission standards; steps to review existing ambient air quality standards incorporating PM10, and PM2.5; and banning two strokes three wheelers from 2008.
Future plans include: shifting of monitoring site to Doramadawala; start dry deposition monitoring (PM10) also in the new site; expand current impact assessments and initiate other types of impact assessments; capacity building and public awareness activities
 - Recommendations was given, among others, to include transboundary radiation and Persistent Organic Pollutant (POPs) monitoring
16. Dr. Nguyen Thi Kim Oanh, Asian Institute of Technology, Thailand, made a presentation on “Protocol for inter-laboratory calibration of Malé monitoring network”. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/1. Highlight of the presentation and major discussions include:
- Inter-lab calibration is one of the key components in a Quality Assurance programme of environmental monitoring, which aims to recognize the existing data quality and to provide an opportunity to improve it.
 - The activities planned for the Malé monitoring network include: protocol preparation; artificial rainwater sample preparation; sending samples to laboratories; data acquisition and handling; data analysis; reporting and dissemination; and recommendations to improve the data quality

- The draft Protocol has proposed 2 concentrations levels (high and low)
- A brief QA program will be distributed to NIA before the sample analysis, which will also mention the range of concentrations in the samples.
- The procedures for sending and receiving samples, data acquisition, data checking by AIT, and data analysis, and the QA program that will be followed were highlighted
- The first attempt will be during June-November, 2007 and the second one during March-April 2008.
- It was suggested that the Protocol for inter-laboratory comparison could mention that the de-ionised water used in the lab be analysed
- The name of the manufacturer for the proposed chemicals could be mentioned in the protocol.
- It was suggested that the high levels of uncertainty at lower levels of concentration of samples could be decreased by increasing the number of replicates.

17. Mr. Gopal Kumar Jain, SAYEN Secretariat, made a presentation on “Malé Declaration: the Youth Version”. Detailed presentation is given in the document “Malé Declaration/RSC 4/2/2. Highlight of the presentation and major discussions include:

- SAYEN is UNEP’s South Asia Youth Environment Network, with 1500 associations affiliated to it and National Focal Points in each country. The Secretariat is at the Centre for Environment Education, Ahmedabad, India.
- It works through capacity building, awareness building, networking and developing knowledgebase.
- SAYEN is developing a Youth for Clean Air document and an Interactive CD for the Malé Declaration.
- The draft Youth for Clean Air document was introduced and the consultative process that led to it was described.
- The number of deaths attributed to air pollution in Pakistan mentioned in the page 23 of the draft publication is debatable. The box on page 23 will be replaced to mention that air pollution is one of the contributing factors to mortality in different countries at the global or regional level.
- Presently forest fire is mentioned as part of the land use. Other issues related to forestry sector could be highlighted. Specially, ground fires in Himalaya should be included.
- In page 40 of the publication, only major Acts and Policies have been mentioned, it is necessary to mention initiatives by private sector, and civil society.
- Government efforts in Bangladesh and Nepal need to be revised.
- South Asia’s efforts on the implementation of Kyoto should also be included
- It was suggested that Iran youth could also be involved in the preparation of the Malé Declaration awareness material for youths.
- The document could also be made available in local languages.
- Existing networks on awareness among youth could be involved in the dissemination process.

Session 2: Initiatives on air pollution in South Asia

18. Dr. Manju Mohan, Indian Institute of Technology (IIT), Delhi, gave a presentation on work done on air pollution modelling in India. This included a study to prepare the emission

inventory for Delhi and another study to estimate the environmental impact due to SO₂ emission from thermal power plants in India. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/3. Highlight of the presentation include:

- The emission inventory for Delhi considered total emissions of criteria pollutants, greenhouse gases and ozone precursors. Based on the total emissions, gridded emissions of criteria air pollutants were found out for air quality assessment. The gridded emissions were then validated. 11 years data was used. Hot spots and secondary hot spots were identified.
- The study showed that the emissions in Delhi varies partly based on introduction control measures, fuel shifts, changes in agricultural practice, increase in the vehicle fleet or problems within the power generation sector. There has been a noticeable reduction in SO₂ and CO levels, but NO_x and PM levels are high.
- The second study used the RAINS-Asia model and considered 47 Thermal power plants, which were more than 300 MW, out of a total of 83 coal fired thermal power plants in India.
- After introducing the RAINS-Asia model, Dr. Mohan described the locations of emissions, and SO₂ emission and concentration trends. The areas with highest concentrations and deposition were identified and the modeling results were validated with monitoring results.
- Results show that though the power plants contribute a very high percentage of SO₂ concentrations at many locations, deposition at critical ecosystems is not much due to the power plants. This could become an issue if current trends of energy production continue.

19. Prof. Razi Abbas Shamsi, University of the Punjab, Lahore, made a presentation on “Implications of Tropospheric Ozone on Agricultural Production in Pakistan”. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/4. Highlight of the presentation include:

- Introduced: emissions in Lahore and Karachi; Tropospheric Ozone formation and its impacts on crops; and various approaches to crop research.
- Introduced the results of Open Top Chamber, Bio-monitoring and EDU studies done on various crops in Pakistan. Correlations were made with the level of pollutants and the crop yields and vegetative growth, after filtering all possible confounding factors.
- As part of the work under the Malé Declaration project clover bio-monitoring and EDU studies have been initiated. For the bio-monitoring experiment, the difficulty in establishing the plants was analysed.
- The EDU study assessed the growth and yield response of spinach and mung bean to ozone. The ozone levels were high at about 81 ppb. He explained the effect of EDU on: leaf injury; dry weight; growth; reproductive growth; and seed yield. The ozone injury symptoms were not well marked and the results were inconclusive, especially in the case of mung bean.
- From the results of different studies, concluded that there is a rapid increase in ambient O₃ concentration with time and that there is the possibility of drastic yield reductions in staple crops.
- Recommended extensive Biomonitoring and EDU surveys at more rural locations.

20. Dr. Vahid Esfahanian, University of Tehran made a presentation on Air Pollution Modeling. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/5. Highlight of the presentation include:
- Introduction to the need for air pollution Modeling and its applications
 - The scale of modeling could range from the local to global level, depending on the requirements.
 - Air Quality Forecasting Techniques such as the Criteria schemes, Parametric Methods and Deterministic Methods were introduced.
 - Described the development of a Grid-based Eulerian air pollution model by linking the numerical weather prediction and air quality forecast models.
 - To a query on why area sources have not been included in the modeling exercise, Dr. Vahid Esfahanian mentioned that it was to reduce the costs. There was also a discussion on the relative merits of Eulerian model and other deterministic methods.
21. A presentation titled “Market Segment and Geographical Diversification of Electric Vehicles in Nepal” was made by Mr. Gopal Raj Joshi, Clean Air Network Nepal (CANN), focusing on a Global Environment Facility (GEF) supported project to further expand the reach of Electric Vehicles in Nepal. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/6. Highlight of the presentation include:
- Introduction to CANN, which is a network involved in air quality management in Nepal, formed in 2004. It acts as the Local Country Network of CAI-Asia Center . Its mission, strategy and major activities were mentioned.
 - Electric vehicle powered by hydro power has been thought as an alternative because of issues related to energy security and the economical and environmental issues linked to fossil fuel usage. Nearly 55% of national income used to import fossil fuel and there is a monthly loss of 310 million Nepali rupees due to the subsidy given for its usage.
 - Electric vehicles (EV’s) were first introduced through the operation of trolley bus in 1975, followed by three wheeled EVs in 1993. At present 650 commercial vehicles ply in 18 routes and there are 30 charging stations throughout the Kathmandu valley. Second generation of EVs are being planned, including four wheelers.
 - The barriers for the EV industry in Nepal was highlighted
 - The GEF supported project titled ”Reducing Transport Sector CO₂ Emissions Through Market Segment and Geographical Diversification of electric vehicles in Nepal” is to be completed by August 2008 .The supporters and partners for the project, major project activities and the project benefits and outcomes were described
 - The future plans to promote EV’s were also mentioned.
 - Concluded by highlighting CANN’s proposed plan for mass awareness under the Malé Declaration activities.
 - Answering a query, the CANN representative mentioned that no assessments have been carried out about the impacts of Electric Vehicles in Nepal, since comparatively few numbers are still on the road. A suggestion was given to do an LCA study for Electric Vehicles in Nepal, so as to get a comprehensive view. The relative advantages of Hybrid electrics and electric vehicles were also discussed.

22. Dr. Asif Javed Khan Khawaja made a presentation on Public awareness on Air Pollution. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 2/7. Highlight of the presentation include:
- Importance for public awareness was stressed.
 - Major activities being carried out on Public Awareness related to air pollution and road safety was highlighted.
 - Major suggestion was to have focal points for awareness activities and the need to share information among everyone about the activities within the Malé network.

Session 3: Initiatives on air pollution in Asia

23. Ms. Aida Roman of East Asian Network on Acid Deposition (EANET) made a presentation on the activities of EANET. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 3/1. Highlight of the presentation include:
- Briefed the session, regarding the Network’s background, objectives, institutional framework, major activities, major achievements, financial arrangement and recent development of EANET.
 - Monitoring under EANET covers four environmental fields: wet deposition, dry deposition, soil/vegetation and inland aquatic environment.
 - Significant achievements have been made such as improvement of monitoring and strengthening the capacity of participating countries, unified monitoring methodologies and QA/QC activities, publication of data reports and the publication of the Report for Policy Makers, etc. have been made through EANET activities.
 - Highlighted the major decisions of the Intergovernmental Meeting of EANET including the recent adoption of the Periodic Report on the State of Acid Deposition in East Asia and the decision to begin a process to discuss the Text of the Instrument to Provide a Sound Basis for Contribution to EANET.
 - There was a query on whether any acid deposition problems have been detected by EANET, and the EANET secretariat mentioned that first assessment report have been completed and a copy could be obtained from the Secretariat.
24. Mr. Cornie Huizenga, Clean Air Initiative for Asian Cities (CAI-Asia), made a presentation on “CAI-Asia: Recent Developments”. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 3/2. Highlight of the presentation include:
- He introduced the history of CAI-Asia which was launched in 2001 ,to promote air quality in Asian cities and the recent changes in its institutional structure approved by the CAI-Asia General Assembly in December 2006.
 - Since its inception it organized 4 Better Air Quality (BAQ) workshops, created CAI-Asia Local Networks in 7 countries, published the Country Synthesis Reports on urban air quality management for 17 countries and one city, developed a web-based knowledgebase, and jointly organized the First Governmental Meeting on urban AQM in Asia.
 - According to the new institutional structure, the CAI-Asia Center will function as the regional secretariat of the CAI-Asia Partnership, a non-binding, multi-stakeholder network committed to improving air quality in Asia.

- The core programmes and projects were described, including ones that were relevant for South Asia. The next BAQ workshop is scheduled to be held in Bangkok in 2008.
25. Dr. Nguyen Thi Kim Oanh, Asian Institute of Technology made a presentation on the AIRPET integrated monitoring and modeling for air quality management in Asian urban areas. Detailed presentation is given in the document “Malé Declaration/RSC 4/ 3/3. Highlight of the presentation include:
- Introduced air pollution issues in Asia.
 - AIRPET aims to develop a comprehensive assessment of air quality in the region based on long term monitoring; develop appropriate control technologies for developing countries; use modeling tools for regional air quality management; and apply integrated air quality management to reduce air pollution from target sources as the demonstration case.
 - AIRPET network conducts monitoring of air pollutants in 6 cities in China, India, Indonesia, Philippines, Thailand and Viet Nam.
 - Activities by each of the centres and the results from Phase 2(2004 -2007) were presented.
 - Techniques used and the results from the source apportionment study in Chennai under the AIRPET programme were discussed.
26. Mr. Mylvakanam Iyngararasan of UNEP ROAP made a presentation on the Project Atmospheric Brown Clouds (ABC). Detailed presentation is given in the document “Malé Declaration/RSC 4/ 3/4. Highlight of the presentation include:
- Project ABC aims to address the emerging issue of brownish haze, which is caused by air pollution emissions containing aerosol particulates.
 - Potential direct and indirect consequences of the haze include regional and global climate change and impacts on ecosystems, the water cycle, agriculture and human health.
 - The project comprises 3 major programmes: (i) Observation: establishment of a network of ground based monitoring stations across the Asia-Pacific region for data collection and capacity building; (ii) Impact assessment: assessment of the potential impacts of ABC on agriculture, water, and health using the data from the monitoring stations; (iii) Awareness and mitigation: provide science-based information for policy makers to mitigate atmospheric pollution.
 - Lead institutions have been identified for leading studies on impacts of ABC on agriculture, water, and health. The first set of ABC data is now available and will be updated every 6 months.
 - Now ABC programme in Africa is being planned.
 - There was a query if it was based on one term observations, for which the Secretariat clarified that the observations were based on regular monitoring and several campaigns that have been carried out as a follow-up to the INDOEX (Indian Ocean Experiment).

Session 4: Initiatives on air pollution in other regions

27. Dr. Johan Kuylenstierna of SEI and Mr. Iyngararasan of UNEP ROAP presented the progress of the Global Atmospheric Pollution Forum (GAPF). Detailed presentation is given in the document “Malé Declaration/RSC 4/ 4/1. Major highlights include:

- The need for a global forum was highlighted
 - The role of GAPF was mentioned as supporting regional networks, promote sharing of experience and promote discussions to solve problems.
 - The current programmes and activities of the forum and potential future programmes was highlighted
 - The first major project by the Forum was to develop a generic Emission Inventory manual for developing countries. Other activities include developing guidelines on impact assessments and facilitating consensus building.
 - The linkages of the forum with the Malé network include; sharing of experiences, transfer and improvement of methodologies; and integration of South Asian data in global synthesis.
28. Dr.Lars Nordberg, International legislation on air pollution, Sweden, made a short presentation on the LRTAP. He introduced the history of the LRTAP and the Protocols that have been developed under it. They have realized that activities within Europe are not enough, since hemispheric transport has increased. Hence a Task Force has been formed to study hemispheric transport. LRTAP is keen on linkages with other regional networks.
29. During the discussions, the meeting agreed that joint programmes between LRTAP and Malé Declaration will benefit capacity building programme under the Malé Declaration. It was proposed that the Malé Secretariat send a letter to LRTAP Secretariat regarding the joint programme.

Conclusion of Session

30. The Third Regional Stakeholders and Coordination meeting ended with concluding remark from Mr. Rajamani, Regional Facilitator. During his concluding remarks, Mr. Rajamani summarized the progress in each country and appreciated that most of the targets set for Phase 3 is being achieved. From the deliberations, he observed that a lot of capacity exists within the Malé countries, which could be tapped. He stressed the need for better networking and improved awareness building about air pollution related issues and about the progress of the Malé Declaration activities in particular. Mr. Rajamani expressed that the participating countries have to take greater ownership of the project, especially in terms of financial support for the implementation of Malé Declaration. He thanked Sida for its support and hoped that Sida support will continue even in the next phase. Mr. Rajamani thanked the Government of Maldives for the hospitality and excellent arrangements.