Malé Declaration

on Control and Prevention of Air Pollution and its Likely Transboundary Effect for South Asia

Malé Declaration/RSC5/11

English Only

Fifth Stakeholders cum Coordination Meeting

19-20 August 2008, Colombo Sri Lanka

MEETING REPORT

I. INTRODUCTION

1. The Fifth 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 Colombo, Sri Lanka during 19-20 August, 2008. The agenda is enclosed as Attachment I.

2. The meeting was attended by the National Focal Points (NFP) and National Implementing Agencies (NIA) of the 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 as attachment II.

3. Mr. R. Rajamani, former Secretary of Ministry of Environment and Forests, Government of India chaired the meeting as the Regional Facilitator.

II. INTRODUCTION BY THE REGIONAL FACILITATOR

4. The meeting started with an introduction by Mr. R. Rajamani, the Regional Facilitator for the Malé Declaration. In his introductory remarks, Mr. Rajamani commended the progress made during the Phase III of the implementation of the Malé Declaration and hoped that there would be more rapid progress in future. He stressed the need to move from monitoring and impact assessments towards mitigation and the need to adopt cleaner and preventive technologies. He emphasised the need of raising awareness in public, especially in the most vulnerable group such as women, children and elderly. He highlighted Malé Declaration as a successful example for "south-south cooperation". Mr. Rajamani also informed the participants the informal discussion held on 18 August on establishing a regional forum for air pollution in Asia to provide an information sharing mechanism for the existing networks.

III. SESSION 1: MALÉ DECLARATION AND RELATED PROGRAMMES

Progress reporting

5. Mr. M. Iyngararasan of UNEP Regional Office for Asia and the Pacific (ROAP) briefed the international conventions on atmospheric issues, such as the conventions on ozone and green house gases emission and indicated the omission on convention for air pollution, and this is where the Malé Declaration could play a role. He briefly introduced about the Phase I, Phase II, and the activities that are being carried out in Phase III. Mr. Iyngararasan reported the

Phase III achievements. The achievements include : stakeholders meetings for strengthening the regional cooperation and stakeholders participation under the Malé Declaration; monitoring and the corresponding capacity building activities; Standard manual and training for emission inventory to enhance the capacity of NIAs on emission inventory compilation and Integrated Assessment and Information System; impact assessment study on human health in Bangladesh, rapid urban impact assessment in Nepal; impact on corrosion case studies in Iran, India, Nepal, Sri Lanka and Maldives; crop impact assessments in Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka; decision support information for policy formulation and air pollution prevention through a compendium of good practices on prevent and control air pollution and the strategies for implementing these practices in South Asia; capacity building and demonstration projects on eco-house.; awareness rising through Newsletter and brochures; Youth's participation and the Youth for Clean Air Publication and an e-learning CD, national level awareness programmes such as the air pollution and asthma workshop in India. Details are provided in the document "Malé Declaration/RSC5/1/1".

6. Dr. J. Kuylenstierna of Stockholm Environment Institute (SEI) presented a brief overview of the structure of the RAPIDC program and its linkages to the Malé Declaration. He firstly introduced the air pollution networks in the region such as the Composition of Acid Deposition (CAD) monitoring stations; CORNET: networks across Asia and Africa for SO_2 and corrosion monitoring sites; APCEN: a global network linking air pollution and its effects on crop; APINA: network for Africa on air pollution. He explained how the research results through these networks could 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 such as rapid urban assessment, the air pollution impact assessment on health, crop and corrosion and interpreted the available results. He briefed Sida's evaluation results on the Malé declaration activities and indicated the need to strengthen mitigation and policy analysis, and to develop a targeted information strategy to effectively promote policy interventions.. Details are provided in the document "Malé Declaration/RSC5/1/2".

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 of Bangladesh presented the status of implementation of the Malé Declaration in Bangladesh in the last three years. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/3". Summary of the presentation include:
   - Concentration analysis of air pollutants by high volume samplers and diffusive samplers and rain water analysis have been carried out; Metrological parameters have been collected; data obtained through the activities was interpreted and presented;
   - Emission inventory activities have been carried out following the common methodology developed by the Malé Declaration; presented the data collected thus far; unavailability of data is the major difficulty of conducting the emission inventory;
   - Conducted assessment of impact of air pollution among school children in selected schools in Dhaka city and impacts of troposphere ozone on crop have been conducted and the results were introduced;
   - Plan for the implementation of the Malé Declaration in the next three years was briefed, a new monitoring station will be set up depending on availability of resources; emission

inventory will be updated; the health impact assessment could be expanded to other areas, crop impact assessment could be undertaken on local varieties in other areas, corrosion and soil acidification studies could be carried out.

9. Mr. T. Wangchuk briefed the status of implementation of the Malé Declaration in Bhutan. Summary of the speech include:

- Monitoring air pollution is ongoing following the common methodology of the Malé Declaration. Bhutan is also conducting studies to assess the impacts of air pollution on crop
- National Environment Commission, the National Implementing Agency, is developing partnership with the Royal University of Bhutan to monitor the air quality in Eastern Bhutan by setting a monitor station.

10. The progress in India was presented by Dr. P. Gargava. Detailed presentation is given in the document "Malé Declaration/RSC5/ 1/4". Summary of the presentation include:

- Monitoring activities are being carried out at Port Canning station, thrice a week, on SO_2, NO_2, RSPM and rainwater chemistry. Data collected were interpreted and presented. It is found that 24-hourly average concentrations of SO_2 and NO_2 are much lower than ambient air quality standards; RSPM concentrations exceed the prescribed standards, particularly during winter season.
- Impact assessment studies on health, crop and materials have been carried out. Emission inventory is expected to be completed by December 2008.
- Other activities being carried out by Central Pollution Control Board (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.
- Plans for next 3 years were briefed. The institutional arrangement will remain the same. Ministry of Environment and Forest will serve as the National Focal Point and the Central Pollution Control Board will serve as the National Implementing Agency. Four new monitoring stations have been approved. Impact assessment studies will be expanded. Emission inventory will be refined. Capacity building and regional cooperation project will be going on.

11. Mr. M. Zandi presented the status of implementation of the Malé Declaration in Iran. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/5". Summary of the presentation include:

- The source of air pollution in Iran and the corresponding control measurements were introduced;
- Impact assessment studies on materials have been carried out;
- Sand dust was indicated as an emerging air pollution issue in Iran,
- Future plan was presented, which include: 1) increase the number of air quality monitoring stations in Iran; continuous Monitoring of Pollutant Parameters in large cities; attempt to on-line monitoring in large industries; establishment of regional air quality centre, ecological monitoring sites, and national monitoring network; 2) conduct training for air quality monitoring personnel and raise public awareness; 3) conduct study on air

pollution impact assessment on health and crops; 4) improve industry and automobiles engine; design a suitable model for energy consumption in the country.

12. Mr. A. M. Ramiz presented the status of implementation of the Malé Declaration in Maldives. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/6". Summary of the presentation include:
    - Continuous monitoring of SO_2 and NO_2 by passive sampler have been carried out; Monitoring ozone (O_3) has started since May 2007; Corrosion site established on 23 January 2008; Initiate measurement of pH and EC at Hanimaadhoo and Gan this year.
    - The main challenges being faced include: 1) Establishing networks between hospitals to improve and collect health related data; 2) Monitoring is not done at power house stacks; 3) No emission monitoring is done for vehicles, except visible smoke for a very specific period; 4) Lack of human resources in the field of atmospheric chemistry and;
    - Future plans include: 1) Start monitoring PM_{10} and TSPM in existing station, and start measurement of pH and EC from three new locations; Installation of three automatic air quality monitoring stations from 2009, based on funds availability; 2) Rain water samples to be collected in three meteorological stations in the future and to be analysed by the National Health Laboratory of Maldives; 3) Emission inventory will be compiled during 2009; 4) Impact assessments on Health (2010), Crops (2009), Materials (2010) and Acidification (2011) to be carried out and corresponding capacity for the expert institution to be conducted; 5) Conduct awareness programs for students, public, government agencies and NGOs.

13. Mr. Purushottam Ghimire, Joint Secretary of the Ministry of Environment Science and Technology presented the status of implementation of the Malé Declaration in Nepal. Detailed presentation is given in the document "Malé Declaration/RSC5/1/7. Summary of the presentation include:
    - Introduction on NIA, NFP and the national committee members, as well as the overview of emissions of pollutants in Nepal were given;
    - Rapid urban assessment monitoring sites has been established; A study on corrosion impacts has been carried out with eight monitoring sites; Crop Impact assessment studies on mungbean have been carried out;
    - National stakeholders meetings as well as other public awareness initiatives have been conducted;
    - Future activities to be carried out include: Health Impact Assessment; Modelling –IIAS, MATCH; stock at risk – corrosion study; speciation of samples; soil acidification studies; and crop impact of ozone concentrations.

14. Mr. Zia Ul Islam, Director, Pakistan Environment Protection Agency, presented the status of implementation of the Malé Declaration in Pakistan. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/8". Summary of the presentation include:
    - Institutional arrangement in Pakistan for the Malé Declaration; cost of environmental degradation and health impact assessment;
    - Sources of air pollution in Pakistan were introduced, and air quality monitoring network was recently in established in five major cities, which included fixed and mobile monitoring stations were.

- Crop impact assessment has been conducted and the health impact assessment is being initiated;
- Challenges and difficulties in implementing the Malé Declaration activities include: 1) Communication and logistical constraints for supervising the monitoring the site; 2) Some equipments showing sign of wear and tear; 3) Ground Staff Needs More Training; and 4) Needs improved Coordination among NIA and Expert Institute Nominated for c impact assessment studies.
- Future plan for the next three years was also presented. Impact assessment studies on materials, soil and health will be carried out.

15. Mr. R. N. R. Jayaratne of Central Environmental Authority presented the status of implementation of the Malé Declaration in Sri Lanka. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/9. Summary of the presentation include:
- Institutional arrangement on air pollution issues in Sri Lanka
- Ongoing monitoring activities under the Malé Declaration and the results were presented, which include the monitoring of SO_2, NO_2 and also the wet deposition monitoring of these pollutants in regular basis. Problems encountered during the monitoring were highlighted, which include non- durability of plastic material of the lid and the funnel holder of wet only collector under Sri Lanka's climatic condition and the materials became brittle.
- The activities on crop impact assessment and corrosion impact assessment were also presented
- Proposed activities for the next three years were presented. These include shifting the monitoring sites to better position, expansion of sampling activities, capacity building and technical enhancement, plan to disseminate leaflets and posters to raise the awareness of general public, etc
- The following suggestions were presented for further development of the Malé Declaration : 1) Inclusion of transboundary radiation monitoring in to the Programme; 2) explore the possibility of including Persistent Organic Pollutant (POPs) into the Declaration; and 3) Explore the possibility of merging relevant SAARC environment and forestry activities into Male Declaration activities

Inter laboratory Comparison

16. Dr. N. T. Kim Oanh, Asian Institute of Technology, Thailand, made a presentation on "the results of inter-laboratory comparison of Malé Declaration monitoring network". Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/10. Highlight of the presentation and major discussions include:
- Objectives of the experiment and the implantation schedule of the Inter-Laboratory calibration of Malé Monitoring network were presented.
- The procedure of sample and data collection was briefed. The rainwater samplers were sent to the country laboratories by AIT. The NIAs analysed the samples for the following parameters: pH, EC, SO_4^{2-}, NO_3, Cl^-, Na^+, K^+, Ca^{2+}, Mg^{2+}, NH_4. Data showed that some countries had problems in analysing low concentration samples. And Cl^-, SO_4^{2-}, Ca^{2+} are the parameters that the countries get more difficulties in analysis.

- Comments on the presentation included 1) convert pH into concentration; 2) Disclose the name of the laboratories and proposed suggestions for improvements to National Focal Points; and 3) Make the inter-laboratory comparison as a regular activity.

Passive sampler inter comparison

17. Dr. R. Balasubramanian, National University of Singapore, made a presentation on the results of passive sampler inter-comparison. Highlight of the presentation included the following. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 1/11.
    - Objective of the experiment is to conduct an inter-comparison of passive samplers to assess the performance of different types of passive samplers for the analysis of NO_2 and SO_2.
    - Theories of active and passive sampling and background of passive samplers were presented.
    - Details and results of the experiment were presented. It is shown that all four types of passive samplers under the experiment could be used for NO_2 and SO_2 in outdoor atmosphere under urban conditions, and there was a larger variation particularly for SO_2 between the samplers of different types and also within the samplers of the same type, and this happened in both inter and intra-lab studies. This is probably due to analytical uncertainties, and difference in the sampling efficiency based on different coating solutions.
    - It was also noted that inter-lab variations generally larger than intra- lab variations, probably due to the systematic differences in relation to the different analytical techniques used by the participants.

Crop Impact Assessment Studies.

18. Dr. L. Emberson provided an introduction of crop impact assessment. The highlight of the presentation includes,
    - An introduction of the relationship between O_3 and crop loss in South Asia was presented. O_3 could adversely affect the plant which includes foliar / visible injury, accelerate senescence, reduce plant growth, alter plant metabolism, and also reduce crop yield
    - Details of the Malé Declaration crop impact assessment studies were presented. The objectives of the study include 1) Perform "provisional" risk assessments; 2) Conduct experimental studies using standardised experimental protocol; and 3) Develop socio-economic assessment methods and policy engagement.
    - Links to external organisations (e.g. APCEN, LRTAP, ABC, GAP Forum) were briefed.

19. Professor S.R.A. Shamsi of Pakistan presented the experiment results on bio-monitoring and EDU chemical protectant studies conducted in Pakistan. Highlight of the presentation includes
    - Theories of troposheric ozone formation were introduced, and sources of emissions from Pakistan's perspective were briefed.
    - The set up of the experiment and the results were briefed. Research on the white clover bio-monitoring shows that ozone has a negative effect on clover in terms of leaf injury and plant dry weight. The EDU studies on spinach and mungbean shows that ozone has negative effect on crops in terms of pods per plant and seeds per plant.

- Problems in conducting the experiment were mentioned which include long transit period and heat shock problems for clover cuttings. Poor greenhouse propagation and field exposure problems were also mentioned.
- Certain recommendations were made, which include 1) improve the understanding of agricultural policy makers on the adverse impacts of ground level ozone on crops via environmental education and awareness; 2) Extensive bio-monitoring and EDU surveys at more rural locations needed in all South Asian countries; 3) Establish air quality standards through continuous monitoring to understand pollutant concentration ; and 4) Establish additional monitoring of spatial and temporal concentrations of ozone and other pollutants in rural areas proximal to major cities and in the remote agricultural areas.

20. Mr. T. Islam from Bangladesh presented the experiment results on bio-monitoring and EDU chemical prtectant studies in Bangladesh. Highlights of the presentation includes,

- The theories on ozone were briefed, and the sources of air pollution, and background information on agriculture in Bangladesh were introduced.
- Effects of tropospheric ozone on crops were introduced.
- The objectives of the experiment were presented. The experiment was to identify areas in Bangladesh where the ozone concentrations are sufficient to induce ozone-specific injury on ozone-sensitive plants, to assess the biological impacts of increased ozone concentrations on crop plants in Bangladesh, and to determine the frequency of ozone injury and to examine temporal trends of ozone injury development.
- The result shows that White Clover is an adaptable crop in Bangladesh, and NC-S always shows better performances than NC-R, and the White Clover may be the best indicator to observe tropospheric ozone injury symptoms in Bangladesh.

21. Dr. A. Perera from Sri Lanka presented the experiment results of crop impact assessment studies in Sri Lanka. Highlight of the presentation include

- The objectives and the procedure for the experiment were presented. The objective of the experiment was to estimate the impacts of tropospheric ozone pollution on Mung bean (*Vigna radiata*) in Sri Lanka.
- Research shows that there is no statistical difference between the EDU and non-EDU treated plants. This might be due to the heavy rainfall during the experiment period which resulted in low ozone concentration and wash-out of EDU. The second experiment was carried out during dry season. Research shows that the EDU treated plants grow slightly better than the non-EDU treated plant, though the difference is not statistically significant.
- It is concluded that average Ozone concentration at the study site is not at a risk level but there could be some high ozone concentrations which might impact plants. However, Heavy rainfall, high humidity and lower night temperatures, changing weather patterns in the site during the study periods might have diluted the ozone impacts in Mung bean plants.

22. Prof. M. Agrawal from India presented the result on EDU treatment. Highlight of the presentation includes,

- Research on sensitive plants such as mungbean shows that ozone has a negative impact on sensitive crops

- Leave injury was observed during the first year experiment when the ozone concentration of that particular year is quite high. However, in the second year, the leave injury was not that significant in which only yield loss was found. It is due to a relatively lower ozone concentration during the second year.
- High concentration of EDU might provide negative effects on plants. Therefore, the EDU amount should be properly decided. She also noted that Ozone is a pollutant in rural area rather than urban area.
- It is concluded that EDU can be successfully used for assessing O_3 induced changes in plants under ambient field conditions, and EDU can be used as a tool in bio-monitoring programme to map O_3 injury in plants especially in developing countries (major constraints: continuous electricity and non-availability of monitoring equipments)

23. Ms. B. Banmali Pradhan, ICIMOD, presented the results of the EDU experiment in Nepal. Experiment was conducted on white clover, mungbean. Highlights of the experiment includes,
    - Objectives of the experiment were presented. The experiment is to assess the biological impact of ambient ozone concentrations on growth and yield parameter of Mungbean in Nepal, assess the suitability of EDU for regional risk assessment at Rampur, Chitwan, Nepal, and to determine the frequency of ozone injury and to examine the temporal trends of ozone injury development in Mungbean
    - EDU treated plants generally show better growth and less injury compared to non-EDU treated plants in the experiment.

24. Detailed presentations and draft crop assessment report are given in the document “Malé Declaration/IG10/3/1.

Health impact Assessment Studies

25. The presentation on the result of health assessment in Dhaka city was presented by Professor Sk. A. Ahmed of Bangladesh and Prof. Frank Murray of Perth University, Australia. Detailed presentations and draft assessment health report are given in the document “Malé Declaration/IG10/3/2.
    - The presentation started from basic introduction on the particular matter’s impact to human health, especially to children health. Particular matter is the major air quality problem in Dhaka.
    - Methodology of the experiment was presented. Peak Expiratory Flow Rate was measured on daily basis. The daily PM concentrations together with other meteorology data were recorded. The correlation between PEFR and PM were studied. Research shows that particular matters do have a statistically significant impact on morning, afternoon in the population studied.

26. Associate Professor Frank Murray of Murdoch University, Australia gave a presentation by comparing the results in Dhaka with studies in South California.
    - The study shows that there is a relationship between Peak Expiratory Flow Rate (PEFR - a measure of lung function) in both asthmatic and non-asthmatic children and PM10 and PM2.5 concentrations.

- It confirms that the study done in Dhaka is consistent with studies in Mexico City, the Netherlands, Bangkok and studies in the USA. It is concluded that if ambient concentrations of PM10 and PM2.5 in Dhaka and similar cities could be reduced the harmful impacts on the respiratory health of children could be substantially decreased

Corrosion Impact Assessment Studies

27. Dr. D. Saha from India presented the results of corrosion impact studies. The studies were carried out in India, Iran, Maldives, Sri Lanka and Nepal. Detailed presentation and draft corrosion impact assessment report are given in the document "Malé Declaration/IG10/3/3. Highlight of the presentation includes:
    - The methodology used for conducting the corrosion impact assessment studies were briefed during the presentation. Case study in Agra and India were also introduced.
    - Corrosion study at Sri Lanka and Nepal were also presented.
    - Attempts have been made to compare the present data to similar data obtained in Europe. The most important pollution parameters (dry deposition of SO_2, acid rain and for some materials possible HNO_3) seem to be the same in subtropical/tropical climates as well as in temperate climate.

28. Mr. A. Muhusin Ramiz from Maldives provided a brief on ongoing corrosion impact studies in Maldives. The monitoring station is established in Hanimaadoo together with the air quality monitoring.

29. Ms. B. B. Pradhan from Nepal delivered a presentation on corrosion studies in Nepal. The highlight of the presentation includes,
    - The methodology of the corrosion study was presented. The study was to assess the rate of corrosion at the defined sites, ideally close to a place where environmental variables are measured using exposure of standard samples, and the racks were exposed in nine sites for the period between November 2006 to November 2007
    - Results of the study was presented
    - Method for calculating the economic cost of corrosion on buildings and structures was also presented.

30. Mr. M. Zandi, of Iran briefed the corrosion monitoring activities in Iran. A monitoring site is established in Tehran and data collection is ongoing.

31. Ms. R.A.Warnika Ranawaka Arachchi of Sri Lanka presented the ongoing corrosion monitoring activities in Sri Lanka. One corrosion monitoring site has been established in the CEA premises in Batharamula.

Rapid Urban Assessment

32. Ms. B. Pradhan gave a presentation on the results of rapid urban assessment in Nepal. Detailed presentation and draft rapid urban assessment report are given in the document "Malé Declaration/IG10/3/4. The presentation highlights include:

- Outcomes of the training conducted in Kathmandu in November 2006 was briefed. The research assessed the concentration of SO_2, NO_x, CO, NMVOC, NH_3, PM10 and PM2.5.
- Pollution hotspots are identified through mapping. The research provides a vivid overview of the air quality condition in Khatmandu.
- An emission inventory for Khatmandu was also compiled.

Integrated Information and Assessment System

33. Mr. Iyngararasan of UNEP and Dr. Johan of SEI presented the Integrated Information and Assessment System developed by UNEP and SEI. The model intends to integrate all the result fromthe Malé Declaration. The function of the IIAS include: introduction to the IIAS; emissions and scenarios; atmospheric transport and deposition; monitoring data; impacts of regional air pollution in terms of risks of corrosion, crop and health; option for pollution prevention and control.

Compendium of Good Practices

34. Professor R. M. Shrestha from Asian Institute of Technology delivered a presentation on the compendium of good practices for reduction of atmospheric emissions. Detailed presentation is given in "Malé Declaration/RSC5/1/12.
    - Mechanism introduced in the compendium include command and control approach, market based approaches, and voluntary approaches.
    - Other approaches such as congestion charge, banning of vehicles are also introduced. Comments from the participants include: 1) Include policy analysis such as cost and benefit analysis on particular practices in the compendium; 2) applicability of practices need to be studied and country or region specific mechanism for up scaling could be developed; and 3) Cost-effective practices should be introduced to the countries.

Awareness raising

35. Mr. Gopal from South Asian Youth Environment Network (SAYEN) delivered a presentation on the Malé Declaration Public Awareness materials for Youth. The presentation introduced the process of producing the Publication "Youth for Clean Air". The publication was composed by youth groups in collaboration with the Malé Declaration Secretariat. He also demonstrated the awareness CD which is being developed based on the publication. Participates were requested to provide their comments, if any, before the end of October 2008. Detailed presentation is given in "Malé Declaration/RSC5/1/13.

IV. SESSION 2: INITIATIVES ON AIR POLLUTION IN SOUTH ASIA

36. Dr. A.Q. Sarker from Bangladesh gave a presentation entitled "Indoor Air Pollution: A Look through cooking practice with both traditional and improved cook stove in rural Bangladesh". Highlights of the presentation include,
    - Dr. Sarker started his presentation by providing background information on indoor air pollution and its impact on human health, especially to the most vulnerable groups such as women and children.

- The study carried out was to assess the status of indoor air pollution when cooking with traditional and improved cook stoves in rural Bangladesh.
- Research shows that the improved cooking stoves perform better than the traditional stoves in terms of reducing indoor air pollution, as well as fuel and time consumption on cooking.
- However, the ICS is not widely adopted by the local residents as the awareness on indoor air pollution is low and not sufficient incentive in adopting ICS due to the free availability of fuel wood.
- It was noted that almost all the households in rural areas depends on biomass for cooking. Biomass fuel is a major source of IAP, and traditional stoves releases more smoke during cooking that is most harmful to human health. People are habituated to use traditional stove. It will take time to replace traditional stove with ICS if new intervention are not taken. Detailed presentation is given in "Malé Declaration/RSC5/2/1.

37. Professor M. Mohan from India gave a presentation on "performance evaluation of some regulatory air quality models with comprehensive emission inventory over megacity Delhi".Detailed presentation is given in "Malé Declaration/RSC5/2/2.
- Professor M. Mohan started her presentation by presenting the contribution of sources of air pollution in Delhi.
- Ambient particulate matter concentrations have been estimated over seven sites in Delhi by two models viz. AERMOD (07026) and ADMS-Urban on particular matters for two years 2000 and 2004. The overall performance of the ADMS and AERMOD were presented.
- Research shows AERMOD and ADMS-URBAN are validated for a tropical city such as Delhi; Model validation shows a satisfactory performance of the two models;
- It is revealed that sophisticated models where input data requirements are more, do not always lead to a better model performance in case there is inadequate data for such studies;
- AERMOD is applied for exposure assessment study in some specific case studies in Delhi; two case studies chosen for pollution reduction show that a small decrease in vehicular emissions causes significant reduction in mortality.

38. Mr. G. Raj Joshi of Nepal delivered a presentation entitled "Clearing the Air in Nepal". Activities and best practices in Nepal were presented. Emission reduction measures such as banning of old polluting brick kilns, switch to electric vehicles, improvement of cooking stoves and utilizing household biogas plants were introduced. Public awareness activities implemented in to promote reduction of air pollution and climate are introduced. Detailed presentation is given in "Malé Declaration/RSC5/2/3".

39. Mr. A.J. Khawaja of Pakistan made a presentation on creating awareness on environment-public opinion counts. The public awareness activities organized were introduced, which include:
- Information Centre (Karachi & Islamabad), Green Library (PEPA & NUST), Inter School Debates & Project (Model) Exhibitions, Walks – subject specific, Plantation – with care for six months, and E-newsletters.

- Safety and road safety programmes were also presented. Detailed presentation is given in "Malé Declaration/RSC5/2/~~3~~4".

V. SESSION 3: INITIATIVES ON AIR POLLUTION IN ASIA

40. Ms. A. Roman of East Asian Network on Acid Deposition (EANET) made a presentation on the progress of EANET. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 3/1. Highlight of the presentation include:
- Ms. Roman briefed the session, regarding the Network's background, objectives, institutional framework, major activities, major achievements, financial arrangement and recent development of EANET.
- The major decisions of the Intergovernmental Meeting of EANET were highlighted.
- Periodic Report on the State of Acid Deposition in East Asia has been developed and it is available on the EANET website.
- QA/QC activities have also been conducted under EANET on a regular basis.
- Capacity building activities were briefed, which include individual training courses, videos conference for children, enhancement of negotiation skills for policy makers

41. Ms. M.G.E. Bathan, Clean Air Initiative for Asian Cities (CAI-Asia), made a presentation on "CAI in Asia". Detailed presentation is given in the document "Malé Declaration/RSC 5/ 3/2. Highlight of the presentation include:
- An introduction to 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.
- CAI-Asia Local Networks are created in seven countries, and the Country Synthesis Reports on urban air quality management were published for 17 countries and for one city,
- Capacity building for effective AQM include individual training, training for trainers and development of training manual
- CAI-Asia also works closely with government and stakeholders, and addresses the co-benefits by addressing air pollution and climate change together
- Integration and scaling of CAI efforts were also presented.

42. Dr. N. T. Kim Oanh, Asian Institute of Technology made a presentation on the AIRPET integrated monitoring and modelling for air quality management in Asian urban areas. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 3/3. Highlights of the presentation include
- Air pollution status and challenges 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 modelling 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 six cities in China, India, Indonesia, Philippines, Thailand and Viet Nam.

- Activities by each of the centres during Phase I and II (2002 -2007) were presented and the lab control devices developed in countries were also introduced.
- The project has scaled up for pilot applications in factories, where the factories purchase the technology and apply in their daily operation
- Integrated management for rice straw burning was also introduced. Integrated AQM for brick manufacturing community has been developed.
- AIRPET Phase III plan was presented which is to provide overall picture of air quality in Asia taking into account long range transport contribution.

43. Mr. M. Iyngararasan, UNEP ROAP made a presentation on the Project Atmospheric Brown Clouds (ABC). Detailed presentation is given in the document "Malé Declaration/RSC 5/ 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 three 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.
- The hotspots of ABC have been identified.
- Major finding on water, food security and health is being compiled in the form of an assessment report and the report will be launched during the last quarter of 2008.
- Phase II implementation of ABC will include four components: ABC-Asia; ABC-Africa; Surya (mitigation); Glacial melt (adaptation).

44. Mr. L. Nordberg from Sweden delivered a presentation on capacity building on policy makers. The presentation started from tentative steps toward a multilateral agreement on long-range transboundary air pollution. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 3/5. The basic principle and concepts that policy makers should be familiar with were introduced.
- Steps were introduced, including: establishing secretariat; visionary framework arrangement; including basic obligation for emission inventories, pollution control, monitoring research and approaches; provisions for subsequent effects-based; prepare separate protocols with differentiated obligations on emission reduction; consider base years and target years for implementation of obligations and compliance monitoring; aim at widest possible adherence of countries to agreed instruments.
- The driving forces for negotiation, rationales for agreement, type of agreement, differentiated responsibilities were also presented.

VI. SESSION 4: INITIATIVES ON AIR POLLUTION IN OTHER REGIONS

45. Dr. J. 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 5/ 4/1. Major highlights include:

- The objectives for a global forum were highlighted: strengthening inter-governmental networks at regional scale; greater harmonisation of technical system, information and assessment process within and between the regions and capacity building based on them, and promoting consensus among stakeholders to underpin emergence of regional, hemispheric and global action.
- The role of GAPF was mentioned as supporting regional networks, promote sharing of experience and promote discussions to solve problems among the existing networks.
- 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, and transfer and improvement of methodologies,
- Progress in the regions was briefed. In Latin America, Ministers of the Environment agreed to establish an intergovernmental network on air pollution; In Africa, a "Lusaka Agreement"-Southern African Development Community (SADC) Regional Policy Framework on Air pollution has been adopted. In Europe, LRTAP outreach to other regions;

46. Dr. L. Emberson of SEI provided a presentation on Convention on Long-range Transboundary air pollution. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 4/2.

- The structure of LRTAP was introduced.
- The LRTAP secretariat's collaboration with Malé Declaration was highlighted.
- Possible areas for collaboration include ICP waters, ICP materials; ICP forest; ICP modelling and mapping; ICP Vegetation; taskforce on health and integrated assessment modelling.
- During the discussions, the meeting agreed that joint programmes between LRTAP and Malé Declaration will benefit capacity building programme under the Malé Declaration. In 2007, the Malé Declaration Secretariat based on the request from the RSC4 sent a letter to the LRTAP Convention Secretariat on developing joint activities. LRTAP Convention responded positively. The meeting appreciated the positive response and requested the Malé Declaration Secretariat to develop joint projects in collaboration with the LRTAP Secretariat.

47. Mr. M. Iyngararasan of UNEP delivered a presentation on UNEP Partnership for Clean Fuels and Vehicles (PCFV) on behalf of PCFV Secretariat. Detailed presentation is given in the document "Malé Declaration/RSC 5/ 4/3".

- The PCFV promote unleaded and low sulphur fuels. Activities include technical support, and networking. Pakistan and Bangladesh expressed their interest to participate in the activities of PCFV.

VII. CONCLUSION OF SESSION

48. The Fifth Regional Stakeholders cum Coordination meeting ended with concluding remark from Mr. Rajamani, Regional Facilitator. During his concluding remarks, Mr. Rajamani expressed the appreciation, on behalf of the entire delegates, to the Central Environment Authority and the Ministry of Environment and Natural Resources for the hospitality and excellent arrangement, which made the meeting a success. He mentioned that we have understood what is happening based on years of efforts in the Malé Declaration. He thanked the excellent participation of all the countries and stakeholders.

49. He summarised the progress in each country and appreciated that most of the targets set for Phase III 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 make a 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 Sri Lanka for the hospitality and excellent arrangements.