

The Eighth Session  
of the Intergovernmental Meeting of the Malé Declaration  
on Control and Prevention of Air Pollution and  
Its Likely Transboundary Effects for South Asia;  
13 September 2006

**MALÉ DECLARATION  
ON  
CONTROL AND PREVENTION OF AIR  
POLLUTION AND ITS LIKELY  
TRANSBOUNDARY EFFECTS  
FOR  
SOUTH ASIA**

**Past, Present, and Future**

# 1. BACKGROUND

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## 1.1 Air Pollution

1. Air pollution affects the ‘invisible gaseous substance enveloping the earth, a mixture mainly of oxygen and nitrogen, breathed by all land animals and plants, the earth’s atmosphere’. It injects into this ‘clean air’, which is good for breathing, survival and natural growth, substances that change its quality and make it ‘unclean’. These substances could be varied like oxides of carbon, nitrogen, and sulfur as well as ozone, particles having silica and other material, including toxic or carcinogenic ones, persistent organic pollutants (POPs) etc. Air pollution can come from natural sources like volcanic outbursts, natural fires in forests, coal mines, marsh gases, etc which are rather sporadic events. But there are also manmade sources ranging from the traditional cook stove, burning fuels such as wood, dung, coal etc, to the chimneys of factories and thermal power plants, exhausts of automotive vehicles and emissions from several other sources. The air pollution can be seen and unseen, overt and insidious. In the fog and smoke from stoves and exhausts we can ‘see’ air pollution. But there are sources including these which also emit unseen substances which stealthily enter the lungs, eyes, noses and ears of living beings, soils, waters and even affect manmade structures by erosion.

## 1.2 Transboundary air pollution

2. Air pollution from manmade sources can remain inside the house, in a local area or over several human settlements or industrial or agricultural locations within the bounds of a country. When this is not effectively prevented or controlled, then, the winds and other meteorological phenomena may carry it for long distances. Part of it may dissolve in the rain and fall back on the earth, acidifying soils or water and take the form of ‘acid rain’ which sometimes carries soot and other chemicals with it too. Such transported pollution can enter the bodies of living beings and also get deposited on buildings, structures etc. sometimes with corrosive effect. When the effects of meteorological phenomena do not confine the air pollution to local or national boundaries and carry it to long distance or otherwise, it is called transboundary air pollution. There are a number of “transboundary pollutants including sulphur oxides, nitrogen oxides, ammonia, tropospheric ozone, heavy metals and POP’s. As emissions often give rise to local impacts as well as regional effects after long-range transport, local impacts are considered part of the regional air pollution problem.

## 1.3 Increase in air pollution-major causes

3. The major causes of air pollution are the production of energy by burning fossil fuels, industrial production processes, automotive fuel burn, biomass burning, and domestic sources that result in gaseous emissions, some of them toxic. In almost all cases, the single biggest culprit is the use of fossil fuels like coal, furnace oil, diesel, petroleum etc. As economic growth occurs it bears a high degree of correlation with energy consumption which in turn requires fossil fuels and increases air pollution.

4. The energy production processes in thermal power plants mostly uses fossil fuels and very few use technologies which reduce or minimize the air emissions. In coal, combustion

technologies like fluidized bed combustion can reduce emissions and end of pipe solutions like de-sulphurisation and electrostatic precipitators can reduce pollution but do not have the same effect as energy production by hydro energy or other 'cleaner' technologies like solar or wind energy technologies. In industries too there are ways of reducing or even eliminating air emissions by use of waste recycling and other cleaner technologies and using cleaner fuels.

5. In the automotive sector, air quality is greatly affected by the emissions of oxides of carbon and nitrogen and some other organic pollutants. As the automobiles and aeroplanes and other vehicles increase in number air pollution increases and is also transported. Use of cleaner sources like natural gas, solar radiation and hydrogen can reduce this but the change over to all these fuels is minimal.

6. As mentioned, there are also natural sources of air pollution like volcanic eruptions but these are sporadic. However, forest fires which are mostly manmade can significantly add to air pollution, as happened in the South East Asia in 1997.

#### **1.4 Impacts of air pollution**

7. Air pollution impacts on human health causing respiratory and other diseases in human beings and even animals. Often, it can cause acid rain which affects soils, crops, forests, etc. It affects soils by increasing their acidity and reducing productivity. In turn it affects farming and livestock. Air pollution can enter the waters inland and marine and affect over a longer period the productivity of the ecosystems there and for example reduce fish stocks. Its corrosive and other effects like discolouration on man-made structures, heritage monuments etc., have also been noticed and documented.

#### **1.5 Transport of air pollution**

8. The plumes of gases from the sources mentioned can rise vertically and join other green house gases which can cause warming of the Earth's atmosphere. They can also be transported by winds and rain to other areas and countries either creating a new problem or adding to existing local pollution there. Thus, the sources of air pollution like industries and power plants may have far reaching effects, while apportioning the blame becomes difficult.

9. It is to be noted that there are a number of likely "transboundary" pollutants as mentioned above in 1.2

#### **1.6 European Experience**

10. Historical records show that there were several hundreds of excess deaths each year between 1873 and 1966 in cities like London and New York. Between 1960 and 1979, the pH level of Lake Gardsjon in Sweden declined from the level of 6 to 4.5, thus acidifying the lake and resulting in total loss of fish. Up to 1970, salmon declined in the acidified waters of the southern rivers of Norway. Corrosion impacts on steel touched a peak in 1980 in the Czech Republic. Forests were damaged between 1970 and 1986 in Germany and Central Europe due to acidic deposition, and lakes were facing acidification and eutrophication. Ground level ozone increased affecting crops. As a result of much scientific research across Europe the cities of Europe started tackling the problems of air pollution from 1950 onwards. Policy processes were developed nationally from 1960 onwards to reduce acidification of waters etc.

The UN Conference on Human Environment in Stockholm in 1972 also looked at these issues both from regional and global perspective. This was followed by regional initiatives in Europe from 1983 onwards to reduce emissions. By 2000, sulfur emissions decreased by over 50% and there was lesser decrease for other emissions, more stringent protocols were developed for Europe after 2000 by UN/ECE and EC.

### **1.7 Focus on prevention of air pollution**

11. No introduction on this subject would be complete without a consideration of preventive measures to abate and control air pollution based on experiences learnt and technologies tried out. Such a survey has been well presented in a thematic paper presented by Mr. Surendra Shrestha, regional Director, UNEP-Asia Pacific on the occasion of the 20th Anniversary of the UNEP Sasakawa Environment Prize celebration at Beijing in September 2004 and is reproduced in Annex I (Malé Newsletter Volume 3 no2 page 3 onwards).

## 2. CONCERNS OF SOUTH ASIA

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### 2.1 Background

12. All countries in South Asia started economic progress particularly after the end of colonial rule in the late 1940's. This resulted in increasing consumption of fossil fuels, urbanization and industrialization. All these produced air and water pollution problems for the region. By 1972, when most of the countries participated in the UN Conference on Human Environment in Stockholm, the problems had started peaking. Exposure to the ideas developed in Europe and elsewhere and scientific findings in their own countries made the South Asian countries take notice and start a policy and legislative process for tackling problems like air pollution. By the time they participated in the UN Conference on Environment and Development in 1992 in Rio de Janeiro (the Earth Summit), all these countries had initiated some measures towards waste and emission reduction, but as it came out in that Conference, particularly in the context of the Conventions on Global Climate Change and Biodiversity, the anxiety of the developing countries that their path towards economic progress and elimination of poverty should not be hamstrung by inequitable arrangements to tackle air quality etc, came to the fore. The countries of the South (as they were described) wanted differential treatment based on their stage of economic progress, common but differentiated responsibilities and access to cleaner technologies (which had helped the Northern countries to clean their own environment) on concessional terms and encouragement for capacity building to understand and solve problems that surfaced due to adoption of energy intensive technologies most of which resulted in increased pollution.

### 2.2 Policy dialogue

13. UNEP had taken several initiatives in the 1980s and 90s focusing on problems of Asia as well as South Asia in particular. Its regional office for Asia Pacific at Bangkok and the Regional Resources Centre at AIT Bangkok (earlier UNEP/EAP-AP) were highlighting the State of the Environment in the region and sub-regions and also helping sub regional organizations dealing with environmental problems to start building up capacity to marshal data, use latest technologies, including GIS (Geographical Information Systems), to analyse data and proffer solutions at the national level. UNEP was also working closely with subregional environmental organizations which had come into being, like SACEP (South Asia Cooperative Environment Programme), on such issues. UNEP had concluded by 1997 that air pollution was an emerging issue in Asia. In particular, emissions of sulphur dioxide and nitrogen oxides have been rising steadily over the past few decades. Rapid growth of cities, together with expansion of industry and transport systems, has made the Asian region increasingly concerned with these emissions. Projections indicate that potentially large increases in emissions may occur during the next twenty to fifty years if the current trends persist. If this occurs, the impacts which have been experienced in Europe will become apparent in large parts of Asia. These problems include the reduction in crop yield by direct effects of gases; acidification of forest soils and lakes; impacts on human health; impacts of corrosion on manmade structures, impacts on soil fertility leading to damaging changes in natural ecosystems (e.g. changes in biodiversity); and impacts on forest and crop growth in sensitive soils.

14. In the circumstances, UNEP-Bangkok at AIT (Asian Institute of Technology) initiated a policy dialogue in concert with SEI (the Stockholm Environment Institute which had a track record of working on air pollution related issues) and financial support from the Swedish International Development Cooperation Agency (Sida). On 19 and 20 March 1998, senior government officials of the South Asian region and experts on air pollution met at AIT, Thailand. South Asian countries of Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka participated. Expert organizations from the sub region as well as the region and SEI, Sida and SACEP participated. The presentations in summary highlighted the growing air pollution in the South Asian countries due to expansion of the energy, transportation and industrial sectors of their economies. The projections and modeling exercises of the experts showed that further expansion without preventive strategies to control the effects of air pollution would potentially cause long-term damage to the crops, soils, human health and monuments of South Asia. The presentations covered the European experience as well as the more recent developments in the ASEAN region arising from the forest fires of 1997. It was noted that the environmental group of ASEAN, viz., ASEAN was working on a haze action plan to minimize the severity of the haze caused by the forest fires. The meeting also took note of the possibility of localized and national air pollution also becoming transboundary problems as in Europe and the need to study the phenomena carefully to facilitate prompt subregional cooperative action. In the light of these presentations and discussions, the meeting agreed on a draft declaration to be presented to the Governing Council of SACEP which was to have its seventh meeting at Malé in the Maldives in April 1998.

### **2.3 Regional Haze Action Plan in ASEAN**

15. As mentioned above, the South East Asian experience with fighting the haze created by the forest fires in Indonesia and land practices in the plantations of Malaysia (which subsequently spread to Singapore) was discussed in the abovementioned meeting at AIT Bangkok as it was an example of a transboundary air pollution problem. ASEAN's haze task force had been set up since 1995 when smaller fires had started creating problems. It started focused work after the major 1997 haze episode which impacted on human health in three countries. A regional Haze Action Plan was prepared which prescribed concrete measures to be taken at the regional, sub-regional and national levels to prevent and monitor the haze and mitigate its impact. National haze action plans have also been developed to complement it. It is on the basis of these plans that ASEAN and the member-states concerned have taken action on the haze problem.

16. Subsequently in 2001, The ASEAN states negotiated a legal instrument called the 'ASEAN Agreement on Transboundary Haze Pollution'. The Agreement gives a legal basis for the ongoing activities of the Regional Haze Action Plan.

### **2.4 Decision of the SACEP Governing Council**

17. The draft Declaration finalized in the policy dialogue referred to above was placed before the Governing Council of SACEP in April 1998. Matters were ripe for some consensus on tackling the likely effects of transboundary air pollution in South Asia. Not only were the countries of South Asia perturbed about the growing air pollution problems in their own countries but they had participated in the global negotiations on climate change primarily induced by the green-house gases. Nearer their own area they had witnessed the concern caused in the ASEAN region by the haze resulting from forest fires. Despite their anxieties

about potential capping of their air emissions affecting their economic growth, the countries of South Asia wished to look at local and regional air pollution as separate phenomena demanding their attention. Therefore, the Environment Ministers present in the meeting of the Governing Council of SACEP thought it appropriate to give their seal of approval to the Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia.

### 3. MALÉ DECLARATION

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#### 3.1 Thrust of the Declaration.

18. The text of the Malé Declaration is given in Annex II. The thrust of the Declaration is on the need to study air pollution phenomena, monitor air pollution and its transport, study its impacts and build capacity at the national level to monitor and analyse data.

#### 3.2 Significance of the Declaration

19. Prudence and stimulus for scientific study and capacity building were the key elements of the Declaration **which was the first regional agreement of its kind not only in South Asia but also in the developing world.** The agreement also provided a basis for improving national reporting systems and to continue the process in stages with mutual consultation to draw up and implement national and regional action plans and protocols to abate air pollution based on a fuller understanding of transboundary air pollution issues. There was thus recognition of the scientific uncertainties associated with the process, which had to be studied and monitored in depth based on the creation of capacity where it did not exist, together with recognition of the precautionary principle which encourages timely actions for developing and/or adopting “strategies to prevent and minimize air pollution”.

20. A major outcome of the Declaration was the increased focus given to domestic air pollution (outdoor and indoor) in the member countries. The commissioning of baseline studies dealt with in the next chapter was a significant stimulus to this process.

21. The clause for building up of institutions of policy and technical requirement and keeping the window open for the good offices of regional, and international bilateral and multilateral agencies was a strategic step and has resulted in greater cooperation not only between the countries but also amongst expert institutions in the region and outside, Sida, UNEP, AIT etc. Iran has also joined in the exercise as the eighth Malé Declaration country.



## 4. IMPLEMENTATION

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### 4.1 Phase I: Network, baseline studies and action plans in each country and monitoring mechanism

#### Network and organization

22. The implementation of the Malé Declaration was envisaged to be in phases, keeping in mind the objectives, content and thrust of the Declaration. Phase I started with the establishment of a network of organizations to implement the Declaration. In the countries that adopted the Malé Declaration National Focal Points (NFP's) were identified in each country, and for the detailed follow up, National Implementing Agencies (NIA's) were identified. In most countries the NFP was in the Government itself, in the Secretariat dealing with Environment while NIA's were either pollution control authorities or agencies dealing with implementation of environmental regulation. A list of NFP's and NIA's is given in Annex III.

23. The first session of the intergovernmental meeting was held in February 1999 and adopted the Phase I Implementation Plan. The countries agreed to prepare the baseline studies and also action plans bringing out national priorities in meeting the objectives of the Declaration.

24. The NIA's, in association with experts and institutions, and under the guidance of the NFPs, undertook to produce baseline studies in the first year, involving the compilation of baseline information on air quality monitoring and management in each country.

#### Baseline Studies

25. The baseline studies were based on data collected from different agencies in the countries relating to the structure, modalities, regulations, institutions and capacities available, etc., in addressing the problems of local air pollution which could spin off into transboundary air pollution. Gaps were also identified in the monitoring systems and in capacities to set up the instrumentation necessary for the assembly and analysis of data.

26. The baseline studies covered a spectrum of initiatives and gaps in each country. Some had an established national air quality and meteorological networks and most had a regulatory framework in place, prescribing standards for emissions and ambient air quality. Some had the institutional capacity to measure and control air pollution at the national level while others were in the process of setting it up. Interestingly, the studies became compendia of the state of air pollution in each country and the status of measures for tackling it through preventive and control measures. In many cases the Malé process itself resulted in improvements on existing measures and the taking of new initiatives to tackle local air pollution which could be a source of transboundary air pollution,

#### Action Plans and Dissemination to stakeholders

27. The baseline studies led to the formulation of National Action Plans by NFP's and NIA's indicating the steps to be taken to monitor, build capacity to measure and analyse air quality data. The priority issues were also established. In the second session of the intergovernmental meeting held in March 2000 the Phase I outputs in terms of the studies and national and subregional plans were reviewed and adopted.

28. It was also agreed that national and sub regional stakeholders' meetings would be held to disseminate the results of the implementation of the Malé Declaration. The NIA's were to be guided in the implementation by stakeholders drawn from academia, civil society, industry, youth groups etc. The first such workshop was held at Maldives in April 2000.

#### **4.2 Monitoring Committee**

29. An important finding of the second network meeting was that a mechanism for monitoring transboundary air pollution and building training and capacity was essential. For this purpose the creation of a Monitoring Committee (MoC) comprising experts on air pollution was recommended by the second session of the intergovernmental meeting and came into place with three experts experienced in measuring, monitoring and analyzing both air pollution and meteorological data.

30. The MoC had the backing of the scientific staff of UNEP RRC.AP and SEI in their work. The MoC was mandated to study the national needs and recommend a plan for filling the existing gaps in the monitoring system.

31. By June 2001, before the conclusion of Phase I, the MoC prepared a strategy paper for the Phase II implementation including the criteria for selection of monitoring sites in remote areas near the borders measuring both dry and wet deposition. The MoC also prepared the outline of the technical manual to help in training and capacity building. This manual was based on the East Asia network on Acid Deposition (EANET) manual.

#### **4.3 Phase II**

##### **Capacity Building and the setting up of monitoring stations**

32. The implementation plan for Phase II was to put in place expertise, equipment and information for quantitative measurement and monitoring, analysis and policy recommendations for eventual prevention/control of air pollution.

33. The third session of the intergovernmental meeting was held in June 2001 in Colombo and reviewed with NIA's the strategy for Phase II and also adopted the outline of the technical manual and requested the MoC to develop a fully fledged manual on the basis of the agreed outline. It was also agreed to start the training programmes for building capacity and setting up monitoring stations along the borders identified by the MoC in consultation with the countries. The first regional training programme was conducted at UNEP RRC.AP in May 2002. Benchmark criteria for the location of monitoring stations were drawn up. These details were discussed in the fourth session of the intergovernmental meeting held at Kathmandu in July 2002.

34. National stakeholders' meetings were held in India in September 2002.

35. The first transboundary air pollution monitoring station under the Malé Declaration was set up in Nepal (Rampur, Chitwan district) in March 2003 along with a training programme. During 2003 monitoring stations were set up in all the countries. In Bhutan it was located in Gelephu, in Sri Lanka at Dutuwera and at Hanimaadhu in Maldives, in Bangladesh at Shatkhira district, In India at Canning Town of South Parganas District, West Bengal, in Iran at Chamsari of Ilam Province, in Pakistan, at Bahawalnagar in the Punjab Province.

36. The second regional training workshop was held in India in August 2003, run by the Central Pollution Control Board (CPCB-NIA), soon followed by the fifth session of the intergovernmental network meetings at Dhaka, Bangladesh in October 2003. Country presentations on the setting up of monitoring stations, advisory committees, stakeholders' meetings, pollutants measured, training programmes and capacity building were made. This was followed by presentations by SEI on parallel activities on emission inventories compilation and air pollution modeling. An important development in this network meeting was the development of a vision for Phase III which would comprise: continuation of monitoring beyond Phase II and setting up of additional monitoring stations; introduction of ozone monitoring; training and refresher courses; analysis and impact studies including emission inventories and mitigation options.

37. A stakeholders' meeting for Bangladesh was held after this meeting. The stage was set for entering Phase III through in country training programmes throughout 2003-2004 and the continuation of setting up monitoring stations.

#### **4.3 Phase III**

##### **Review of Phase II and Plans for Phase III**

38. In March 2004 a workshop on rapid urban assessment, health impacts and corrosion was held at New Delhi, India under the RAPIDC (Regional Air Pollution in Developing Countries) Programme with technical inputs from SEI and IVL, Sweden. The member countries of the Malé Declaration participated and discussed various subjects including air pollution in the context of the Malé Declaration, air pollution and impacts on health, epidemiological studies, corrosion studies etc. This paralleled the efforts under the Malé Declaration process whilst also feeding into it.

39. The sixth session of the intergovernmental network meetings was held in Teheran, Iran in October 2004. First a review of Phase II implementation was made. It was noted that all the countries showed their commitment to the long term objectives of the Malé Declaration by their initiatives in setting up monitoring stations. Also, the institutional structure was developed and local capacities in monitoring local and transboundary air pollution had been increased. Phase II had also helped in developing a common methodology, training of technical staff, strengthening of monitoring stations and the establishment of scientific and stakeholder networks.

40. The meeting also adopted the plan of implementation for Phase III. The general objective of Phase III was to continue to promote the scientific base for prevention and control of transboundary air pollution in South Asia and to encourage and facilitate

coordinated interventions of all the stakeholders on transboundary air pollution at the national and regional level. It was also agreed that the focus of Phase III would include: (i) strengthening regional cooperation and Stakeholders' participation under the Malé Declaration; (ii) strengthening capacity building programmes initiated during Phase II; (iii) enhancing the analytical and impact assessment capabilities at the national level through integration of findings from the monitoring stations, local pollution prevention studies and by conducting impact assessment studies; (iv) providing decision support information for prevention; and (v) raising awareness for action through targeted dissemination.

41. The seventh session of the intergovernmental meeting was held in New Delhi, India on 13 October 2005. Countries made a presentation of their plans for Phase III which will be implemented from end November 2005 to August 2008. The progress after the sixth session of the intergovernmental meeting was reviewed along with the data report. The data reports from the air samplers and air concentration analysis graphs for sulphur dioxide and nitrogen oxide was presented by all countries. The graphs showed the trends for varying periods between 2003 and 2004 and it was agreed that more information flow from all countries for continuous periods would be required to draw conclusions. Meanwhile capacity building would continue and initiation of information flow for policy and impact studies would be made during Phase III.

## 5. THE WAY FORWARD

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### 5.1 Data Analysis

42. Phase III is at the mid point when data are now being produced by the monitoring stations and the countries are starting to analyse them. It is expected that the capacities established in each country and the support of UNEP, SEI and Sida will lead to meaningful conclusions on the state of transboundary air pollution in a few years time.

### 5.2 Knowledge network to combat domestic air pollution

43. In the meantime, the countries of South Asia will continue to address the problem of domestic air pollution (both indoor and outdoor), which if prevented and/or controlled can help mitigate transboundary air pollution. Countries already well equipped to study, prevent and control air pollution, as well as others on the way can benefit by exchange of information and ideas through a knowledge network. Such a network can transmit information on various pollutants, measuring devices and methodologies such as fixing of standards, regulatory mechanisms and fiscal incentives and disincentives to reduce air pollution and the use of cleaner technologies both in respect of renewable and non renewable fuels etc. In UNEP's CAN (Collaborative Assessment Network) network meeting in November 2005 in Bangkok, a knowledge network has been agreed upon and this will be a very good vehicle for the Malé Declaration countries to piggy back on to access information and knowledge.

### 5.3 Impacts on health, crops, soils and materials

44. There is need for more studies on the impacts on both human and animal health, soils, crops and materials due to air pollution. Results of available studies have to be translated into action plans for mitigation and prevention. Priority issues to be tackled include childhood asthma caused by air pollution and changes in pH levels in soils and water bodies.

### 5.4 Awareness

45. Greater awareness among those affected by air pollution and the stakeholders is a prime requisite at this stage not only to push through regulatory and other measures to prevent and control air pollution but also to soften its impacts mentioned above. Raising such awareness will have to be a combined effort of the scientific community, policy makers, Governments, NGOs, doctors, industrialists, farmers, students, audio visual and print media and the general public.

### 5.5 Adoption of preventive (or alternate cleaner) technologies

46. Many preventive technologies are now available in South Asian countries, some of them based on the indigenous efforts. Solar, wind, battery power, fuel cells etc., in the area of automotive fuels and energy are already in use and have to be multiplied with a view to phase out fossil fuels. Bio fuels are also a promising area, depending on the resource endowments of the country and competing uses for the land required to grow such fuels. In the interim stage when fossil fuels have to be used, better and optimal combustion technologies which minimize emissions both at source and end of the pipe are a must. The adoption of these technologies would depend not only on regulation and policy measures but also on trend

setting by both producers and consumers. Recycling of waste, use of modes of transport that do not require fossil fuels and so on are not strangers to the populations of South Asia who have traditionally practiced a simple life style and the efforts should be to build upon this ethos by the dissemination of knowledge of more modern but cleaner technologies on affordable terms.

## **5.6 Protocols on transboundary air pollution**

47. Earlier we talked of the European experience where the studies of spreading transboundary air pollution affecting waters, land etc., led to the evolution of protocols in the European Union. We also noted the efforts in ASEAN to tackle the haze problem-a subset of air pollution. South Asia may or may not be fortunate to avoid such problems by digesting and adopting the right strategies to combat air pollution and avoid its transboundary effects. In any case when the results of the studies on air pollution occurrences, their impacts etc., flow in, the time may come for South Asian countries to reflect on the need for soft laws of a sub regional character to take the Malé Declaration a few notches higher up. It would be wise for the stakeholders and policy makers as well as civil society to start debating these issues from now on in this populous region of the world which has much to suffer and even more to offer!

## ANNEX I

### AIR POLLUTION REQUIRES A FOCUS ON PREVENTION

*UNEP Sasakawa Environment Prize was celebrated in Beijing, China during 28 – 30 September 2004. UNEP Regional Director, Mr. Surendra Shrestha presented a thematic paper on air pollution at this ceremony. His presentation is presented here.*

#### I. BACKGROUND

The United Nations Conference on Environment and Development (UNCED), the Rio Summit, held in June 1992 articulated the Agenda 21, a blueprint for action for sustainable development. The World Summit on Sustainable Development (WSSD), held in September 2002 focused on the implementation of this blue print through partnerships to achieve tangible results for sustainable development. The Summit, participated by 104 Heads of State and Government, also set sustainable development as the target for national governments. Society, economy and environment are considered the three pillars of sustainable development.

**Social Development:** World population has more than doubled over the last half century, from 2.5 billion in 1950 to 6.5 in 2004. It is projected that the population will stabilize at 9 billion in the next 50 years. During the past half century, life expectancy has increased throughout the world with advances in public health, vaccines, antibiotics, and food production. There is, however, disparity in these advances and poverty remains the major challenge for the 21st Century. 2.5 billion to 3 billion people now live on less than \$2 a day. Approximately 1 billion people in Asia live in extreme poverty on less than US\$1 a day, which is around 2/3 of the world's poor. The poor are the most vulnerable to environmental changes. For example, between 2 and 3 times as many disaster events were reported in the United States in 1999 as in India or Bangladesh but there were 14 times and 34 times more deaths in India and in Bangladesh, respectively, than in the United States.

**Economic Development:** The global economic output has grown from just under \$7 trillion (in 2001 dollars) of goods and services in 1950 to \$46 trillion in 2000, a gain of nearly sevenfold. Average income per person worldwide nearly tripled during the period from 1950 to 2000, and the same time the population doubled. The global economy is expected to grow at 3.1 percent during the next 15 years. Asia will be the engine of growth with an average growth rate of 6 percent during the next 15 years.

**Environment:** World primary energy consumption increased by 2.9 percent in 2003. The demand for primary energy is expected to double every 28 years; in Asia, demand doubles every 12 years. The demand for energy has increased the pressure on the environment; land, air, water and biodiversity.

#### II. CURRENT SITUATION

The steep development trajectory followed since the industrial revolution has resulted in the release of air pollutants into the atmosphere at a rate beyond nature's capacity to absorb. For example, atmospheric CO<sub>2</sub> levels rose from an estimated 280 ppm at the beginning of the industrial era in 1760 to 373 ppm in 2002. The concentration of CO<sub>2</sub> has increased by 1.3 ppm per year since 1960. Approximately 28.2 billion tons of CO<sub>2</sub> are being released into the atmosphere annually. Based on the average absorption rate of a U.S. commercial forest, around 9.6 billion hectares of forest is required for sequestering the CO<sub>2</sub> annually released. This is 2.5 times the current forest area which is around 3.8 billion hectares. It is estimated that annual SO<sub>2</sub> emission, another major air pollutant, in Asia alone will reach 80 million tons by 2010 or 110 million tons by 2020. UNEP's Global Environment Outlook report shows that

of the 15 cities in the world with the highest levels of particulate matter, 12 are located in Asia. Six of these cities also have the highest levels of SO<sub>2</sub>.

The late 1990s and early 21st century has been marked by increasingly "extreme" weather and climate-related events. Millions of lives around the world are adversely affected by climate-related environmental crises each year. Natural disasters cost the world over \$60 billion in 2003 up from around \$55 billion the year before. Poor air quality in urban areas is related to approximately 0.5 million deaths each year in Asia and contributes to the plight of millions who suffer from asthma, chronic lung and cardiovascular diseases, and lung cancer. India is spending over \$100 billion every year on treatment of diseases caused by air pollution. Cost of air pollution in China is estimated at 7 percent of GDP. These costs are estimated to rise to 13 percent of GDP by 2020. According to the Asian Development Bank (ADB) air pollution is costing Indonesia US\$400 million a year and this could increase tenfold by 2010 in the absence of pollution controls.

Temperature rise caused by global warming has accelerated the natural process of glacier melting to a great extent. For example, with the temperature rising by 10°C, the Alpine glaciers have shrunk by 40 per cent in area and by more than 50 per cent in volume since 1850. In Africa, mapping of Mount Kilimanjaro between 1912 to 2000 shows that its snow cover has shrunk by 82 per cent. It is predicted that by 2015 it will have no snow cover. A recent study by the UNEP (United Nations Environment Programme) and ICIMOD (International Center for Integrated Mountain Development) shows that the Himalayan glaciers are retreating up to 30 meter per annum. Himalayan glaciers are extremely sensitive to global warming. Scientific discoveries within the last decade have revealed that long-range transport of gases and particles in air has led to widely distributed haze layers. Initial impact studies shows that the haze layers will have significant impacts on human health, on crop yield and the water budget, through changes to the seasonal monsoon pattern.

**Urbanization** is another issue coupled with air pollution. In 2000, 47 percent of the world population lived in urban areas and the number is expected to increase to about 60 percent by 2030. The urban transition, coupled with economic growth, will further stimulate the knowledge based economy. The urban sector will receive massive investments over the next 50 years, especially on motorization and infrastructure, which will determine resource and energy consumption patterns for decades.

### III. FUTURE CHALLENGES

**Legal measures:** Since air pollution issues are transboundary in nature, legal frameworks through intergovernmental cooperation could provide effective means of addressing air pollution issues. In Europe, the UNECE Convention on Long-Range Transboundary Air Pollution (LRTAP) was established to address transboundary air pollution, particularly the threat from 'acid rain'. The Convention is recognized as one of the earliest and most effective examples of international collaboration on environmental problems. The most recent example is the 2002 Agreement on Transboundary Haze Pollution of the Association of Southeast Asian Nations (ASEAN), which entered into force in November 2003. The agreement, signed by the 10 member countries of ASEAN, is the first such regional agreement in Asia that binds a group of contiguous states to tackle transboundary haze pollution resulting from land and forest fires. The agreement also has the provision to include other air pollutants in the future.

At the national level, legal measures have been successful in phasing out use of leaded petrol in many countries, the use of polluting two-stroke three-wheelers (e.g. Thailand and Nepal) and shifting public transport to natural gas (New Delhi).

**Technical measures:** A strong focus on prevention is advocated in addressing the mega-issue of air pollution. Intergovernmental initiatives should also be supported by provision of technical measures that national governments could incorporate within their development



process. Wind energy generation capacity has increased six fold from 4800 megawatts in 1995 to 31100 megawatts by the end of 2002. The advancements in fuel cell technology is setting the stage for the evolution of the hydrogen based economy. The fuel cell is more efficient than an internal combustion engine and it is clean, emitting only water vapour. In 2002, Iceland decided to move from fossil fuels to hydrogen by converting its public transport to the hydrogen fuel.

Hybrid cars are commercially available. Toyota alone expects to sell 130,000 Prius hybrids in 2004 which gives double the mileage of a comparable gasoline car and reduces emissions of CO<sub>2</sub> by 50% and CO, HC and NO<sub>x</sub> by 90% below Japanese standards. China and India have announced large investments in hydrogen and fuel cell vehicles.

**Fiscal measures:** one of the major challenges in tackling air pollution issues is the incorporation of cleaner technologies into the development process at an early stage. It could be achieved by making cleaner technologies financially affordable using fiscal measures. The Thai Government, for example, restructured the vehicle tax system in August 2004 to promote energy saving. According to the new system, a 10 percent duty will be reserved for hybrid, electric-powered, and fuel cell vehicles, well under the 30 percent or higher rates generally levied on passenger sedans.

#### IV. CONCLUSIONS

The World's gross domestic product (GDP) will increase fourfold in the next 50 years. The Asian economy is projected to grow two times the world average. Rising income levels, middle class and urbanization coupled with globalization will have a growing impact on the level of motorization and infrastructure developments in Asia. This will have significant impacts on energy use and pollution load into the atmosphere. Unless action (example: a major shift towards renewable) is taken now, the planet will face unpredictable challenges that will increase in intensity over the coming decades.

The linkages and interactions between atmospheric and other environmental issues are complicated. Under the framework of existing regional initiatives, scientific capacities need to be developed to provide a quantitative base on which to base policy decisions in an integrated manner, on a regular basis, at the regional level. Legal, financial and technical interventions can be made from the solid scientific base.

Prevention aspects need to be advocated and incorporated as part of economic and social activities with a focus on the ecosystem and changes in the life style. This should lead to a major shift from a high-consumption society to a sustainable society. Awareness for action among political leadership is key to integration of social, economic and environmental goals.

A Circular economy is being promoted in China, especially in Guiyang City which is a participating city under the China Council for International Cooperation on Environmental Development (CCICED). Guiyang had very severe acid rain in the past and ranked as the most polluted city in the world. After 10 years of efforts, the situation has substantially improved. Japan promotes the concept of 3Rs (Reduce, Reuse and Recycle). The Group of Eight (G8) industrialized countries will launch the 3Rs Initiative to encourage more efficient use of resources and materials. The initiative will be formally launched in 2005 at a ministerial meeting in Japan. These are good examples of sustainable development paths. UNEP has taken a lead role in developing a global ten-year framework of programmes on sustainable consumption and production - one of the key outcomes of the WSSD (World Summit on Sustainable Development). •

## ANNEX II

### **Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia**

Recognizing the potential for increase in air pollution and consequential phenomena due to concentration of pollutant gases, acid rain or acid deposition as well as the impacts on the health of humans and other living organisms in all our countries due to man made and natural causes; and also

Recognizing the potential for increase in transboundary air pollution as a corollary of air pollution in each country; and

Realising that the potential for air pollution increase and its transboundary effects will accumulate in the absence of national measures to abate and prevent such potential; and

Reiterating in this context Principle 21 of the UN declaration on the Human Environment in 1972 which stated that States have, in accordance with the charter of the United Nations and the principle of international laws, the sovereign right to exploit their own resources pursuant to their own environmental policies, and the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction;

Keeping in mind that need for constant study and monitoring of the trends in air pollution with a view to understand the extent of our potential for damage to the environment and health in the member countries and taking consequential measures to strengthen and build capacity for such activities;

Stressing the need for development and economic growth that will help build up the quality of life and incomes of all the people of all the region, in particular the poorer sections of the population, having due regard to the need to have a clean and healthy environment;

Emphasising that air pollution issues have to be analysed and managed in the wider framework of human and sustainable development within each country and within the region; and

Drawing from the experience of co-operation in the region in matters like cultural exchange and also from the experience in other regions like Europe and sub-regions of Asia like ASEAN and East Asia.

We declare that countries of this region will initiate and/or carry forward programmes in each country to

1. Assess and analyse the origin and causes, nature, extent and effects of local and regional air pollution, using the in-house in identified institutions, universities, colleges etc., building up or enhancing capacities in them where required;
2. Develop and/or adopt strategies to prevent and minimise air pollution;
3. Work in co-operation with each other to set up monitoring arrangements beginning with the study of sulphur and nitrogen and volatile organic compounds emissions, concentrations and deposition;
4. Co-operate in building up standardised methodologies to monitor phenomena like acid depositions and analyse their impacts without prejudice to the national activities in such fields;

5. Take up the aforesaid programmes and training programmes which involves the transfer of financial resources and technology and work towards securing incremental assistance from bilateral and multilateral sources;
6. Encourage economic analysis that will help arriving at optimal results;
7. Engage other key stakeholders, for example, industry, academic institutions, NGOs, communities and media etc., in the effort and activities.

We also declare that we shall constantly endeavor to improve national reporting systems and strengthen scientific and academic effort in the understanding and tackling of air pollution issues.

We further declare that we shall continue this process in stages with mutual consultation to draw up and implement national and regional action plans and protocols based on a fuller understanding of transboundary air pollution issues.

We declare that in pursuit of the above, we shall evolve, as appropriate, institutional structures at the national level, including networking, both for the purposes of policy and the technical requirements, and we shall use the good offices of regional, international bilateral and multilateral agencies in this, as appropriate.

**ANNEX III**

**List of National Focal Points (NFP) and National Implementing Agencies (NIA) of Malé Declaration**

<b>Country</b>	<b>National Focal Point (NFP)</b>	<b>National Implementation Agency (NIA)</b>
Bangladesh	Ministry of Environment and Forest, Room# 1309 Building 3 Building #6 Bangladesh Secretariat, Dhaka , Bangladesh	Department of Environment Ministry of Environment and Forest E/16 Agargaon, Sher-e-Bangla Nagar, Dhaka-1207, Bangladesh.
Bhutan	National Environment Commission P.O. Box 466, Thimphu, Bhutan	National Environment Commission P.O. Box 466, Thimphu, Bhutan
India	Ministry of Environment and Forests Paryavaran Bhavan, CGO Complex, Lodi Road New Delhi, 110003, India	Central Pollution Control Board (CPCB), Ministry of Environment & Forests, Parivesh Bhawan, East Arjun Nagar,, Delhi 110032, India
Iran	Department of the Environment, Environmental Research center Pardisan Nature Park, Shahid Hemat Highway, Tehran-Iran, Islamic Republic of Iran	Department of the Environment, Environmental Research center Pardisan Nature Park, Shahid Hemat Highway, Tehran-Iran, Islamic Republic of Iran
Maldives	Ministry of Environment, Energy and Water Huravee Building, Malé Maldives	Ministry of Environment, Energy and Water Huravee Building, Malé Maldives
Nepal	Ministry of Environment Science and Technology Singh Durbar, Kathmandu, Nepal	International Centre for Intergrated Mountain Devrlopment (ICIMOD) P.O. Box 3226, Kathmandu, Nepal
Pakistan	Ministry of Environment, Local Govt. & Rural Development 5/F, Shaheed-I- Millat Secretariat Islamabad, Pakistan	Pakistan Environment Protection Agency, House #311, Main Margala road Sector F-11/3, Islamabad 44000 Pakistan
Sri Lanka	Ministry of Environment & Natural Resources Sampathpaya, No. 82, Rajamalwatta Road, Battaramulla, Sir Lanka	Central Environmental Authority 104, Robert Gunawardana Mawatha Battaramulla , Sri Lanka