



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

Ninth Session of the Intergovernment Meeting

Proposal

for

Phase IV Implementation

October 2007

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Executive Summary

SPECIFIC OBJECTIVES	ACTIVITIES
1. Strengthen Regional Cooperation	1.1 Convene Intergovernmental meeting 1.2 Convene Stakeholder engagement at regional and national levels 1.3 Establishment of a Task Force on the future development of the Malé Declaration. 1.4 Feasibility study on the establishment of specialised regional centres adopted by the IG8 1.5 Establishment of specialized regional centres as decided by IG8
2. Strengthen air pollution monitoring network and conduct regular monitoring	2.1 Air pollution concentration and wet deposition monitoring <ul style="list-style-type: none"> - Improve operation of the established monitoring stations (11) - Establish additional monitoring stations - Revise monitoring guidelines to include standard format for reporting meteorological data 2.2 Quality Assurance /Quality Control (QA/QC) <ul style="list-style-type: none"> - Implement inter-laboratory comparison - Translate standard operating manual and relevant documents in local languages. 2.3 Soil acidification monitoring <ul style="list-style-type: none"> - Develop guidelines - Selection of specialized institutions in each country - Training on risk assessment 2.4 Conduct annual refresher training 2.5 Regional database <ul style="list-style-type: none"> - Monthly update of regional database - Quality control of data in database - Develop annual data reports 2.6 Early warning systems <ul style="list-style-type: none"> - Establish air quality indices for citizen advisory during air pollution episodes

<p>3. Enhance the impact assessment capacity of the national institutions and assess the impacts of air pollution in the participating countries</p>	<p>3.1 National-scale assessment of health and air pollution together with capacity building and training (in-country and central); and implementation of simple epidemiological studies in selected countries</p> <p>3.2 National-scale crop impact assessment together with capacity building training (in-country and Central)</p> <p>3.3 Corrosion impact assessment together with capacity building training (in-country and central)</p> <p>3.4 Conduct rapid urban assessment for selected cities together with capacity building and training</p> <p>3.5 Assessment of indoor air pollution in urban and rural areas</p> <p>3.6 Develop a synthesis assessment using available data and knowledge for policy makers</p>
<p>4. Enhance the capacity of NIAs on emission inventory development and Integrated Assessment Modeling, and compilation of emission inventories</p>	<p>4.1 Emission inventory</p> <ul style="list-style-type: none"> - Improvement of Malé emissions inventory preparation Manual and Workbook. - Improvement of national level emission inventories - Development of methodologies for specific sectors: <ol style="list-style-type: none"> 1. Forest / vegetation fires 2. Road transport 3. Small industries (e.g. brick kilns) 4. Natural emissions (modelling projects on biogenic NMVOCs from vegetation and soil dust uplift) <p>4.2 Integrated Assessment Modeling</p> <ul style="list-style-type: none"> - Further Development of the IIAS. - Build specific skills in hand-picked people in order to build specialist capacity for application in each country and for the whole region. - Further application of the MATCH model in South Asia
<p>5. Assist with air pollution reduction policies and strategies</p>	<p>5.1 Regional Level Activities</p> <ul style="list-style-type: none"> - Conduct a feasibility study on developing a regional framework such as a convention on air pollution in South Asia - Development of a regional framework for air pollution reduction on the basis of the feasibility study results <p>5.2 National Level Activities</p> <ul style="list-style-type: none"> - Development of country-specific technical, fiscal and policy measures for emission reduction

	<ul style="list-style-type: none"> - Develop partnership with stakeholders for emission reduction (national level) - Assist with the implementation of technical, fiscal and policy measures for emission reduction
<p>6. Raise awareness for action through targeted dissemination</p>	<p>6.1 Develop handbook on control and prevention of air pollution</p> <p>6.2 Conduct training cum awareness workshops targeting middle level policy makers</p> <p>6.3 Publication of Malé Declaration newsletter.</p> <p>6.4 Conduct awareness programs such as through a painting competition, debate competitions, poster campaigns, newspaper articles, etc. at the national level</p> <p>6.5 Conduct awareness programmes for youths</p>

PROPOSAL FOR PHASE IV IMPLEMENTATION OF THE MALÉ DECLARATION

1. Introduction

With increasing urbanisation and economic growth, and having a quarter of the world's population, air pollution is an increasing concern in South Asian countries. The chemical transformation of the locally emitted pollutants and their transportation across national borders has made it a concern at the sub-regional and regional level. The main pollutants of concern are sulphur oxides, nitrogen oxides, ozone and particulate matter from fossil fuel combustion, transport and industrial sources. In addition, ammonia emissions from agriculture and volatile organic compounds (VOCs) from industrial and transport sectors add to the cocktail of pollutants. They have potential negative impacts on human health, crop yields, and biodiversity. The nitrogen oxides and VOCs react in the presence of sunlight to give ozone concentrations that harm human health, plants and materials. Sulphur oxides and ozone damage cultural monuments and infrastructure by their corrosive effect. In the long term, the sulphur and nitrogen deposition has the potential to acidify ecosystems.

In 1998, UNEP together with the Stockholm Environment Institute (SEI) drew attention to the possibility of the impacts of transboundary air pollution in South Asia. This initiative led to the adoption of the “Malé Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects for South Asia” by eight participating countries—Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka—at the Seventh Governing Council of South Asia Cooperation Environment Programme (SACEP). The initiative was funded by the Swedish International Development Cooperation Agency, Sida, as part of the Regional Air Pollution in Developing Countries (RAPIDC) programme. It is the only inter-governmental agreement of its kind covering the eight countries involved.

The Malé Declaration's objective is to aid the process of providing a clean environment through clean air. The Declaration calls for regional cooperation to address shared local air quality problems and the increasing threat of transboundary air pollution and its possible impacts. Through a process of mutual consultation, the Declaration also calls for the continuation of this process in phases, to formulate and implement national and regional action plans and protocols based on a fuller understanding of transboundary air pollution issues.

2. Current status

During Phase 1 of the Malé Declaration implementation programme, 1998-2000, a network was established, baseline studies were completed and action plans drawn up. The baseline studies provided valuable information on air pollution management programmes in the participating countries and clearly identified the gaps in the existing monitoring systems to understand transboundary air pollution. Consequently, a capacity building programme was initiated in Phase 2 of the implementation programme which included strengthening the monitoring network and training. National and regional level stakeholders consultations were also held during this phase.

The Phase 3 implementation, 2005 to 2008, continued the capacity building for monitoring initiated during the phase 2. In addition, capacity building for impact assessment and prevention of air pollution were also initiated during the phase 3 implementation, which will end in spring 2008.

In view of this, the Eighth Session of the Intergovernmental meeting of the Malé Declaration held in Bhutan in September 2006 decided that a plan should be developed for the next 3 years of implementation (Phase 4).

In March 2007, National Project Managers of the Malé Declaration met during an Exchange Programme at the Malé Declaration Secretariat in Bangkok. At this meeting the countries developed reports of their progress and also listed the activities required in their countries in the next phase. This, along with the needs of the countries articulated in technical training programmes on human health impact, emission inventory preparation, corrosion of materials, crop impact, has formed the basis of the preparation of the proposal for Phase 4 of the implementation programme of the Malé Declaration.

Assessment is to continue to promote the establishment of a 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 national and regional levels.

3. Proposal for phase IV

Building on the capacity developed thus far, phase 4 will focus on assisting the member countries of the Malé Declaration in the reduction of air pollutants. Phase 4 will continue to assist the member countries in: enhancing regional cooperation, monitoring, impact assessment, strengthening the initiatives started in the first three phases and to initiate new ones. The objectives include:

- 1 Strengthen Regional Cooperation and move towards developing a regional agreement;
- 2 Strengthen the air pollution monitoring network and conduct regular monitoring of high quality;
- 3 Enhance the impact assessment capacity of the national institutions and assess the impacts of air pollution in the participating countries;
- 4 Enhance the capacity of NIAs regarding emission inventory development, atmospheric transfer of pollutants and Integrated Assessment Modeling.;
- 5 Assist the member countries of the Malé Declaration with air pollution reduction policies
- 6 Raise awareness for action through targeted dissemination

The main activities to be carried out during Phase IV and the institutional mechanism to implement the activities are described in the rest of the document.

Objective 1 Strengthen Regional Cooperation

Activity 1.1 Convene Intergovernmental meeting

Aim: The progress of Malé Declaration has been governed and reviewed by an annual Intergovernmental network meeting every year, since the adoption of the declaration in 1998. The network meeting is the main body responsible for adopting the work programme, reviewing the progress in implementation of the Malé Declaration and reviewing the scientific information generated. It is proposed to continue this activity annually and use this forum to start the debate on the potential for formal agreements between the Malé Declaration countries.

Process:

- a. Develop annual work plan, progress and other relevant documents
- b. Organise an annual 1 day Intergovernmental meeting, for the next three years. The venue for each year will be decided in consultation with the participating countries.

Deliverables:

- a. Report of the 3 Intergovernmental meetings.

Activity 1.2 Convene Stakeholder meetings

Aim: The Malé Declaration needs to reach out to, and involve in its activities, various important stakeholders at the regional and national levels. These include NGOs, academia, various ministries and government institutions (beyond environment ministries), research institutes, the media, special interest organisations and the private sector. Stakeholders are being engaged through discussion about the Malé Declaration and the air pollution problems it deals with, at national and regional stakeholder meetings. It is proposed to organise national level stakeholders meetings in all the participating countries and 3 annual regional level stakeholders cum coordination meetings be held over the next 3 years.

Process:

- a) Organise an annual 1 day Regional Stakeholders meeting, back to back with the proposed Intergovernmental meetings, for the next three years and .
- b) Organise 1 day National Stakeholders meeting in three of the participating countries.

Deliverables:

- a) Report of the 3 Regional Stakeholders meeting.
- b) Report of the 3 National Stakeholders meeting
- c) Reports from other stakeholder engagement

Activity 1.3 Establishment of Task Force on future development of the Malé Declaration

Aim: A Task Force is proposed, to plan the future of the Malé Declaration. The Task force will consist of representatives from National Focal Points and National Implementing agencies. It

should be adequately represented by relevant actors at the sub-regional level, including SAARC, SACEP and should have links with the SAARC Working Group on Environment. Organisations external to the region will be asked to provide expertise and asked to join as appropriate.

Process:

- a. Development of ToR for the Task Force
- b. Secretariat will communicate to the National Focal Points, National Implementing Agencies on the ToR
- c. Nomination of Task Force members by National Focal Points and National Implementing Agencies

Deliverables:

- a. ToR for the Task Force on the future development of the Malé Declaration
- b. A list of Task Force members

Activity 1.4 Feasibility study on the establishment of specialized regional technical centres as adopted by the IG8

Aim: During the IG8, establishment of specialised technical centres was proposed for implementing the Malé Declaration. A feasibility study of the establishment of specialised regional technical centres is being proposed, through the proposed Task Force on future development of the Malé Declaration.

Process:

- a. With the help of the NFP's and NIA's and technical advisers, compile a TOR for each specialist centre and on the basis of this prepare a list of relevant institutions capable of functioning as the regional centres.
- b. Visit the potential institutions to study the existing capacities
- c. Develop feasibility report on the establishment of new technical centres. The feasibility study will finalise the appropriate focus of the different specialist centres, develop terms of reference and identify the organisations that could coordinate the relevant technical development.
- d. Convene 5 meetings of the task force
- e. Submission of the feasibility report for consideration by the IG

Deliverables:

- a. Feasibility report on the establishment of technical centres including the ToR, and list of institutions to host the regional centres
- b. Report of the capabilities of interested institutions matched to the needs of the Malé Declaration, including the results of site visits
- c. Reports of the task force meetings

Activity 1.5 Establishment of specialized regional technical centres, as decided by IG8

Aim: Specialized regional technical centres are proposed to be established, as recommended by IG 8, as part of a new institutional structure for implementing the Malé Declaration. These include centres specialising in: monitoring of dry deposition, monitoring of wet deposition; soil impacts; vegetation impacts; corrosion impacts; health impacts; emission inventory and modelling, pollution reduction policies and strategies.

Process:

- a. NIAs will communicate to the identified technical institutions in their country based on the decisions of the intergovernmental meeting.
- b. Development of standard operating procedure for the regional centers
- c. Developments of proposals by the designated institutions to host the regional centers
- d. Assist the regional centers in resource mobilization and capacity building

Deliverables:

- a) Standard operating procedure for the regional centers
- c) Proposed implementation arrangements for the activities of the regional centers .
- d) Capacity building undertaken with the chosen centres.

Objective 2 Strengthen air pollution monitoring network and conduct regular monitoring

Strengthening the monitoring capacities based on common methodologies and protocols established during Phase 2 and Phase 3 at the national level will be one of the major tasks for Phase 4 implementation of the Malé Declaration. The stations are operating and require further consolidation and capacity building to ensure that the monitoring is of high quality. The current monitoring network under the Malé Declaration is capable of monitoring air quality as well as rainwater. Air quality measurements include concentrations of respirable suspended particulate matter (RSPM) or PM₁₀ (particulate matter having a diameter <10µm), total suspended particulate matter (TSPM), sulphur dioxide (SO₂) and nitrogen dioxide (NO₂). Rainwater analysis includes pH and electrical conductivity (EC). Some laboratories are also capable of analyzing the concentrations of anions (e.g., NO₃⁻ and SO₄²⁻) and cations (e.g. Ca²⁺, Mg²⁺, K⁺ and Na⁺).

Activity 2.1 Air concentration and wet deposition monitoring

2.1.1 Operation of the 11 established monitoring stations

Aim: The current monitoring network includes 11 monitoring stations. Enabling the continuous operation and maintenance of these stations during Phase IV, is proposed. Newly recruited staff at the monitoring stations needs to be given training in the fundamentals. Adequate attention to such personnel would not be practical during the regular annual training and refresher courses. It is proposed to initiate training programmes exclusively for such newly recruited technicians, during Phase 4. Site visits and onsite trainings will also be organised as part of the operation of existing monitoring stations.

Process:

- a. Continue operation of the monitoring stations by the NIAs
- b. Facilitate delivery of spare parts, as required.
- c. Conduct site audits of all the stations.
- d. Conduct basic training for newly recruited technical staff

Deliverables:

- a. Spare parts delivered to the NIA's or monitoring stations, as required.
- b. Monitoring data of each station
- c. Reports of site audits.
- d. Report of training programmes

2.1.2 Establish additional monitoring stations

Aim: In Phase 4, it is proposed to increase the coverage of the monitoring area by introducing 3 new monitoring sites for monitoring air concentration and rainwater:

Process:

- a. Selection of site by the NIA's, in consultation with the Secretariat and MoC.

- b. Construction of monitoring station and arranging utilities.
- c. Ordering of equipments and spare parts.
- d. Installing and commissioning the equipments.

Deliverables:

- a. Report of site selection
- b. Report of the commissioning of the 3 monitoring stations

2.1.2 Revise monitoring guidelines

Aim: With the development of national level capacity, a review of monitoring methodology is required. Hence, it is proposed that during Phase 4, the monitoring guidelines be revised to suit the current level of expertise. Revised guidelines will also include a standard format for reporting meteorological data.

Process:

- a. Consultation during the annual refresher training on the need for updating the guidelines
- b. Prepare draft guidelines including format for reporting meteorological data
- c. Consult all NIA's on the suitability of the revised guidelines.
- d. Revise the monitoring guidelines, with the approved format for reporting meteorological data.

Deliverables:

- a. Revised version of the monitoring guidelines, with the approved format for reporting meteorological data

Activity 2.2 Quality Assurance /Quality Control (QA/QC)

2.2.1 Implement inter-laboratory comparison

Aim: It is proposed that the inter-laboratory comparison started in Phase 3, be continued annually during Phase 4, for ensuring data quality. Inter-laboratory comparison will be conducted for wet deposition analysis as per the inter-laboratory comparison protocol developed during phase 3.

Process:

- a. Prepare blind samples by the reference laboratory
- b. Send the blind samples to laboratories at NIAs
- c. Analysis of blind samples by NIAs
- d. Analysis of results
- e. Preparation of inter-laboratory comparison reports including the recommendations for further improvement of laboratory analysis at each of the NIA laboratories

Deliverables:

- a. Three annual Reports of the inter laboratory comparison.

2.2.2 Translate standard operating manual and relevant documents into local languages.

Aim: During Phase 4, it is proposed that the standard operating manual and relevant documents be translated into local languages.

Process:

- a. Translate the manual and other relevant documents.
- b. Convene review meeting at the national level
- c. Finalization of standard operating manual in local language

Deliverables:

- a. Standard operating manual and relevant documents in one local language.

Activity 2.3 Soil acidification assessment and monitoring

2.3.1 Develop guidelines

Aim: On the basis of the risk assessment, the monitoring of soil acidification may be considered desirable in potential risk areas. It is proposed that a guideline for the monitoring of soil acidification be prepared.

Process:

- a) Prepare the draft guidelines for monitoring
- b) Consult the NIA's, on the draft guidelines
- c) Finalise the guidelines

Deliverables:

- a) Guideline for the monitoring of soil acidification

2.3.2 Assessment of acidification risks by specialized institutions in each country

Aim: To assess the risk of acidification in each country using the manuals developed under 2.3.1. National level expert institutions will be trained in risk assessment techniques and those interested will develop risk maps for current and projected acidifying deposition.

Process:

- a. Select an institution in each country, with capabilities to monitor and assess soil acidification who will undertake this risk assessment
- b. Conduct risk assessment at the national level

Deliverables:

- a. A list of expert institutions for conducting risk assessment in each of the countries
- b. Risk assessments for countries keen to implement them

Activity 2.4 Annual Refresher Training

Aim: It is proposed to continue to conduct the annual regional training and refresher courses on monitoring transboundary air pollution, during Phase 4.

Process:

- a. Develop programmes for the refresher training
- b. Conduct of the annual training and refresher course.

Deliverables:

- a. Reports of the annual training and refresher course

Activity 2.5 Regional monitoring database

2.5.1 Monthly update of regional database

Aim: The data from the monitoring stations are being compiled by the Secretariat at the regional level in a regional database. It is proposed that this activity be continued during Phase 4. Quality control of the regional database is important and will be routinely undertaken in Phase IV.

Process:

- a. Verification of data by the national advisory group
- b. Transfer of data to Secretariat
- c. Quality Control of the data by MoC
- d. Update the regional database.

Deliverables:

- a. Updated regional database
- b. Report on the database

2.5.2 Develop annual data reports

Aim: An annual data report is being prepared for each monitoring station. The data report analyses the trends of the monitored parameters, the comparison between the monitored and modelled data and also comments on data quality. It is proposed that this activity be continued during Phase 4.

Process:

- a. Preparation of the data report for each year, including issues related to data quality and add an assessment relating to trends in the pollution data and the comparison to atmospheric modelling and trajectory analysis.
- b. Discussion on the draft data report at the annual refresher training
- c. Finalization of the data report
- d. Submission of the data report to the intergovernmental meeting

Deliverables:

- a. Data report and assessment for each year

Activity 2.6 Early warning systems and air pollution index development

Aim: To develop a common air quality index for the region based upon existing indices in the region and elsewhere and link this to public service advisories for vulnerable groups during episodes of poor air quality.

Process:

- a. Develop air pollution index based upon experience and practice in Malé countries and internationally. Consider how early warning systems can be developed without the need for detailed modelling.
- b. Consultation during the annual refresher training
- c. Finalization of the system
- d. Submit to the intergovernmental meeting for formal approval

Deliverables:

- a. Air Quality Index linked to citizens advisories during episodes of poor air quality and an approach for early warning.

Objective 3: Enhance the impact assessment capacity of the national institutions and assess the impacts of air pollution in the participating countries

Local and transboundary air pollution and their impacts need to be studied based on the monitoring data, modelling and impact assessment approaches. The tools and methodologies developed during the Phase 3 implementation of the Malé Declaration will be useful in this process, after being adapted for South Asian conditions and the needs of the implementation of Malé Declaration. Specific activities to accomplish this task include:

Activity 3.1: Health impact assessment together with capacity building training

Aim: Health Impact assessment activities have been initiated during Phase 3. By the end of Phase 3, two regional training programmes on health impact assessment would have been conducted. It is proposed that during Phase 4, health impact assessment studies be conducted in some countries and the simple epidemiology study undertaken in Bangladesh be expanded to other countries. It is also proposed to continue with the annual regional level training programme on health impact assessment. In addition, a national-level training programme on health impact assessment is proposed to be conducted in 3 countries during Phase 4.

Process:

- a. Conduct health impact assessment studies in each country to estimate the burden of disease caused by air pollution
- b. Conduct regional workshop on health impact assessment
- c. Conduct one national level workshop on health impact assessments, in 3 countries
- d. Undertake epidemiological studies on the impact of particulate pollution on asthmatic children in two cities .

Deliverables:

- a. Report of the health impact assessment study
- b. Reports of the regional workshop on health impact assessment
- c. Reports of the national level workshop on health impact assessment
- d. Reports of the epidemiological studies in two countries

Activity 3.2 Crop impact assessment together with capacity building training

Aim: Considerable risk to crop yield in the Malé region has been suggested in activities undertaken in Phase III. It is proposed that during Phase 4, crop impact studies, continuing to use both modelling and experimental approaches be conducted in all Malé countries. The modelling risk assessment studies will have a country specific focus, using national level agricultural distribution, production and management regime statistics. This will improve the accuracy with which the “hot spots” can be identified. The results from these modelling studies would use methods developed to provide an indication of the emissions (by sector and location) that are likely to be contributing to the ozone levels resulting in the greatest crop yield losses.

Process:

The experimental approaches and the modelling based risk assessment will evaluate and demonstrate the absolute magnitude of crop yield losses. For the experimental work, it is proposed to put the main focus on chemical-protectant studies, in addition to the bio-monitoring studies. Ideally, screening experiments would be conducted at select sites in Asia to develop EDU protocols for additional crops and cultivars (these are required to identify the quantity of EDU that needs to be applied which is specific to different crops and cultivars).

- a. Conduct modelling and experimental crop impact assessment studies in each country
- b. Conduct regional workshop on crop impact assessment methods
- c. Conduct one national level workshop on crop impact assessment methods, in 3 countries

Deliverables:

- a) Reports of the crop impact assessment studies in each country
- b) Reports of the regional workshop on crop impact assessment
- c) Reports of the 3 national level workshops on crop impact assessment

Activity 3.3 Corrosion impact assessment together with capacity building training

Aim: Corrosion Impact studies have been initiated in several countries during Phase 3 showing enhanced corrosion in polluted parts of the region. A regional training programme on corrosion impact assessment has also been conducted. It is proposed that during Phase 4, corrosion impact studies be conducted in all the countries, with further corrosion racks being placed in key locations. It is also proposed to continue with the annual regional level training programme on corrosion impact assessment. In addition, a national level training programme on corrosion impact assessment is proposed to be conducted in 3 countries during Phase 4. This will include stock at risk and economic assessments related to corrosion damage.

Lead organisation: UNEP RRC.AP

Process:

- a. Conduct corrosion impact assessment studies in each country, including exposure of sample racks in further locations
- b. Conduct regional workshop on corrosion impact assessment
- c. Conduct national level workshop in 3 countries

Deliverables:

- a. Reports of the corrosion impact assessment studies in each country
- b. Reports of the regional workshop on corrosion impact assessment
- c. Reports of the national level workshops on corrosion impact assessment

Activity 3.4 Conduct rapid urban assessment for selected cities together with capacity building training

Aim: A rapid urban assessment was initiated in Kathmandu during Phase 3 and this will be followed up in Phase 4. A national level training programme on rapid urban assessment has also been conducted in Nepal. It is proposed that during Phase 4, rapid urban assessment be conducted in additional cities which will form a ‘Malé Declaration City Assessment’ activity. It is also proposed to continue with a national level training programme on rapid urban assessment, in conjunction with the city level rapid urban assessment. The methods will be modified according to the level of technical competence in each city and the SimAir model will form an important tool, amongst others, in developing a more rapid assessment of the environmental degradation in the city.

Process:

- a. Conduct Rapid urban assessment studies in select cities
- b. Conduct national level workshops on rapid urban assessment, along with the city level assessment.
- c. Conduct regional level training programme

Deliverables:

- a. Reports of the city level rapid urban assessment studies
- b. Reports of the national level workshops on rapid urban assessment
- c. Reports of regional level training

Activity 3.5 Assessment of indoor air pollution in urban and rural areas

Aim: Indoor air pollution is a major concern in South Asia, but very little data is available on it. It is proposed that studies be conducted on indoor air pollution in selected cities and rural areas, during Phase 4. These would focus on first compiling available information from the region and internationally on the issue and make a synthesis available to the NIAs, using the results from the Partnership for Clean Indoor Air, WHO and other activities in the region. Secondly the extent of the problem needs to be assessed. A classification of the different situations concerning house type, fuel burnt and technology used in each country giving rise to different levels of indoor air pollution in each country will need to be undertaken. This can then be linked to census data to better estimate the scale of the problem. Further, monitoring of the particulate matter (e.g. using DUSTRACKS) in the different house/fuel/technology categories can be undertaken to determine the average concentrations. Questionnaires filled by the relevant households can start to determine the different health impacts associated with different levels of PM concentration and noxious gases, also considering confounding variables. This can then augment the health risk assessment in each country. Although some of this work has been carried out in the region, there has never been a concerted, coordinated effort to assess this problem by the governments of the region using a common approach. The assessment can also take note of the failures and successes of policies attempted in the region to address the problem and propose actions that can be taken forward.

Process:

- a. Compile and synthesise available information on indoor air pollution and policies to address it.
- b. Conduct indoor air pollution study in urban and rural areas by categorising the different types of housing, use of solid fuel and technology found in a country and assess i. the extent

of the different categories existing in each country and ii. the typical pollution load represented by that combination through limited monitoring campaigns. Health outcomes of the different situations can be assessed using questionnaires.

- c. Assess best practice and policies to alleviate indoor air pollution.

Deliverables:

- a. A synthesis report of the current knowledge on indoor air pollution
- b. Reports of the indoor air pollution studies in urban and rural areas of each country
- c. Assessment report of possible policy options that could meet with success based upon previous experience

Activity 3.6 Conduct an assessment of available data and knowledge and develop an assessment report for policy makers

Aim: A considerable amount of emission, monitoring, impact and policy data and information is being generated from the implementation of the Malé Declaration and other institutes in the Malé region. The data and knowledge generated is useful for policy making if provided in an appropriate form, and when assessed and interpreted appropriately. It is proposed that the data be used to develop an assessment report during phase 4. This would also need consultation with the decision makers to ensure that the information generated is the most relevant for their decision making.

Process:

- a. Preparation of Terms of Reference for the preparation of the assessment report
- b. Preparation of the draft assessment report
- c. Consultation with the working group on future development
- d. Incorporation of inputs from the working group
- e. Submission to the intergovernmental meeting for consideration

Deliverables:

- a. Published assessment report

Objective 4: Enhance the capacity of NIAs on emission inventory development and Integrated Assessment Modeling, and compilation of emission inventories

Activity 4.1 Emission inventory

4.1.1 *Improvement of Malé emissions inventory preparation Manual and Workbook.*

Aim: An emission inventory preparation Manual and Workbook was prepared during Phase 3. Participants have been trained in it and the countries have started preparing the emission inventory for their countries. There are several areas that require improvement in the Manual and the Workbook, so as to make it more suitable for the conditions in the participating countries, to insert aspects such as spatial distribution of emissions and temporal distribution of emissions. It is proposed that the Manual and Workbook be improved during phase 4, in consultation with the participating countries.

Process:

- a. Circulation of the existing Manual and Workbook, together with proposed improvements for comments.
- b. Revision of the Manual and Workbook

Deliverables:

Revised Manual and Workbook

4.1.2 *Compilation of national level emission inventories*

Aim: During Phase 3, training was conducted in the preparation of emission inventories and the countries have started compiling national level emission inventories for the year 2000. This is the beginning of what needs to be a process of continuous improvement which can be based around training meetings, regular contact between meetings and site visits. It is proposed that the national level emission inventory preparation be continued during Phase 4, with the inventories being updated for the year 2005.

Process:

- a. Conduct training on the compilation of emission inventories
- b. Continuous improvement of the national level emission inventories initiated in Phase 3; training workshops and site visits.

Deliverables:

- a. National level emission inventories;
- b. Training workshop reports.

4.1.3 *Development of methodologies for specific sectors:*

Aim: Certain sectors/emission sources that are relevant for South Asia, are yet to be comprehensively included in the emission inventory preparation Manual and Workbook that was prepared during Phase 3. These include: forest / vegetation fires; road transport; small industries (e.g. brick kilns); and natural emissions (e.g., biogenic NMVOCs from vegetation or soil dust uplift). It is proposed that

during Phase 4, methodologies be prepared to more fully account for the emissions from these sectors/sources and the emission inventory Manual and Workbook be revised accordingly.

Process:

- a. Preparation of draft methodologies to account for the emissions from the above mentioned sectors/sources
- b. Consultation with the NIA's on the draft methodologies
- c. Finalisation of the methodologies
- d. Revision of the emission inventory Manual and Workbook, after including the finalised methodologies

Deliverables:

- a. Methodologies for emission inventory preparation from: forest / vegetation fires; road transport; small industries (e.g. brick kilns); and natural emissions (e.g., biogenic NMVOCs from vegetation or soil dust uplift).
- b. Revised emission inventory Manual and Workbook, with the methodologies for the above mentioned sectors/emission sources included

Activity 4.2 Integrated Assessments and Atmospheric Transport Modeling

Aim: Integrated assessment and atmospheric Transport Modeling are specialised areas of activity requiring capacity building. It is proposed that during Phase 4, an annual regional level training in modelling be conducted for appropriate personnel from each country. It is also proposed that one among the trained personnel undergo a 3 month attachment programme with the Secretariat, where he/she will help in the development of the Integrated Information and Assessment Model (IIAS).

Process:

- a. Conduct of the annual regional level training programme on integrated assessment and modelling
- b. Conduct of attachment programme for the development of IIAS
- c. development of user manual for IIAS
- d. dissemination of IIAS for the NIAs

Deliverables:

- a. Report of the annual regional level training programme on integrated assessment and modelling
- b. Report of attachment programme
- c. IIAS together with the user manual

Objective 5: Assist with air pollution reduction policies and strategies

Activity 5.1 Regional level activities

5.1.1 Conduct a feasibility study on developing a regional framework such as a convention on air pollution in South Asia

Aim: As the implementation of the Malé Declaration progresses, greater involvement of the participating countries is required. A regional framework such as a convention on air pollution in South Asia could be a logical step forward towards this end. It is proposed that a feasibility study be conducted during Phase 4, for a convention on air pollution in South Asia. The study is proposed to be conducted by the proposed Task Force on future development of the Malé Declaration.

Process:

- a. Conduct a feasibility study of the proposed convention on air pollution in South Asia
- b. Convene meetings of the task force
- c. Submission of the feasibility study for consideration by the IG

Deliverables:

- a. Report on the feasibility of the proposed convention on air pollution in South Asia

5.1.2 Development of a regional framework for air pollution reduction

Aim: Air pollution reduction measures across the participating countries will be successful only if proper cooperation and better understanding exists among the countries. Towards this end, it is proposed that during Phase 4, a regional framework for air pollution reduction measures be developed and presented for adoption by the participating countries. It is proposed that the regional framework be developed by the proposed Task Force on the future development of the Malé Declaration based on the feasibility study.

Process:

- a. The proposed Task Force on air pollution reduction policies and strategies develops a draft regional framework for air pollution reduction measures.
- b. Consultations with the participating countries on the draft regional framework for air pollution reduction measures
- c. Revision of the draft regional framework for air pollution reduction measures, based on comments from the countries
- d. Discussion of the draft regional framework at IG meeting

Deliverables:

- a. draft regional framework on air pollution reduction measures
- b. final version of regional framework on air pollution reduction measures

Activity 5.2 National level activities

5.2.1 Development of country specific measures for emission reduction

Aim: It is proposed that during Phase 4, a report be prepared to elaborate country specific measures for air pollution reduction, based upon the progress in Phase 3.

Process:

- a. Development of ToR for the preparation of national level report on measures for air pollution reduction
- b. Consideration of the ToR by the IG meeting
- c. Conduct of study and preparation of report on measures for air pollution reduction for each country

Deliverables:

- a. Report on measures for air pollution reduction for each country

5.2.2 Develop partnership with stakeholders for emission reduction at the national level

Aim: Emission reductions can be realised only when all the different actors are brought together. During Phase 4, it is proposed to develop partnership with relevant stakeholders such as private sector, who could invest in implementation of emission reduction measures.

Process:

- a. Identify the areas for collaboration and relevant stakeholders
- b. Establishment of partnership agreements between government and stakeholders

Deliverables:

- a. Partnership agreement between government and stakeholders in one country

5.2.3 Assist with the implementation of measures for emission reduction

Aim: It is proposed that during Phase 4, implementation of emission reduction measures be initiated at the national level. This would be based on the priorities identified in the proposed study on country specific measures for emission reduction. Technical training programmes on eco-housing initiated during phase 3 will be continued.

Process:

- a. Feasibility study of the proposed emission reduction measures and identification of measures those are feasible to be implemented
- b. Develop proposal for implementation, with implementation plan
- c. Conduct training programmes on eco-housing for 3 countries

Deliverables:

- a. Report of the feasibility study of the proposed emission reduction measures

- b. Proposal for implementation
- c. Training reports on eco-housing

Objective 6: Raise awareness for action through targeted dissemination

The network under the Malé Declaration should act as a platform to generate knowledge and awareness about shared local problems and transboundary air pollution and its likely impacts amongst various stakeholders—governments, civil society, etc—to arrive at the right mix of policies and programmes to tackle the problem. Specific activities include:

Activity 6.1 Develop handbook on control and prevention of air pollution

Aim: A handbook on control and prevention of air pollution is proposed to be developed during Phase 4. Handbook will be prepared in three modules: (i) module one will provide fundamentals of air pollution and its local and transboundary effects; (ii) module two will provide the negotiation techniques for developing policy tools on air pollution reduction; (iii) module three will cover the technical measures to support the implementation of air pollution policies.

Process:

- a. Development of ToR for the preparation of a handbook on control and prevention of air pollution
- b. Preparation of the handbook on control and prevention of air pollution

Deliverables:

- a. Handbook on control and prevention of air pollution

Activity 6.2 Conduct training cum awareness workshops targeting middle level policy makers

Aim: It is being proposed that during Phase 4, two regional level training cum awareness workshop be conducted for middle level policy makers. This workshop will be conducted based on the handbook developed.

Process:

- a. Development of training programme
- b. Nomination of participants by NFPs and NIAs
- c. Conduct of two regional level training cum awareness workshops for middle level policy makers

Deliverables:

- a. Report of the national level training cum awareness workshops for middle level policy makers

Activity 6.3 Publication of Malé Declaration newsletter

Aim: Biannual newsletter is being published by the Secretariat to disseminate the activities of the Malé Declaration. It is being proposed that during Phase 4, the Malé Declaration newsletter continue being published on a biannual basis.

Process:

- a. Invite NIAs and other institutions participating in the implementation of the Malé Declaration to contribute to the newsletter.
- b. Publication of the Newsletter

Deliverables:

- a. Six issues of the newsletter

Activity 6.4 Conduct awareness programs such as painting competition, debate competitions, poster campaigns, newspaper articles, etc. at the national level

Aim: During Phase 4, it is proposed that national level public awareness campaigns be conducted in two countries, through painting competitions, debate competitions, poster campaigns, newspaper articles, etc. NIAs will identify appropriate institutions to conduct these campaigns at the national level.

Process:

- a. Preparation of national level public awareness materials on air pollution
- b. Conduct of a national level painting competition on the importance of air pollution reduction
- c. Conduct of a national level debate competition on the importance of air pollution reduction
- d. Conduct of a poster campaign on the importance of air pollution reduction
- e. Preparation of newspaper articles on the importance of air pollution reduction

Deliverables:

Following deliverables will be completed for two countries:

- a. Report of the national level painting competition on the importance of air pollution reduction
- b. Report of the national level debate competition on the importance of air pollution reduction
- c. Report of the poster campaign on the importance of air pollution reduction
- d. Copies of newspaper articles on the importance of air pollution reduction

Activity 6.5 Conduct awareness programmes for youths

Aim: South Asian Youth Environmental Network (SAYEN), established in 2002 with the support from UNEP has provided a platform for disseminating the priorities of the Malé Declaration in South Asia. As part of the Phase 3 implementation, SAYEN has developed awareness materials for youths. During Phase 4, a three-year awareness and action programme to be conducted by youth associated with SAYEN for other youth, schools and general community, facilitated through SAYEN NFPs in the respective countries. Three phased programme will include Air Pollution Education (year 1); Air Pollution Action (year 2); and Air Pollution and other linked issues such as Climate Change (year 3).

These awareness and action programmes would be based on the activities suggested in the “Youth for Clean Air” document that was prepared by SAYEN as part of the Phase 3 implementation. Wherever applicable, SAYEN will collaborate with the awareness programmes conducted by NIAs or their designated institutions.

Process:

- a. Development of awareness materials targeting youth
- b. Include Malé Declaration activities as part of the SAYEN annual work plan
- c. Conduct national level awareness workshops on air pollution

Deliverables:

- a. Awareness materials for youths
- b. Reports of the awareness campaigns

4. Implementation arrangement

The implementation of Phase 4 will follow the institutional arrangement of the Malé Declaration, which was adopted at the Eighth Session of the Intergovernmental Meeting.

Project steering

The countries are represented at the Intergovernmental Meeting and this forum has overall responsibility for reviewing and agreeing to the workplan on an annual basis, thus ensuring ownership of the process by the countries involved.

National level implementation

National Implementing Agencies (NIAs) will be responsible for the implementation of the national level activities with the guidance from the National Focal Points and participation of national level technical institutions.

Regional level implementation

At the regional level the Malé Declaration secretariat, which is UNEP RRCAP, as designated by the Malé Declaration countries will manage the project. The Secretariat will be helped in the implementation by SACEP on policy aspects and SEI on technical aspects. Upon mobilization of resources for phase 4, the secretariat will sign a Memorandum of Understanding with NIAs, SACEP, SEI and other technical institutions for the phase IV implementation of the Malé Declaration. Regional level institutions partnering the Secretariat for each of the activities are identified in the following table:

SPECIFIC OBJECTIVES	ACTIVITIES	PARTNER INSTITUTIONS
1. Strengthen Regional Cooperation	1.1 Convene Intergovernmental meeting 1.2 Convene Stakeholder engagement at regional and national levels 1.3 Establishment of a Task Force on the future development of the Malé Declaration. 1.4 Feasibility study on the establishment of specialised regional centres adopted by the IG8 1.5 Establishment of specialized regional centres as decided by IG8	1. SACEP, SAARC
2. Strengthen air pollution monitoring network and conduct regular	2.1 Air pollution concentration and wet deposition monitoring <ul style="list-style-type: none"> - Improve operation of the established monitoring stations (11) - Establish additional monitoring 	2.1 MoC, SEI

<p>monitoring</p>	<p>stations</p> <ul style="list-style-type: none"> - Revise monitoring guidelines to include standard format for reporting meteorological data <p>2.2 Quality Assurance /Quality Control (QA/QC)</p> <ul style="list-style-type: none"> - Implement inter-laboratory comparison - Translate standard operating manual and relevant documents in local languages. <p>2.3 Soil acidification monitoring</p> <ul style="list-style-type: none"> - Develop guidelines - Selection of specialized institutions in each country - Training on risk assessment <p>2.4 Conduct annual refresher training</p> <p>2.5 Regional database</p> <ul style="list-style-type: none"> - Monthly update of regional database - Quality control of data in database - Develop annual data reports <p>2.6 Early warning systems</p> <ul style="list-style-type: none"> - Establish air quality indices for citizen advice during air pollution episodes 	<p>2.2 MoC, SEI, AIT</p> <p>2.3 SEI</p> <p>2.4 MoC, SEI</p> <p>2.5 MoC</p> <p>2.6 SEI</p>
<p>3. Enhance the impact assessment capacity of the national institutions and assesses the impacts of air pollution in the participating countries</p>	<p>3.1 National-scale assessment of health and air pollution together with capacity building and training (in-country and central); and implementation of simple epidemiological studies in selected countries</p> <p>3.2 National-scale crop impact assessment together with capacity building training (in-country and Central)</p> <p>3.4 Corrosion impact assessment together with capacity building training (in-country and Central)</p> <p>3.5 Conduct rapid urban assessment for selected cities together with capacity building and training</p> <p>3.6 Assessment of indoor air pollution in urban and rural areas</p> <p>3.7 Develop a synthesis assessment using</p>	<p>3.1 SEI, Murdoch University and other institutions as required</p> <p>3.2 SEI</p> <p>3.3 KIMAB</p> <p>3.5 SEI, IVL, and other institutions as required</p> <p>3.6 SEI and other institutions are required</p> <p>3.7 SEI</p>

	available data and knowledge for policy makers	
4. Enhance the capacity of NIAs on emission inventory development and Integrated Assessment Modeling, and compilation of emission inventories	<p>4.1 Emission inventory</p> <p>4.2 Integrated Assessment Modeling</p>	<p>4.1 SEI</p> <p>4.2 SMHI, SEI, IIIIE</p>
5. Assist with the air pollution reduction policies and strategies	<p>5.1 Regional Level Activities</p> <ul style="list-style-type: none"> - Conduct a feasibility study on developing a regional framework such as convention on air pollution in South Asia - Development of a regional framework for air pollution reduction on the basis of the feasibility study results <p>5.2 National Level Activities</p> <ul style="list-style-type: none"> - Development of country-specific technical, fiscal and policy measures for emission reduction - Partnership build-up with stakeholders for emission reduction (national level) - Assist with the implementation of technical, fiscal and policy measures for emission reduction 	5. AIT, SACEP, and other technical institutions as required
6. Raise awareness for action through targeted dissemination	<p>6.1 Develop handbook on control and prevention of air pollution</p> <p>6.2 Conduct training cum awareness workshops targeting middle level policy makers</p> <p>6.3 Publication of Malé Declaration newsletter.</p> <p>6.4 Conduct awareness programs such as through a painting competition, debate competitions, poster campaigns, newspaper articles, etc. at the national level</p> <p>6.5 Conduct awareness programmes for youths</p>	<p>6.1 GAPF</p> <p>6.2 GAPF</p> <p>6.3 All the partners</p> <p>6.4 SAYEN</p> <p>6.5 SAYEN</p>