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Regional Air Pollution in Developing Countries (RAPIDC) 1998–2007

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and Economic Cooperation

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Executive Summary

Abstract

RAPIDC is a programme contributing to solving air pollution in South Asia and Southern Africa. Our evaluation of RAPIDC shows that the programme is mainly on schedule and is producing technical results of high quality. It is also contributing significantly to cooperation on and understanding of air pollution problems in South Asia and Southern Africa. RAPIDC has so far been weak on mitigation and policy analysis, and lacks a targeted information strategy to effectively promote policy interventions in the countries. Actions should be taken to reduce these shortcomings for the rest of phase III and an eventual phase IV.

Background

Sida has since 1998 funded the programme Regional Air Pollution in Developing Countries (RAPIDC) in order to contribute to solving air pollution problems in South Asia and Southern Africa. RAPIDC has supported The Malé Declaration on the Control and Prevention of Air Pollution and its Likely Transboundary Effects between Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka, and The Air Pollution Information Network for Africa (APINA) comprising Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe. Also, air pollution networks linking together research efforts in Asia, Africa and internationally on i) Composition of Asian Deposition (CAD), ii) Air Pollution and Crop Effects Network (APCEN), iii) Corrosion Network (CORNET) and iv) Air Pollution in Mega Cities of Asia (APMA) have been supported. Phase I of the programme ran for the years1999–2000, phase II during 2001–May 2005 and phase III from May 2005–April 2008.

Problem Statement

The main purpose of the evaluation is to:

- assess the extent to which the objectives and results of RAPIDC have been achieved in an effective and efficient manner, and
- provide recommendations and lessons learned from programme implementation.

Conclusion and Recommendation

Most activities are expected to be completed early 2008 according to the plan

The administration of RAPIDC, carried out by a Programme Management Committee led by the Stockholm Environment Institute (SEI) has been very efficient, and most activities have been on schedule. For the remaining activities behind schedule, actions have been taken to ensure that they will be completed according to plans by the end of Phase III. However, the finalization of a few activities may still be delayed or finalized in a way not fully in compliance with the requirements of the Project Programme.

RAPIDC has contributed significantly to the understanding of air pollution problems

The programme has come a long way towards mapping the various emission sources and understanding the complex relations between them and their contributions to ambient air concentrations and effects on human health, crops, buildings and cultural heritage etc., especially in South Asia. Technical results of high scientific quality have been produced, which should be important for future policy making. RAPIDC has provided frameworks for cooperation between scientists in South Asia and

Southern Africa, and created important links between civil servants and experts in various fields. This should contribute to local ownership of the results produced.

Thus, it can be concluded that the programme work so far has contributed to the overall objective of *solving air pollution problems in Asia and Africa*. It is also our view that the work has contributed significantly to the part of the programme purpose of *promoting international cooperation and developing scientific information for the policy process.*

The programme is still relatively far from implementing policies to control air pollution

RAPIDC is still relatively far from achieving the part of the programme purpose that says *to facilitate the development of agreements and/or protocols to implement measures which prevent and control air pollution*. In our view the formation of large, comprehensive protocols similar to those in Europe in Asia and Africa, as seems to have been the goal, should not be stressed. Even if there is transboundary pollution in the regions, the damages from this pollution are likely not as significant as in Europe. Thus, one should take the necessary time to understand the transboundary effects properly, and consider carefully what kind of interventions that eventually might yield the largest benefits. In the end, the result may be that cooperation on more limited but important issues like for instance cooperation on reducing sulfur in fuel might be what is needed.

RAPIDC has focused too little on policy implementation and targeted information

In our view too much of RAPIDC has been concentrated on monitoring and related activities. All activities assessing various impacts are in principle supposed to have a component on policy interventions and socio-economic issues, and there are also separate activities on these issues. This is one of the weakest parts of the programme so far, and efforts to strengthen this part should be made for the rest of the programme period. In addition, a well targeted information strategy is lacking and the information activities carried out so far have not been designed to spur actions towards air pollution among the public and important decision makers. These shortcomings are particularly important for Malé Declaration countries, where results are about to be disseminated. Efforts to strengthen this part during the remaining programme period should be made.

An eventual Phase IV should be more focused

A potential Phase IV should be more focused on the issues considered important for policy implementation and emissions control. This could for instance be health impacts and impacts on crops. Co-benefits from CO2 emission reductions should also be considered. Policy analysis and cost benefit analysis of various interventions should be an important part of the project. The role of the networks should be reconsidered, and if maintained they should be targeted towards cross-cutting issues of interest for both Malé Declaration and APINA countries.

Other activities should be phased out unless local or other donor funding is made available. Also, Sida should demand local co-funding, both in-kind and cash, to support a phase IV. This is particularly important for the Malé Declaration countries, which should be able to contribute with substantial funding if they find the activities interesting. In APINA considerable donor funding would most likely still be necessary.

1 Introduction

Sida has since 1992 supported the "Programme for Atmospheric Environment Issues in Developing Countries", implemented by Stockholm Environment Institute (SEI). The Programme was evaluated for the period 1992–97 and the evaluation published in Sida Evaluation 99/18.

Initially climate issues and the protection of the ozone layer were part of the programme. However, from 1998 and onwards, the programme has focused on air pollution and was named Regional Air Pollution in Developing Countries (RAPIDC). The programme is now in its third phase, which is running from May 2005 until April 2008. The purpose of the evaluation is to assess the extent to which the objectives and results of RAPIDC have been achieved in an effective and efficient manner, and to provide recommendations and lessons learned from programme implementation. See ToR in Annex I.

The evaluation has been based on a survey of documents from the project and the various activities, see Reference list. The Programme Proposals and the half-yearly and yearly reports, in particular Annual Report (2007), have been important documents to assess the progress of the programme according to plans. In addition the evaluator has attended the following events:

- Training Workshop on Impacts of Air Pollution on Crops under the Malé Declaration in Dhaka, Bangladesh 15–16 August 2007.
- The 9th session of the Intergovernmental Meeting on Malé Declaration, and the Regional Stakeholders cum regional Coordination Meeting in Malé, the Maldives 2–3 October 2007.
- Training Workshop on Emissions Inventory Preparation in Victoria Falls, Zimbabwe 15–16 October 2007.
- APINA Annual and Planning Meeting 17–19 October 2007 in Victoria Falls, Zimbabwe.

These events provided a glimpse into the practical work of RAPIDC, and enabled contact and interviews with a broad range of project participants and stakeholders which had not otherwise been possible. For an overview of persons interviewed see Annex II

The results of the evaluation are presented in this report. The author of the report is John Magne Skjelvik.

2 Achievements of RAPIDC

2.1 Description of the Programme

The Regional Air Pollution in Developing Countries (RAPIDC) programme has existed since 1998, and is a follow up of the previous Programme for Atmospheric Environment Issues in Developing Countries. The overall objective of RAPIDC is *'to contribute to solving air pollution problems in Asia and Africa'*. The RAPIDC Programme Purpose is *'to facilitate the development of agreements and/or protocols to implement measures which prevent and control air pollution through promoting international cooperation and developing scientific information for the policy process'*. The programme has had three phases: phase I 1998–2000, phase II 2001–2004 and the current phase III for the period May 2005–April 2008.

The RAPIDC programme has supported the following activities (during phase I also some minor activities in Latin America were supported):

The Malè Declaration

The Malé Declaration on the Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia is an intergovernmental agreement to tackle regional air pollution problems, established in 1998 by Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan and Sri Lanka.

APINA

The Air Pollution Information Network for Africa, APINA, was formed in 1997. The main purpose of APINA is *'to fill gaps in knowledge on air pollution issues in southern Africa and ensure that currently available information and concerns are articulated to policy makers and the regional policy processes is promoted'* and form a strong link between the air pollution scientific community and policy makers at national and regional levels. Member countries today are Botswana, Malawi, Mozambique, South Africa, Tanzania, Zambia and Zimbabwe.

Air Pollution networks

The purpose of the networks is to link together research efforts in Asia, Africa and internationally and undertake activities to promote understanding where major gaps in knowledge about air pollution exist, and also aid the development of Malé Declaration and APINA activities. The networks have varied somewhat during the phases of RAPIDC, but the current networks are:

- *Composition of Asian Deposition (CAD),* to promote the scientific understanding of deposition (wet and dry), atmospheric transfer and impacts in Asia through support to a network of monitoring stations.
- *Air Pollution and Crop Effects Network (APCEN),* to develop unified methods and coordinating their use for impacts of air pollution on crops in Asia and Africa.
- *Corrosion Network (CORNET),* to promote an understanding of the impact of air pollution on corrosion of materials under Asian and African conditions.
- *Air Pollution in Mega Cities of Asia (APMA),* to develop and apply strategic frameworks for Urban Air Quality Management with Clean Air Initiative-Asia (CAI-Asia) of the Asian Development Bank and World Bank.

Budget

The budget for the three phases of RAPIDC is shown below

Figure 2.1 RAPIDC budget. Million SEK.

Phase	Year	Budget Asia	Budget Africa	Total budget
I	1999–2000	n.a.	n.a.	17.2
II	2001–April 2005	30.3	4.8	35.1
III	May 2005–April 2008	33.3	13.3	46.6

Source: Sida

2.2 Project Performance and Efficiency

in relation to the indicators, assumptions and risks specified in the LFA and the Project Document in phase I

The two-year Phase I could be seen as a start up phase trying to get an overview of the pollution situation in the regions, what knowledge existed, who was working with these issues, developing scientific networks etc., building on the previous Programme for Atmospheric Environment Issues in Developing Countries. The adoption of the Malé Declaration at the start of the phase lead to some changes in the programme compared to the specifications in the Logical Framework Analysis (LFA) to be able to give sufficient support to this initiative from the start. Also APINA was supported and showed good progress during the phase. The activities in Latin America in connection to the free trade organization

MERCOSUR were for several reasons not fulfilled according to the plan and around half of the initial funding was transferred to other activities in Asia and Africa. Almost all other activities were carried out according to schedule. Below is a review of the various activities carried out during phase I, compared to the plan specified in the LFA matrix, where the results/outputs started on section 5.1.

1. Result 5.1 Improved international co-operation through informing and influencing the policy process

Activity 5.1.5 Asia policy dialogue follow-up

The adoption of the Malé Declaration in April 1998 lead to increased activities under this part of RAPIDC. During phase I a baseline study of air pollution, showing gaps in knowledge and infrastructure, and a national level action plan to implement the Declaration were developed for each member country. Two workshops were held. The quality of the information provided varied according to the experience with air pollution issues in each country. Nevertheless, this activity was very successful and achieved almost more than expected.

Activity 5.1.6 Latin American policy dialogue follow-up

A regional policy dialogue was held early in the phase, resulting in the Cañuelas Declaration agreeing on some basic principles and an action plan to work against air pollution through the free trade agreement MERCOSUR. However, due to some personal problems suffered by the person in charge of the work this initiative was not followed up properly. Also, it seems in our view to have been lack of commitment in the countries to follow up this work, which was more or less terminated at the end of phase I.

Activity 5.1.7 Southern Africa policy dialogue follow-up

A policy dialogue held in 1998 under the auspices of the Southern African Development Community (SADC) successfully initiated discussions on the problem of regional transboundary air pollution in Africa, and was attended by policy makers from various national ministries. The output was the "Harare Resolution on the Prevention and Control of Regional Air Pollution in Southern Africa and its Likely Transboundary Effects". A lot of follow-up activities in the form of data compilation, networking etc. were done as a follow up of this resolution, and the preparation of the ground for an Environmental Charter in the region was started.

2. Result 5.2 Increased information flow and higher awareness in developing country expert community

Activity 5.2.1 Increased research activity in the regions

A series of initial methods that can be used in developing countries to promote investigations into risks posed to human health, crops, forests and natural vegetation and to man-made monuments and materials were produced. The methods involved mapping techniques, dose-response relationships for health, corrosion and crop impacts, as well as air quality guidelines and critical loads and levels, indicating thresholds for damage. The so called MATCH-model, developed in Sweden to model atmospheric transportation of pollution, was presented and used widely in Asia to model nitrogen and sulfur transportation. However, it became apparent that it was too early to use the model for such calculations in the region because of lack of data. Most activities were fulfilled according to LFA, but some workshops etc. were delayed. The LFA also contained some 'reserve projects' that were not carried out in this phase.

Activity 5.2.2 Enhanced knowledge base for increased information flow and higher awareness in the expert community.

The activities included studies summarizing knowledge on human health, crops, forests and corrosion as well as the development of databases on air pollution. The human health study progressed particularly well, with involvement of leading specialists on the global circuit and from developing countries. Several documents from these activities have been published, and several newsletters have been made.

Activity 5.2.3 Co-operation and functioning networks established for increased information flow and higher awareness in the developing country expert and policy communities

Some of the planned activities were scaled down or postponed into phase II to enable follow up of the policy dialogues and establishment of the Malé Declaration. These changes were done in agreement with Sida. The remaining network 'Composition and Acidity of Asian Precipitation' (CAAP) which originated in previous phases was maintained through the phase and carried forward into phase II. Websites were developed and data posted according to LFA, except for the APINA website which was not launched due to some technical difficulties. The LFA also contained some 'reserve projects' that were not carried out in this phase.

2.3 Project Performance and Efficiency

in relation to the indicators, assumptions and risks specified in the LFA and the Project Document in phase II

Phase II of the programme continued with the implementation of the Malé Declaration, where developing of a monitoring network was the main activity. Furthermore the development of the APINA network and its policy linkages received further support. Methodology development for capacity building and initiation of new networks as well as consolidation of existing ones were also given further support. Some changes in the structure of the programme were made, linking the various activities more directly to the Malé Declaration and APINA policy processes during the first part of the phase. Below is a review of the activities carried out compared to the specifications in the LFA matrix, where the results/outputs started on section 3.1 Most activities were carried out in accordance with the LFA requirements, but because of some delays in equipment installations monitoring did not occur for as long as had originally been planned.

1. Result 3.1 Improved international cooperation regarding air pollution

3.1.1 Implementation of the Malé Declaration

Activity 3.1.1.1 Developing the National Implementation Agency (NIA) Network

It was decided early in the phase that instead of asking the appointed NIAs in each country to produce status reports by updating the baseline and action plan documents from phase I as specified in the phase II programme, one should concentrate on setting up the monitoring campaign and national frameworks for stakeholder involvement. Also, the production of regular newsletters was added. Except for Pakistan, where permission to set up a monitoring station on a location near the border to India was not granted, all countries identified monitoring sites and installed monitoring equipment during the period under the guidance of a Monitoring Committee (MoC). The committee decided that the stations should be located in rural areas remote from point sources and should be able to provide information about long distance transport of air pollutants. The NIAs were given full freedom on site selection to ensure ownership of the programme. Also, five newsletters were produced during the phase.

Activity 3.1.1.2 Monitoring support for the Malé Declaration Implementation

A monitoring manual was developed, monitoring equipment installed and personnel trained to carry out regular monitoring (except for Pakistan). Also, long term monitoring plans were drawn up. The gases sulfur dioxide (SO2) and nitrogen oxide (NOx) and particulate matter (PM10) were measured at the rural sites in each country, as well as rain water pH and electrical conductivity. Plans were also made for rain chemistry to also be analyzed in the long-term. These were demanding tasks, since except India, none of the countries had any systematic monitoring activities. Thus, not all sites were fully operational at the end of the phase.

3.1.2 Follow up of the Harare Resolution

Activity 3.1.2.1 Developing the APINA for the Harare Resolution Follow-up

The aim of this activity was to develop a protocol on environmental issues in Southern Africa through collation of information on the impacts of air pollution on ecosystems, agriculture, materials and human health, building capacity in the region for the assessment of air pollution impacts, networking and providing technical assistance of the development of a SADC protocol on environment. Most activities specified in the LFA were carried out according to schedule, except for mitigation options that were not covered as much as planned because of scarce funds. Also outreach materials were not translated into Portuguese or French as planned due to prioritization of available funds.

A lot of the activities carried out were aimed at strengthening APINA through workshops and research activities. The highlight of the phase was the regional policy dialogue meeting on air pollution in cooperation with SADC in Maputo, which saw the direct engagement of policy makers at the ministerial level. The results from various activities were presented. Many countries in Africa have not yet reached the level of economic development and industrialization as the developed world and Asia, and thus opportunities exist to avoid the human and environmental costs of economic development. The outcome was a draft "Maputo Declaration on the Prevention and Control of Air Pollution in southern Africa and its likely Transboundary Effects", and a road map was initiated to have the draft declaration endorsed by SADC ministers. The activities were characterized by a high degree of regional ownership, but variable response from country representatives.

2. Result 3.2 Expert knowledge concerning air pollution to support decision making

3.2.1 Parallel studies to the Malé Declaration

Activity 3.2.1.1 Emission inventories for the Malé Declaration

A manual and a workbook on emissions inventory techniques and methodologies that could be used in phase III to carry out emissions inventories were developed. Standard methodology was used to facilitate the understanding and use by regional experts. Sulfur dioxide (SO2), nitrogen oxides (NOx), particulate matter (PM10), total suspended particulates (TSP) and ammonia (NH4) are covered, as well as large point emission sources and area sources. This activity is closely linked to the RAPIDC project on Integrated Assessment Modeling.

Activity 3.2.1.2 Integrated Assessment Model (IAM)

The main task in this activity was to develop an integrated assessment tool for use in South Asia in support of the Malé Declaration process. The tool was based on the MATCH Atmospheric Transfer Model developed in Sweden. The advantage of this tool is that the model allows the handling of large amounts of information needed to understand policy relevant questions regarding transboundary air pollution issues. However, the use of the model showed that in addition to access to powerful computers and networks, the MATCH user needs to be very familiar with programming and file handling. Users also wanted the opportunity to change some of the applications of the model to improve its applicability, which was not possible. Several users were also critical of some of the results from the model calculations.

3.2.2 Training and networking

Activity 3.2.2.1 Modeling concentrations and depositions

This activity consisted of two parts: i) continue development and application of the MATCH model for use in tropical regions, specifically focusing on nitrogen, ozone and particle calculations, and ii) installation of the model at the Malaysian Meteorological Services including staff training. Both activities were carried out according to plans, and several papers were produced and published.

Activity 3.2.2.2 Composition of Asian Deposition (CAD)

This activity had two aims: i) to support the development of a CAD network and ii) to increase the capacity of institutes in India and Vietnam to carry out high quality monitoring of wet and dry deposition of air pollution in regional sites exposed to long range transport of air pollution away from cities and point sources. The work plan was followed closely. The only significant deviation was difficulty in establishing regular contacts with the Vietnamese scientists. Several workshops and meetings were held, and many papers were produced. A substantial transfer of knowledge took place related to the transboundary transport of air pollutants, their effects on ecosystems and techniques for monitoring the pollutants in air and in precipitation.

Activity 3.2.2.3 Rapid Urban Assessment (RUA) in Asia

The aim of this activity was to continue development of RUA tools initiated in phase I at urban scale to evaluate emissions, concentrations and impacts and allow early focus on implementing cost effective abatement measures. Hyderabad was chosen as case study, and all tasks were executed according to plan. The results from RUA were very close to those using top down calculations.

The RUA approach was developed at the Swedish Environmental Research Institute (IVL) for assessment of air quality, and the assessment can be carried out relatively quickly and at far lower costs compared to most existing approaches. It involves combining conventional top-down and bottom-up emission inventory approaches, measurement of air pollutants using diffusive samplers, and air pollution dispersion modeling with geographical information systems (GIS). The method produces emission and air pollution concentration maps which can be used for assessing air pollution impacts, and to develop and implement sound air quality management strategies at urban scale. This approach is in our view one of the most interesting outcomes from RAPIDC that could be a very important part of an urban air quality management system in developing cities. It could be linked to health, crops and corrosion impact studies.

3.2.3 Impact risk assessments

Activity 3.2.3.1 Health impacts in Asia

Under this activity a manual on how to assess risk assessments for health effects in different Asian countries was produced, as well as a manual for the derivation of Asia specific dose-response relationships. These show that concentrations of particulate matter were far higher in many cities in the Asian region than in cities in Europe and North America. In addition, studies of mortality rates and lung function in cities in Asia showed findings very consistent with studies from America and Europe. Based on case studies in Jakarta, Bangkok and Singapore it was estimated that considerable health improvements could be made. Particle monitoring at the airport of Hyderabad could not be carried out as planned. Some monitoring of indoor air pollution in Hyderabad was carried out, showing high values where wood was used. A workshop disseminating these results was held in New Delhi.

Activity 3.2.3.2 Corrosion impacts

A network of 12 test sites with six partners in Asia and 4 test sites with three partners in Africa were created to perform a corrosion exposure programme, with more sites than described in the LFA. However, due to late start the exposures could not run for as long as expected. When this activity was formulated it was clear that this was a long term activity that would have to run into a phase III. A workshop was held together with the RUA and health projects with Asian and African participants to transfer knowledge, integrate the activities and promote south-south linkages as well as north-south ones.

Activity 3.2.3.3 Air pollution effects on crops and forests

Under this activity 3 sub-activities were carried out in accordance with the LFA: i) establishing of an air pollution effects network on crops (APCEN), ii) developing observatorial and experimental protocols to

assess air pollution impacts to vegetation across Asia and iii) hold a workshop in Asia to facilitate information exchange.

Activity 3.2.3.4 Acidification of developing country ecosystems

This activity should promote understanding of acidification in South Asia through analysis of ecosystems at risk through a detailed analysis from a regional perspective, and through creating links within Asia. However, this was changed on request from the NIAs, who asked for a manual that would allow them to carry out assessment of the risk posed to their ecosystems by acidification. This manual was produced and distributed to them.

Activity 3.2.3.5 Air Pollution in the Megacities of Asia (APMA)

The main activity was in cooperation with the Clean Air in Asia (CAI-Asia) initiative to benchmark air quality management and practice in 23 Asian cities. Because these were more cities than originally planned, the final report was considerably delayed. Another important activity was to provide technical support and training through workshops, which had comprehensive participation. The third main activity was to facilitate the harmonization of urban air quality management approaches via the development of a regional framework. Several consultation meetings were held, and a Strategic framework document was published. APMA had no direct links to RAPIDC during phase II.

2.4 Project Performance and Efficiency

in relation to the indicators, assumptions and risks specified in the LFA and the Project Document in phase III

Phase III is merely a follow up of the other phases, and includes some restructuring of the network activities. We conclude that most of the activities in phase III under the Malé Declaration specified in the LFA are either on track or on schedule. Several of the activities under APINA have been delayed. For those activities behind schedule actions have been taken to ensure that they will be completed according to plans by the end of RAPIDC phase III in April 2008. However, the finalization of a few activities may still be delayed or finalized in a way not fully in compliance with the requirements in the LFA. Below is a review of the status and results of the various activities so far.

Malé Declaration

The major activities and sub-activities of the Malé Declaration listed in the LFA are:

1. Result: Malé Declaration network enhanced

Activity 1.1 Strengthen regional cooperation

The sub-activities are on schedule, but an increase in the budget has been required to complete the scheduled activities. This involves annual network meetings, meetings with other networks, organizations, newsletters, press releases etc. This has been going on according to LFA requirements.

Activity 1.2 Strengthen stakeholder participation

This is on schedule, but more funding is needed. The main task is holding 3 stakeholder meetings with NGOs, industry, scientists etc.

Activity 1.3 Strengthen National Structures to support the Malé Declaration

The activity is on schedule. The task is to support and arrange meetings with National Advisory Groups, which have been established in all countries.

2. Result: Monitoring capacity enhanced

Activity 2.1 Strengthen and enhance the Malé Declaration pollution monitoring network

Activity 2.2 Training in monitoring

Activity 2.3 Implementation of Quality Assurance/Control programme

Activity 2.4 Study the movement of air pollution to monitoring sites

Activities 2.1–2.4 are closely linked. All are now on track, but some sub-activities are delayed. However, they are planned to be carried out during phase III. The main result for activity 2 should be to strengthen the monitoring activities established during phase II. Three new monitoring sites will be established in remote sites in Sri Lanka, Iran and Bhutan in accordance with the LFA. The first, locally produced passive samplers used are said to have been of poor quality, but passive samplers are now working in all countries, and the aim is that active monitoring stations shall be operating permanently in all countries when phase III is completed. However, some countries are not monitoring all parameters, and the time series will be shorter due to the delays.

The sites in several countries have been established in very remote areas, with lack of stable electricity supply, difficult road access, poor protection of the instruments for landslides and difficult climate conditions etc. An important guideline for choosing site seems in some countries to have been that since the stations are supposed to monitor transboundary pollution, they should be located close to the border. This is not necessary, and should in our view have been overruled by the MoC. Some of the monitoring sites would likely have to be changed (e.g. Sri Lanka), in Bhutan the equipment has been moved to the capital because the monitored values at the original site were very low! The monitoring stations seem to be dependent on regular supplies of spare parts from RAPIDC. Also, upkeep and frequent calibration of the equipment need assistance from the programme. Long-term sustainability is also dependent on finding an institution in the region capable of analyzing the monitoring results which are now been analyzed in Europe, i.e. passive sampler analysis. Thus, the sustainability of the monitoring system could be questioned.

Training has been kept up, but it has been difficult to keep up staff continuity in some countries since people leave or are moved to other positions. Also, there have been problems in some countries, especially India and Bangladesh, to get permission on time to sending people to training events abroad.

3. Result: Emission inventory, scenarios and integrated assessment developed

Activity 3.1 Develop capacity in emission inventory preparation

This is basically on track. The LFA requests 4 training workshops to be held, that each country develops an emissions inventory and that the manual from phase II is further developed to include CO, NMVOC and PM2.5 as well as methods for spatial distribution of the emissions. It has been decided to have 3 instead of 4 workshops, these have been combined with other workshops to save money and link various activities. Capacity in emission inventory compilation has been considerably enhanced as a result of these activities. An e-mail discussion forum has been established to facilitate discussions on inventory, scenario and modeling issues.

Activity 3.2 Develop capacity in emission scenario development

The activity is on schedule. The aim of the activity is to develop capacity to create transboundary air pollution emission scenarios. A draft manual for scenario generation is developed and training workshops have been held according to LFA requirement. The workshops have been combined with workshops on activities 3.1, 3.3 and 5.1 so that the same people are involved and can link the activities together.

Activity 3.3 Develop integrated assessment capability

The activity is mostly on schedule. The main tasks are to upgrade the regional Integrated Assessment Model (IAM) developed during phase II, install the MATCH atmospheric transportation model at UNEP and hold training workshops in the use of IAM and atmospheric modeling. IAM should be upgraded to accept national emissions and scenario data, and attempt to include information to assess acidification, regional health and crop impacts. Inputs to IAM for ozone level and PM calculations are needed from the MATCH model.

All the technical information from the Malé Declaration activities has now been put into the IAM, which has been renamed the Malé Declaration Integrated Information and Analysis System (IIAS). This is a joint effort with UNEP and several other institutions. In our view this tool offers a wide range of options for calculating depositions and concentrations, risks and effects of policy interventions etc. The downside of this is that the new model system has proved to be complicated to operate, requiring high skills and a lot of time. Questions have been raised if UNEP is capable of operating and maintaining the MATCH model in the longer run. It is also a question whether countries could operate the IIAS. For ozone and PM concentrations, which are both expected to increase in the coming years, the modeling with MATCH for use in IIAS is somewhat behind schedule, but is expected to be completed by the end of phase III.

Activity 3.4 Develop Rapid Urban integrated Assessment (RUA) capacity

This activity has been delayed, but is now on schedule. The main task is to develop the RUA concept introduced in phase II, through applying it in at least one Malé Declaration city, and train all countries in using the method. Kathmandu has been chosen as the test city. This activity will also include training on the development of a strategic framework and action plan on air quality management for Kathmandu through consultation with relevant stakeholders and approaches based on the work carried out in the Air Pollution in the Megacities of Asia (APMA) project. The implementation was delayed because of political problems and because the original equipment was taken by a landslide.

4. Result: Impact assessment capacity of National Implementation Agencies (NIAs) supported and strengthened

Activity 4.1 Strengthen knowledge on impacts of air pollution on human health

The activity is on track. The aim of the activity is to develop capacity within the countries to asses the impacts of air pollution such as PM and ozone on human health through training in assessment, using concentration data and exposure-response relationships. From this a network of health experts should be established. These tasks have been carried out. Participants at the training have expressed high level of satisfaction with the approach. A study on health impacts of air pollution among school children in selected schools of Dhaka have been carried out in accordance with the LFA and a draft paper has been prepared. This is in our view a very important activity, since it directly addresses one of the key issues for policy makers concerning air pollution. From a scientific point of view the Dhaka study is interesting, since it is one of the few such studies from developing countries.

Activity 4.2 Strengthen knowledge on impacts of air pollution on crops

This activity is delayed due to problems with propagation of clover clone bio-indicator plants from Europe to be used for an experiment to assess ozone damage on crops in Malé Declaration countries. The risk of these problems was foreseen in the LFA. Clover plants have now been established in Bangladesh and Pakistan, and the bio-monitoring experiment has now started. However, a plant import permit for cover cuttings into India has not yet been obtained.

The main task of this activity is to carry out a bio-monitoring experiment to assess potential ozone damage on crops, and to establish a bio-monitoring network in the Malé Declaration countries. The network now comprises 5 countries. There are many experienced scientists on crop damage in

India, Pakistan and Sri Lanka, and links are being built from these to scientists in other countries. There is already substantial evidence that ground level ozone is causing damage to crops in the region. Yield losses of up to 30 percent have been indicated. Hopefully the clover experiment will contribute further knowledge on this. However, it is hard to see that this activity could be fully completed during phase III in accordance with LFA.

Activity 4.3 Strengthen knowledge on impacts of air pollution on corrosion

The activity is on track. The aim of the activity is to develop capacity in the region to assess the impact of air pollutants on materials and objects of cultural heritage through assessing corrosion at test sites, demonstrate corrosion risks and training in stock at risk. Four new test sites have been established in addition to the 12 from phase II, and ten corrosion kits were erected in Kathmandu. All these will produce results in fall 2007. Corrosion attacks of acid deposition ranging from zinc and carbon steel to stones are tested.

Activity 4.4 Strengthen knowledge on impacts of air pollution on acidification

This activity is said to be on track. The aim of the activity is to develop capacity to assess the potential for soil acidification and subsequent ecosystem impact to put into the IIAS model. The LFA specifies training, which is scheduled for early spring 2008.

5. Result: Decision making for prevention and control of air pollution supported and strengthened

Activity 5.1 Provide decision support information for policy formulation and mitigation

Activity 5.2 Case studies of practical options to prevent air pollution

Activity 5.3 Sector based approaches to pollution prevention and control

Most of these activities are delayed. These activities are supposed to inseminate good practices for mitigating air pollution for policy makers and stakeholders. Activity 5.1 should according to LFA study good examples for local, national and regional level legal and financial measures and provide options tailored for each country. This should be a desktop study, involving consultation with country representatives and key individuals. Activity 5.2 should focus on case studies in the housing and transport sector. For the housing sector, life cycle resource efficiency should be addressed, and the activity should participate in eco-house pilot projects, assessing implications on emissions and how policy can promote the eco-housing concept. This part is also supposed to be a desk study linking with cases in the field. An eco-friendly house in Sri Lanka has been successfully completed with funding outside the Malé Declaration, and several training programmes have been conducted for architects in accordance with the LFA. In the transport sector the study should examine the impact of the use of different vehicle technology, opportunities afforded by expanding use of rapid mass-transit system and the potential of walking and cycling as healthy, clean alternatives to motorized mobility. This case study is also supposed to be a desk study linked to cases in the field. Impact of using hybrid vs. SUV or other vehicles on emissions is mentioned along with opportunities to introduce mass rapid transit as the outputs from the case study. Activity 5.3 should 'report on potential for power sector emission prevention, consider clear ideas in the industry sector and develop a report on clear opportunities by sector.' A strategy paper on future scenarios and results on options that can feed into the models should be an output.

It has been decided to implement these activities as one project as it according to Annual report (2007) turns out that there is considerable overlap between the aims of the different projects and it is very difficult to separate policies from case studies. A manual containing international case studies for policy interventions is being developed. A draft of Policy Options for Air Pollution Prevention and Control on South Asia has also been developed. A consultation for an eco-housing project in the Maldives and a workshop on an eco-housing project in Bhutan have been held. Two training sessions have also been held. The remaining tasks of the activities are supposed to be completed during the rest of phase III.

Since these activities are straight forward and not dependent on outcomes of other activities of the Malé Declaration work it is hard to see why these activities are delayed. To what extent the specifications in the LFA is in touch with the most obvious, cost effective actions to reduce air pollution in the Malé Declaration countries will be discussed later in this report.

6. Result: Awareness about air pollution in South Asia in key stakeholder communities raised.

Activity 6.1 Raise awareness for action through targeted dissemination

This activity is on schedule. The LFA specifies activities to develop media packages on air pollution through publication of awareness materials, educational materials targeting primary schools, secondary schools, colleges and universities, and conducting regular lectures and consultations with senior government officials.

The implementation is focused more on youth than the LFA indicates, and is also using the informal education system as opposed to the formal education system. Among the impacts of air pollution, health impacts are being used as the awareness tool as it is easily understood. The main task has been to develop a document called 'Youth for Clean Air', going through the major sources and impacts of air pollution, mitigation and prevention measures and the Malé Declaration and its contribution to the prevention of air pollution. Based on this an animated CD will be developed to be used as resource and awareness material. Information meetings have been held with senior governmental officials in several countries, and a document on the past, present and future of the Malé Declaration has been prepared targeting academic institutions and researchers. In addition several newsletters and brochures have been prepared, and a national awareness campaign has been carried out in Bangladesh. Several other activities, mostly targeting youth, are either implemented or will be implemented during the rest of phase III.

While the material produced may be highly relevant in creating awareness on air pollution, it can in our view be questioned whether the large focus on youth is in line with the specifications in the LFA. It should also be questioned whether the specified activities have the right focus if the target is to promote actions to improve air quality. This will be discussed later in the report.

APINA

Our general view of the APINA activities specified in the LFA is that most of them now are on track, after some delays at the start as reported in the annual reports. The goal of the management at the APINA secretariat is to complete the outstanding issues at the end of 2007 or early 2008.

Status for the main activities and sub-activities of APINA are as follows:

1. Result: Stakeholder participation at national level enhanced

Activity 1.1 Strengthen stakeholder participation and national APINA structures

This activity is on schedule, stakeholder meetings have been held in all countries. Several of the meetings attracted significant media attention. The general impression is that air pollution is gaining increasing attention, and most countries have either developed or are in the process of developing legislation on air pollution. The support to develop the capacity of National Focal Points (NFPs) and APINA Country Representatives (ACRs) is going on, and country air pollution status reports for the participating countries are planned to be completed by end of 2007.

2. Result: Technical capacity in air pollution assessment developed and/or enhanced

Activity 2.1 Ensure synergies among APINA Task Teams and with other regional and international stakeholders

This activity was completed the first year. A start-up workshop was held in July 2005 and produced recommendations for each APINA activity.

Activity 2.2 Develop capacity in emission inventory preparation

This task has been slightly delayed, but is now going very well. A common template, including a workbook for registering emissions is made and updated, training workshops are held and at least 2 people from each country are trained. The training also comprises assessing various potential sources of data (including the use of activity data to develop emissions), top down vs. bottom up approach and quality control of the data. Draft emissions inventories for 2000 are available for all countries, and will be refined and quality checked during the rest of phase III. A draft regional emissions inventory should be ready in January 2008. Some fact sheets will also be developed.

Activity 2.3 Establish/enhance monitoring network in participating countries

This activity is on track. The main activity is to prepare a compilation of existing activities in the region and identification of needs, and a draft scoping report is made. Only South Africa and Botswana have established monitoring networks, but the data collected may not always be available for use or suitable for assessing the impacts of air pollution. In most countries there are limited resources and shortage of equipment, both for analysis and monitoring. The member countries have no or inadequate coordinated approaches for validation of the data or dissemination of the collected information. The information is mainly put into databases in the format that cannot be applied directly by policy makers.

Activity 2.4 Enhance atmospheric transfer modeling and integrated assessment activities in southern Africa.

This activity is on track. A scoping report on existing activities on atmospheric transfer modeling and integrated assessment activities in the region has been prepared, which is the main activity. The study reveals a dire shortage of qualified and experienced modelers in most countries, with the exception of South Africa, Mozambique and Tanzania. It is proposed to build on this expertise in further capacity building. A five day dispersion modeling course has been held, starting with local dispersion models. The people are trained on local models to start with, before a more complicated model is eventually installed in the region in a future modeling centre. A feasibility study for establishing a regional modeling centre has been prepared.

Activity 2.5 Develop Rapid Urban Air Quality Assessment (RUA) capability

The activity is now on track after a delay. This was because inadequate funds had been allocated to the activity and the process of choosing a city to use as case study took more time than anticipated. The original equipment was made of aluminum which could be stolen and therefore had to be replaced, which also contributed some to the delay. Besides, some budget errors also caused delays. Maputo has been selected as demonstration city for RUA activities, and the implementation started in February 2007 and will be completed in September 2008. Local training workshops in using RUA have been carried out in Maputo and a regional workshop to illustrate the RUA methodology was held in Maputo for representatives of the other APINA countries. This activity will also include training on the development of a strategic framework and action plan on air quality management for Maputo through consultation with relevant stakeholders and approaches based on the work carried out in the Air Pollution in the Megacities of Asia (APMA) project. See description of the RUA concept in chapter 2.3 above.

Activity 2.6 Strengthen knowledge on impacts of air pollution on human health

Country data on existing case studies have been gathered, and training on simple, effective methodologies for health risk assessments has been carried out in accordance with the LFA. However, Air Quality Model training using the so called SIM-AIR model was also started, but not completed (except for in

Tanzania) due to lack of time, personnel, data and funding. This activity is not specified in the LFA, which advocates a simple approach. A health impact assessment report with the results from participating countries should be produced at the end of this year. Case studies not specified in LFA have been funded locally in Botswana and Mozambique.

Generally, there is little knowledge and analysis of health impacts of air pollution in the region. Air pollution levels in certain urban parts of the region are above recommended national and WHO guidelines. Not much has been done to improve the situation.

Activity 2.7 Strengthen knowledge on impacts of air pollution on crops

The project is delayed due to problems with the propagation of clover-clone bio-indicator plants at all southern African sites apart from the pilot site in South Africa. The problems have occurred due to the long transport time of the plant cuttings (shipment from Europe to Africa via express courier) and various unfavourable site-specific conditions. This was a risk of failure stated in the LFA. South Africa will now function as a regional supply center of clover cuttings for the other countries. These failures also have affected the budget negatively. One will now try to carry out the experiment during the growing season 2007–2008. A training workshop was carried out at the pilot site to teach APINA members from the other regional sites how to set up biomonitoring experiments. A report with recommendations on how bio-monitoring sites should be set up in APINA countries is completed.

Activity 2.8 Strengthen knowledge on impacts of air pollution on natural ecosystems

This activity is on track. The main output will be a feasibility study on how to develop studies to identify sensitive ecosystems in the region potentially impacted by air pollution. The feasibility study has been drafted. Apart from South Africa very little work has previously been done on this issue in the region. Southern African vegetation shows little evidence of either direct effects of gaseous pollution or indirect, soil-mediated impacts in any of the countries studied so far, which is in strong contrast to the experience of Europe. It was originally thought that some unique ecosystems could be at risk. Although there is no evidence of impacts yet it is thought that, as emissions continue to increase, some ecosystems in southern Africa may be at risk of impacts in the future, including some highly diverse ecosystems unique to the region. In developing the feasibility study there were according to the Annual report 2006–2007 poor responses from country representatives and lack of local funding for the activity. It was also very difficult to obtain information from respective countries on what ecosystems exist and key issues affecting them.

Activity 2.9 Strengthen knowledge on impacts of air pollution on corrosion

Experiments exposing materials on 4 sites have been carried out since phase II, and 2 new sites have been added during phase III. Based on exposure-response functions from Europe, the measured corrosion values are lower than expected for zinc and higher than expected for limestone. Sulfur dioxide pollution was found to be the most important causal agent. The results have contributed to a scientific publication on corrosion in developing countries. Preliminary stock at risk surveys have been carried out in Tanzania and Zambia. The only two tasks outstanding at the time of the review were feasibility studies for stock at risk and economic assessment and of demonstration of corrosion risks using Rapid Corrosion Assessment Kits, which were reserve projects not originally planned for this phase. Training in stock at risk and economic assessment of corrosion damage will be carried out. Reporting on these activities is in progress.

3. Result: Decision support information for policy formulation and mitigation of air pollution issues enhanced

Activity 3.1 Provide decision support information for policy formulation and mitigation

This activity has been delayed, but is now on track. The main tasks are conducting scoping studies on environmental legislation options (in progress), controlling and mitigating options (being edited and finalized) and socioeconomic issues (being edited and finalized). The delay is said to be due to the fact that this area is new for APINA, and the networking in the region is at an early stage of development. A training workshop on these issues has been held.

4. Result: Communication on air pollution issues enhanced

Activity 4.1 Raise awareness for action through targeted dissemination

This activity is delayed. Many of the tasks under this activity are dependent on the launching of the APINA website, which is still (October 2007) not up and running. A website prototype is available, and is said to be publicly launched in November 2007. Newsletters on Phase III activities, proceedings of all the workshops carried out, fact sheets, completed scoping reports and other material should according to LFA be posted on the website. Most of this material is ready for posting. An APINA member from the University of Zambia has been engaged and helps the Secretariat in information collation and dissemination.

5. Result: International cooperation on air pollution in Africa enhanced

Activity 5.1 Develop a Regional Policy Process for Air Pollution in (Southern) Africa

This task is to move towards the adoption of the Draft Maputo Declaration on emission reductions at ministerial level, liaising with SADC, the African Union (AU) and UNEP. According to the Annual Report 2006–2007 this activity has been slightly delayed. Even if the policy dialogue has been meant for the end of the phase such a dialogue need to be developed gradually, and it remains to be seen to what extent this activity will be a success.

SADC have now revived the process of developing a SADC Protocol on Air Pollution. Several meetings have been held as specified in the LFA, and APINA is now being recognized as a partner in influencing policy on air pollution issues in the region.

Activity 5.2 Promote Better Air Quality Management (AQM) in the cities of Africa

This activity has lead to a series of Ministerial level recommendations for action on air pollution issues in SSA. The main task has been to promote better air quality in African cities through training of AQM through cooperation with WHO, UNEP and the World Bank.. In the event in 2006 49 sub-Saharan African countries participated (about 30 at Ministerial Level, including one Prime Minister), which are more than expected. Training sessions and several promotion meetings have been held.

6. Result: Networking for regional co-operation on air pollution enhanced

Activity 6.1 Enhancing networking and coordination

This is an ongoing activity, providing funding for APINA representatives to attend joint meetings with the Malé Declaration and other networks and APINA members to hold Annual Meetings. It also includes coordination with other parts of RAPIDC, writing annual and half-annual reports attendance of annual coordination meetings etc. All these activities have been going well, but the work load at the APINA secretariat has been very high. The APINA member engaged in helping the secretariat on information issues could perhaps help somewhat on the work load.

The air pollution networks

Except for APCEN most of the activities in the other networks seems to be more or less on schedule.

APCEN

The following three main activities for phase III are listed in the LFA:

1. Maintain and expand APCEN network, development of network role
2. Enhance capacity of scientists to undertake experiments
3. Develop socio-economic assessments

All sub-activities seem to be on schedule after a considerable delay (see under Malé Declaration and APINA above), except for the mentioned problems with obtaining clover plant import permits in India for the pilot study. APCEN has developed the experimental protocol for the pilot study (clover experiments). The entire APCEN network now comprises around 75 members from 25 countries. A steering committee and a website were established in summer 2007, and two workshops have been held in accordance with the LFA requirements. Several scientific papers and books have come out of the assessment work carried out. The most important remaining tasks to fulfill are in our view to successfully complete the clover experiment in Malé Declaration and APINA countries, establish a database and translate the biological impacts found into social and economic impacts.

APMA

The Air Pollution in the Mega Cities of Asia (APMA) network was established to support the development and implementation of comprehensive air quality management (AQM) in a selected Asian city with the APMA/CAI-Asia network, and is a parallel activity to the activities undertaken within the Malé Declaration.

The following main activities for phase III are listed in the LFA:

1. Support AQM strategy formation in selected Asian cities
2. Development of an AQM information system for Asian cities.

Because the Programme Advisory Group (PAG) expressed some concern over APMA's role in a regional programme and its relationship to other programme activities, it has in agreement with Sida been decided to change the original plan and to use the insight from the Benchmarking Report and other material to redirect the programme into:

- Enhancing capacity on air quality management in urban areas for better explanation of regional data; and
- Emphasizing and strengthening the close links between APMA and the Rapid Urban Assessment project under Malé Declaration and APINA activity 2.5.

During year two of Phase III Kathmandu and Karachi were selected as cities having limited AQM, and the cities have subsequently started monitoring particulate matter (PM_{10}, $PM_{2.5}$) with DustTrak analyzers in order to (a) test the passive monitoring results of IVL, and (b) to employ an enhanced capacity for $PM_{2.5}$ monitoring for better characterization of PM. A manual on guidance to quality assurance/quality control was drafted.

By the end of phase III the plans are to statistically evaluate the data collected by the DustTraks, estimate the burden of disease in Kathmandu and Karachi, and compile a report. Since PM is the biggest air pollution problem in urban centres the monitoring of real time concentrations is very valuable and they should be used to inform the development of the strategic frameworks and action

plans on AQM in Karachi and Kathmandu through multi-stakeholder consultations (similar monitoring and strategic framework develop is also ongoing in Maputo under APINA activity 2.5).

While monitoring is an important part of an AQM system, these network activities have in our view to a too large extent been turned into a monitoring programme. Almost all of the activities have so far been directed towards monitoring activities, and it is hard to find any activities supporting the development of more complete AQM systems.

CAD

The Composition of Asian Deposition (CAD) network's purpose is to support the building of monitoring stations in South and South East Asia for measurement of the deposition (wet and dry) of pollutants on terrestrial ecosystems to facilitate emission control. The network is based on previous activities on analyzing wet depositions in previous phases of RAPIDC.

The following main activities for phase III are listed in the LFA:

1. CAD network development
2. Training scientists from Asia
3. Capacity building through development of high quality sites.

All sub-activities are on schedule. Since the work builds directly on work in previous phases of RAPIDC, the sub-activities and tasks are rather detailed, but seem to be fulfilled or about to be. The network has also produced some important publications that are either published or in press. One of the major, tentative conclusions from the work is that acidification is not likely to be a serious concern during the next few decades in South, South-East and East Asia – except for some areas in South Western China. This is due to the alkaline nature of most Asian soils that tend to neutralize the acids formed from the emissions of sulfur and nitrogen oxides. This conclusion is based both on results from the CAD network and on research carried out in co-operation with other scientists. The network also concludes that the most important air pollution issues in the region are probably the aerosol/health and aerosol/climate issues and the impact of enhanced surface ozone on crops.

CORNET

The CORrosion NETwork (CORNET) consists of a network of organizations, contact persons and test sites. This network was developed within the corrosion sub-project in Phase II of RAPIDC.

The following main activities are listed in the LFA:

1. CORNET development and capacity building
2. Continuation of Exposure Network sites from Phase II

All sub-activities seem to be on track, and there are no deviations from the LFA. The network now consists of 16 test sites in Asia and 6 sites in Africa, see above. Workshops are held according to schedule, and analysis and training of evaluation of dose response functions based on the results from the test sites have started. The main aim of the network is to analyze to what extent and how the different climatic conditions compared to Europe affects the relative importance of the effects of local and long-distance transported pollutants. Main obstacles have been lack of capacity in some participating countries. The most important remaining tasks are to fulfill the ongoing activities and establish trends in corrosion and pollution and comparison of samples evaluated in network countries to those from other regions.

2.5 The Usefulness of the Indicators Specified

In general, the results, activities, descriptions and outcomes in the LFA are specified in a way that makes them easy to steer and assess for compliance. Some of the descriptions of activities are very detailed, and where possible they are quantified (i.e. number of workshops to be held, number of people trained) and what kind of product should be the final output. It is also fine that there are reporting requirements for most of the workshops, meetings etc. One could of course always want indicators to be more specific and detailed, but this has to be weighted against giving sufficient flexibility for project managers to adjust activities as one goes along. By and large we think that the right balance between ensuring concrete results and flexibility has been found.

However, there are some differences between some activities regarding the demand for outputs. For instance, no socio economic evaluation of results is required in CORNET, while this is required in APCEN. These are similar activities which should require the same kind of output, which should facilitate presentations for policy makers to decide on interventions, which is the overall goal for RAPIDC. Also some activities have specified number of workshops etc. to be carried out while other, similar activities have no such requirements.

Whether the indicators specified have focused on the right issues from a significance point of view will be evaluated in chapter 3.

2.6 Additional Outputs and Outcomes beyond those Specified in the Project Document

RAPIDC has yielded some concrete outputs not specified in the LFA in the Project Document. Several scientific papers and reports have been generated and co-funded through the programme, especially through APCEN. Also, more workshops than specified have been carried out under some activities, which have been funded locally.

Some case studies not specified in LFA have also been funded locally. For instance, case studies on health issues not specified in LFA have been funded locally in Botswana and Mozambique.

2.7 Overall Evaluation of the Programme and Progress towards Achievement of Overall Objectives and Results

The overall inspiration for RAPIDC has been the air pollution control strategies and convention developed in Europe during the 1980s and 1990s under the UN/ECE umbrella. While Europe spent some 20 years or more developing these frameworks, the aim for RAPIDC has been to facilitate regional protocols and agreements for emission reductions in South Asia and Southern Africa as rapidly and efficiently as possible by utilizing the best available technical expertise and advice from Europe, especially from the Swedish resource base, and internationally.

The programme has come a long way towards mapping the various emission sources and understanding the complex relations between them and their contributions to ambient air concentrations and effects on human health, crops, buildings and cultural heritage etc., especially in South Asia. RAPIDC has provided frameworks for cooperation between scientists in Asia and Africa, and created important links between experts in various fields and civil servants. This should contribute to local ownership of the results produced.

Thus, it can be concluded that the programme work so far has contributed to the overall objective to *contribute to solving air pollution problems in Asia and Africa*. It is also our view that the work has contributed significantly to the part of the programme purpose of *promoting international cooperation and developing scientific information for the policy process.*

However, the programme is still relatively far from achieving the part of the programme purpose *to facilitate the development of agreements and/or protocols to implement measures which prevent and control air pollution.* The Annual Report (2007) seems to be somewhat too optimistic regarding rapid formation of protocols, although it recognizes that this depends on factors outside of RAPIDC. In our view the formation of large, comprehensive protocols similar to those in Europe in Asia and Africa should not be stressed. The results from RAPIDC and other research, for instance RAINS Asia, show that even if there is transboundary pollution in the regions, the damages from this pollution may not be as significant as in Europe. Thus, one should take the necessary time to understand these mechanisms properly, and consider carefully what kind of interventions that might eventually yield the desired results.
Also because the RAPIDC work so far has been relatively weak on assessing policy interventions and socio economic issues, the necessary time should be taken to consider this. In the end, the result may be that comprehensive, European-style protocols and agreements are not what are needed to curb pollution in a cost effective way, but rather cooperation on more limited but important issues like for instance cooperation on reducing sulfur in fuel.

It is fair to say that both the Malé Declaration and APINA started out as transboundary focused programmes, but have gradually developed into focusing more on local issues. In APINA, more attention has been on awareness and elementary information, since there was and still is a general lack of knowledge of air pollution and its effects and lack of various skills to cope with the problems. This also reflects that air pollution problems today are less important in Southern Africa than in South Asia, but the problems are growing. In Asia more work on air pollution has been going on, the awareness and technical skills are higher, and the Malé Declaration has therefore been able to produce concrete results quicker. However, we have an impression that more devotion and commitments to the issues and work have been shown among local APINA people than among Malé Declaration people.

The role of the networks has been to link together research efforts in Asia, Africa and internationally and undertake activities to promote understanding where major gaps in knowledge about air pollution exist. They have significantly contributed to cooperation and dissemination between the Malé Declaration and APINA countries, and the rest of the world. However, only two of the networks have targeted really cross-cutting issues (crops and corrosion), the two others have focused on issues in Asia. Thus, it could be asked if the networks really have looked at the most pressing cross-cutting issues, or if for instance a network on policy issues would have been more appropriate.

We think that too much of RAPIDC has been concentrated on monitoring and related activities.
All activities assessing various impacts are in principle supposed to have a component on policy interventions and socio-economic issues. This is one of the weakest parts of the programme so far, and efforts to strengthen this part should be made for the rest of the programme period. In addition, a well targeted information strategy is lacking and the information activities carried out so far have been random and not targeted towards important decision makers. These shortcomings are particularly important for the Malé Declaration, where results are about to be disseminated. Efforts to strengthen this part during the remaining programme period should be made.

3 Quality and Significance of the Results

In this chapter scope, quality and significance of the programme is assessed in relation to expected results, scientific credibility, international development and practical usefulness for the member countries. Since most of the activities are not completed and related documents are not yet available, our assessment should be considered as a first, qualified overall assessment of the outputs so far.

3.1 Scope, Quality, and Significance of the Project Outputs and Results Produced to Date

High scientific quality of most of the activities

It is our impression that most of the technical outputs from the programme so far are of high scientific quality. Recognized scientific institutions are responsible for the various technical parts of the programme which in itself should be a guarantee for quality and scientific credibility. Also the long list of publications either published in scientific journals or in progress resulting from the various parts of the project show that the scientific quality is high.

However, we are more uncertain about the quality and usefulness of the work done regarding the policy, mitigation and socio-economic parts of the programme. There are few reports available so far. We have gone through the draft 'Compendium of Best Practices on Prevention and Control of Air Pollution' and related course material. It presents a comprehensive overview of case studies, mostly on the use of economic instruments from industrialized countries. While these cases may be interesting from a scientific point of view, most of them may be too complicated to be applied for most RAPIDC countries. Furthermore, it fails to mention the perhaps most important policy measure to be applied in many of the countries in Asia, namely phasing out various kinds of fuel subsidies.

The results could be significant for further policy development

Since there are so far relatively few final results it is hard to assess the significance of RAPIDC for further policy development. The work has contributed to some results that could be important in the longer run, i.e. related to transboundary effects, health effects etc. All activities are according to the Project Document (2004) supposed to include control and mitigation issues as well as socio-economic considerations, which are mostly lacking so far. Thus, the significance is hard to assess, but this should be an important issue in an eventual phase IV.

Most of the activities have focused on the right issues – but not all

Given the activities chosen, the specified sub-activities and tasks have mostly focused on the right issues considered from the countries' usefulness point of view. However, some of the activities should in our view have had a somewhat different focus.

The clover clone plants experiment to assess crop impacts from air pollution is an example of how scientific considerations have influenced the execution of a project activity. To enable comparison between various regions of the world it was decided to use clover plants from Europe, similar to those used in other experiments. This is highly understandable from a scientific point of view, but it led to a delay and perhaps no or less results than if local plants had been used. For local farmers and policy makers it is probably more important to have knowledge about air pollution impacts on the plants they are using instead of comparing them with the situation in other regions of the world. Both local and imported plants should have been used, since the problems that occurred were foreseen in the LFA.

Also the focus of 'Result 5 Support and strengthen decision making for prevention and control of air pollution' under the Malé Declaration has in our view specified rather peculiar activities. Focusing on transportation seems right, given that this sector is the main source of air pollution in almost all of the

countries. However, focus should have been on how to introduce cleaner fuels, measures targeting the existing vehicle fleet (inspection and maintenance programmes etc.). At the national level there are many initiatives taken by the governments in the transport sector that could have been supported. Targeting eco-housing seems not justified, since this would only contribute to emission reductions from new houses and would most likely be hard to introduce in the countries without massive promotion campaigns. Instead one should have focused on a sector with significant emissions in many countries, for instance the power sector (as mentioned in the LFA). Also, the case studies should have included cost benefit analysis of various interventions, since this could have contributed significantly to policy implementation. The information work will be assessed in Chapter 4.

The scope has probably been too broad

RAPIDC is a very ambitious programme. The scope of work has been very broad, perhaps too broad, trying to cover all aspects and effects of air pollution, although it has been narrowed somewhat since phase I and II. A more focused scope from the start could have resulted in more progress in the remaining activities. Before phase III there were consultations on activities to prioritize, and APINA countries were asked through a questionnaire how important they consider the various activities. While the participants were not asked to rank the various tasks, but rather to consider the importance of each activity, the results of the survey and consultations indicated that effects on health, crops and mitigation were the highest prioritized activities. However, most activities were implemented. A justification for this could be that many of them were started during phase I and II, and there is little knowledge about all these issues, especially in Africa. The least prioritized activities could contribute to an assessment of the various damages from transboundary air pollution and not just using data based on studies from more developed countries.

Even if most of the activities are now on schedule and seem to produce some relevant results, one might ask if not the overall results from the programme would have benefited from a more narrow scope. Focusing more on for instance health issues and approaches to curb emissions could have brought more useful insight to the policy shaping process, and contributed to policy recommendations.

3.2 Policy Development in the Regions

Hardly any policy development so far

It is hard to find examples where the RAPIDC results have spurred policy development to tackle air pollution in any of the countries. Although it has lead to increased awareness in the countries, there seem so far to be too little awareness in most countries about the damages from air pollution. This is of course related to lack of final results from the programme. But in our view this has also something to do with the presentation of the results, which need to be highlighted and presented in a way that causes attention among decision makers and other stakeholders. The use of cost benefit analysis could be important in this respect.

Policy actions from RAPIDC would benefit the poor

A substantial share of the people in RAPIDC countries live under the poverty line, especially in Africa. These people tend to be living in areas highly exposed to air pollution, and are also suffering from poor water and sanitation services, medical care etc. that may render individuals more susceptible to the effects of air pollution. Thus, actions to curb air pollution would highly benefit the poor. Therefore, RAPIDC's overall objective to contribute to solving air pollution problems in its areas of operation is also an objective to improve the conditions of the poor. To the extent that the activities under RAPIDC are leading to future reduced air pollution, the programme would highly contribute to improved living conditions for the poor population in South Asia and Southern Africa.

3.3 RAPIDC on the International Scene

Others are starting to learn from RAPIDC

It is our impression that RAPIDC has increasingly been recognized as an important project on the international air pollution research and policy development scene. Representatives from the programme are invited to international conferences, papers are accepted in recognized journals and cooperation with other international programmes (especially in Asia) show that RAPIDC is taken seriously and recognized. Up till recently RAPIDC has mainly learned from others, now others are increasingly learning from RAPIDC. The activities in some of the networks have contributed to this.

One important contribution to the international research arena is that RAPIDC now contributes with new data and analysis based on the actual situation in South Asia and Southern Africa. Previously analyses of air pollution problems and mitigation options have mostly used data from America and Europe, because these have been the only ones available. Data from other regions are not necessarily representative for the RAPIDC countries. Thus, local data will enable more realistic and better analyses, and hopefully also better and more cost effective air quality policies in the longer run.

3.4 The Programme Sustainability

RAPIDC is hardly sustainable without further donor support

A lot of good work has been done in the various activities, and the people engaged show great devotion to it, especially in APINA countries. From this point of view the sustainability of the programme seems very promising. However, because of severe shortage of skilled personnel, experience, equipment and funding in the APINA countries the programme would most likely need further, substantial donor support to eventually be able to stand on its own in the future.

In the Malé Declaration countries skills and experience is much more available, implying that the programme should be able to operate more on its own. But this will require that the activities are prioritized in the countries, so that funding will be made available. This remains to be seen, but some donor support is most likely needed also here for a phase IV. But local financial contribution should be required from the countries to indicate their support.

In both regions long term sustainability will most likely require that some countries take a lead role in both regions, for instance India and South Africa. The engagement and willingness to play this role of these, or other countries, remains to be seen.

4 Cooperation, Dissemination and Capacity Building

In this chapter we assess how RAPIDC has contributed to cooperation on various levels, and how the results have been disseminated and used to build capacity in the countries. We also assess how important stakeholders have been involved in the programme.

4.1 Cooperation

RAPIDC has lead to North-South cooperation

The greatest achievements of RAPIDC so far has been the promotion of cooperation at various levels. Programmes like this of course involve North-South cooperation, and this has been widespread. SEI has played a crucial role here, together with the other institutions from developed countries engaged as advisors under the various activities. Through trainings, review of data, experiments, and papers there have been a substantial transfer of knowledge from north to south.

RAPIDC has spurred cooperation also on South-South level

What is rather special is that RAPIDC has also spurred South-South cooperation, both between countries and institutions within the Malé Declaration and APINA and across the two parts of RAPIDC. This has been achieved both through the networks, but also independent of those. This has been especially important for the APINA countries, which have been able to learn from their more experienced colleagues in Asia who recently may have been through the same problems they are now facing. This creates a rather unique way of learning.

The results have lead to multilateral cooperation

The results have certainly spurred multilateral cooperation between both the Malé Declaration and APINA countries and activities. Between other multilateral networks like EANET, CAI-Asia and RAPIDC there has also been cooperation at many levels and through many channels. The preliminary results from RAPIDC have been discussed at various meetings, and compared with results from other projects.

4.2 Capacity Building and Ownership

Non-member countries could also benefit

The programme has also tried to include and spread information to neighboring, non member countries. This has been especially successful in APINA, where one has managed to engage most countries in Southern Africa by among other things inviting them to meetings. Also non-member countries have been invited to some meetings. RAPIDC has also contributed to increased contact and collaboration between scientific institutions and environmental authorities within some countries.

Strong commitments and ownership in APINA

Programme ownership and engagement seem strongest in APINA countries, where also the knowledge about air pollution is weakest. Since there are no other similar programmes dealing with air pollution issues in southern Africa, APINA provides important international inputs to research and government institutions on these issues. The engagement among stakeholders in the Malé Declaration countries seems in general weaker, but also here there are several examples of strong engagement in several sub-activities and working groups.

4.3 Information and Dissemination Activities

Most of the information has been spread through meetings and newsletters

The spread of information from the various parts of RAPIDC has been through workshops, training courses, stakeholder meetings etc. Some of these have been relatively broad meetings comprising a lot of stakeholders. Also, regular newsletters, fact sheets and publications focusing on special issues have been an important information source. National level public awareness campaigns have been promoted, and are planned to be held in Bangladesh and Sri Lanka. In the Malé Declaration youth have been targeted through a special publication and a multimedia presentation.

Information from the programme has only to a limited degree reached the most important stakeholders

Many different stakeholders have been reached through the various activities, but the perhaps most important ones, namely high level politicians and other decision makers, have only to a limited degree been reached. UNEP have provided information about the Malé Declaration work and its results through its bilateral meetings with environment ministers, and some of the ministers have participated in events under the Declaration. However, there seem to have been a perception that since the Ministries of Environment are represented in the programme as National Focal Points (NFPs) there is no need for any action to pay further attention to key decision makers. But the NFPs are usually representatives positioned relatively far down in the hierarchies of the ministries, with limited power to push through new information and policy initiatives. Besides, Ministries of Environment are often among the weakest ones in the government administrations, requiring the support of other, stronger ministries to push new, environmental policies forward.

Lack of targeted information strategy

There seems to be a lack of strategy for the information activities of RAPIDC. Much of the dissemination has been targeted at the scientific community. This can to some extent be explained by the lack of final results so far, but one should anyway start informing policy makers and other key stakeholders about damages of air pollution and the benefits of mitigation programmes. Since the goal of the information activities would be to spur actions against air pollution, policy makers and other high level decision makers should be prime targets through specially designed information, including cost benefit analysis of mitigation measures. Furthermore, media and NGOs should be targeted through information packages that could lead to pressure for action. To ensure this, the information should focus on health damages, effects on mortality etc. which are usually the key policy driver. Targeting media is difficult, and professional help from professional environmental journalists would be necessary to prepare articles/features in the appropriate media.

Websites are either not updated or non-existent

There is a lack of updated websites under RAPIDC. There should be three main websites, one for the whole programme hosted by SEI, one for the Malé Declaration hosted by UNEP and one for APINA hosted by IES. Only the first two are up and running at the end of October 2007. In addition, the APCEN Network has its own website. The websites are, however, not regularly updated or used extensively. When the evaluation work started summer 2007 the RAPIDC website had not been updated since 2004! Many parts of the Malé Declaration website has still not been updated since 2003/2004, and much of the data are old and outdated. The APINA website will likely be launched in November 2007.

For a programme with training and dissemination as a key task this is not good enough, and it has hampered the dissemination of results. There should have been a common website that should work as a hub for all activities under RAPIDC, with links to the various activities, containing discussion forums etc. and links to other common used websites in the regions. Some of these internal needs have, however, been taken care of by email-forums for discussion of sub-activity issues.

5 Administration, Institutional Structure and Financing

5.1 Administrative and Institutional Structure

The Stockholm Environment Institute (SEI) has from the start had a leading role in management, coordination and as a scientific adviser to RAPIDC. SEI has been contracted by Sida and been responsible for the implementation of the whole programme.

During phase I and II, a Programme Steering Committee consisting of the main programme partners advised SEI in the overall management of the programme. As part of the 'transfer of ownership' process to other responsible institutions and more local commitment, a Programme Management Committee (PMC) has during most of phase III managed the programme. PMC consists of members from SEI and the following institutions:

- *UNEP RRCAP* (United Nations Environmental Programme Regional Resource Centre for Asia and the Pacific): secretariat responsible for the administration of the Malé Declaration.
- *SACEP* (South Asia Cooperative Environment Programme)
- *IES* (Institute of Environmental Studies, University of Zimbabwe): secretariat responsible for the administration of APINA
- *UNZA* (University of Zambia).

A Technical Advisory Committee (TAC) is appointed to give technical guidance. In addition A Programme Advisory Group (PAG) is appointed to advise Sida on issues related to the programme. Each country has a National Focal Point (NFP) in Ministries of Environment and a Malé Declaration National Implementing Agency (NIA) and APINA Country Representative (ACR) at some local research institution.

The administrative structure has proved efficient

The organizational structure of RAPIDC looks relatively complex. SEI has had the formal responsibility towards Sida for the budget, contracts, reporting and follow up. However, UNEP and IES have been responsible for the day to day management of Male Declaration and APINA respectively as subcontractors with SEI having an overall coordinating role. The two institutions have also been responsible of managing their respective regional budgets and subcontracting participating institutions in their regions. Again the role of SEI has been to oversee that the regions adhere to their subcontracts. SACEP and UNZA have assisted UNEP and IES respectively. This arrangement has proven to be very efficient.

However, SACEPs role in the programme seems to have been limited and gradually reduced during phase III from a more active role in phase II. SACEP has had no designated role in the programme. The SACEP management claims that it was envisaged that capacity building of SACEP should be undertaken through phase III to play an active role in the Malé Declaration but also to take up the role of Secretariat in the next phase, but that none of this has been carried out (SACEP, 2007). The reason for this is according to SACEP (2007) that UNEP has not wanted to duplicate the secretariat. All Malé Declaration countries except Iran are members of SACEP. We have not found any indications that the reduced role of SACEP has had any negative influence on the practical implementation of the Malé Declaration activities. In our view it should be left to the Malé Declaration member countries to decide how they should be represented in the RAPIDC governing bodies and the implementation of the various Malé Declaration activities, and what role SACEP should play. At the 8th session of the intergovernmental meeting of the Malé Declaration in 2006 the member countries appreciated the role and

coordination of UNEP, and asked UNEP to continue as the secretariat for the Declaration. SACEPs role should be further considered and clarified in an eventual phase IV.

SEI's and PMC's administration of the programme has been efficient

The follow-up of activities have been ensured through the half-yearly reporting of ongoing activities. Then deviations from plans and budgets have been detected, and necessary actions taken to put them on track. Also frequent, informal contact between PMC members, and between PMC members and project partners, NFPs, NIAs/ACRs have contributed to a smooth project operation. The annual meeting in Stockholm with Sida to discuss progress and results has been an important milestone for PMC.

However, despite this largely positive picture there have been some delays in single sub-activities as shown in chapter 2. Some of these, like the problems with the clover plants, were foreseen and should have been tackled by using other sources and/or plants. The late start of the mitigation and socio-economic activities might be due to lack of expertise of these issues among the PMC members, and/or waiting too long to bring people with such relevant background on board.

A more complicated issue is the decision of location of the monitoring stations and sampler equipment in the Malé Declaration countries, where local considerations were accepted by the Monitoring Committee (and not objected by the PMC) on the grounds of local ownership, even though one knew the solutions were not the best ones from a cost efficient point of view. Since this has resulted in increased costs and/or delays of the project this should have been overruled by the PMC. Local ownership is not a goal in itself, but rather a way of getting good, sustainable results based on local needs.

The Technical Advisory Committee (TAC) have ensured commitment

TAC consists of the PMC members and representatives of the main contractors of RAPIDC, mainly from the Swedish resource base with a few Asian institutes sometimes also invited. The idea with TAC is to discuss the results achieved at the various milestones, to validate results and ensure commitment and engagement in RAPIDC and the results. TAC meets once a year to present and discuss the results achieved the last year, which seems very useful both to validate reports and data, and to ensure a common understanding of what RAPIDC is all about. This is also an area that could reveal deviations from project plans etc. It is also useful for the various project workers to see how their parts fit into the larger work of RAPIDC.

The Programme Advisory Group (PAG) has given very useful comments during the years

PAG consist of six members with a mixed background and broad experience from various air pollution issues. It advises Sida in providing direction and guidance on RAPIDC activities. In particular PAG reviews annual and, as appropriate, interim reports on the programme prepared by the PMC. At such reviews, PAG assesses the relevance and effectiveness of all reported activities, taking into account the overall objective of the Programme. It considers progress in relation to agreed project goals and time schedules and prepares, if deemed necessary, recommendations for adjustments and revisions. PAG reports to Sida, and submits regularly comments and suggestions on half-yearly and annual progress reports. Most often RAPIDC has adjusted the implementation according to PAGs recommendations.

PAGs reports from the years 2002 till May 2007 present in our view very useful comments on the ongoing activities, their content, relevance and progress. PAG has for instance for several years asked for more inclusion of policy issues, cost benefit analysis of interventions and a more targeted information strategy. These recommendations have not, however, been taken sufficiently into consideration by RAPIDC.

The system for follow-up and quality control has so far worked well

There is common practice in all sub-activities that all data and reports from RAPIDC are subject to a review by experts to be checked for quality and consistency. Under some activities there are also special groups designed for this. All reports must be finally approved by the PMC. The results are also to some extent discussed in the TAC meetings. This should ensure the quality of the results coming out of the programme. Hopefully, this system will also ensure the results and usefulness of the mitigation, policy and socio-economic parts of the programme.

5.2 The Financial Administration of the Project

Financial management has been very tight.....

The total budget for phase I–III has been approximately SEK 98.9 million. The annual budgeting has been very detailed using a system developed by SEI over several years. This has been necessary given the large number of sub-projects, contractors and various activities. There have been almost no over-runs of the budget so far, and SEI, UNEP and IES have kept a very tight control on the spending. The half-yearly reports on activities have been very important to avoid cost overruns. In such a large budget with so many single projects and partners this is impressive.

Around 8.5 percent of the total RAPIDC budget is allocated to management of the programme. According to SEI this includes administration of subcontracts, management and reporting to Sida. Even if this does not cover all administration in all parts of the programme, this is not a high share of the total budget going to administration given the administrative structure of the programme and the large number of participants. A simpler administrative structure, for instance one with SEI as the sole responsible for the administration could have reduced the administrative costs somewhat, perhaps without reducing the overall efficiency of the programme. However, this would have reduced the local ownership of the programme, especially in Africa.

....and seemingly flexible enough

The tight budget control does not seem to have reduced flexibility too much. A contingency in the budget has allowed for the covering of unexpected expenses. We have only spotted one example of budget inflexibility, namely the case where an error in the travel budget for the implementation of Rapid Urban Assessment in Maputo delayed the implementation, because it took time to get funding from the contingency. Another option could have been to "borrow" funds not used for RUA in Kathmandu because of project delays there, but this could not be done.

Substantial co-financing support have not been achieved so far

The issue of raising co-financing (in addition to in-kind contribution) to ensure more local commitment and long term sustainability of the project has been raised on several occasions during phase III. However, so far very little co-financing from participating countries has been achieved. Only a few cases like Botswana and some local training/workshop activities have been reported. This is not a very promising sign for the long term sustainability of the RAPIDC programme. However, there are indications that the programme could have motivated governments to fund some air pollution activities outside the programme.

6 Lessons Learned and Recommendations

6.1 Lessons Learned

Some of the key lessons learned from the RAPIDC programme are:

- It takes time to establish an organization like the RAPIDC, and one should allow for some trial and error.
- A simple approach should be employed. Tendency to use complicated models should be avoided. A promising approach in this respect is Rapid Urban Assessment, which should be seriously considered as an alternative to too much monitoring and modeling.
- Other experts than technical ones should to a larger extent be engaged in the programme, notably energy economists and environmental journalists.
- A tight, hands-on administration is needed on such a comprehensive programme to ensure deliverance on time and avoid cost overruns.

6.2 Recommendations

Recommendations for the remaining Phase III

Since most of the activities now seem to be on schedule, neither substantial organizational nor operational changes should be necessary. However, the PMC and SEI in particular should put in enough administrative resources to ensure that all activities are completed in time and to the extent possible also in compliance with the LFA requirements. Also, some cost benefit and policy considerations to complete the activities assessing impacts should be ensured. Furthermore, a targeted, well designed information approach to disseminate the results from phase III should be developed.

Recommendations for a potential Phase IV

A potential Phase IV should be more focused on the issues considered important for policy implementation and emissions control. This could for instance be health impacts and impacts on crops. Also, co-benefits for CO2-emissions reduction from actions to improve local and regional air quality should be considered, among other things because this could attract international funding for mitigation measures. Policy analysis and cost benefit analysis of various interventions should be an important part of the project. Cost benefit analysis has proved to be a powerful tool to raise awareness on environmental problems and spur interventions, and should be used for these purposes also under RAPIDC. It could for instance be used to analyze potential cost savings from joint actions between several countries if there are transboundary pollution effects or other benefits from joint actions, compared to unilateral actions in each country. Also, analysis of interventions like the environmental benefits of phasing out fuel subsidies and what could be done to mitigate the social effects of this could be done. Such analysis could be very valuable information for policy makers. This will require including environmental economists and perhaps also people with some social sciences background to a much larger degree than today.

The experiences with the concept of Rapid Urban Assessment (RUA) should be followed closely to see if this could provide a least cost pathway to actions compared to the traditional monitoring and emission inventory approach. RUA could provide a widespread application since the tool is originally developed for regional policy analysis. However, RUA also require some monitoring and emissions inventory approach, so the potential application should be considered closely.

Other activities should be phased out unless local or other donor funding is made available. Also, Sida should demand local co-funding, both in-kind and cash, to support a phase IV. This is particularly important for the Malé Declaration countries, which should be able to contribute with substantial funding if they find this interesting. In APINA considerable donor funding would most likely be necessary.

The same administrative structure as in phase III should be applied, since this is now well established and has proved effective. However, SEIs tasks will likely have to be put out on a tender process, allowing for other institutions to apply for this position.

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Annex I: Terms of Reference

Sida wishes to assign one of the Framework Consultants for Air Quality Management the task of evaluating the RAPIDC programme. The evaluation should be made early fall 2007.

Background

Sida has since 1992 supported the "Programme for Atmospheric Environment Issues in Developing Countries", implemented by Stockholm Environment Institute (SEI). The Programme was evaluated for the period 1992–97 and the evaluation published in Sida Evaluation 99/18. At that time climate issues and the protection of the ozone layer were also in the programme.

However, from 1998 and onwards, the programme has focused on air pollution and was named Regional Air Pollution in Developing Countries (RAPIDC) with the website at: www.rapidc.org. The programme is now in its third phase. The budget during the different phases is given in table below.

Phase	Year	Budget Asia	Budget Africa	Total budget
I	1999–2000	n.a.	n.a.	17.2
II	2001–April 2005	30.3	4.8	35.1
III	May 2005–April 2008	33.3	13.3	46.6

The RAPIDC Programme has focused on South Asia and the implementation of the "Malé Declaration on the Control and Prevention of Air Pollution and its Likely Transboundary Effects for South Asia", which was adopted by the South Asia Co-operative Environment Programme (SACEP) Governing Council in 1998.

In southern Africa the development of the Air Pollution Information Network for Africa (APINA) has been supported.

In addition four scientific networks have also been developed:

- The Composition of Asian Deposition (CAD)
- The Air Pollution and Crop Effects Network (APCEN)
- The Corrosion Network (CORNET)
- Air Pollution in Mega Cities of Asia (APMA)

Programme Organisation

The Stockholm Environment Institute has from the start had a leading role in management, coordination and as scientific adviser to RAPIDC. However, this present phase is to be seen as a bridging phase where more responsibility is to be taken by the partners in Asia and Africa respectively. Discussion is now taking place within RAPIDC Asia and Africa and the scientific networks on how to proceed since Sida has stated that the present phase will be the last when Sida will sign a contract with SEI.

The programme is now steered by a Programme Management Committee (PMC) with members from SEI, UNEP RRCAP, SACEP, IES and UNZA[1]. A technical advisory committee (TAC) gives technical guidance. Most of the Swedish resource persons that contribute to RAPIDC serve at TAC.

In addition Sida has appointed a Programme Advisory Group (PAG) under the chairmanship of Lars Nordberg with two additional members from Europe, two from Asia and one from Africa. The purpose of PAG is to provide Sida with advice regarding the development of RAPIDC.

Purpose of the Assignment

The last evaluation covered the period up until 1997, thus it is 10 years since an evaluation was made. Sida would like to have an evaluation as a basis for a decision for further support in case the RAPIDC partners will approach Sida for additional funding when present phase ends.

The purpose of the evaluation is to assess the extent to which the objectives and results of RAPIDC have been achieved in an effective and efficient manner. Further to provide recommendations and lessons learned from programme implementation.

Scope of Work

The evaluation should cover phases 1, 2 and 3 up until the date of the evaluation and it should include all parts of RAPIDC.

In carrying out the evaluation the consultant shall, but not be limited to, address the following issues:

(i) A summary evaluation of the programme and of its major components undertaken to date and a determination of progress towards achievement of its overall objectives and results.

(ii) An evaluation of project performance and efficiency in relation to the indicators, assumptions and risks specified in the logical framework matrix and the Project Document. Determine the usefulness of the indicators specified.

(iii) An assessment of the scope, quality, and significance of the project outputs and results produced to date in relation to expected results. The sustainability of the programme should be assessed as well as poverty and gender aspects.

(iv) An analysis of the extent of cooperation engendered and synergy created by the programme in each of its component activities, between national and regional level activities and the nature and extent of commitment among the countries (ownership) and institutions involved. The extent of North- South and South-South cooperation should be covered.

(v) An assessment of RAPIDC in the international policy development regarding air pollution. The contribution of RAPIDC for the world-wide development of air quality management tools and policy development. The role RAPIDC plays on the international arena should be assessed.

(vi) Identification and, to the extent possible, quantification of any additional outputs and outcomes beyond those specified in the Project Document.

(vii) An assessment of the functionality of the institutional structure established and the role of the Program Management Committee (PMC), the Technical Advisory Committee (TAC) and the Programme Advisory Group (PAG)

[1] UNEP RRC AP (Regional Resource Centre for Asia and the Pacific), SACEP (South Asia Cooperative Environmental Programme), IES (Institute of Environmental Science, University of Zimbabwe), UNZA (University of Zambia)

(viii) An evaluation of project coordination, management and administration provided by the PMC. This evaluation should include specific reference to:

a. Organizational/institutional arrangements for collaboration among the various agencies and institutions involved in project arrangements and execution;

b. The effectiveness of project management in terms of cooperation within PMC, assignment and execution of project activities, and flexibility of management in terms of responsiveness to the need for changes in financial allocations, timing of activities, or mode of operation;

c. The effectiveness of the monitoring mechanisms currently employed by the Project

d. Monitoring progress in project execution on a day to day basis;

e. Administrative, operational and/or technical problems and constraints that influenced the effective implementation of the project and present recommendations for any necessary operational changes; and

f. Financial management of the project, including the balance between expenditures on administrative and overhead charges in relation to those on the achievement of substantive outputs.

(ix) Assessment of the work of the Programme Advisory Group (PAG).

(x) A qualified assessments of the extent to which project outputs to date have scientific credibility.

(xi) An assessment of the extent to which scientific and technical information and knowledge have influenced the execution of the project activities. Assessment of to what extent the results have been used to underpin policy development in the regions, including multilateral cooperation.

(xii) Assessment of outreach activities to different stakeholders and stakeholder involvement in the project. An assessment of how the results have been presented to different stake holders.

(xiii) An evaluation of the strategy and approaches adopted by the project regarding the raising of co-financing support to ensure financial sustainability.

(xiv) Lessons learned during project implementation.

Recommendations regarding any necessary corrections and adjustments to the overall project work plan and timetable for the purposes of enhancing the achievement of project objectives and outcomes.

Logistics and Timing

The assignment shall be carried out between August and November 15, 2007. The consultant shall in the tender present hers/his interpretation of the assignment including a tentative work plan, timing, proposed approach and methodology. Minimum 6 person weeks is required for the assignment.
The minimum required number of international travel missions will be three: one to South Asia for the annual meeting of the Malé Declaration and one to Africa, possibly Zimbabwe for the annual APINA Meeting. They are both scheduled for September/October 2007. One visit to SEI, York, UK.

Qualifications

The assignments shall be carried out by one consultant or a team of consultants with the following qualifications:

- Availability for the above described assignment.
- Vast experiences from air quality management work in developing countries.
- Considerable experience of evaluation, both theoretical and practical.
- Good knowledge of development issues.
- Understanding of the assignment.

Consultants that have been involved in RAPIDC activities will be disqualified.

Reporting and Documentation

A draft report shall be delivered to Sida latest October 31. The final report shall be delivered 15 November 2007. The report should be written in English language and be limited to 30 pages (excluding annexes). The report should include an executive summary, lessons learned, recommendations and the terms of reference.

Available Documents

Shorter half year reports and more comprehensive full year reports are produced by RAPIDC. A final report for the period April 2001–April 2004 is available. Documents on increased ownership have been prepared.

PAG have produced comments on the full year reports and the chair of PAG has produced comments on half year reports.

Several scientific articles, books and technical manuals, available from SEI.

Annex II: Persons Interviewed during the Evaluation

Prof. Madhoolika Agrawal, Department of Botany, Banaras Hindu University, India.

Dr. Lal Prasad Amgain, Assist Professor, Agronomy, Institute of Agriculture and Animal Science, Tribhuvan University, Nepal.

Prof. Harold Annegam, University of Witwatersrand, South Africa.

Dr. Arvind Anil Boaz, Director General, South Asia Cooperative Environmental Programme (SACEP).

Mr. Patrick Bueker, Stockholm Environment Institute – York, University of York.

Mr. Barney Chipindu, Task Team Leader Socio-economic Issues, University of Zimbabwe.

Mr. Juliao Cumbane, APINA Country Representative, Mozambique.

Dr. Sam Ekstrand, IVL Swedish Environmental Research Institute Ltd.

Dr. Lisa Emberson, Stockholm Environment Institute – York, University of York.

Prof. Sara Feresu, Institute of Environmental Studies, University of Zimbabwe.

Mr. Kenneth Gondwe, Task Team Leader Emission Inventory, Malawi.

Mr. Quazi Sarwar Imtiaz Hashmi, Deupty Director, Department of Environment, Bangladesh.

Dr. Kevin Hicks, Stockholm Environment Institute – York.

Mr. Cornia Huizenga, Head of Secretariat, Clean Air Initiative for Asian Cities (CAI-Asia).

Mr. Mylvakanam Iyngararasan, Senior Programme Officer, UNEP RRC.AP.

Dr. Johan Kuylenstierna, Director, Stockholm Environmental Institute – York.

Mr. Marcus Liljeberg, Swedish Environmental Research Institute Ltd.

Ms. Thabisa Mbungwana, APINA Country Representative, South Africa.

Ms. Kezia Mbwanbo, APINA Country Representative, Tanzania.

Mr. Lars Nordberg, Chairman PAG.

Mr. Raghunathan Rajamani, Ex-Secretary, Ministry of Environment & Forestry, India.

Prof. Dr. S. Razi Abbas Shamsi, Department of Botany, University of the Punjab, Pakistan.

Mr. Surendra Shresta, Regional Director UNEP RRC.AP.

Prof. Stephen Simukanga, University of Zambia.

Dr. Karin Sjøberg, IVL Swedish Environmental Research Institute Ltd.

Ms. Sara Stenhammar, Environmental Adviser, Swedish International Development Cooperation Agency (Sida).

Mr. Harry Vallack, Stockholm Environmental Institute – York.

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