An Introduction to the Regional Air Pollution in Developing Countries (RAPIDC) Programme

Frank Murray, Murdoch University, Perth, Australia

**Malé Declaration: 2nd National Stakeholders Workshop**

RAPIDC has been through three Phases. This is Phase Three. The programme is funded by Sida, the international development agency of Sweden
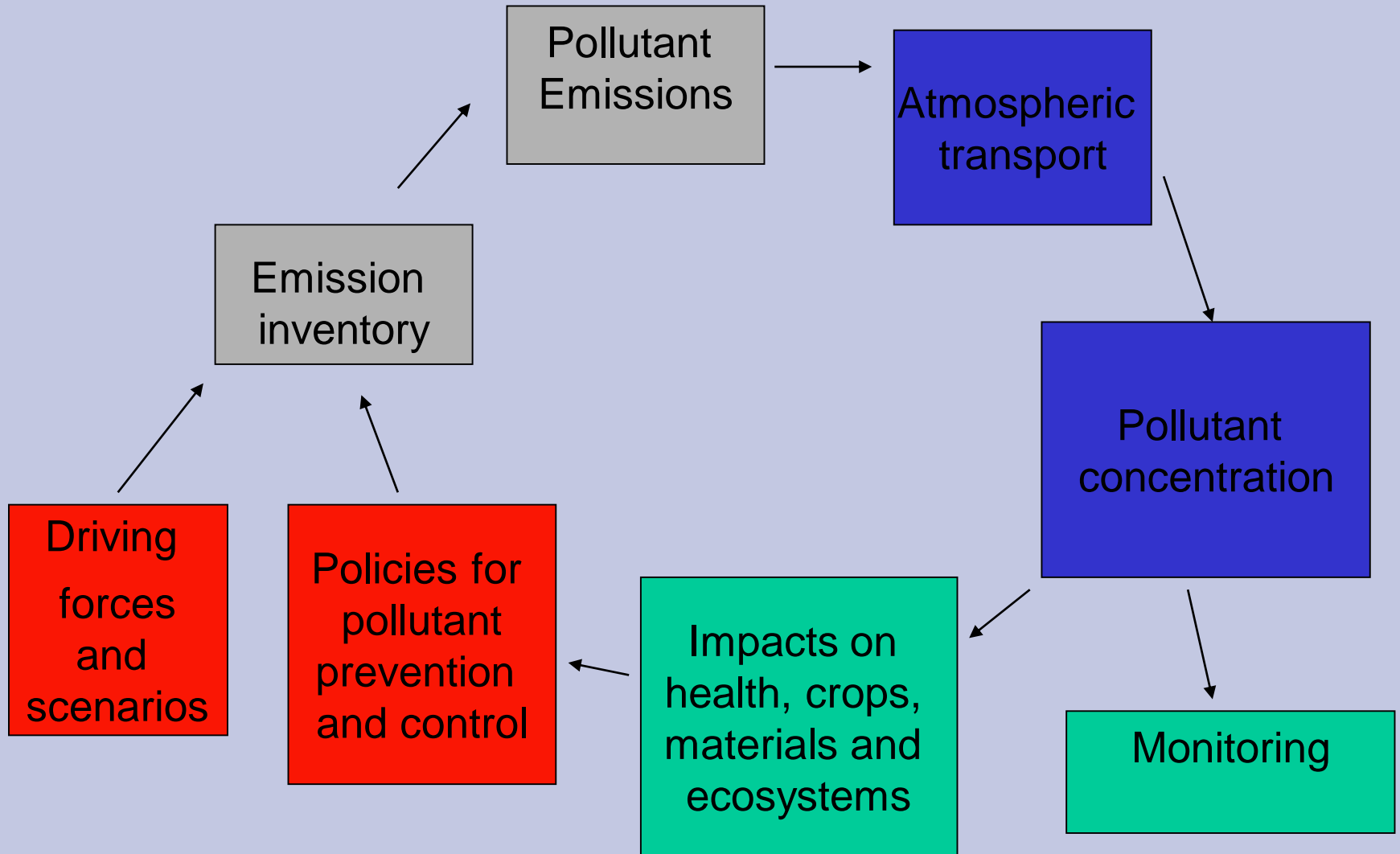
RAPIDC Programme Purpose
'**to facilitate the development of agreements and/or protocols to implement measures which prevent and control air pollution through promoting international cooperation and developing scientific information for the policy process'**
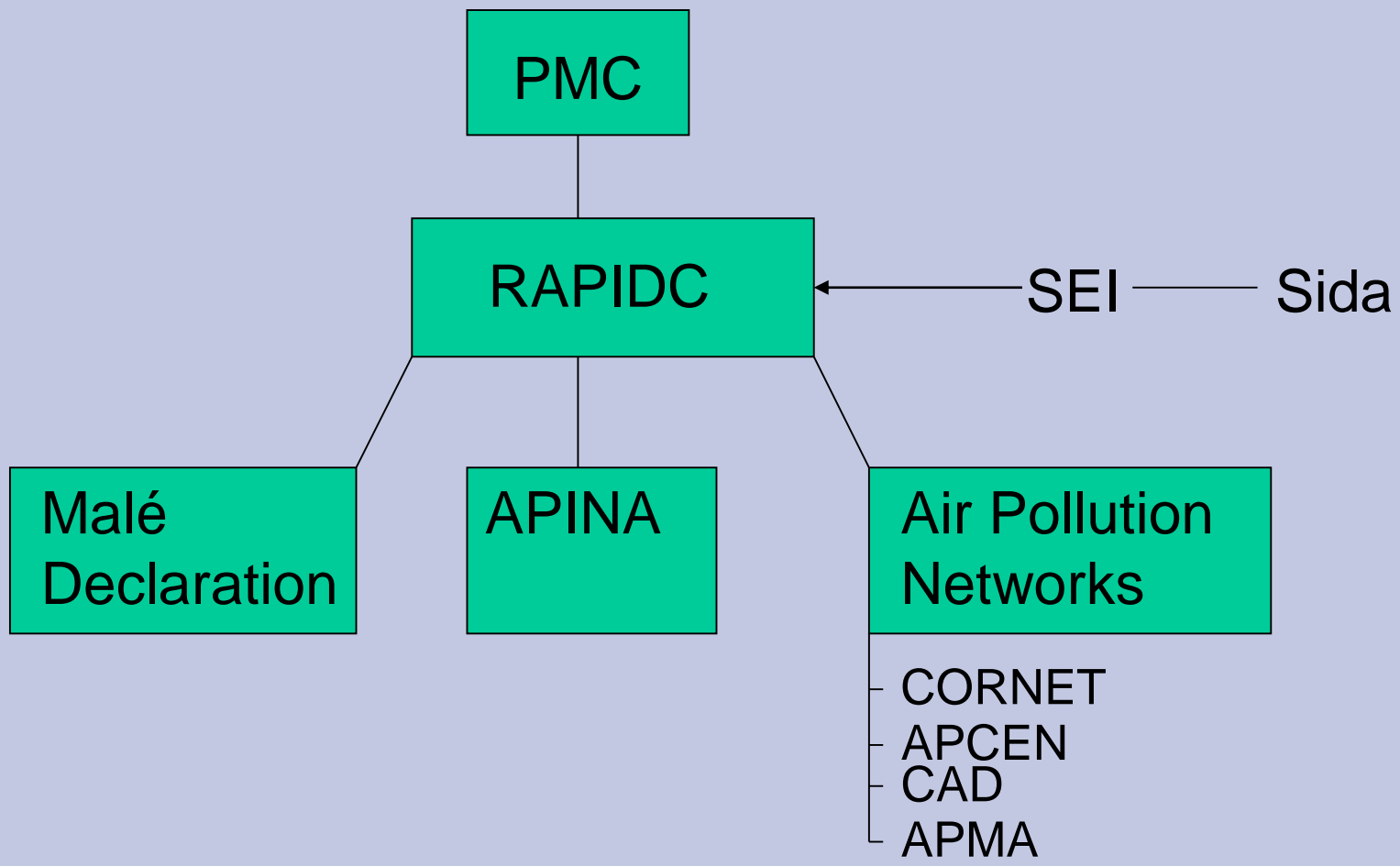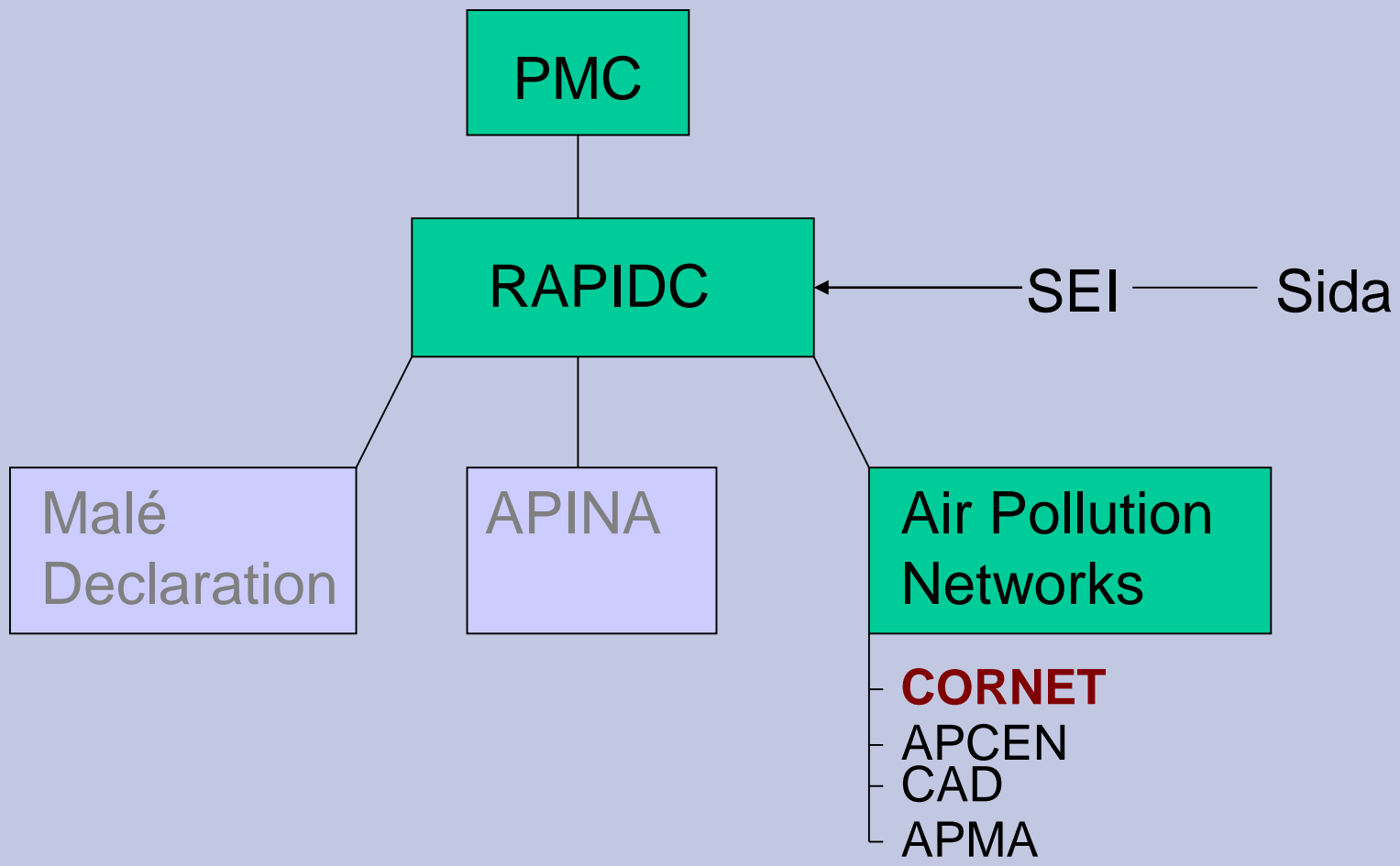
RAPIDC Approach
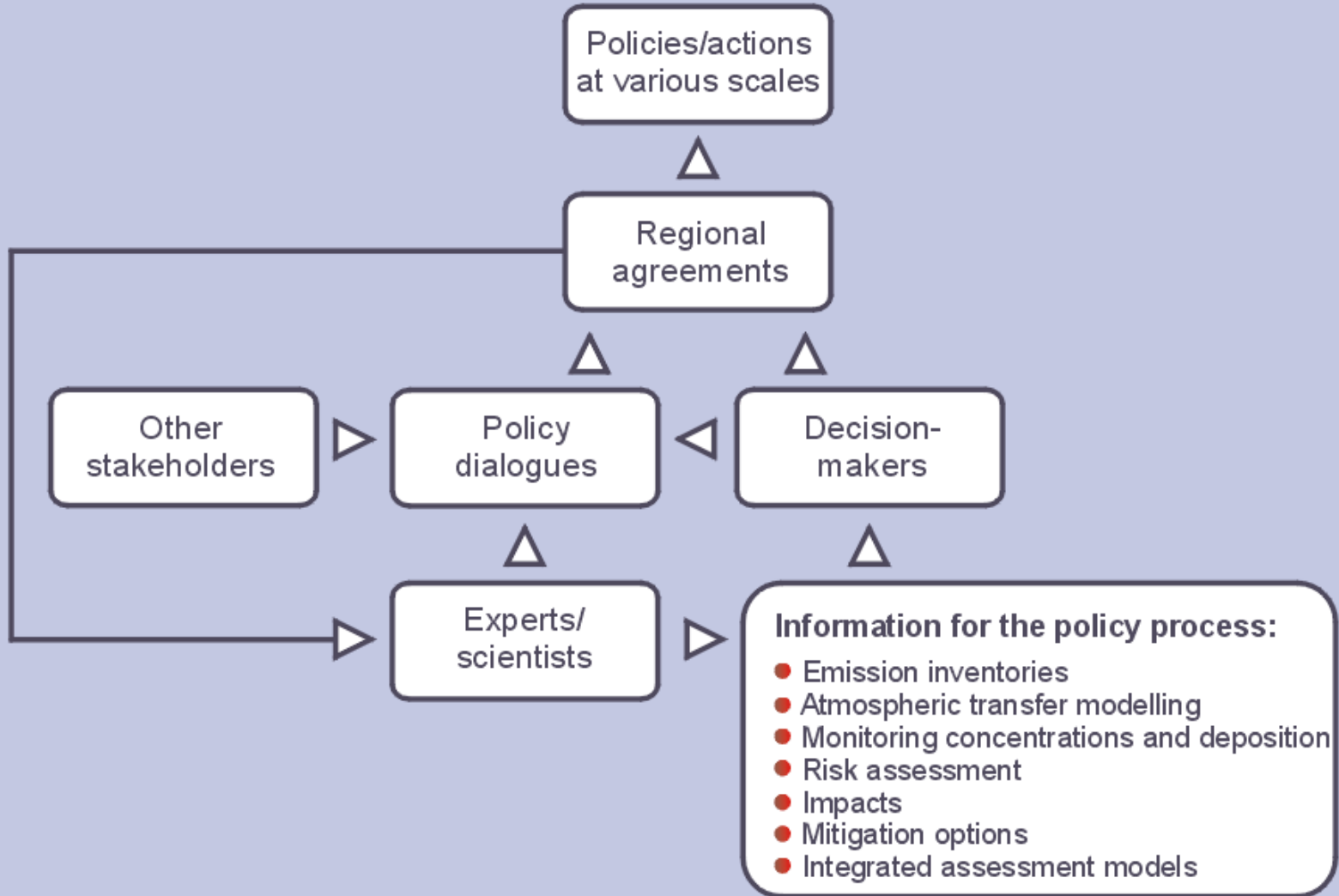
Phase Three RAPIDC Structure

RAPIDC Structure

Networl: CORNET – Corrosion Network

Global network of scientists looking into the impact of air pollution on the corrosion of materials

i.   **Exposing standard samples on racks**
     Network of sites across Asia and southern Africa

ii. **Exposure of kits**

iii. **Stock at risk study**

iv. **Heritage impacts**

Air Pollution and Corrosion in Europe
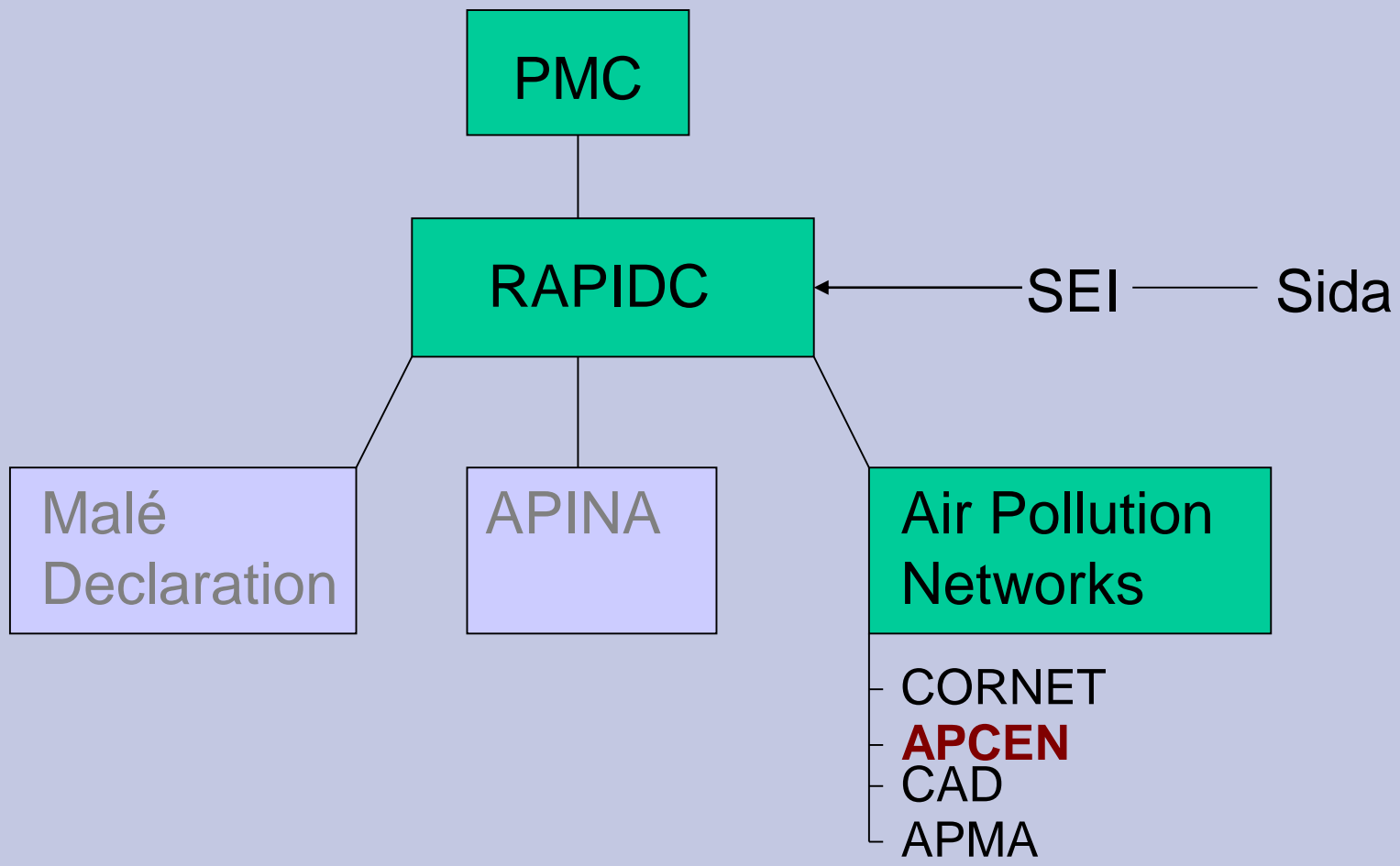

Impacts in Central Germany

RAPIDC Structure

APCEN – Air Pollution Crop Effects Network

Global network linking air pollution and crop effects scientists

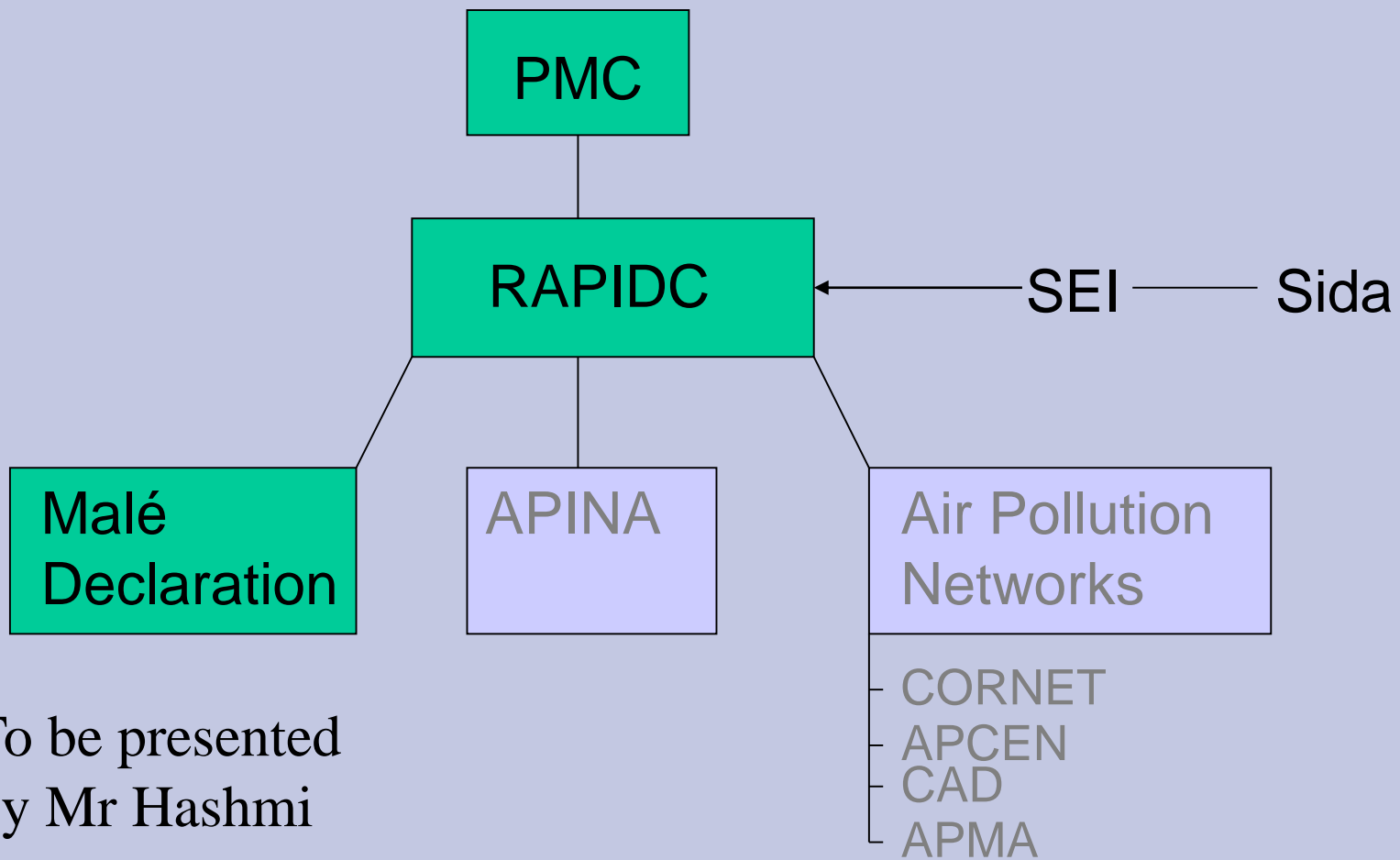**Developing methods, consistent with UNECE activities, for use in Malé Declaration and APINA**

Project activities:

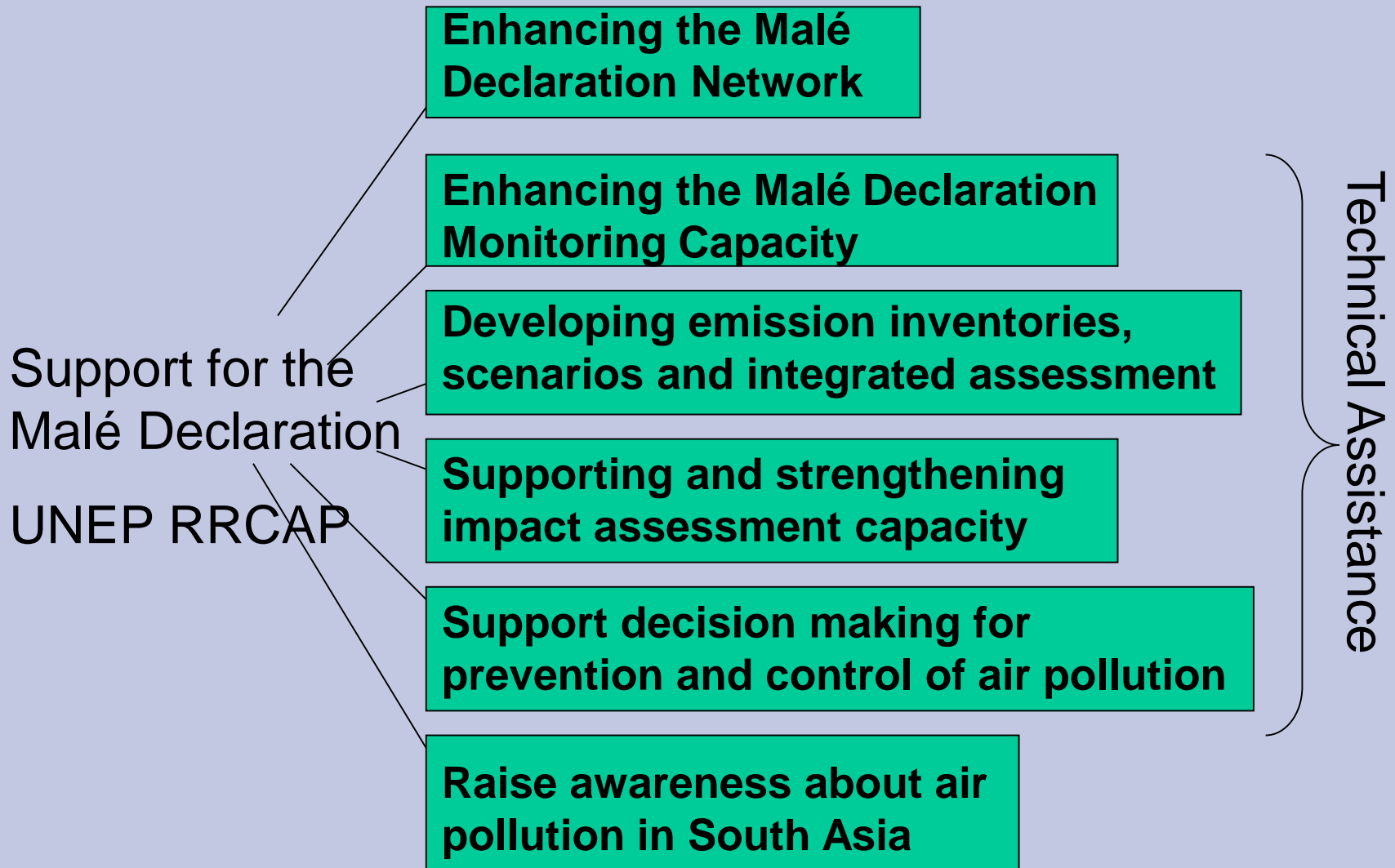• Using Indicator Plants

• Chemical protectant studies

• Coordination of exposure experiments

RAPIDC Structure

PMC

RAPIDC ← SEI —— Sida

Malé Declaration

APINA

Air Pollution Networks

CORNET
APCEN
CAD
APMA

To be presented
by Mr Hashmi

RAPIDC
Regional Air Pollution in Developing Countries

Enhancing the Malé Declaration Network

Enhancing the Malé Declaration Monitoring Capacity

Developing emission inventories, scenarios and integrated assessment

Supporting and strengthening impact assessment capacity

Support decision making for prevention and control of air pollution

Raise awareness about air pollution in South Asia

Support for the Malé Declaration

UNEP RRCAP

Technical Assistance

RAPIDC
Regional Air Pollution In Developing Countries

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Technical Assistance

Monthly mean concentrations of NO_2
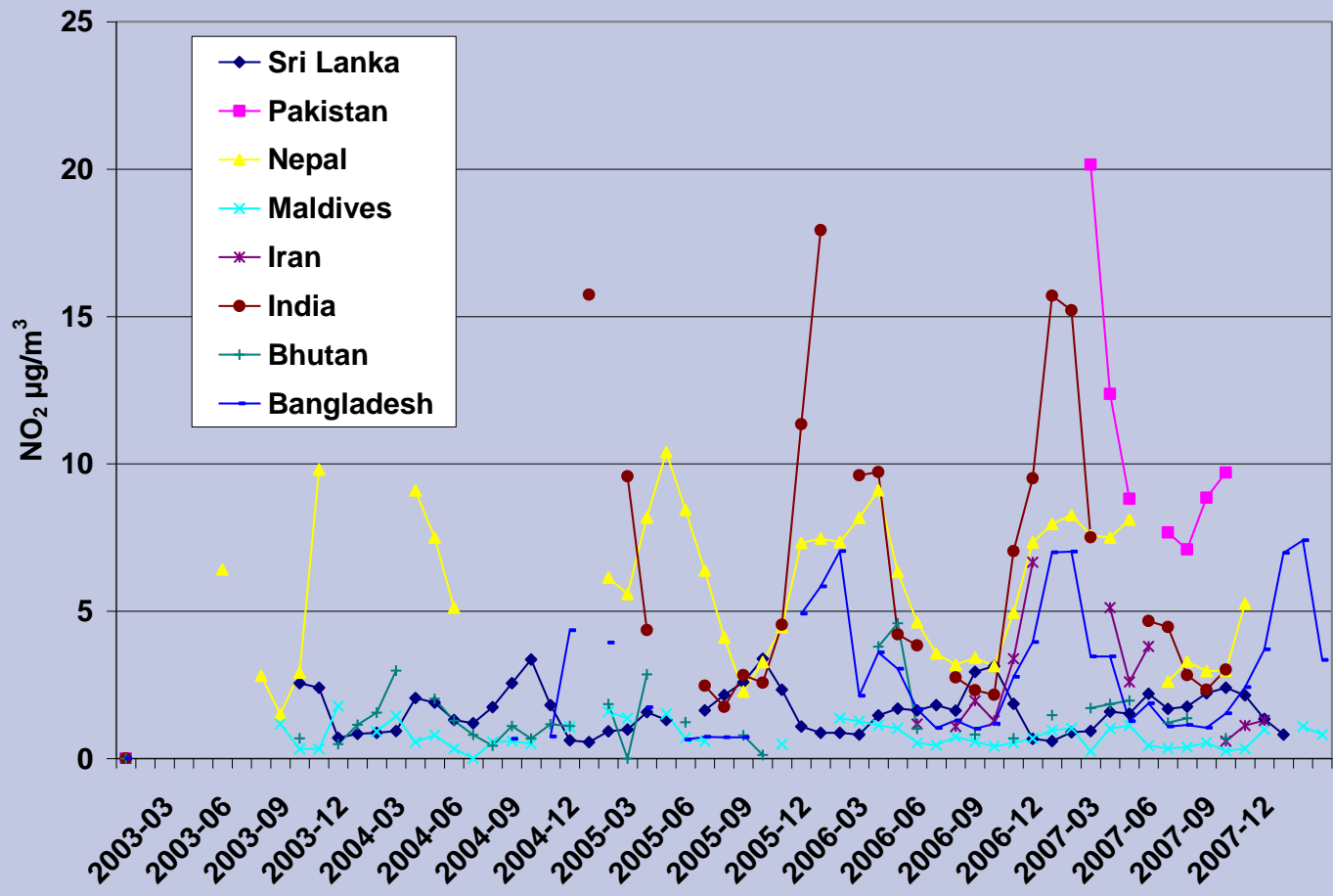
• Pakistan shows highest values

• Low levels in the Maldives, Bhutan and Sri Lanka.

• India, Bangladesh and Nepal show similar variation pattern, but with higher levels in India.

Support for the
Malé Declaration

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Technical Assistance

Atmospheric Transport of Pollutants

- MATCH model in Malé IIAS

  S, N, O_3, $PM_{2.5}$

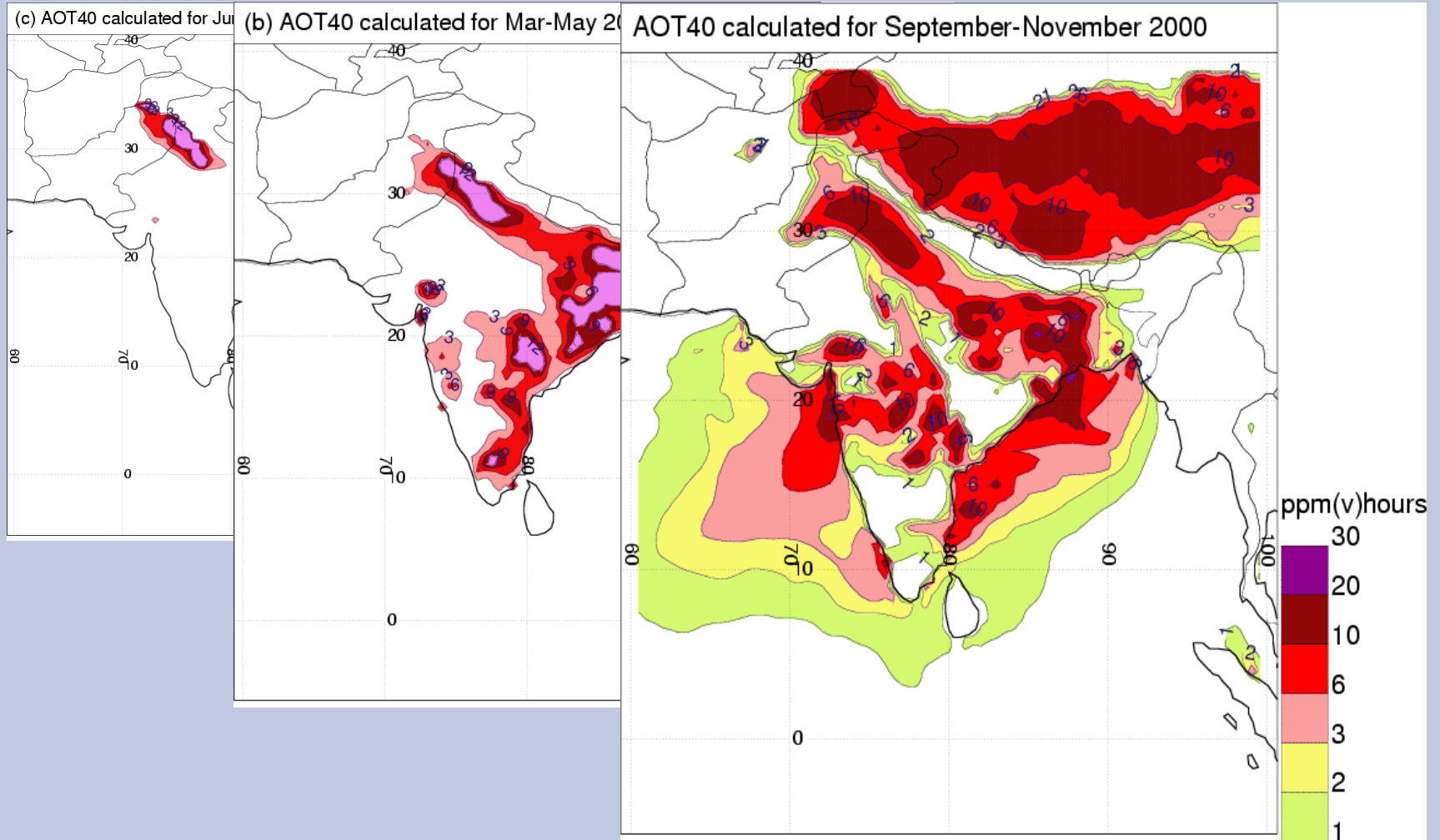- Training in principles of atmospheric transport

- MATCH model installed at Malé Secretariat, UNEP RRCAP

- A presentation on the emissions inventory will be made by Mr Ahsan & Mr Hassan

Monthly-accumulated, Total sulphur deposition (incs)

SMHI TUE 01 FEB 2000 00Z+000
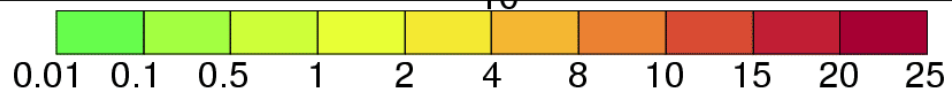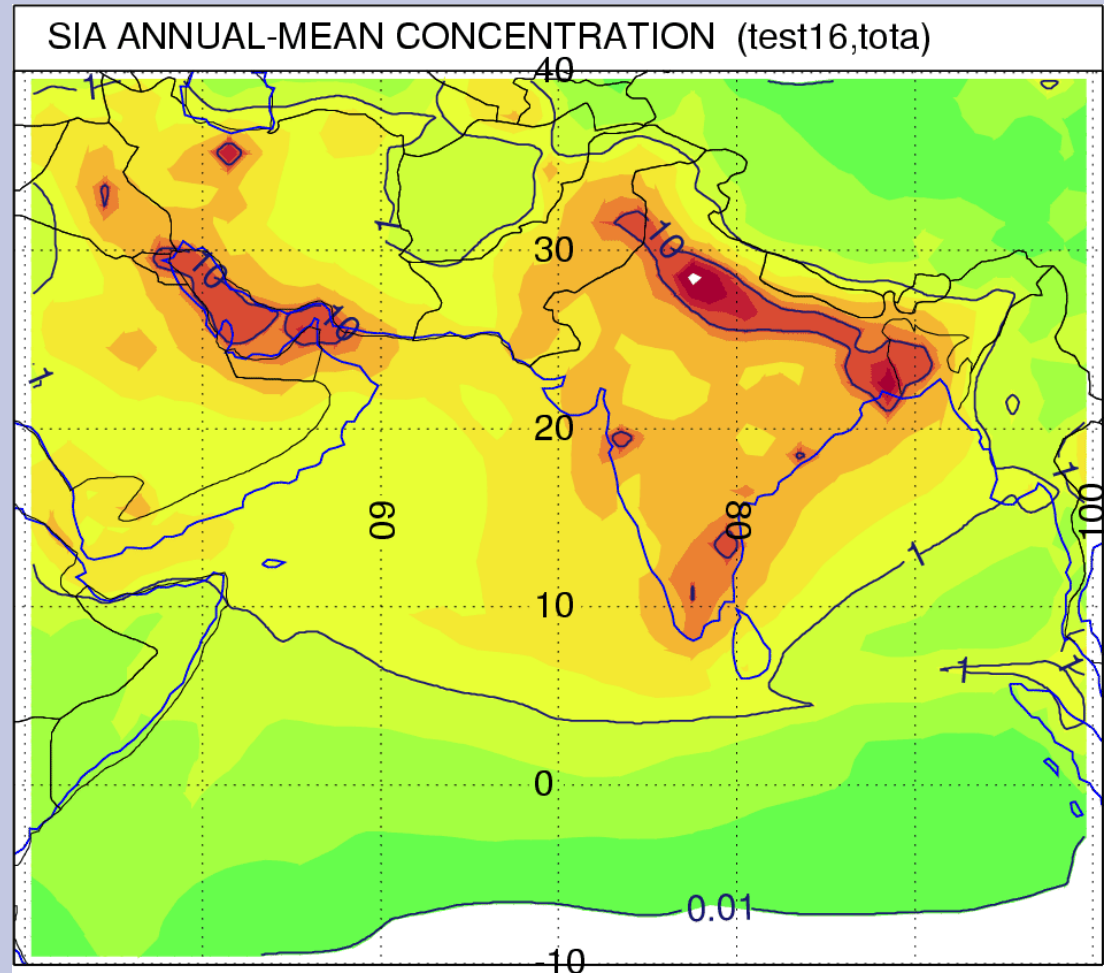
0.01 0.05 0.1 0.2 0.4 0.6 0.8 1 2 4
gS/m2yr
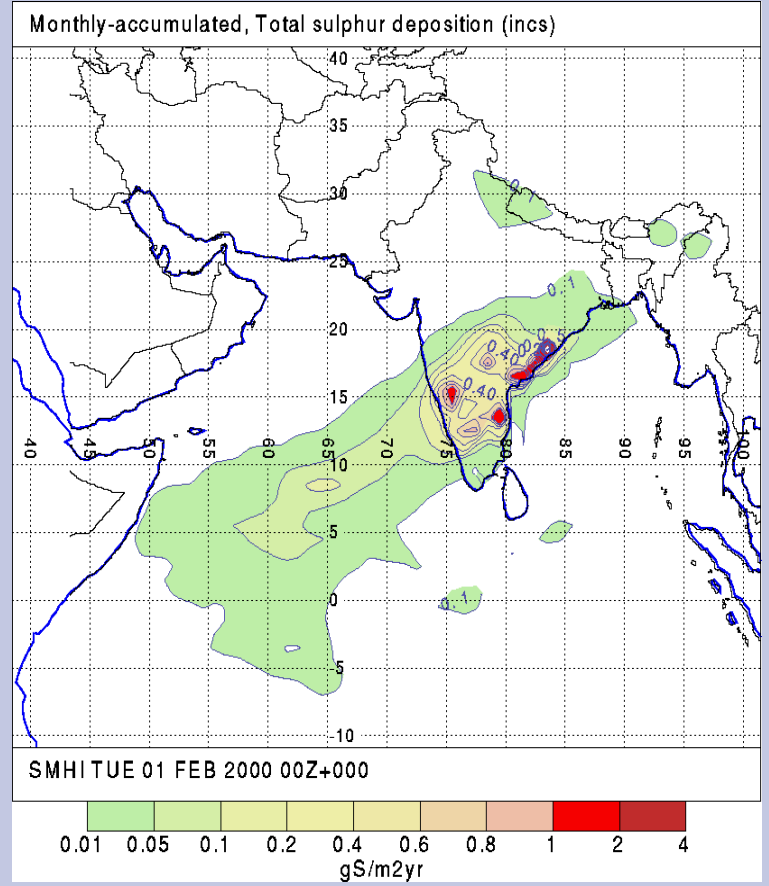
Ozone modelling in South Asia

Modelled three-month AOT40 (accumulated over 40 ppb(v))
over snow-free land areas of South Asia during 2000.

PM2.5 concentration from MATCH model from Secondary Inorganic Aerosols

SIA ANNUAL-MEAN CONCENTRATION (test16,tota)

INTEGRATED INFORMATION AND ASSESSMENT SYSTEM

Pollutant Emissions

Atmospheric transport

Emission inventory

Pollutant deposition or concentration

Driving forces and scenarios

Policies for pollutant prevention and control

Impacts on health, crops, materials and ecosystems
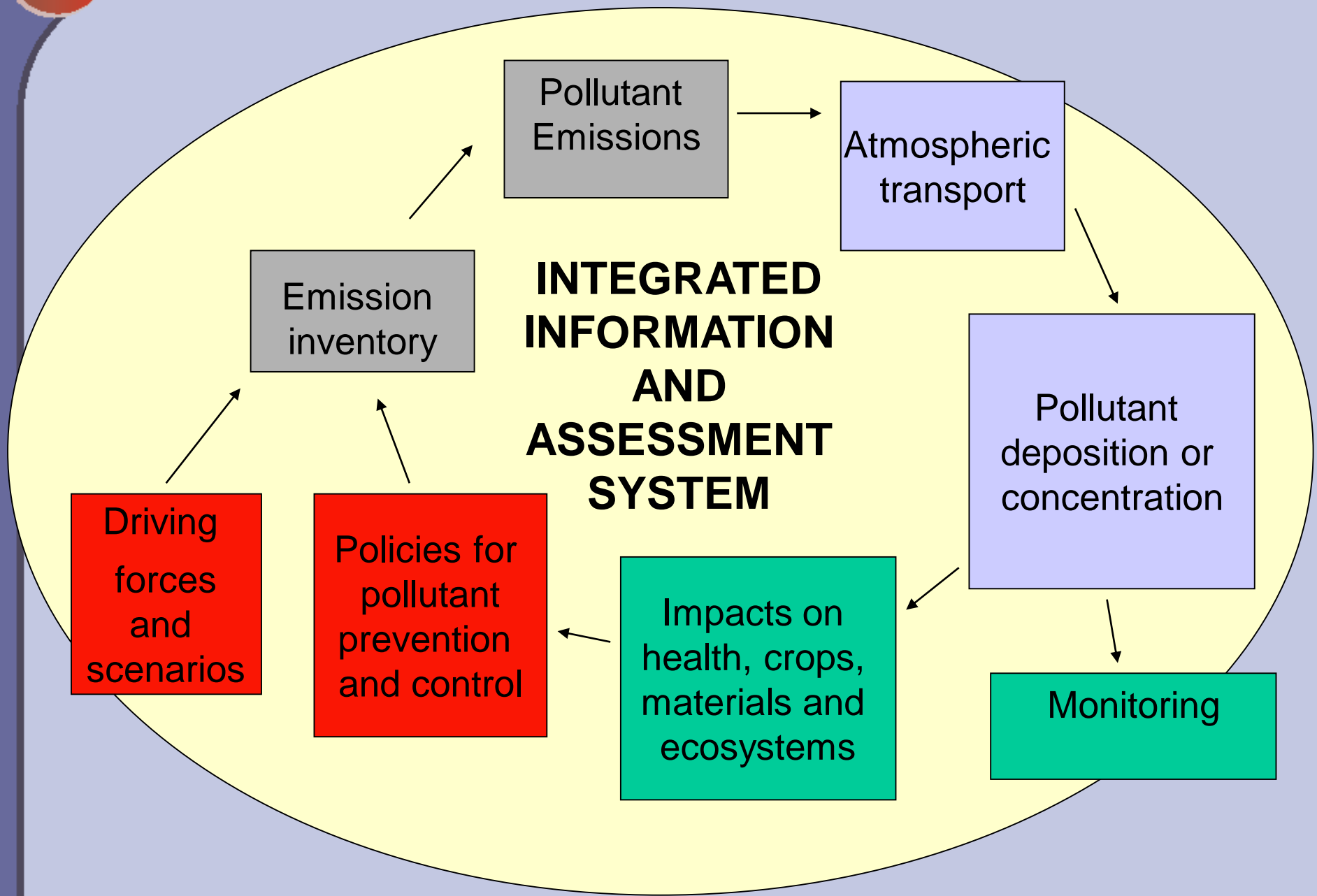
Monitoring

Rapid Urban Assessment for Cities - the Process

Satellite data and digital maps. Top - down and bottom-up approach for the establishment of an emission database.

Emission Data-base

Dispersion Modelling

Map 1

NOx (ton/km2,year)

0 - 5
5 - 15
15 - 30
30 - 45
45 - 60
60 - 80
80 - 105
105 - 230
230 - 430
430 - 2300

NOx (µg/m3)
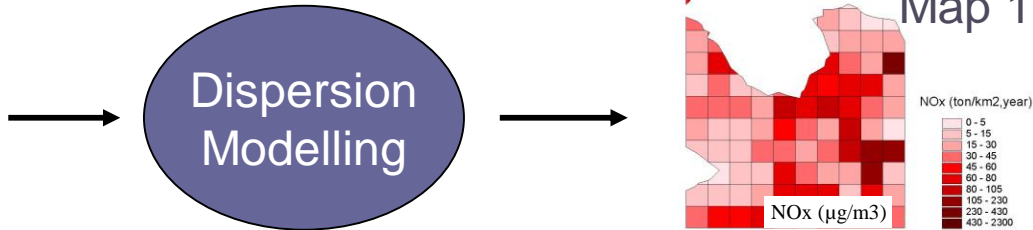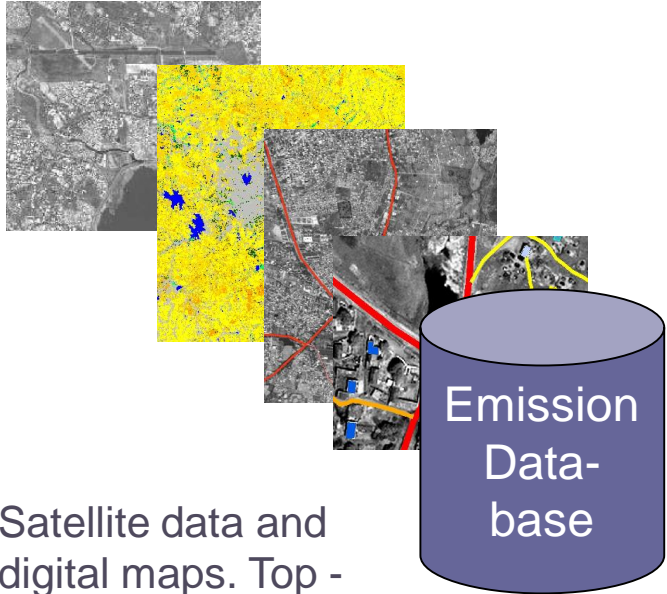
Emission analysis & modelling

Two parallel processes - monitoring and modelling.

Monitoring

Map 2

NOx (ton/km2,year)

0 - 5
5 - 15
15 - 30
30 - 45
45 - 60
60 - 80
80 - 105
105 - 230
230 - 430
430 - 2300

NOx (µg/m3)
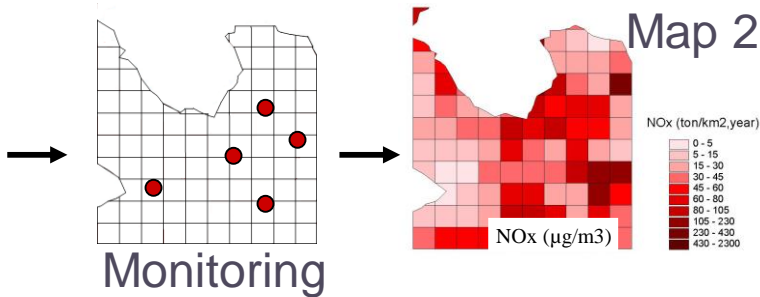
New technologies: eg PM Monitoring with DustTrak

DustTrak provides hand-held, reliable, real time measurement of TSP, PM10, PM2.5 and PM1 for about $5000

RAPIDC
Regional Air Pollution In Developing Countries

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Raise awareness about air pollution in South Asia

Technical Assistance

Human health impacts

1. Hold training workshops in assessment methods (*in Bangkok October 2006 and in 2007*)

2. Health study in Dhaka (to be presented by Dr Karim & Dr Hossain)

| Particle Size (mm)	Effect
9.2 to 30	Visible Pollution
5.5 to 9.2	Lodges in nose/throat
3.3 to 5.5	Main breathing passages
2.0 to 3.3	Small breathing passages
1.0 to 2.0	Bronchi
0.1 to 1.0	Air sacs
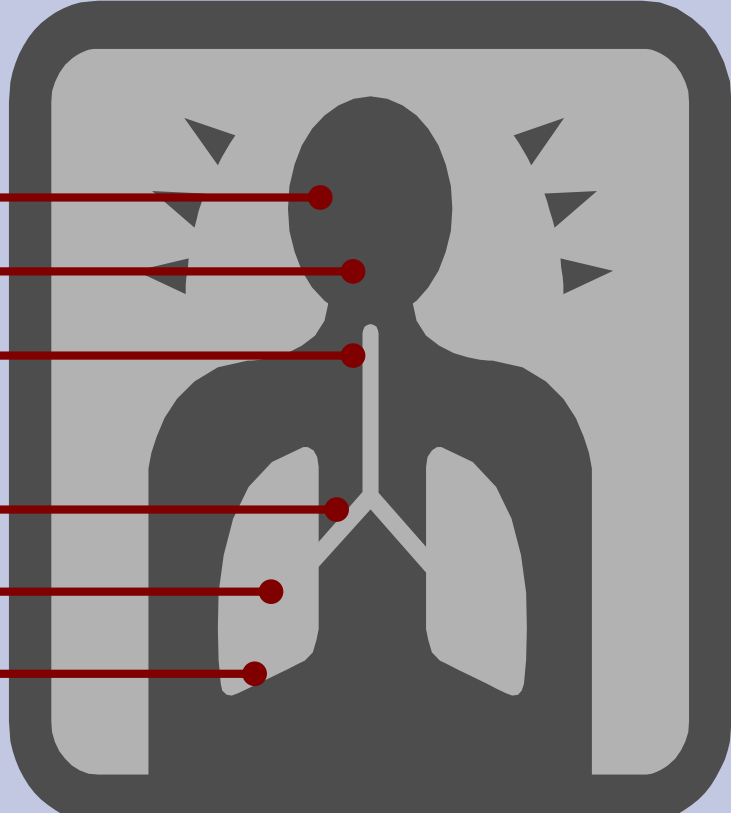
Study to determine air pollution impacts on health of schoolchildren in Dhaka

To assess the impacts on health of asthmatic and non-asthmatic children of variable daily exposures to PM_{10} and $PM_{2.5}$

Risks of soil acidification
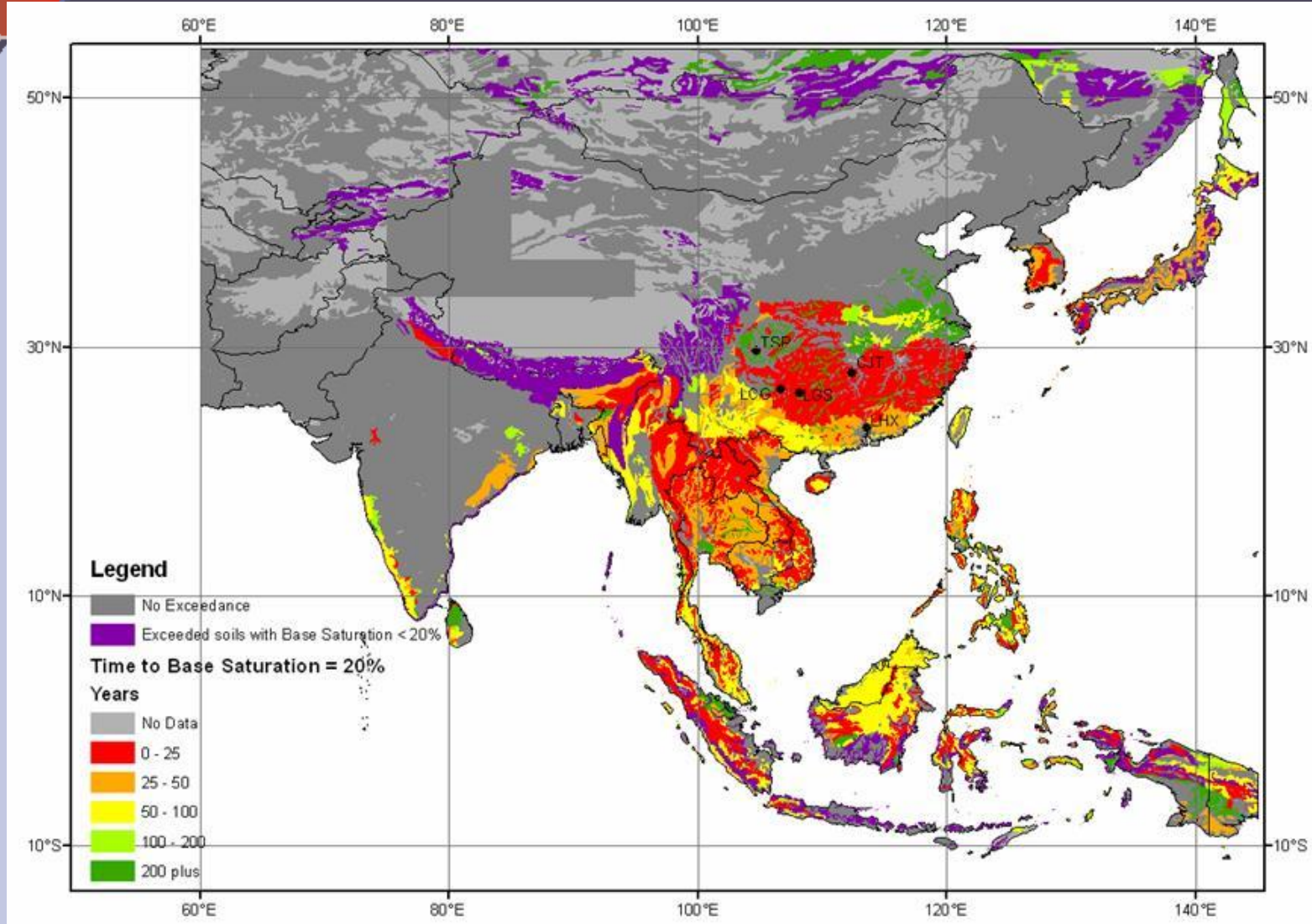
Hicks, Kuylenstierna, Owen, Dentener, Seip and Rodhe, Ambio 2008

'Pessimistic' case map showing number of years for soil acidification to 20% BS in the top 50cm of soil

Malé Declaration Crop Impacts Study

Project activities (to be presented by Prof Sattar & Mr Hassan):

• Using Indicator Plants to assess risk of ozone pollution

• Chemical protectant studies

• Ozone survey (Bhutan)

• Training

Countries:

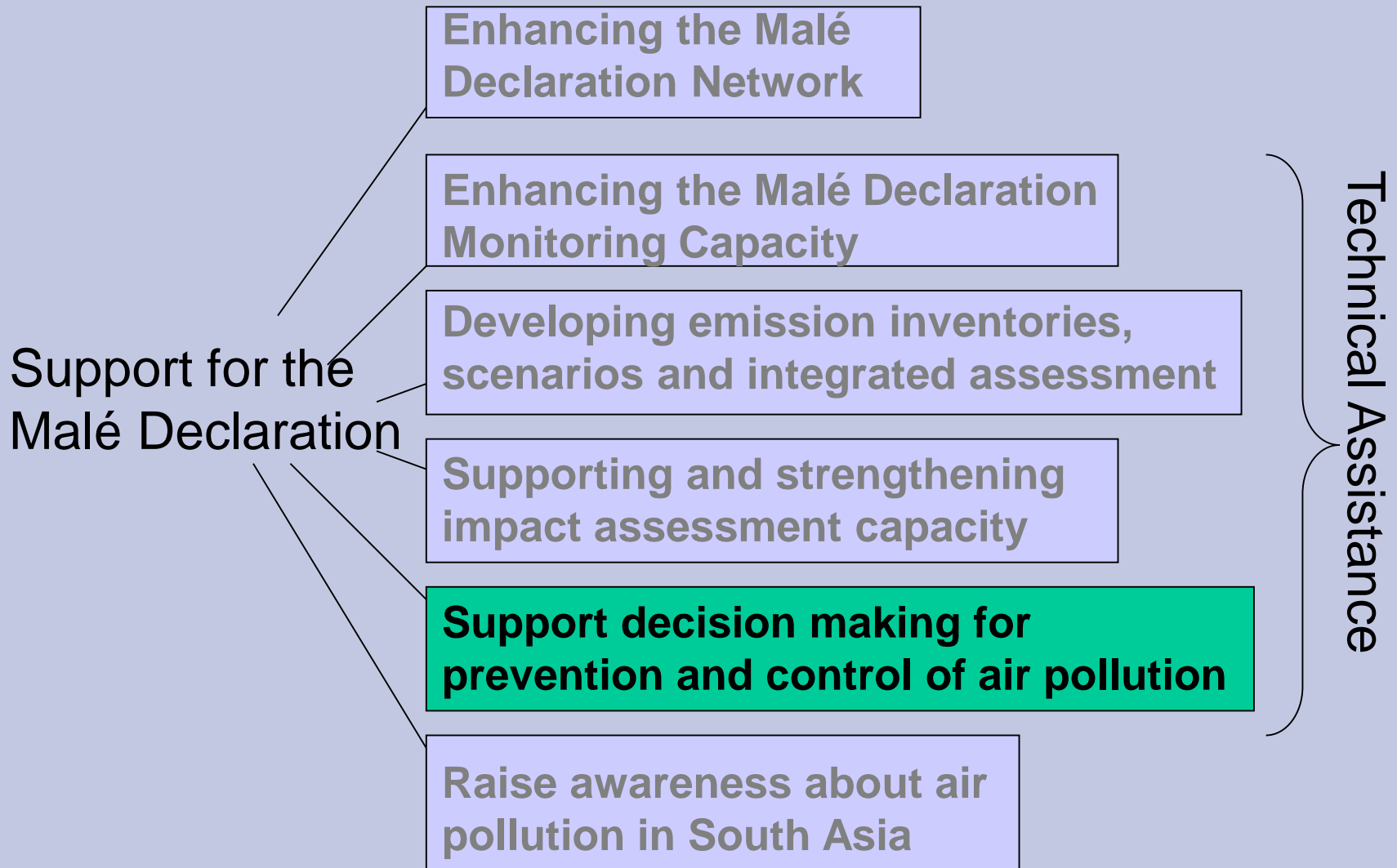Bangladesh
Bhutan,
India,
Pakistan,
Sri Lanka

Malé Corrosion Activities

Passive samplers

Corrosion kit

Main rack and kit including passive samplers

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Technical Assistance

Malé Policy Options

- Policy case study manual by IIIEE: '*Policy Options for Air Pollution Prevention and Control*' in South Asia

- Complemented by 'Compendium of best practices on Prevention and Control of Air Pollution' by Ram Shrestha (AIT)

- Perspectives on implementation of international and regional good practice in different Malé countries by SEI

- Three training courses held in 2006, 2007 and 2008

SEI Project:
Perspectives on Air Pollution Control Policy in South Asian Countries

- **Case Study Countries:**
  - ❖ **Bangladesh**
  - ❖ **India**
  - ❖ **Nepal**
- **Qualitative Research:**
  - ❖ **18 Interviews with AQM experts**
  - ❖ **Literature Reviews**
  - ❖ **Qualitative data analysis using NVivo software**

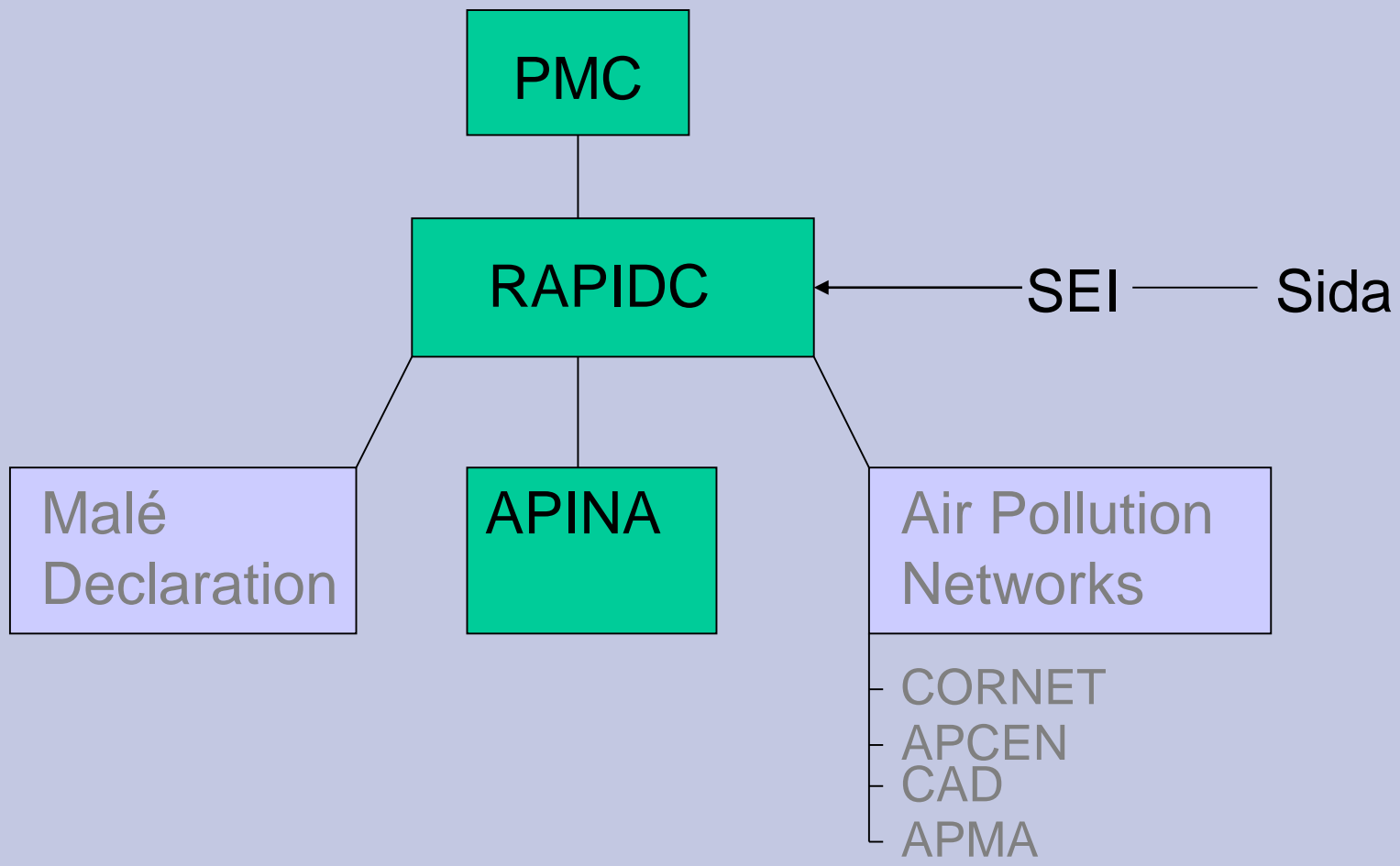| City/Country	Interview Examples
Delhi, India	• CPCB • MOEF • CSE • TERI
Dhaka, Bangladesh	• DOE • NIPSOM • BCAS • BAEC
Kathmandu, Nepal	• MOEST • Kathmandu Municipality • ENPHO

RAPIDC Structure

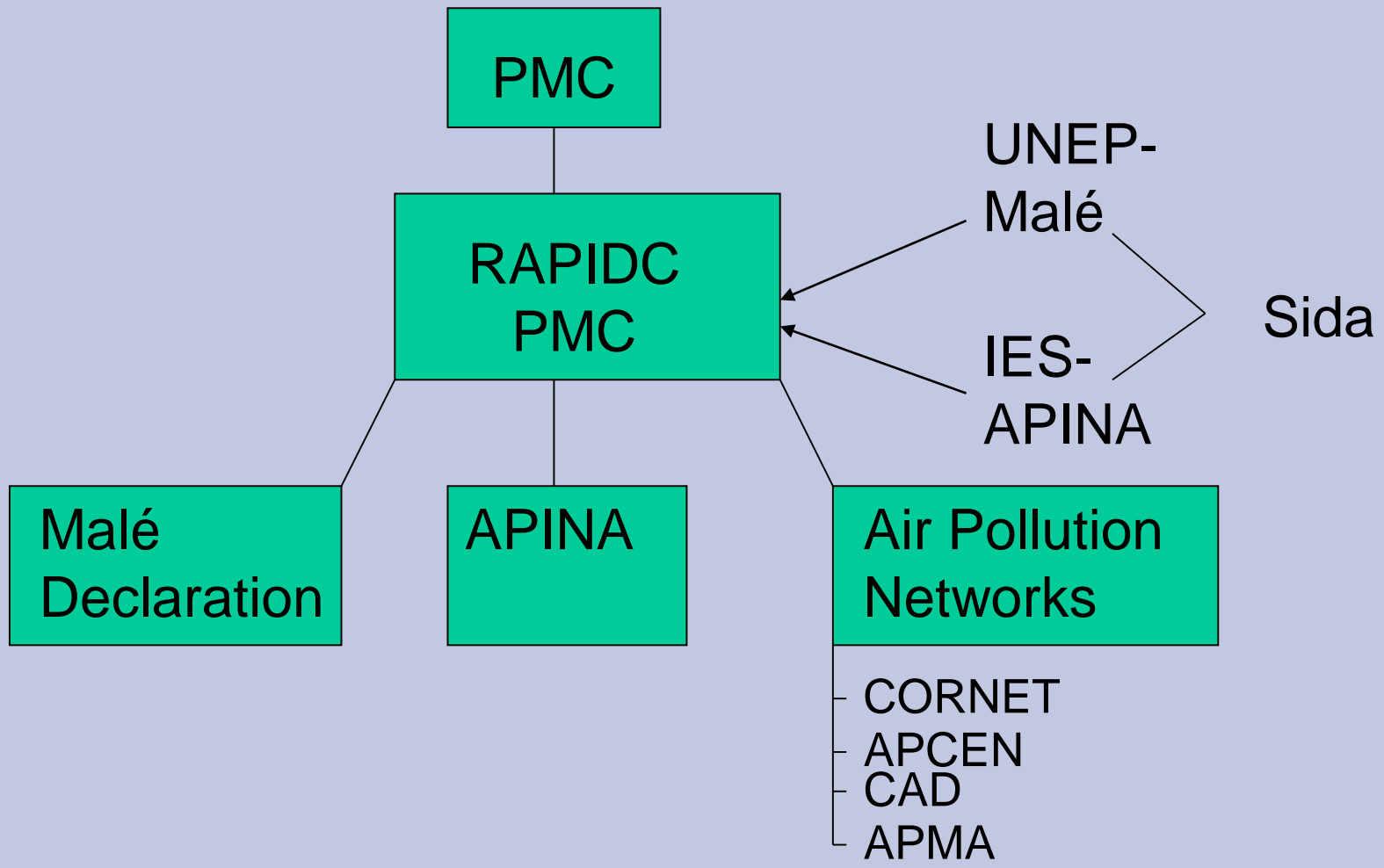# APINA – Air Pollution Information Network for Africa

- APINA is a network of policy makers, scientists, NGOs, industry and other stakeholders formed in 1998

- APINA has the objective to ensure that existing impacts of air pollution in Africa are tackled and emerging risks are prevented.

- It aims to fill the gaps in knowledge on air pollution and ensure that currently available information and concerns are articulated to policy makers in Africa.

APINA

AIR POLLUTION INFORMATION NETWORK-AFRICA

APINA Activities

Like Malé, APINA carries out activities on all aspects of the air pollution policy cycle including:

- Emission inventories (similar progress to Malé, linked to ministries)
- Atmospheric transfer modelling
- Deposition Monitoring
- Impacts (health, crops, ecosystems, corrosion)
- Rapid integrated urban assessment
- BAQ Sub-Saharan Africa (Training and Ministerial Meeting in Nairobi July 2006)
- Decision making support information
- Lusaka Agreement

Phase Four RAPIDC Structure

PMC

RAPIDC PMC

UNEP-Malé

IES-APINA

Sida

Malé Declaration

APINA

Air Pollution Networks

- CORNET
- APCEN
- CAD
- APMA

The Future:

Ownership

RAPIDC will not be coordinated by SEI in the future (2009-)

Direct contract between Sida and Malé Secretariat

SEI can continue to advise as required by countries/Secretariat

Countries will directly implement activities. RAPIDC can provide technical assistance

Priorities:

Consolidation of Monitoring Network and activities

Implementation of emission inventories and scenarios

Implementation of impact studies

Linkage to other regional initiatives

Conclusions

RAPIDC now has the foundations for further development of agreements and policies in the Malé region

Serious impacts on health, crop yields and corrosion have been demonstrated

RAPIDC can now move confidently into Phase Four where regional frameworks to further develop emission prevention and control can be developed

Economic analysis and progress on policy development needs to be a greater focus

Thank you for your patience!