

# PROGRESS IN THE RAPIDC PROGRAMME: and planned activities in support of Phase III of the Malé Declaration

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***Aspects covered:***

- The role and aims of the RAPIDC Programme
- Planned activities in support of the Malé Declaration
- Goals of these projects

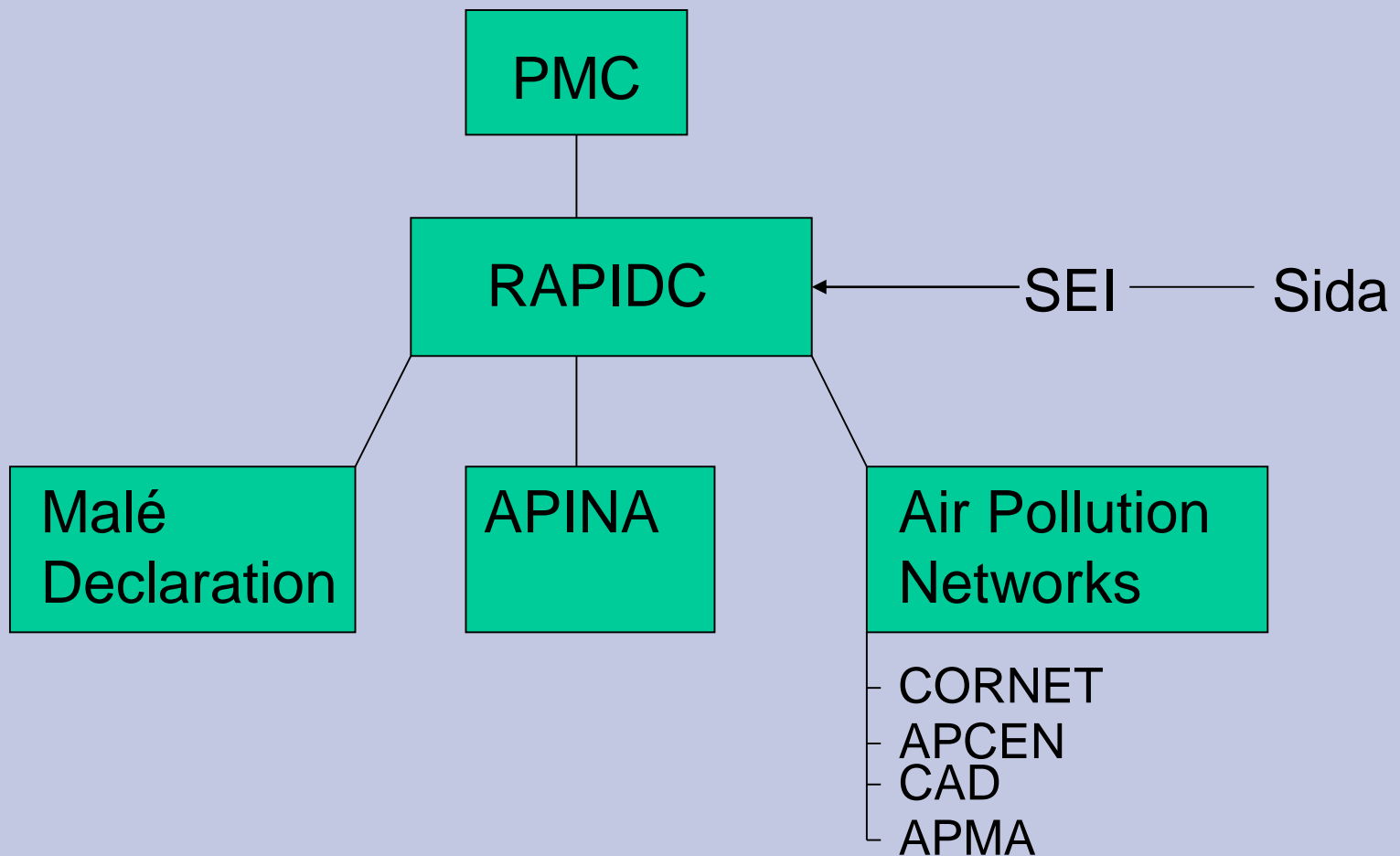




## RAPIDC Programme Purpose

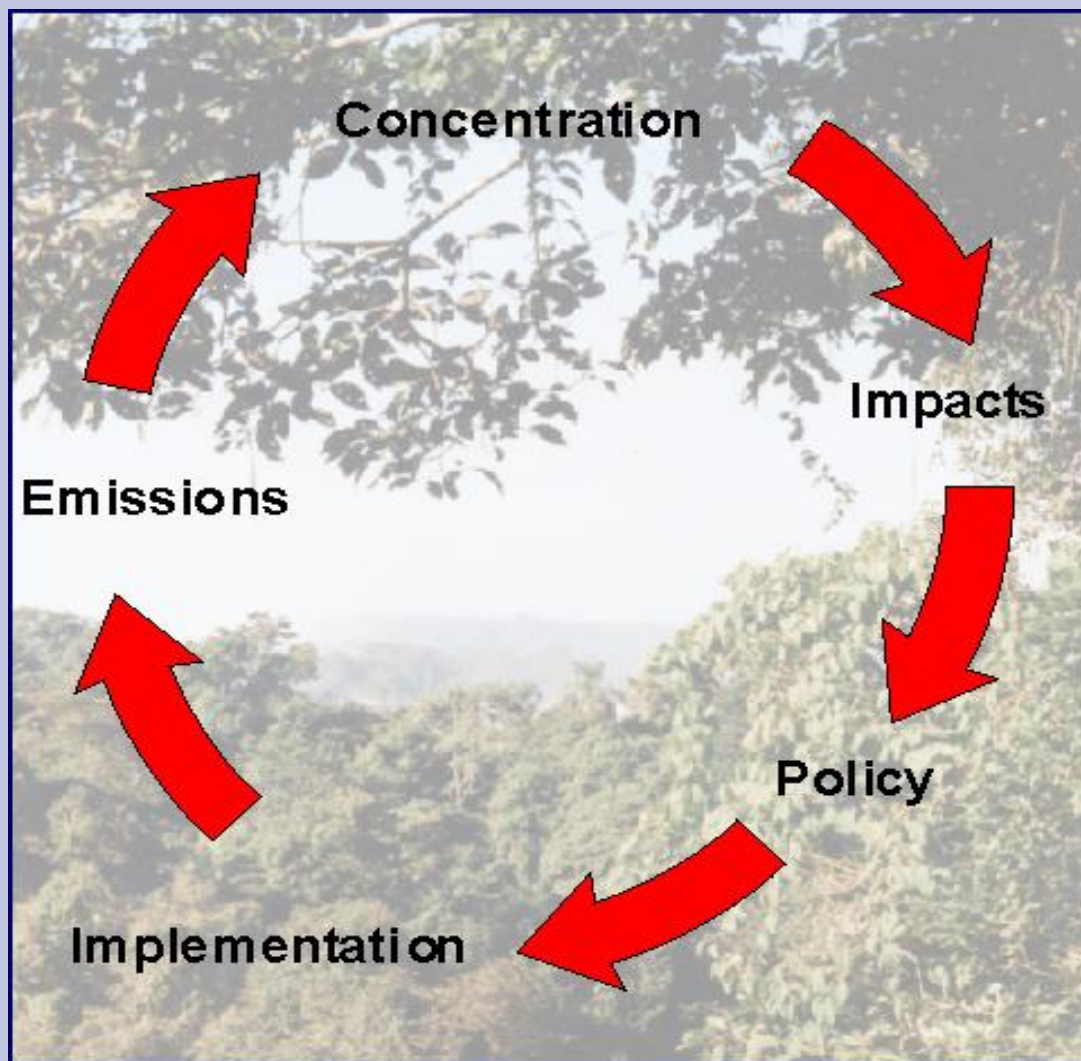
***‘to facilitate the development of agreements and/or protocols to implement measures which prevent and control air pollution through promoting international cooperation and developing scientific information for the policy process’***

## Regional Air Pollution In Developing Countries Programme



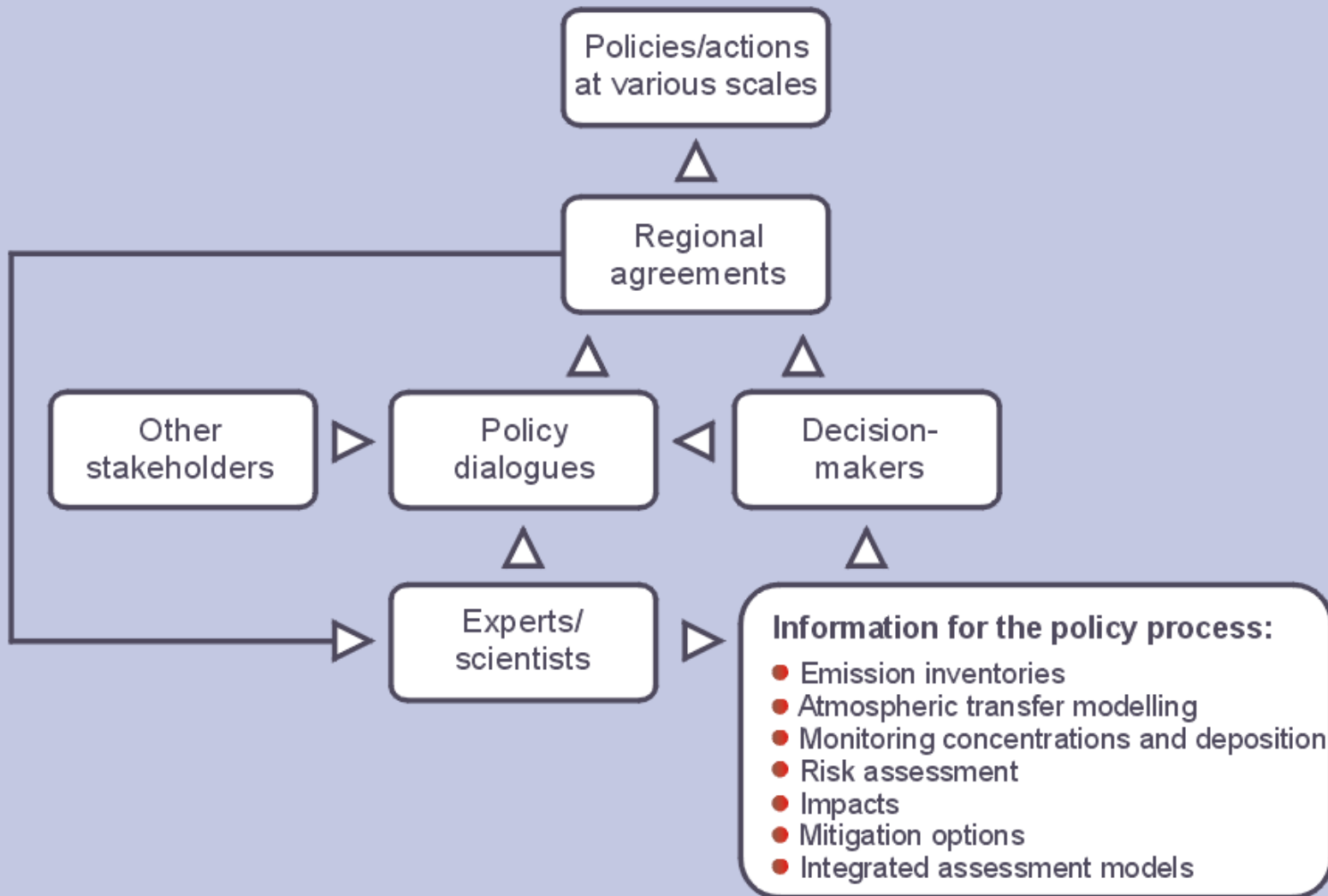


## **Knowledge Required by Policy Makers**

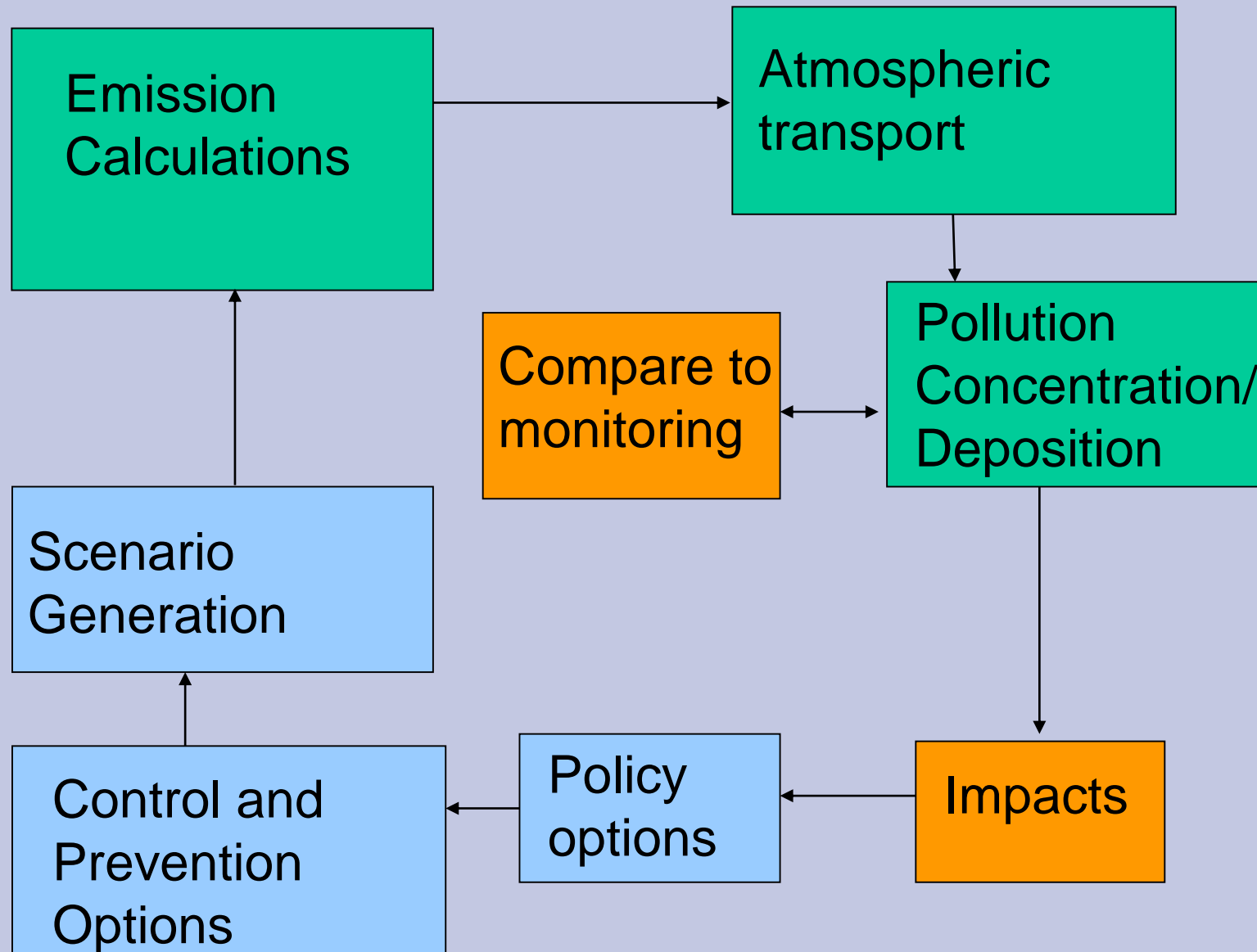




## RAPIDC Approach



## Malé Integrated Assessment of Air Pollution



Support for the  
Malé Declaration

**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**



## Atmospheric Transport of pollutants

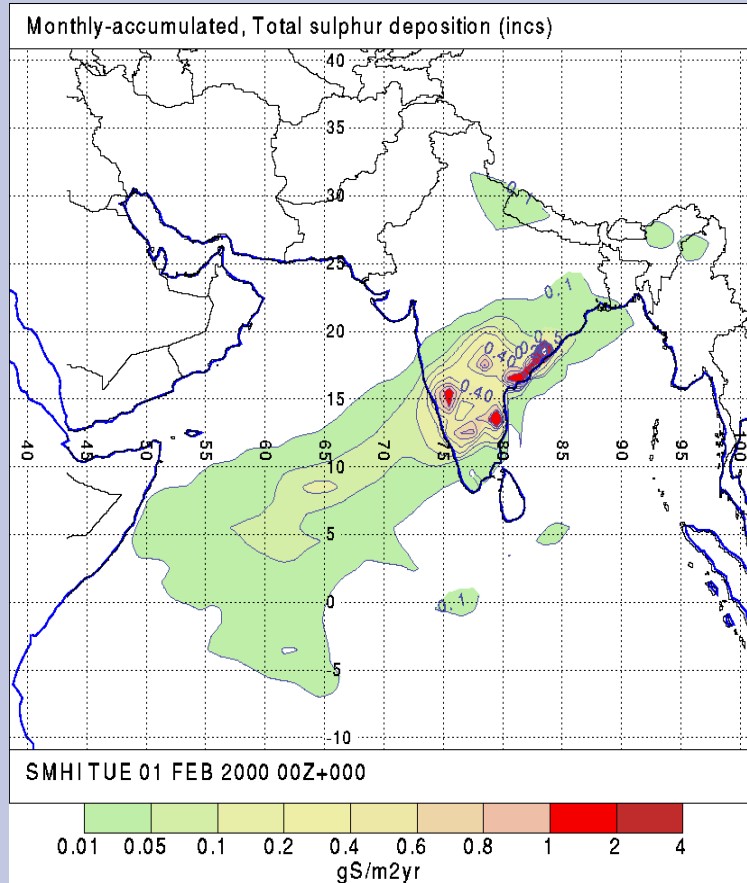
## Planned activities and goals

1. Trajectory Analysis
2. Training in atmospheric modelling
3. Developing a group of meteorologists

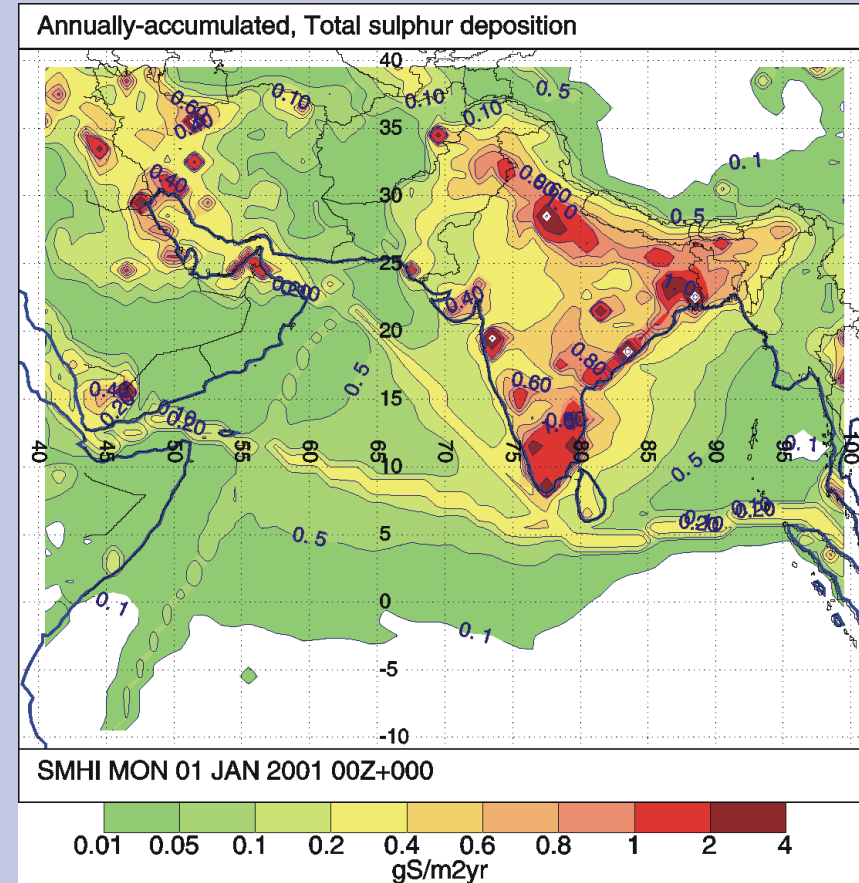




## MATCH Model



Monthly Sulphur Deposition due  
to emission from one region



Annual Sulphur  
Deposition

## Emission inventories

### Activities envisaged:

1. Training in use of Male Manual and Workbook
2. Compilation of emission inventories by countries for emission regions
3. Continuous improvement of the manual



## **Enhance Capacity in developing Emission Scenarios**

Activities envisaged:

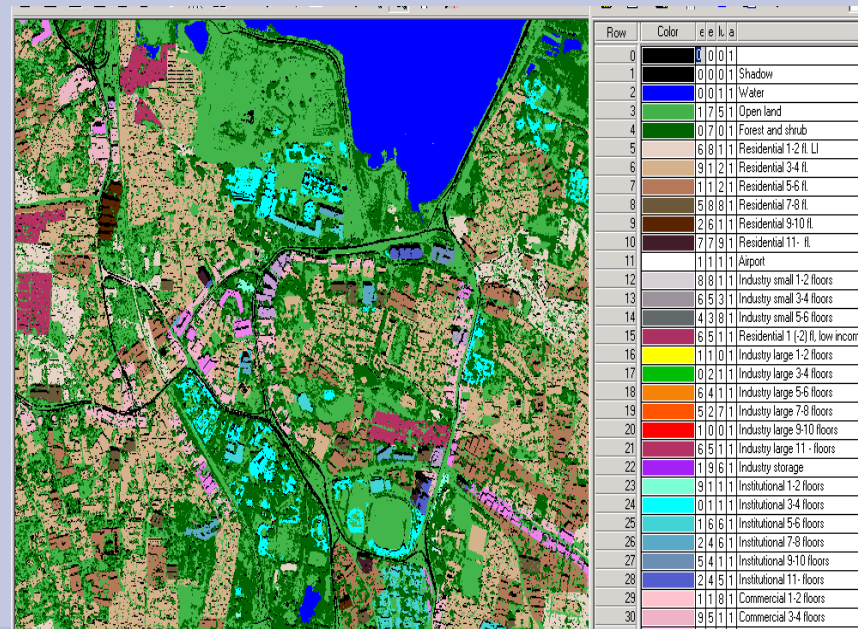
1. Hold training workshops in scenario development
2. Produce a manual for the development of pollution scenarios
  - A “why”, “what”, “how” manual
  - To link to emissions inventory
  - Up to 4 Workshops back to back with emission inventories
  - Application of methods by countries



## Rapid Urban Assessment

### Planned activities

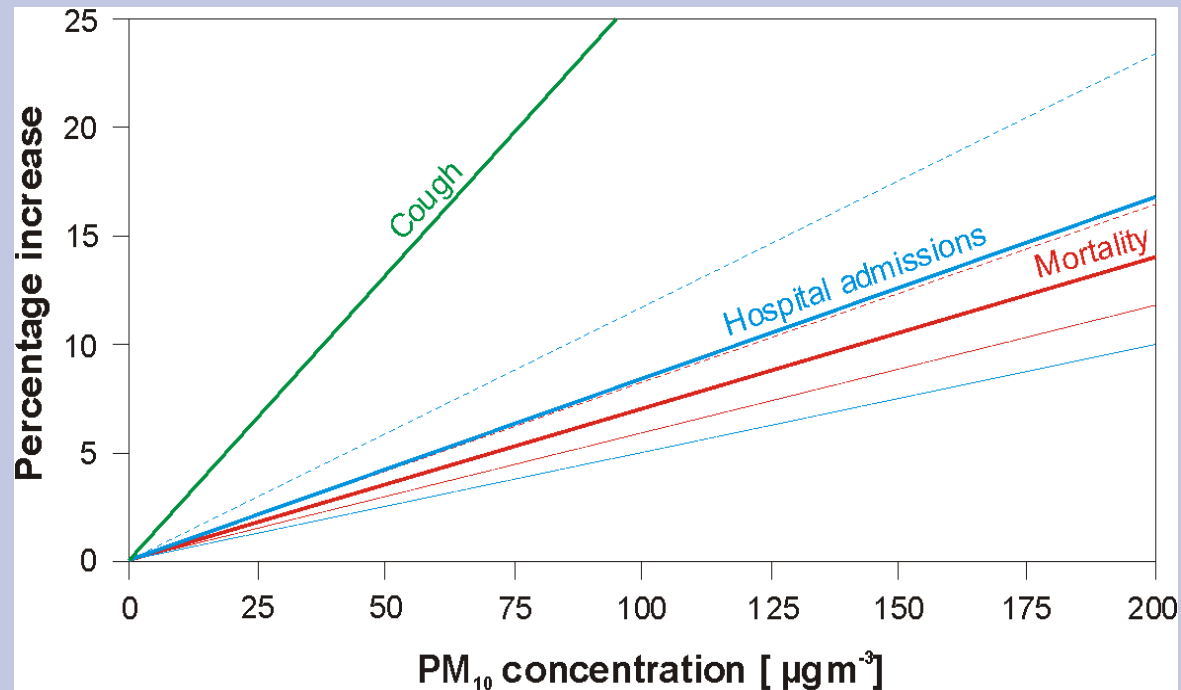
- Training in methods for all nominated institutions
- Application of methods in one city comprising:
- top-down emission inventory for city using Male manual
- disaggregation of emissions using satellite data
- dispersion modelling in urban area
- monitoring campaign



## Human health impacts

Activities include:

1. Setting up a group of health experts to assess the status of health impact studies in South Asia
2. Hold training workshops in assessment methods – learning by doing
3. Undertake a health study







## Schools study to determine air pollution impacts on children's health

**Personnel:** Epidemiologist, Nurse, Technicians recruited to run study

**Method:** 2 schools, 3-9 grade (1500-2000 pupils) in area with high PM

- 100 randomly selected asthmatic children chosen and 50 control
- 10 teachers chosen and trained
- Monitoring site near or at school
- Spirometer for all 150 children twice daily
- Personal samplers used 1 day per week
- All symptoms recorded, all data logged and analysed by epidemiologist/ statistician



## Requirements for implementation of schools study

<b>Personnel</b>	<p>Epidemiologist to coordinate studies (part-time for 2 years)</p> <p>Nurse to oversee and take part in activities (12 months)</p> <p>Monitoring technician (6 weeks)</p> <p>Data logger/ statistician (6 months)</p> <p>10 teachers from schools</p>
<b>Equipment</b>	<p>Monitoring station (PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>) up to 2km away</p> <p>Personal PM monitors</p> <p>Passive samplers for exposure assessment (?)</p> <p>Met station (within 2km)</p>
<b>Other</b>	-





## **Impacts on crops**

### **Project activities:**

- Using Indicator Plants to assess risk of ozone pollution
- Chemical protectant studies





## Risk assessment using Indicator Plants

1. Undertake biomonitoring study using plants sensitive to ozone
  - i. Grow cuttings in pots with standard soil and wicks to keep moist
  - ii. Tend plants
  - iii. Assess damage to plants
  - iv. Analyse data at training workshop

The experimental site should be large enough to house 50 to 100 plant pots, be secure from animal invasion, and have access to a water supply.



**Ozone induced injury on clover**

## Assessing Yield Reductions

- i. Establish sites with crop plants grown in pots with standard soils and wicks to keep plants at standard moisture
- ii. Spray soil of some pots with EDU (ethylene di-urea) and control pots not sprayed. EDU protects plants from ozone.
- iii. Harvest plants and compare yields of protected and un-protected crops







## **Corrosion Impact Activities**

- i. Exposing standard samples on racks**
- ii. Exposure of kits**
- iii. Stock at risk study**





## Corrosion Impact Activities

### i. Exposing standard samples on racks

- to determine an absolute measure of corrosion and develop dose-response relationships
- assemble rack and expose samples pre-prepared by SCI
- Need to monitor  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{O}_3$ ,  $\text{HNO}_3$  and PM (total deposited) bi-monthly
- rain pH and amount (weekly)
- Need a met station measuring  $^{\circ}\text{C}$  and RH



## **4.3 Potential Corrosion Impact Activities**

### **ii. Exposure of kits**

- to determine a relative measure of corrosion in sites with different levels of pollution absolute measure of corrosion
- Expose for 1 year
- up to 10 sites per city E.g. 2 metals and one stone sample per site
- Passive monitoring of gases only

### **iii. Stock at risk study**

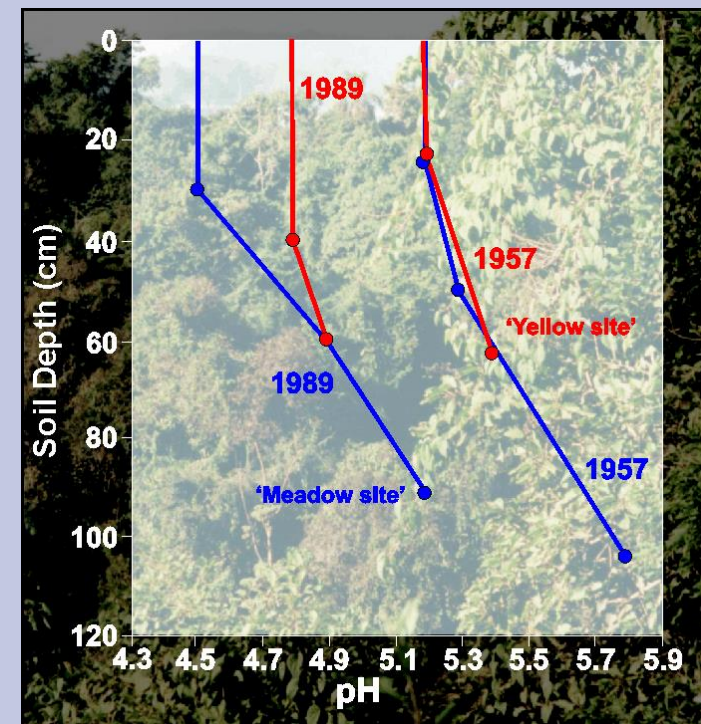
- identify materials in typical buildings (random inventory of 100s of buildings)
- Generalise occurrence of buildings across city
- Include street infrastructure and vehicle fleet
- Estimate economic losses for materials where have D-R relationships



## Acidification studies

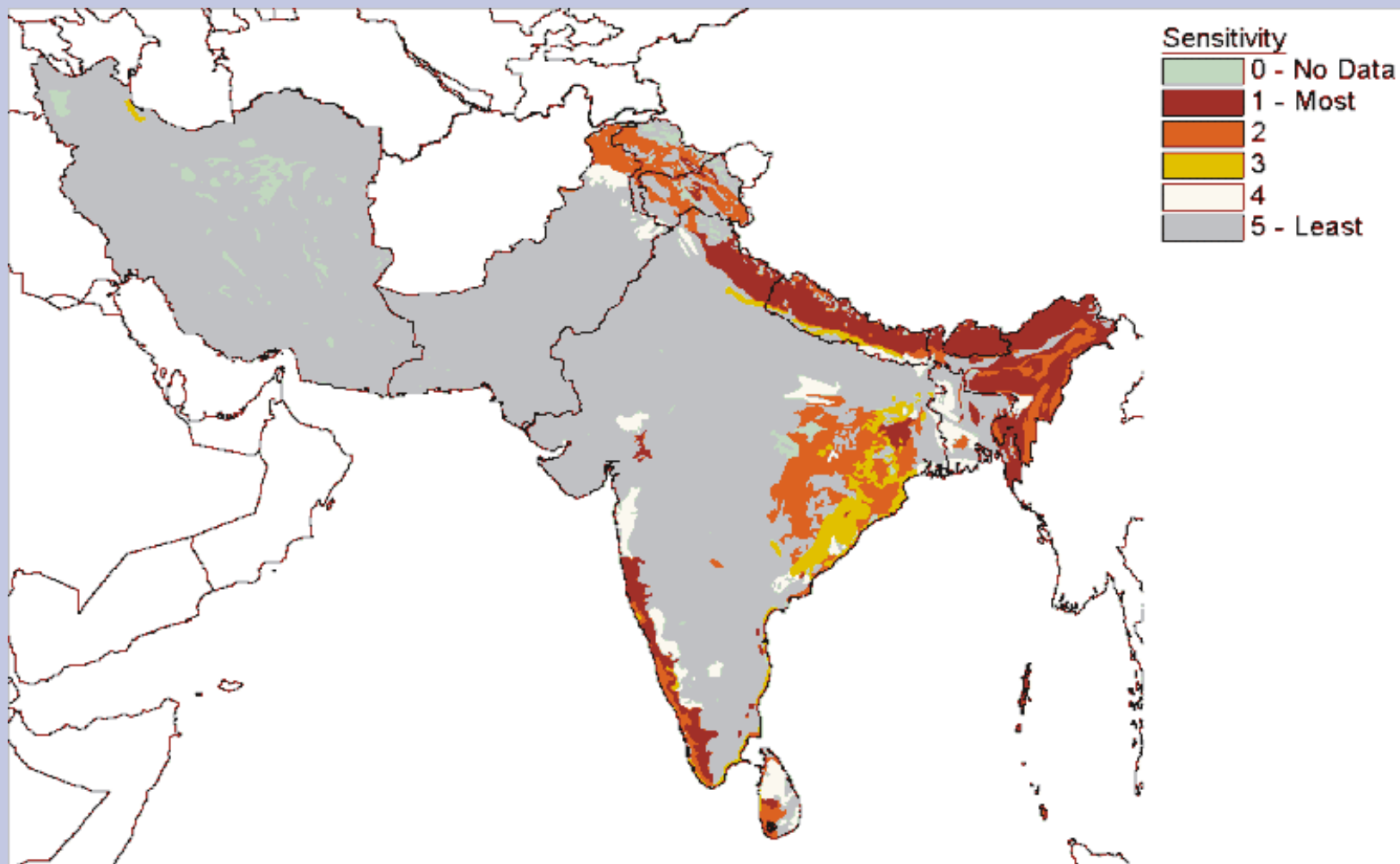
- i. **Mapping sensitivity of soils/ ecosystems to acidification**
  - Using soil map – reclassify into relative sensitivity classes according to manual
  - Compare to deposition
- ii. **Time development of acidification**
  - Apply methods in manual to soil data from monitored sites

Soil acidification at Mt. Lu in southern China (Zhao, 1996)





## Terrestrial Ecosystem Sensitivity to Acidic Deposition in South Asia (preliminary assessment)



Source: Kuylenstierna *et al.* 2001

## **Conclusion:**

The purpose for undertaking the studies is to train people in methods that can help to develop an integrated assessment of air pollution in South Asia

The results of using the methods will help to determine the emissions, scenarios and risk of impacts to crops, materials, health and ecosystems

Limited funds for studies are available and need to be matched with resources and infrastructure available in each country, country priorities and enthusiasm for different projects