

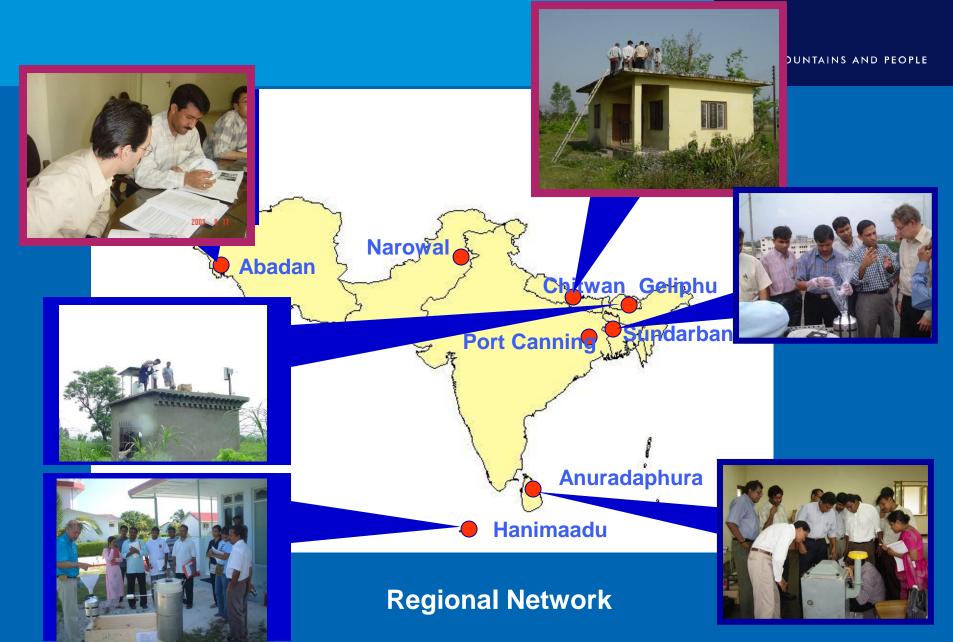
Emission Inventory of Nepal for the Year 2005

International Centre for Integrated Mountain Development

Kathmandu, Nepal

Male' Monitoring Stations

ICIMOD



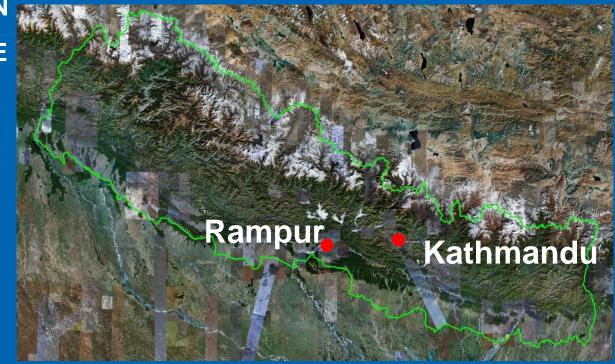
Monitoring site



FOR MOUNTAINS AND PEOPLE

Country: Nepal

- Location: Institute of Agriculture and Animal Science, Rampur
- Site type: Rural site, 15 km south of the Royal Chitwan National Park
- Latitude: 27^o 38' 52.8" N
- Longitude: 84^o 20' 47.7" E
- Altitude: 165 mamsl



Instruments

ICIMOD



Wet Only Collector

High Volume Sampler





Bulk Collector



Passive Sample



Laboratory





Impact studies Under Male' Declaration Project

Corrosion study in Kathmandu

Passive Samples: SO₂ NO₂ O₃ HNO₃ PM₁₀







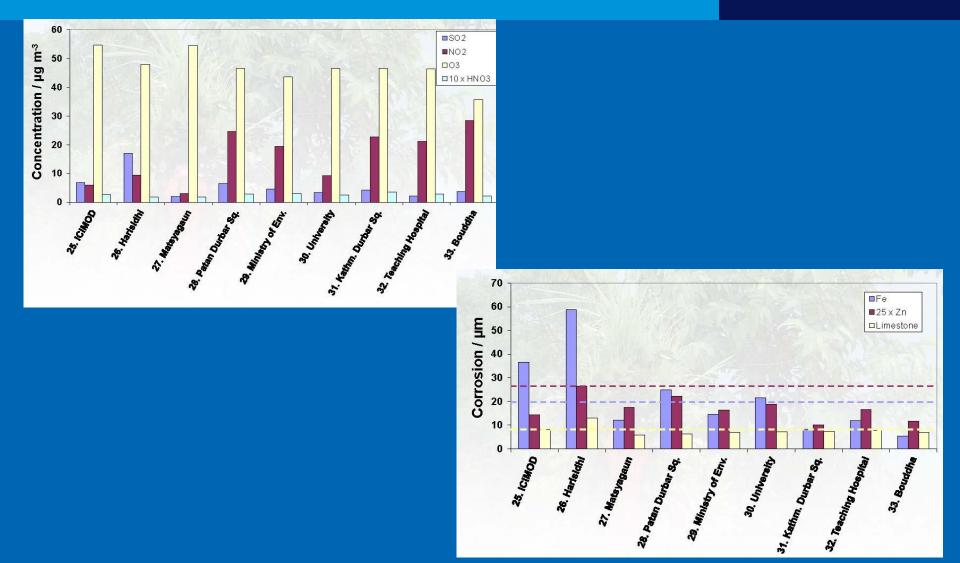


Material Exposed:

Carbon Steel, zinc steel, Copper, Coated steel and lime stone

Results

ICIMOD



Impact of Ambient Ozone Concentrations ICIMOD on Crop with the use of Ethylendiurea (EDU)

FOR MOUNTAINS AND PEOPLE



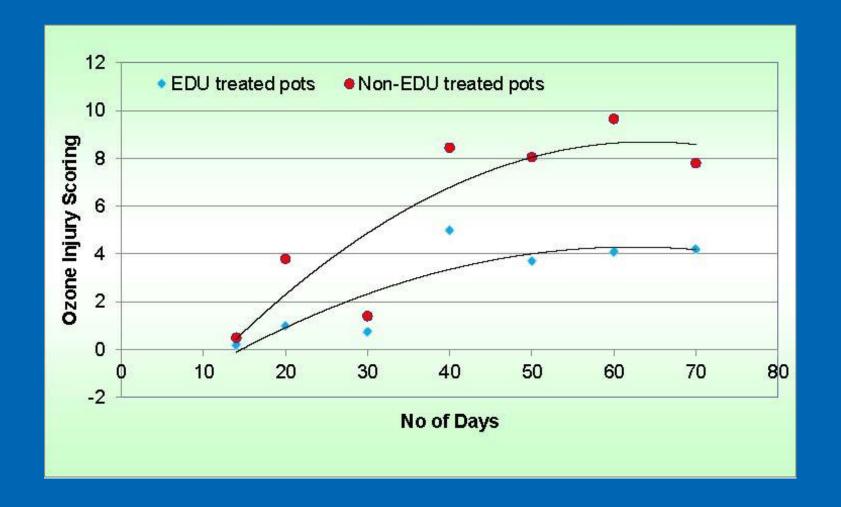
Field –layout



EDU and Non-EDU treated Plant

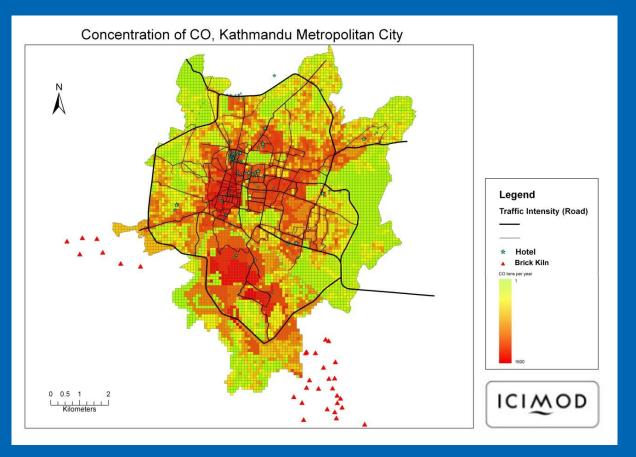
Results





Rapid Urban Assessment Kathmandu

ICIMOD



- prepared the concentration maps of selected pollutants (SO₂, NO_X, CO, NMVOC, NH₃, PM₁₀ and PM_{2.5}) in Kathmandu
- find out the hotspot areas in Kathmandu

ICIMOD

OR MOUNTAINS AND PEOPLE

Application of Emission Inventory

Malé Emissions Inventory Workbook Template - Version 2.4

Prepared within the Sida-funded Regional Air Pollution In Developing Countries (RAPIDC) programme as a contribution towards the Implementation of the Malé Declaration on Control and Prevention of Air Pollution and its Likely Transboundary Effects

Template prepared by: Stockholm Environment Institute at York (SEI-Y), UNEP RRC-AP and SACEP Date last modified: 2008-01-28

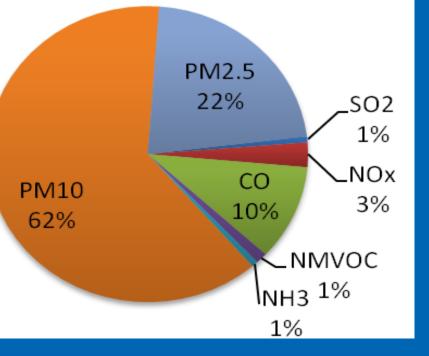
User must enter inventory details here:

Inventory year:	2005	
Region:	South Asia	
Country:	Nepal	
Province:	Kathmandu	

MENU OVERVIEW

GO	Menu1	Sectors 1. to 4. Fuel combustion activities
GO	Menu2	Sector 5. Fugitive emissions (non-combustion) for fuels
GO	Menu3	Sector 3. Fuel combustion activities. Sector: Transport (De
GO	Menu4	Sector 6. Industrial processes (non-combustion) emission:
GO	Menu5	Sector 7. Solvent and other product use
GO	Menu6	Sector 8. Agriculture
GO	Menu7	Sector 9. Vegetation fires and Forestry.
GO	Menu8	Sector 10. Waste
GO	Menu9	Large Point sources
GO	Sheet 9	Summary sheet - Annual emissions of each pollutant by sou
GO	References	3

Total Emission of the Pollutant of Kathmandu



Health Impact Assessment



FOR MOUNTAINS AND PEOPLE

Field study Completed



Emission Inventory of Nepal for the Year 2000 and 2005



Emission Inventory of Nepal for the Year 2005

Data Used



FOR MOUNTAINS AND PEOPLE

Activity data was collected from:

- Statistical Year Book of Nepal 2006-07
- Economic Survey of Nepal 2006-07
- Environment year Book of Nepal 2008
- IEA and FAO datasets
- Some other sources available on internet
- Different institution and Personal communication



CO Emission form different sectors

2000 1500 CO emissions kt/yr 1000 500 0 Other fuel combustion Fugitive entresions fuels 50Wentiother productuse Nonroad transport Crop residue burning Other energy sector Industrial processes Other agriculture Industry combustion Powerstations Road transport Vegetation fires Waste



NH₃ Emission form different sectors

200 150 NH₃ emissions kt/yr 100 50 0 Fugitive emissions fuels Solventiother product use Honroad transport Other fuel combustion Crop residue burning Industrial processes Other energy sector Other agriculture Industry combustion Powerstations Roadtransport Vegetation fires Waste



MNVOC Emission form different sectors

700 600 500 MNVOC emissions kt/yr 400 300 200 100 0 Other fuel combustion Fugitive enissions fuels 50Wentiother productuse Nonroad transport Industrial processes Crop residue burning Other energy sector Other agriculture Industry combustion Powerstations Roadtransport Vegetation fires Waste



NO_X Emission form different sectors

35 30 25 NO_X emissions kt/yr 20 15 10 5 0 Fugitive enissions fuels Other fuel combustion 50^{Wentiother productuse} Other energy sector Non-road transport Crop residue burning Other agriculture Industry combustion Industrial processes Powerstations Road transport Vegetation fires Waste



SO₂ Emission form different sectors

20 15 SO₂ emissions kt/yr 10 5 0 Other fuel combustion Fugitive enissions fuels 50^{Wentlother product use} Homose transport Other energy sector Crop residue burning Industrial processes Other agriculture Industry combustion Powerstations Roadtransport Vegetation fires Waste



PM₁₀ Emission form different sectors

400 350 300 PM₁₀ emissions kt/yr 250 200 150 100 50 0 Fugitive enissions fuels Solventiother product use Homosd transport Other fuel combustion Crop residue burning Industrial processes Other energy sector Other agriculture Industry combustion Powerstations Roadtransport Vegetation fires Waste



PM_{2.5} Emission form different sectors

35 30 25 PM_{2.5} emissions kt/yr 20 15 10 5 0 Other fuel combustion Fugitive anissions fuels Solventiother product use Homose transport Other energy sector Crop residue burning Industrial processes Other agriculture Industry combustion Powerstations Roadtransport Vegetation fires Waste



Total emission form different sectors

2500 **□** SO2 NOx 2000 CO Emissions kt/yr NMVOC 1500 NH3 PM10 1000 PM2.5 500 0 Nonroad transport Other fuel combustion Fugitive emissions fuels 50^{Wentlother product use} Crop residue burning Industrial processes Other energy sector Industry combustion Other agriculture Road transport Vegetation fires Powerstations Waste

Unavailable Datasets

ICIMOD

- 1 Waste burn data
- **2** Vehicle Distance Travel
- **3** Burning of Forest/ Grass land
- 4 Lack of relevant activity data. The data available is not in proper format.
- 5 **Process (non combustion) emission from the producing**
 - NMVOC emission from Bread factory
 - Emission from Solvent and other products
 - > others





- 1. Dataset in the scattered for
 - Difficulty in collection
 - Difficulty in comparison
- 2. Dataset are poor and lack uniformity which might result in inaccurate analysis and results
- 3. Frequent changes of the responsible officers

Conclusions



- The major pollutants emitted from different sources are CO, NH₃, PM and NMVOC.
- The major source of CO are residential, vegetation fire and transportation.
- Where as PM is mainly emitted from the transport sector.
- Maximum emission of NH₃ is from Agriculture sector due to excessive use of N-containing fertilizers and manure management.
- NMVOC is mainly from Industrial process and resident sector



Data collection under progress for year 2010 Emission Inventory

Thank you



FOR MOUNTAINS AND PEOPLE

Acknowledgements

Mr. Harry Vallack, SEI, York

UNEP RRC-AP, Bangkok Thailand

Sri lankan team