



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



Overview of national level implementation of the Malé Declaration in Nepal

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Presentation Outline

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Introduction



- Area- 147,181 sq. km.
- Country of the Mt. Everest, birth place of Lord Buddha
- Population 26.6 m, growth rate: 1.35%,
- 45th biggest in population, 95th in terms of Area
- Borders with India in the South, East and West; with China in the North
- Urban population: 18%, Life expectancy 65 yrs
- Percent Urbanization by 2050: 36%
- Nepal ranks twenty-fifth globally in biodiversity,
- Forest covers approximately 39.5% of the total area,
- 23.23% of the country has been delineated as national park and conservation areas,
- Only 27 per cent of the country is potentially arable and only 20 per cent is under cultivation,
- Per capita income is US\$ 729 with a gross domestic product (GDP) growth rate at 5.1 per cent in 2013-14
- 25 per cent of Nepalese living below the poverty line





Issues on Air Pollution

- **Rapid Urbanization**
- **Brick kilns in operation in Kathmandu Valley**
- **Growing Numbers of Vehicles**
- **Traffic Congestion and Increasing Demand of Fossil Fuel**
- **Industrialization**
- **Widening of road (dust)**





Existing Legal Framework on Air Quality Management

- ✓ Constitution of Nepal, 2015
- ✓ Environment Protection Policy, 1987
- ✓ Industrial Policy, 1992
- ✓ Nepal Environmental Policy and Action Plan (NEPAP I), 1993
- ✓ National Transport Policy, 2002
- ✓ Industrial Enterprises Act, 1992
- ✓ Transport Management Act, 1992 and Regulation 1997
- ✓ Environment Protection Act and Rule, 1997
- ✓ Ozone Depleting Substances Consumption (Control) Rules, 2001



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- **Standard on Emission and Chimney Height for Brick Kilns, 2008**
- **National Indoor Air Quality Standard and Implementation Guidelines, 2009**
- **National Ambient Air Quality Standard, 2012**
- **Nepal Vehicle Mass Emission Standard, 2012**
- **Standard on Emission and Chimney Height for Industrial Boiler, 2012**
- **Standard on Emission for Diesel Generator, 2012**
- **Standard on Emission for Cement and Crusher Industries, 2012**
- **Environmental Standards for Incinerators**



Organizations involved in Air Quality Management in Nepal



- Ministry of Science, Technology and Environment, lead organization and national focal point of Male Declaration.
- Department of Environment, implementing agency of MoSTE in all environmental issues
- ICIMOD, (International Centre for Integrated Mountain Development) national implementation agency for Male Declaration

Members:

- Institute of Agriculture and Animal Science (IAAS) TU, Chitwan ; now it is **Agriculture and Forestry University**
- Clean Air Network Nepal-representing from NGOs
- Center for Pollution Studies, Institute of Engineering (IoE-TU) representing from academic institutions
- Department of Hydrology & Meteorology, GoN



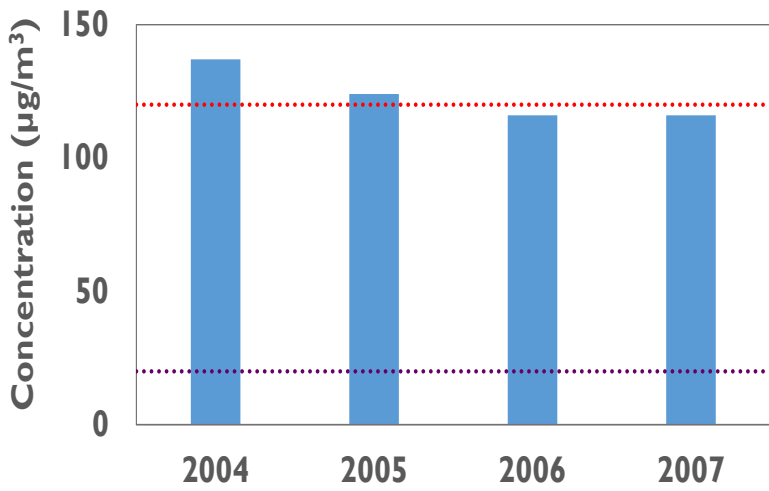
Air Quality Status and Pollution Sources

- Annual average PM_{10} concentrations in Kathmandu Valley from 2004 to 2007 was slightly decreased
- These were above the WHO air quality guideline value
- A more recent emission inventory showed that transport sector generated approximately 98% of total PM_{10} emissions in 2010 and 69% of total emission loads
- Unfortunately, the six monitoring stations in the capital have not been operational since 2007
- MoSTE re-established three previous station to measure PM_{10} during the period of Oct. 2013 to May 2014. They are ultimately closed.
- Government plan to establish different AQM stations



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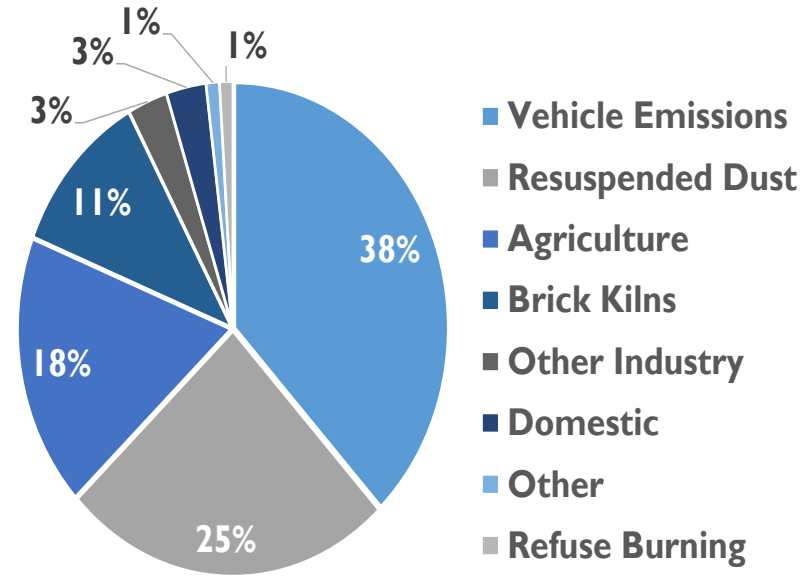
ANNUAL AVERAGE PM₁₀ LEVELS IN KATHMANDU (2004-2007)



- Kathmandu
- 24 hr National Ambient AQ Standard
- WHO Annual AQG

**No annual PM10 national standard*

EMISSION PROFILE PM₁₀ IN KATHMANDU (2006)



- Vehicle Emissions
- Resuspended Dust
- Agriculture
- Brick Kilns
- Other Industry
- Domestic
- Other
- Refuse Burning



Energy Consumption Status

Year 2013/14

Energy Source		Tons of Oil Equivalent	% Contribution
Traditional	Firewood	8,154	72.60
	Agricultural residues	403	3.57
	Animal Residue	426	3.79
	Total	8,983	76.97
Commercial	Coal	320	2.84
	Petroleum Products	1,264	11.25
	Electricity	374	3.32
	Total	1,958	20.52
Renewable	Total	291	3.03
Grand Total		11,232	100

Source: Economic Survey 2013/14, MoF



No. of Registered Vehicles

Types	Fiscal Year		
	1989/90 to 2013/14	2013/14	Up to mid- March 2015
Bus	32,914	2,776	2,375
Minibus/ Mini truck	14,719	1,412	1,288
Crane/ Dozer/Excavator	52,981	2,789	2,467
Car/ Jeep/Van	150,107	11,372	9,054
Pickup	23,839	5,668	3,703
Microbus	2,814	178	611
Tempo	7,527	17	914
Motorcycle	1,371,206	163,945	142,241
Tractor/Rower Tiller	73,173	10,070	6,911
Others	6,543	116	49
Total	1,755,821	198,343	169,613

Source: Economic Survey 2013/14, MoF



Impacts

- Incidences of Air Pollution-Related Deaths (Mortality Estimates) in thousands (2012)

Respiratory infections: 13.1	Respiratory diseases: 23.7
Cardiovascular diseases: 41.4	Trachea, bronchus, lung cancers: 2.2

- Health impact study
 - A report in 2011 on cooking with biomass fuels indicated an association between acute exposure to smoke of women with restrictive lung disease and blood de-oxygenation, showing that fine particulate matter can worsen pre-existing lung diseases



Achievements

- 1991 - Ban on import of three wheelers
- 1992 - Banned entrance of two stroke vehicles in Katmandu valley
- 1995 - Introduction of Vehicle Emission Standards & Testing
- 1996 - Provision of Financial incentives for electric three wheelers
- 1997 - Promulgation of Environment Protection Act & Regulations
- 1999 - Ban on Vikrams (diesel 3-wheelers) in Katmandu Valley



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- 1999 - Ban on import of new 2 stroke vehicles and second hand vehicles
- 2000 - Introduction of Nepal Vehicle Mass Emission Standard (Euro I)
- 2002 - Establishment of Ambient Air Quality Monitoring System with six permanent stations in Katmandu valley (PM10, PM2.5, TSP, NO_x, Pb, Benzene)
- 2003 - Introduction of National ambient air quality standards



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- 2004/5 - Ban on running of moving Bull Trench Kiln in Kathmandu Valley. Promotion of Fixed Chimney and VSBK.
- 2006 -Preparation of Action Plan Report on AQM
- 2008 - Emission Standards for Brick Kilns
- 2012 - Up gradation of Vehicular mass emission Standard and national Ambient air Quality standard
- 2012 -Emission Standards of Cement industries, stone crusher industries, DG set and Industrial Boilers.
- 2012 - ban on Moving BTKs throughout the Nepal



AQ Monitoring Station and other related ongoing program

lists sites where long-term measurements are already taking place, or for which long-run resources have been committed by different agencies

Site	Status
Lobuche NCO-P	Nepal Climate Observatory – Pyramid site run by NAST/ EVK2CNR. Already measuring PM 2.5, PM10, ozone, as well as black carbon and aerosol size distribution and aerosol optical depth. Needs data transmission to DoEnv.
Jomsom	Temporary site started for PhD research work by ICIMOD affiliates, but with potential for conversion to long-term site. Currently measurements of CO, ozone, BC and aerosol optical depth.
Yala Glacier, Langtang	Site of ongoing ICIMOD-DHM collaboration to monitor glacier mass balance with plans to install black carbon measurements
Ichhyakamana	Site of full-scale climate observatory to be set up as a collaboration between DoEnv and ICIMOD.
Lumbini	Resources committed by ICIMOD for a full AQ station. Site approved by Lumbini Development Trust



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- **DoEnv is prepared A Plan for Nepal's Air Pollution Monitoring Network (to be approved)**
- DoEnv monitoring stations would be designed to eventually allow measurement of all the criteria pollutants listed in the National Ambient Air Quality Standards, 2012.
- The list of criteria pollutant are as follows: TSP, PM₁₀, PM_{2.5}, CO, NO_x, SO_x, ozone, benzene and lead
- This Plan suggested 56 AQM stations to be establish and operate within the country
- They are prioritized from 1 to 56 using different selection criteria



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- **Letter of Intent (LoI) signed between Department of Environment, Nepal and International Centre for Integrated Mountain Development (ICIMOD) intending to build up new collaborations in the area of atmospheric monitoring and analysis through the establishment and operation of air Quality stations and environment observatories in Nepal**



Challenges on Air Quality Management

- To regulate the fuel quality for vehicle
- On road monitoring of the vehicle mass emission
- Protest (Burning of tire)
- Rapid and haphazard urbanization
- Sustainability of program
- Public health
- Maintaining the rule of law
- To channelize the monitoring data from other organization who have already run the AQ station
- Laboratory facilities for analysis of the criteria pollutants

Major other Studies/ programs Related to Air Pollution



- Government announcement of “*Clean Cooking Solution for All by 2017 (CCS 2017)*” thereby ensuring Indoor Air Pollution free Nepal. (AEPC)
- AEPC is promoting renewable energy sources in the country (ICS, Biogas, micro-hydro etc.)
- Government of Nepal is prepared in-use vehicle emission standard (Draft) to regulate and control the vehicular emission
- Reducing Impact of Black Carbon & other Short Lived Climate Pollutants (ICIMOD)
- A Plan for Nepal’s Air Pollution Monitoring Network is prepared (to be approved) - DoEnv
- Research on diesel power generation and emission in Kathmandu valley by *Clean Air Network Nepal*



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- Promotion of safer cycling infrastructure in Kathmandu valley- Report on assessment of cycle track in Kathmandu Valley by *Clean Air Network Nepal*
- Pokhara Sustainable Urban Transport Conference organized together with Pokhara Sub-metropolitan City by *Clean Air Network Nepal*
- LEADERS Nepal is conducting a program of *Investigation of the effectiveness of national clean cook-stove program in Nepal in reducing Acute Respiratory Infection in ≤ 5 children* project with the support of PEER Health Project of National Academic of Science, USA and USAID (ongoing)
- Evaluation of the impact of major disaster on air pollution and children's health in Nepal by LEADERS Nepal (ongoing)



Glimpses of Nepal



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Thank You !