WELCOME

Presented by:
Mohammad Atikul Islam
Senior Assistant Engineer
Monitoring and Evaluation Section

MSc in Environmental Engineering and Management course

Course duration: 02.08.2019 – 31.05.2021

Funded by: Rural Connectivity Improvement Project (RCIP)

Local Government Engineering Department

135th AIT
Graduation Ceremony

THE DEGREE OF MASTER OF ENGINEERING
IN ENVIRONMENTAL ENGINEERING AND MANAGEMENT

MOHAMMAD ATIKUL
ISLAM

Local Government Engineering Department

Programme Overview

Environmental Engineering and Management Program is part of the Department of Energy, Environment and Climate Change, School of Environment, Resources and Development.

- looks for solutions to environmental problems, water supply and sanitation, wastewater treatment and disposal systems, air pollution, solid and hazardous wastes, waste minimization, and life cycle assessment, environmental impact assessment and management.

❑ The two major focal areas:

✓ Environmental Technology and Management

✓ Water and Wastewater Engineering.

Programme Structure

MSc in Environmental Engineering and Management requires 48 credits

The programme divided into two parts:

- **Part one:** a teaching programme over Three semesters (including an inter semester)

  - 12 credits in each semester + 2 credits in the inter semester (Total 26 credits)

- **Part two:** Thesis (22 credits).

Programme Details

Environmental Chemistry and Laboratory

Solid waste Management

Environmental Quality Management

Environmental Health and Sanitation

Environmental Impact Assessment

Waste Abatement and Management

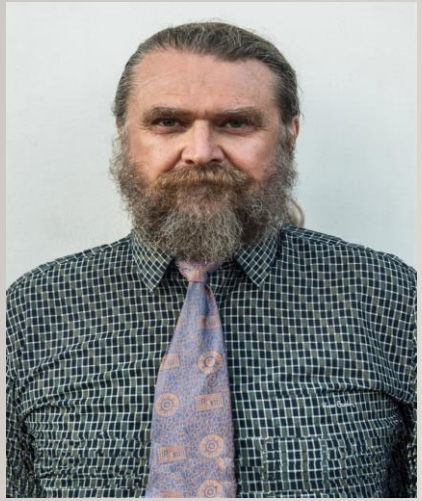
Hazardous Waste Technology and Management

Air Pollution Engineering and Management

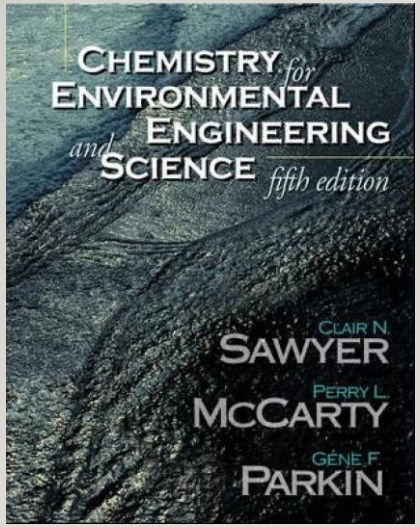
Sustainable Consumption and Production (SCP)

Emission Inventory and Air pollution Modelling

Course Title: Environmental Chemistry and Laboratory



Dr. Oleg V. Shipin

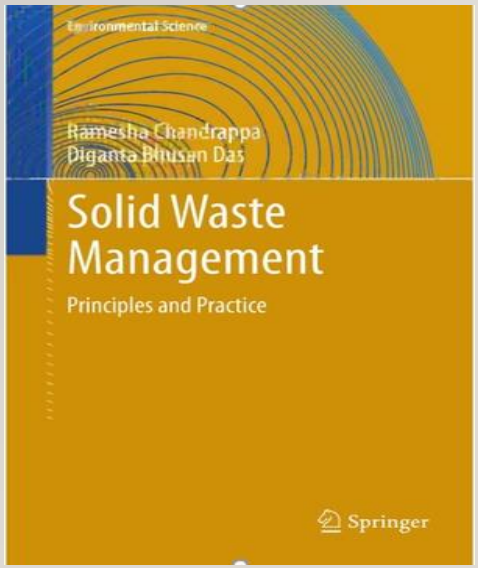


Course outline:

- Provides the fundamental and practical understanding of the physico-chemical and biochemical processes underlying water and wastewater treatment
- Air pollution and air quality control through conduct sampling and analyze physico-chemical properties and characteristics of water, wastewater, air pollutants and solid wastes

Course Title: Solid waste Management

Prof. Thammarat Koottatep

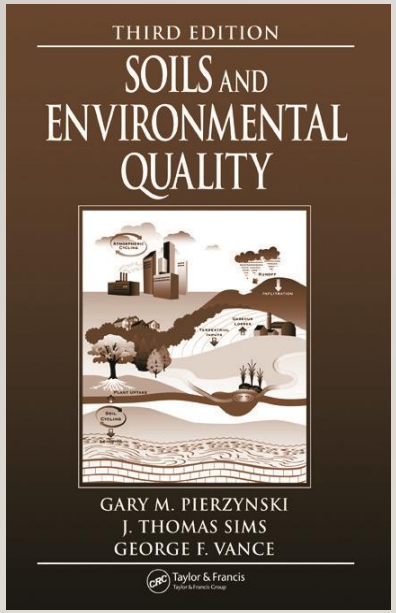


Course outline:

- Global Issues and Trends of Solid waste Management.
- Sources, Generation and Characterization of Solid waste,
- Public Services, Collection and Transportation
- Processing and Transformation of Solid Waste,
- Biological and Chemical Decomposition of Solid Waste (Aerobic and anaerobic processes,), Waste to Energy Processing Technologies,
- Reuse, Recycling and Life Cycle Assessment of Waste Management Systems
- Sanitary Landfill

Course Title: Environmental Quality Management

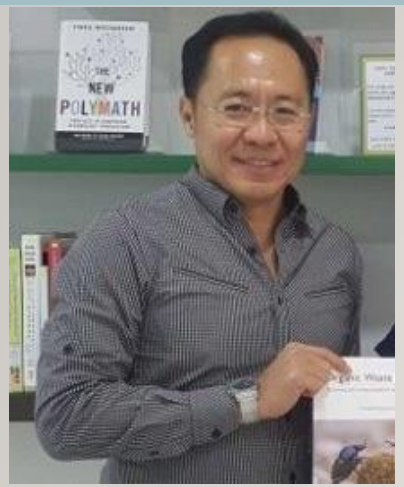
Dr. Wenchao Xue



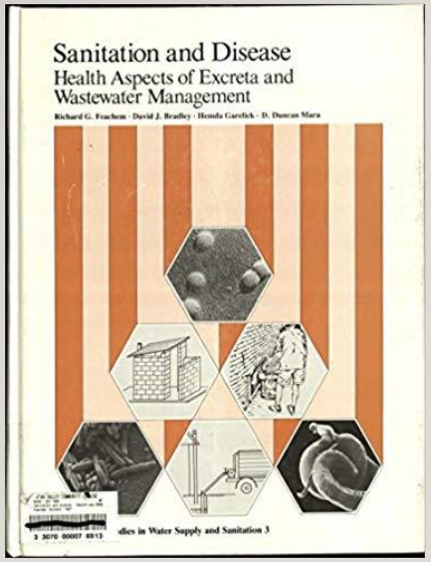
Course outline:

- How the natural environmental systems operate?
- How anthropogenic influence has affected the environment?
- Methods and principles in management of environment.
- Introduces various efforts and policies at national, regional and global level for maintain environmental quality

Course Title: Environmental Health and Sanitation

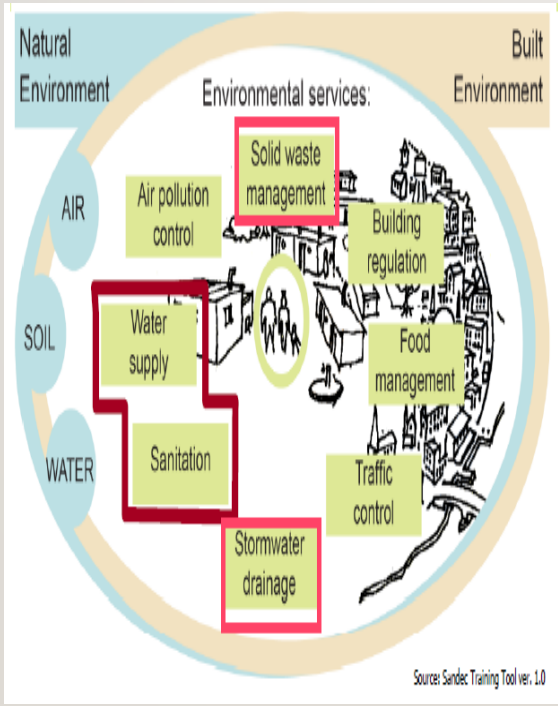


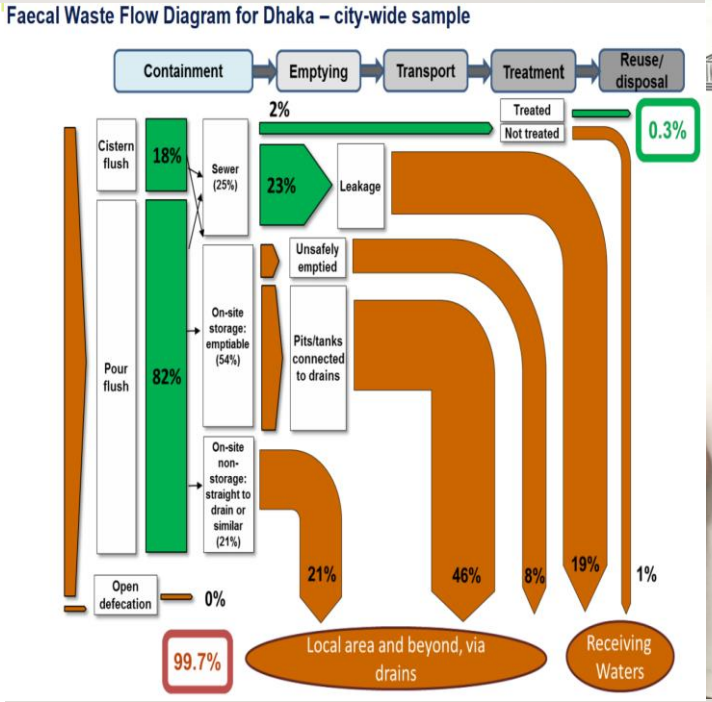
Prof. Thammarat Koottatep



Course outline:

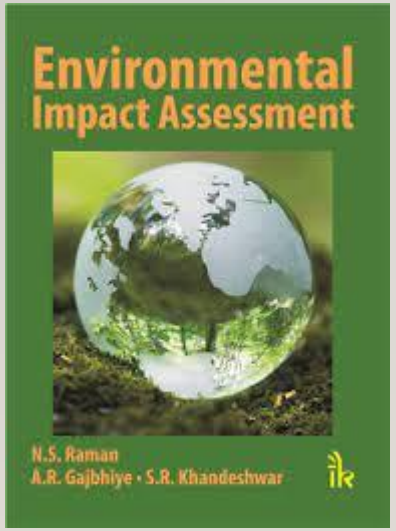
- Theoretical knowledge and practical applications of EHS with particular concern on the severity and fatality of waterborne diseases.
- Advance knowledge of technology and management practices using integrated planning approaches for urban poor contexts in developing countries.





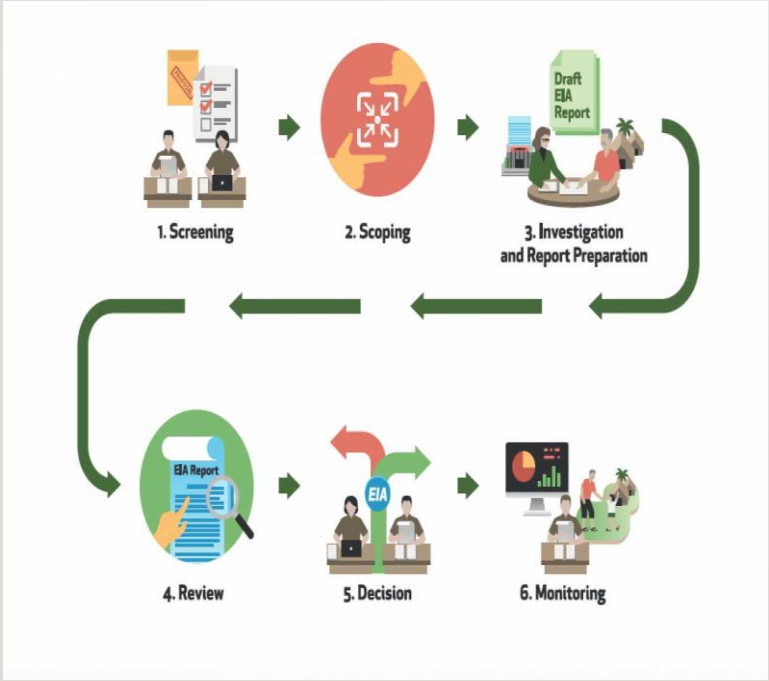
Course Title: Environmental Impact Assessment

Dr. Oleg V. Shipin



Course outline:

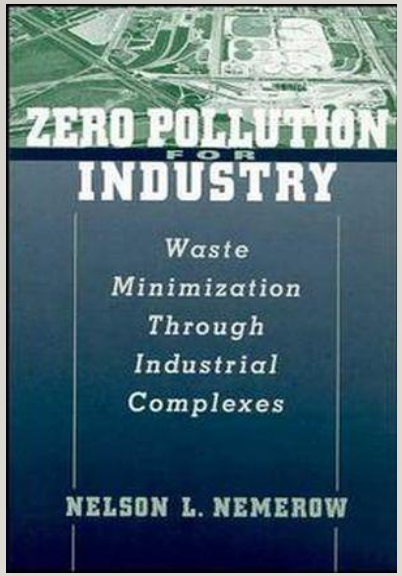
- Consolidates the understanding of EIA as a useful tool in environmental decision-making process, and
- In management of development projects



Qualitative and Quantitative Parameters – Environmental Impact Statement (EIS)

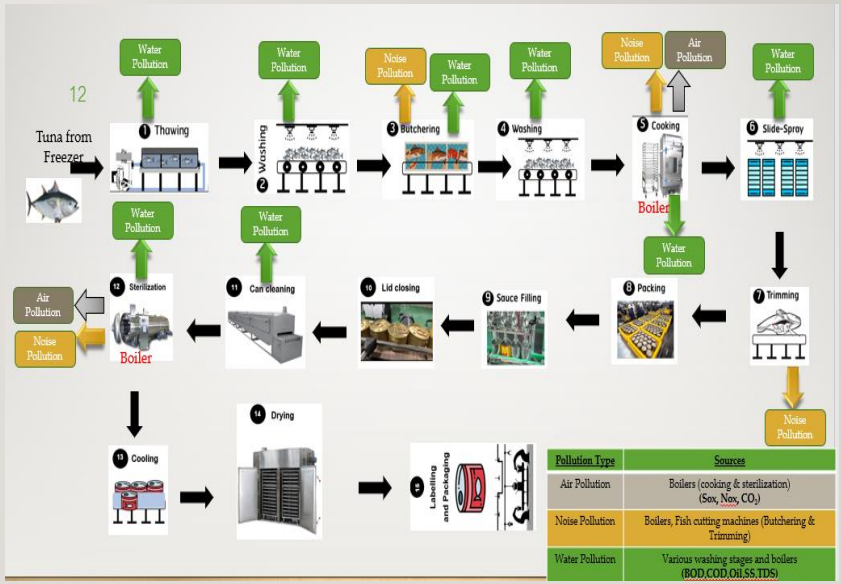
Course Title: Industrial Waste Abatement and Management

Prof. C. Visvanathan



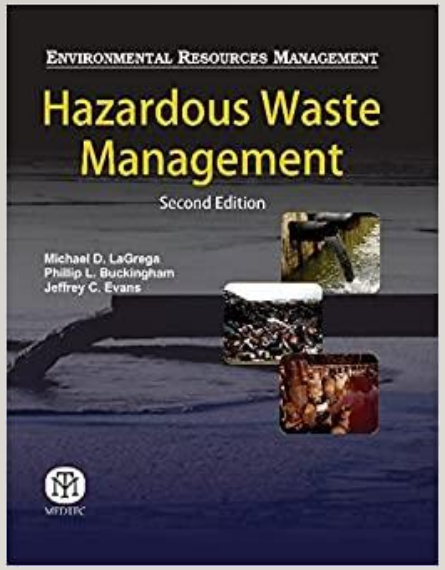
Course outline :

- Theoretical and practical skills to characterize, interpret and conduct waste abatement activities in an industrial environment.
- While integrated way of handling liquid, solid and gaseous emission from industries, greater emphasis are given to liquid pollution abatement and management.



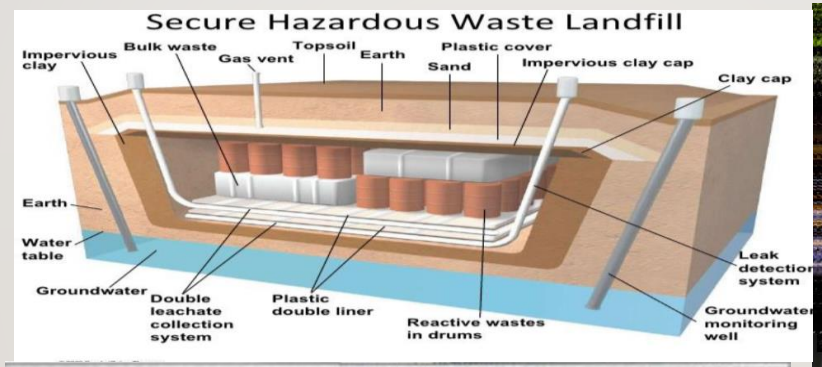
Course Title: Hazardous Waste Technology and Management

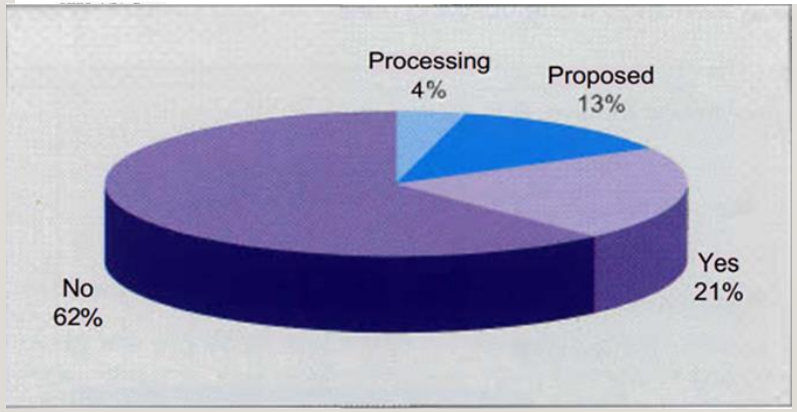
Dr. Wenchao Xue



Course outline:

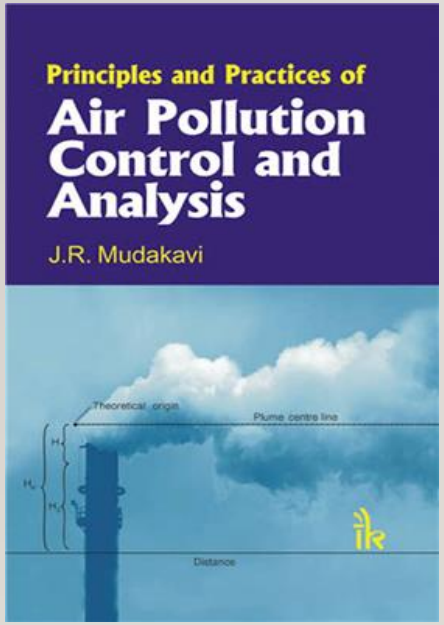
- Exposes the properties of hazardous chemicals, their spread in the environment and risk associated with it.
- Various methods used in hazardous waste management and regulatory aspects.





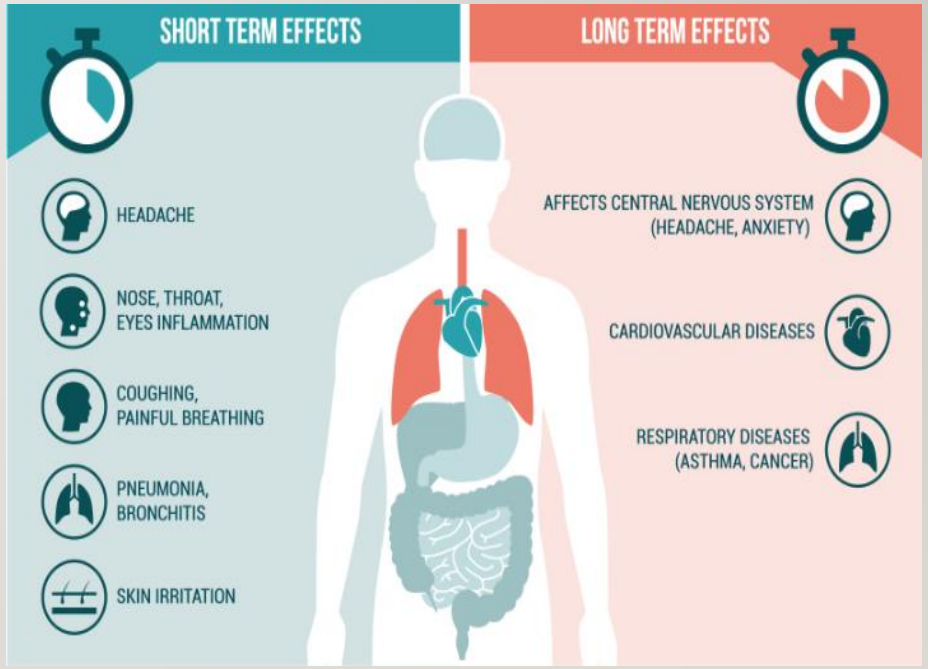
Course Title: Air Pollution Engineering and Management

Dr. Ekbordin Winijkul



Course outline :

- Equip learners with scientific basis and engineering knowledge to understand the complexity of the air pollution problems
- Multiple effects of air pollution, and principal tools for effective integrated air quality management.

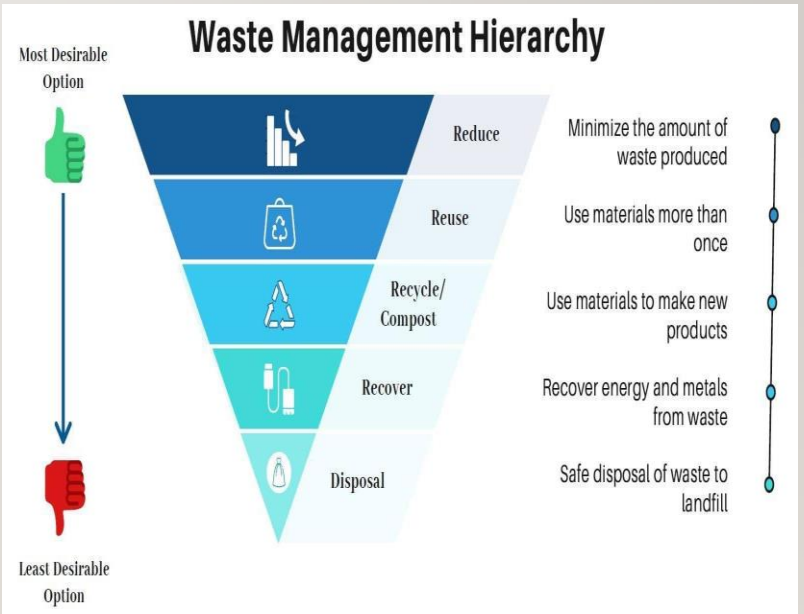


Course Title: Sustainable Consumption and Production (SCP)

Prof. C. Visvanathan

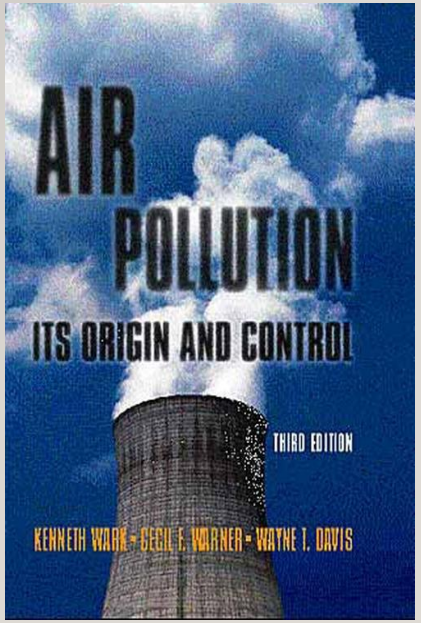
Course outline :

- Overview of the changing pattern of production and consumption of goods and services, from closing the resource loop by practicing sustainable resource use and end-of life waste management in a more holistic.
- Making the entire chain of production, supply chain, and consumption in a more environmentally sustainable and socially and economically responsible ways to influence consumption behavior.



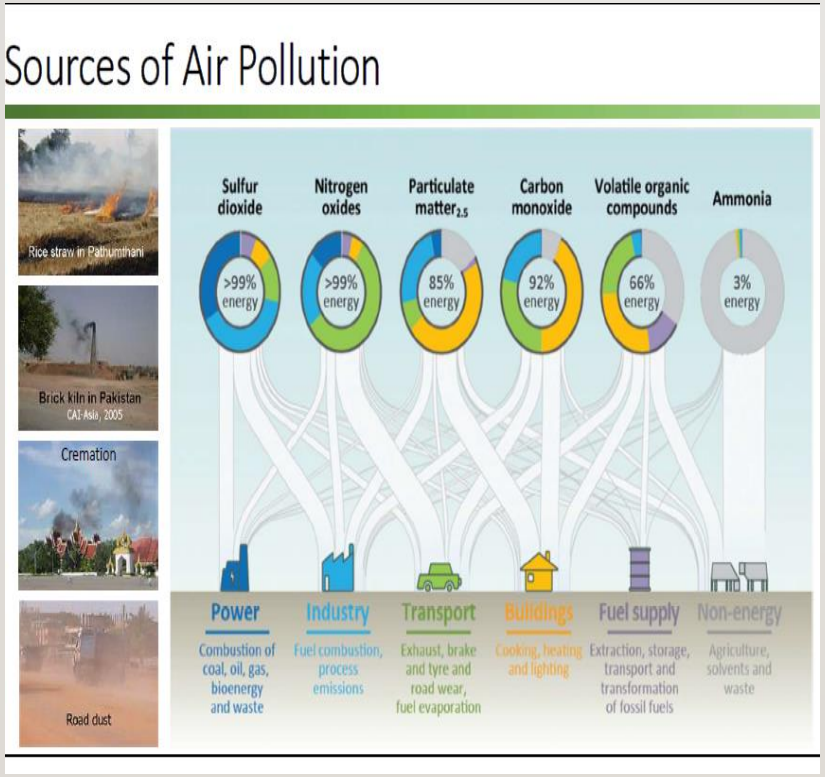
Course Title: Emission Inventory and Air pollution Modelling

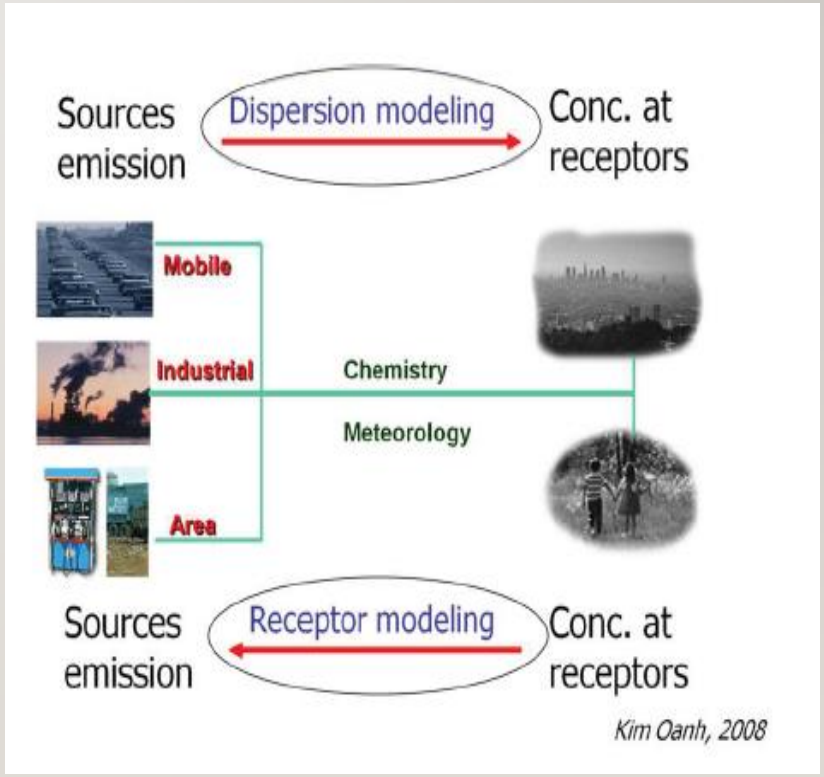
Dr. Ekbordin Winijkul



Course outline :

- Basic concept of air pollution emission Inventory and its development.
- Various types of tools and mathematical modelling for air quality management.





Thesis

Dr. Ekbordin Winijkul

Development of Air Pollution Emission Inventory for Dhaka Metropolitan Region (DMR)

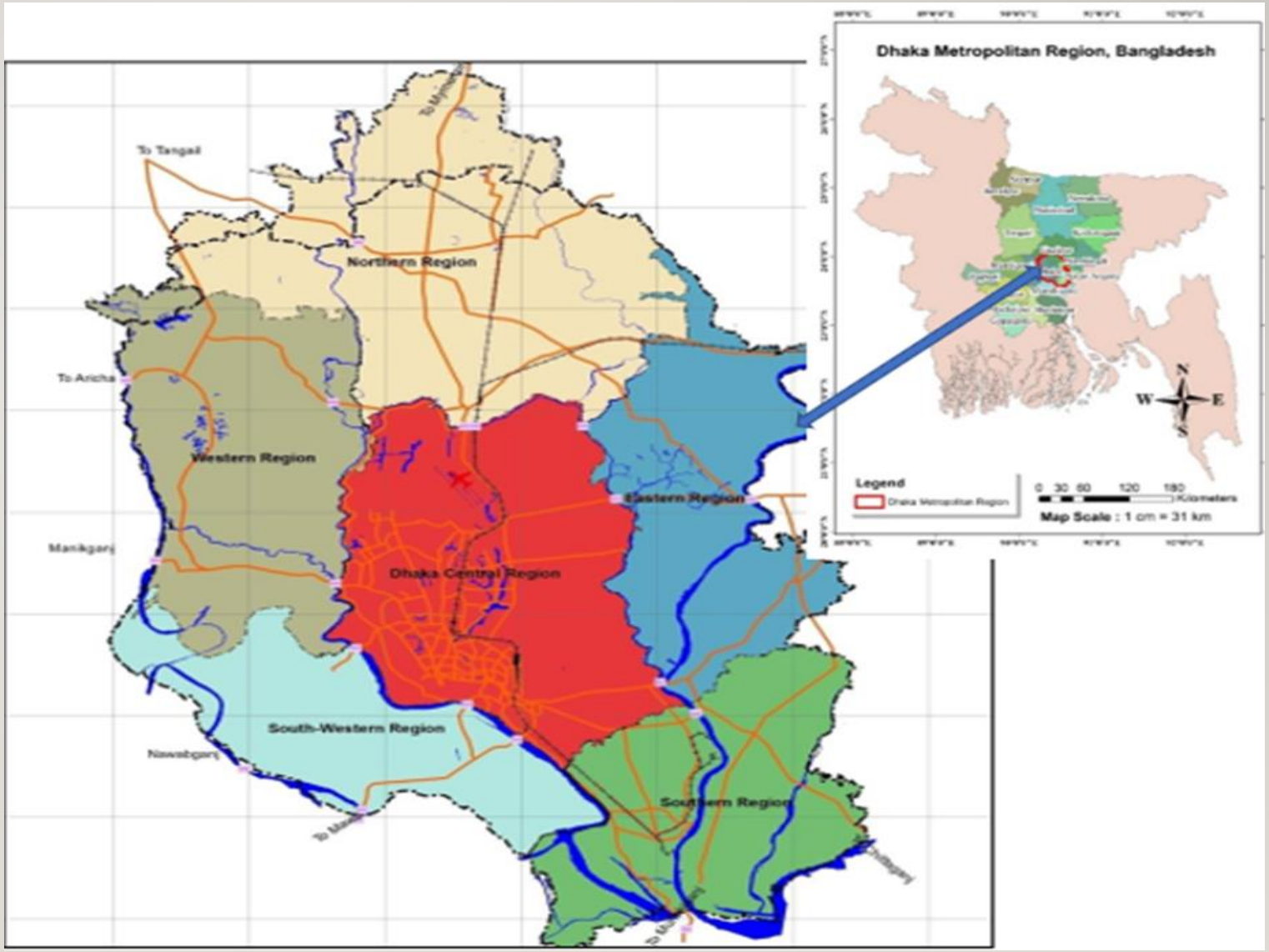
Local Government Engineering Department

Objectives:

- To develop emission inventory for the base year of 2019 for all sectors.
- To estimate the emission reduction in transportation and industrial sectors using the developed emission inventory.

Development of Air Pollution Emission Inventory for Dhaka Metropolitan Region (DMR)

Study area (DMR)



Development of Air Pollution Emission Inventory for Dhaka Metropolitan Region (DMR)

This study focused on emissions from:

On-road transportation

Air transportation

Rail transportation

Water transportation

Industry

Residential and commercial combustion

Open burning

Construction activities

EI's main species included toxic air pollutants:
(PM10, PM2.5, SO2, NOx, CO, NH3, BC, OC, NMVOC) and GHGs (CO2, CH4, N2O).

Development of Air Pollution Emission Inventory for Dhaka Metropolitan Region (DMR)

This study focused on emissions from:

On-road transportation

Air transportation

Water transportation

Rail transportation

Industry

residential and commercial combustion

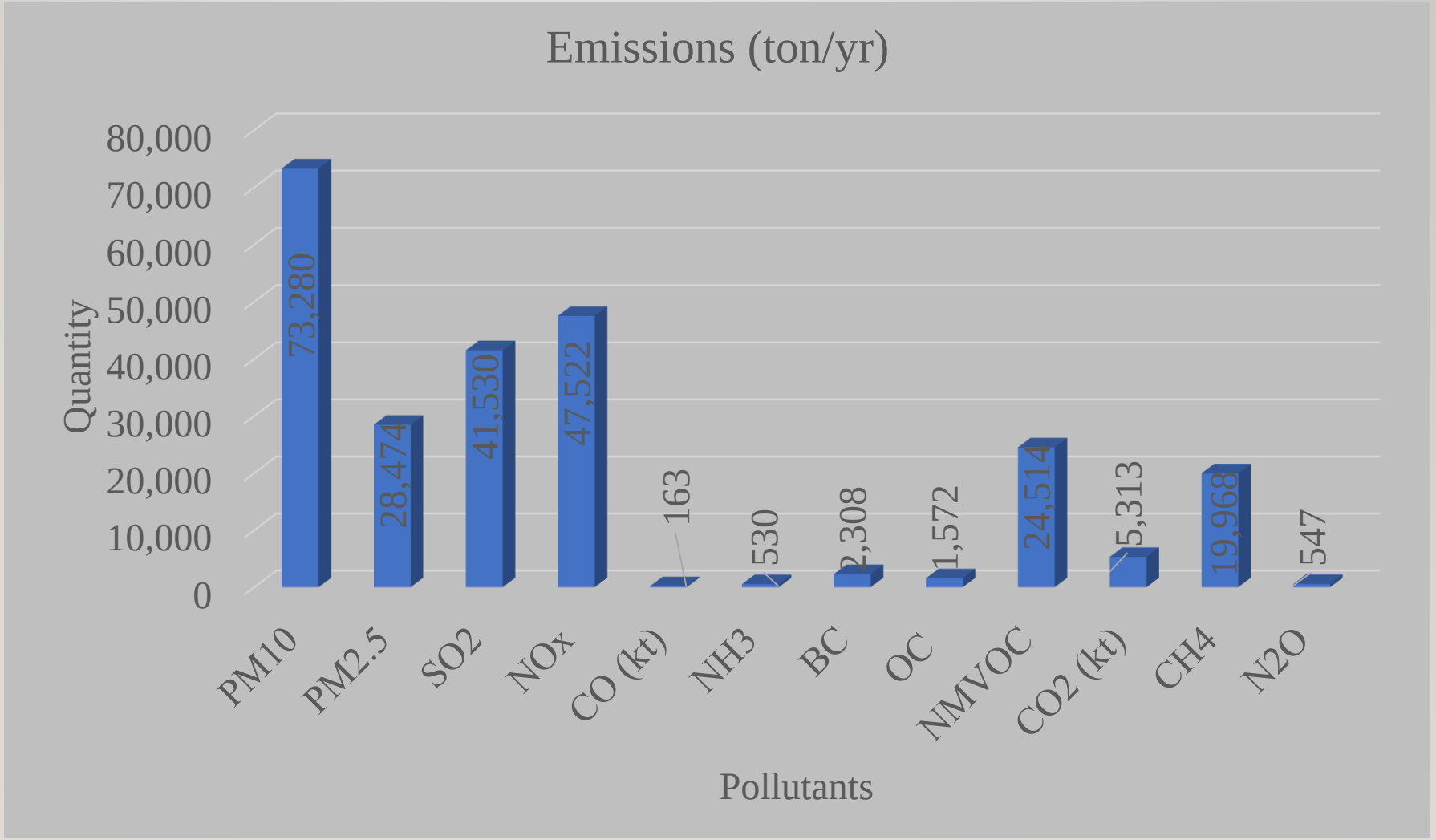
Open burning,

construction activities

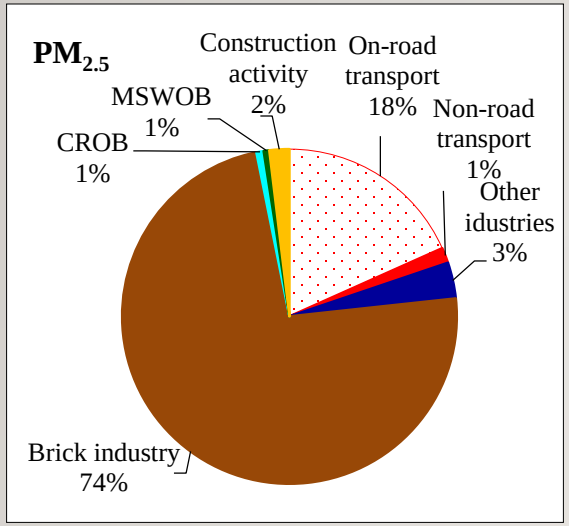
EI's main species included toxic air pollutants (PM10, PM2.5, SO2, NOx, CO, NH3, BC, OC, NMVOC) and GHGs (CO2, CH4, N2O).

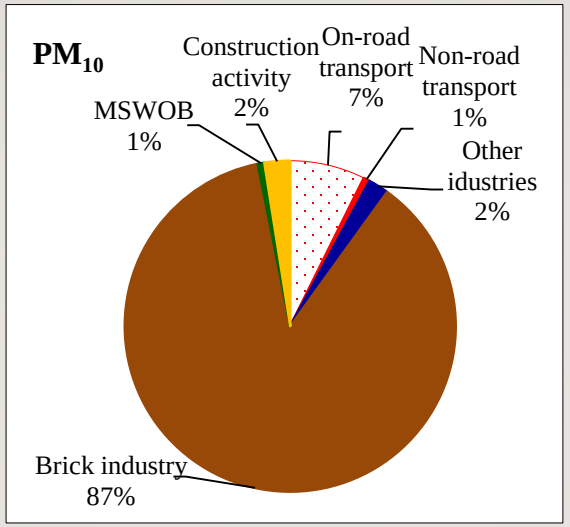
Research findings

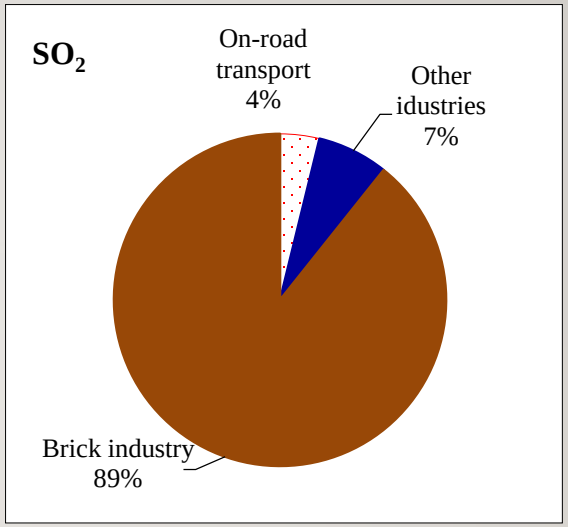
Total Emission for All sectors

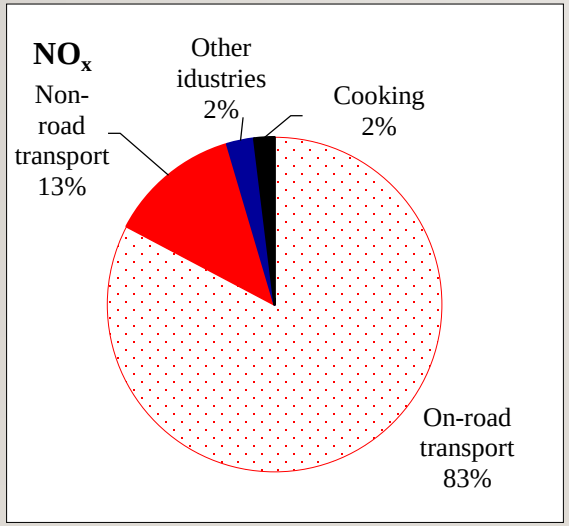


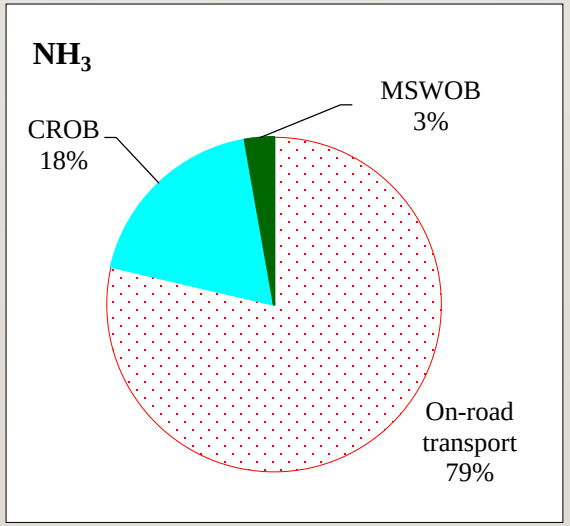
Emission Share by source sectors

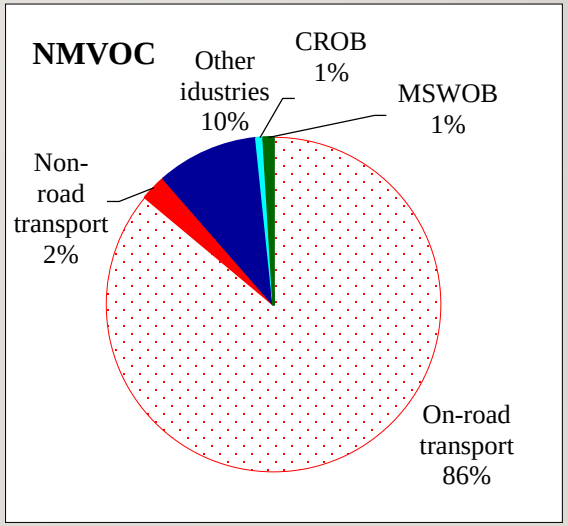




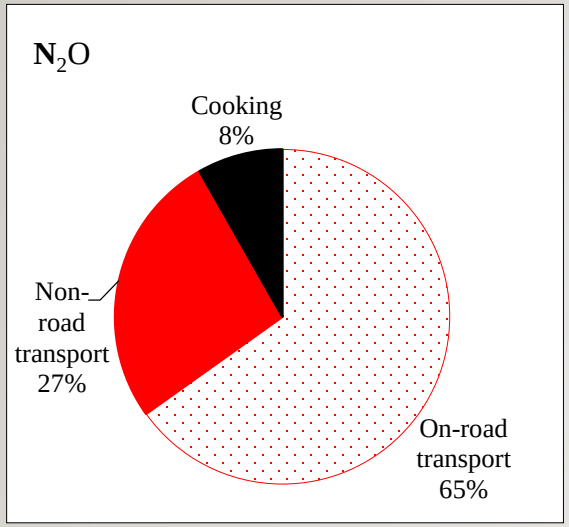


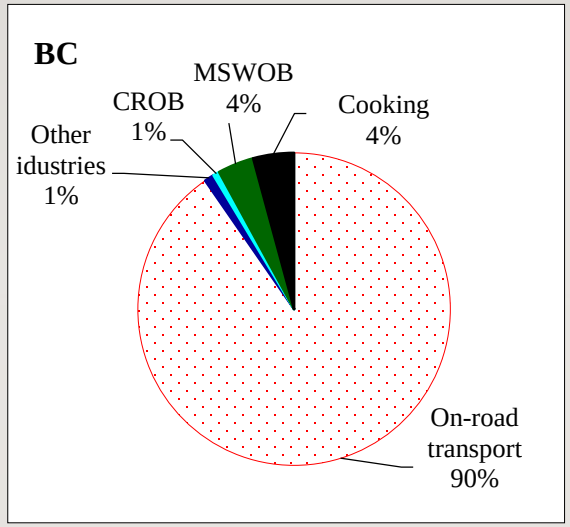


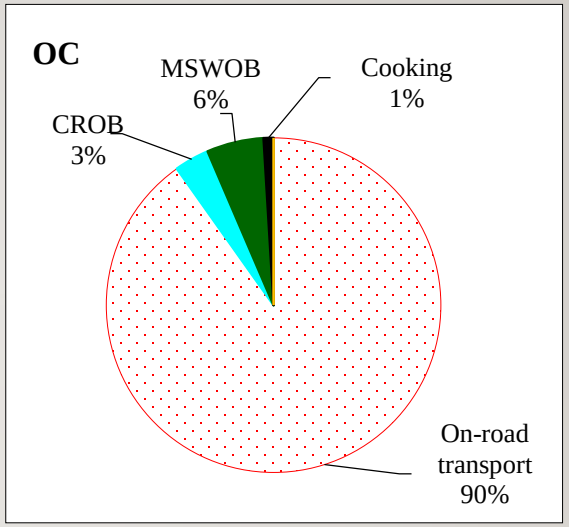


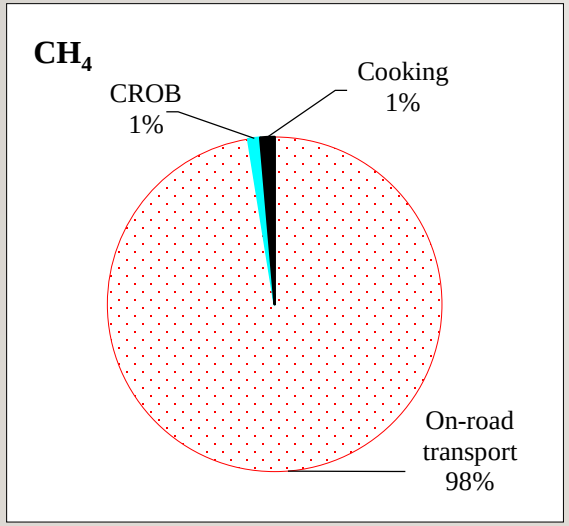


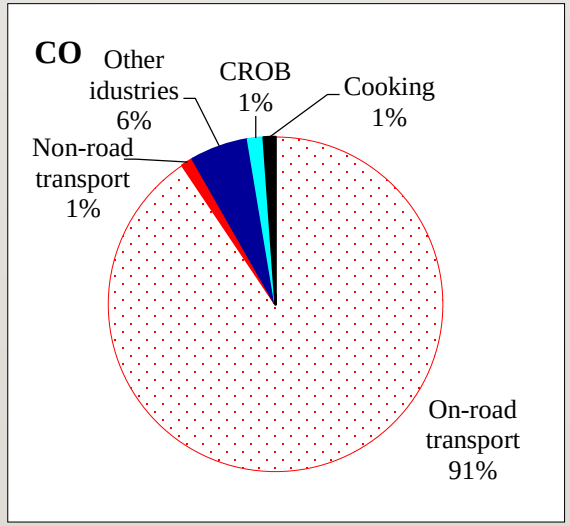
Emission Share by source sectors

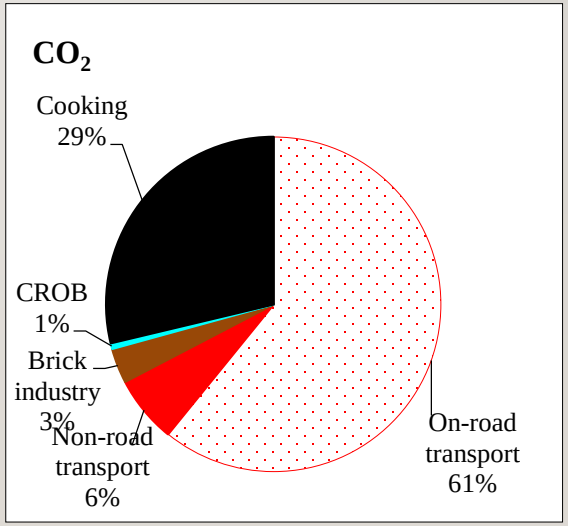












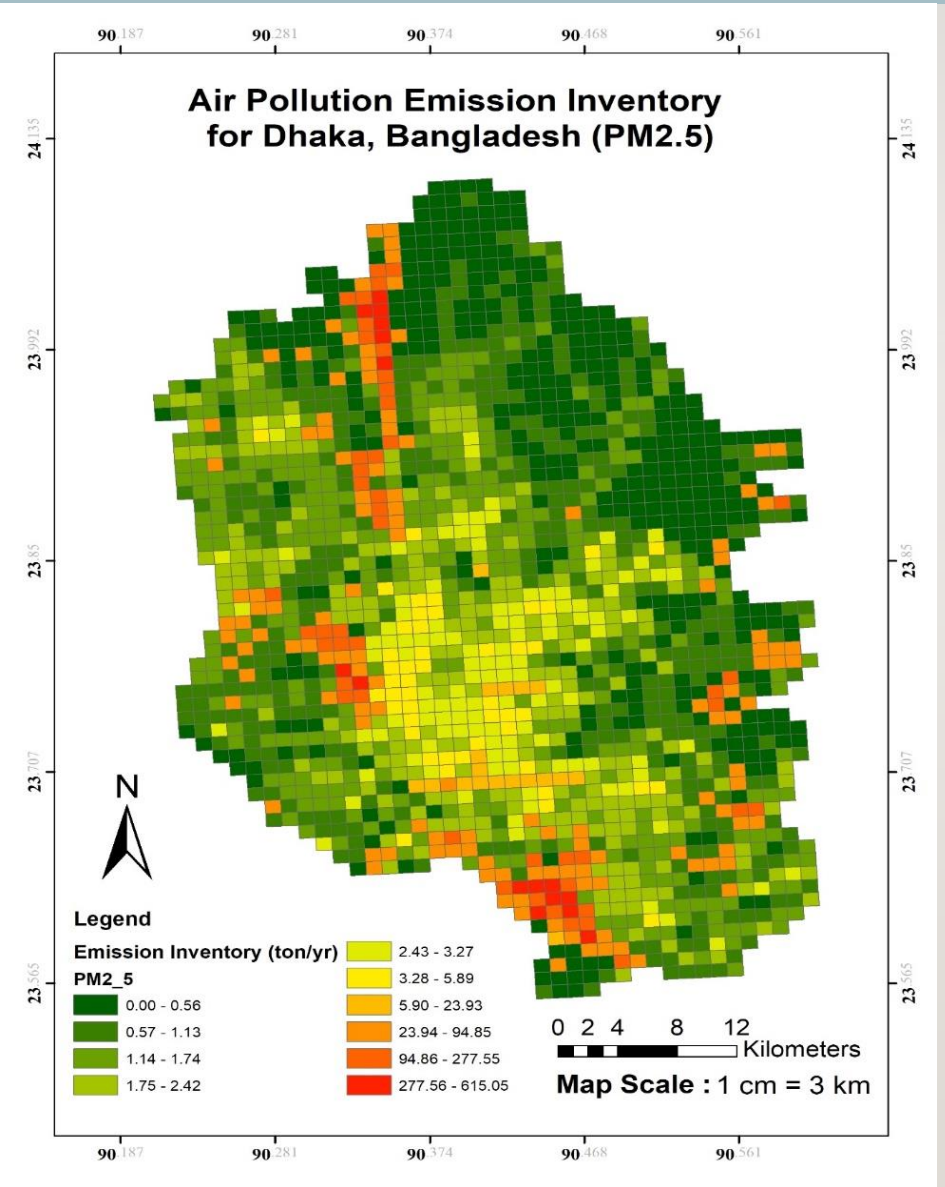
Emission Reduction Scenario for on Road Transportation

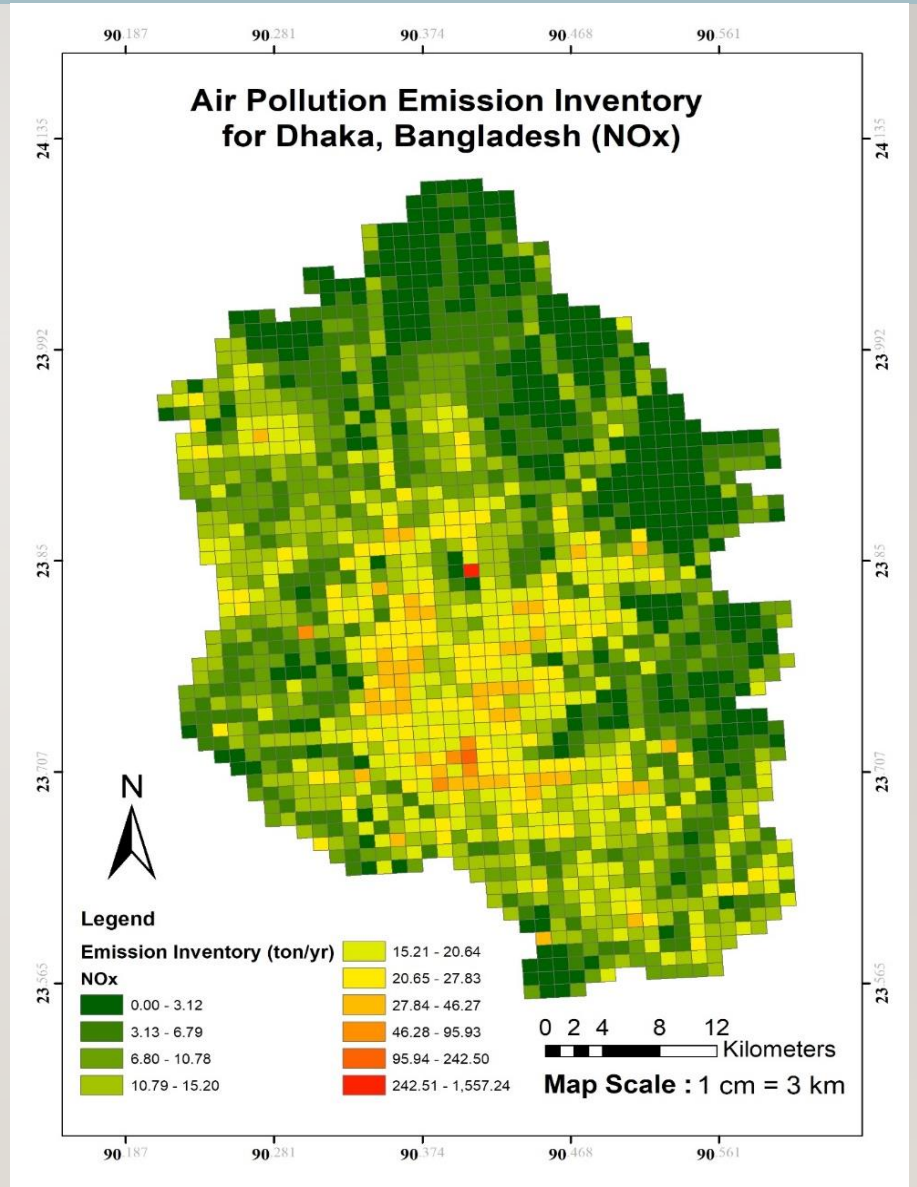
Pollutants	Base Case 2019 (ton/yr)	Scenario EURO IV (ton/yr)	% Reduction with EURO IV	Scenario CNG (ton/yr)	% Reduction with CNG
SO_2	1577	79	95%	12	99%
NO_x	39241	26653	32%	8894	77%
CO	147227	138826	6%	151136	-3%
NMVOC	21122	19621	7%	20960	1%
NH_3	417	413	1%	512	23%
PM_{10}	5345	965	82%	817	85%
$PM_{2.5}$	5206	920	82%	775	85%
CH_4	19341	19264	0.4%	22860	-18%
CO_2	3219666	1897879	41%	2728118	15%
N_2O	365	550	-51%	285	22%
BC	2084	208	90%	139	93%
OC	1417	600	58%	570	60%

Emission Reduction Scenario for Brick Industry

Sector/sub-sector	Emission (ton/yr)			
	PM_{10}	$PM_{2.5}$	SO_2	CO_2
Total Emission of base scenario 2019 (base scenario)	63,344	20,904	36,828	178,248
Total Emission of with reduction scenario of IZK (scenario 3)	4,640 (93%)	1,531 (93%)	4,869 (87%)	57,304 (68%)
Total Emission of with reduction scenario TK.(Scenario 4)	2,630 (96%)	789 (96%)	6,576 (82%)	1,822,650 (-90%)

Spatial distribution of emission





Scope of Contributing to the LGED

- Initial Environmental Examination (IEE)
- Environmental Impact Assessment (EIA)
- Solid Waste Management
- Fecal Sludge Management (FSM)
- Policy Formation in Reducing Air Pollution

Thank You All