



Cooperation for Air Quality Improvement in Seoul and Ulaanbaatar

Seogju Cho

**Seoul Metropolitan Government
Research Institute of Public Health and Environment**

Seoul



Contents



Ambient Air Quality Monitoring Sites in Seoul

Air Quality in Seoul

Transboundary Air Pollutants: Yellow Dust

Cooperative Research between Ulaanbaatar and Seoul

Future cooperation between Ulaanbaatar and Seoul

Ambient Air Quality Monitoring Sites in Seoul



Environmental Information management system

Monitoring Stations



Mobile Monitoring Lab



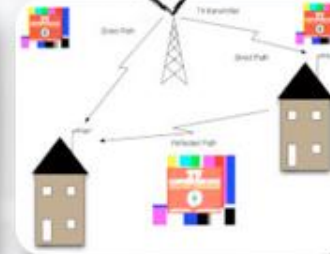
**TMS
Center**



LED display board on main streets (13)



<http://cleanair.seoul.go.kr>



Broadcast

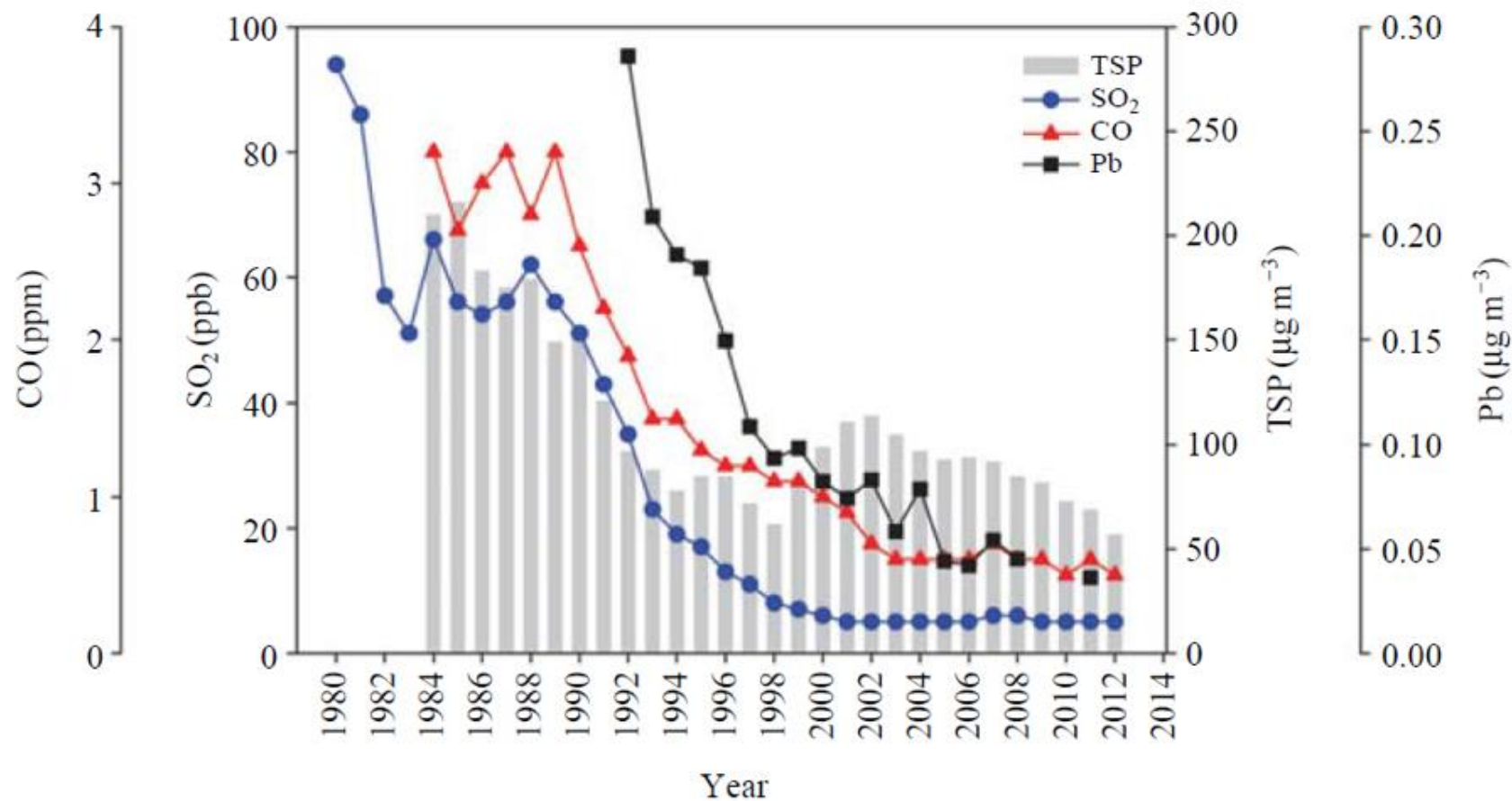


SMS



School

Air Quality in Seoul



Air Pollution Reduction Policy in Seoul

1980~2000

Focus on Switching fuel to low-pollutant containing fuels.

- ▶ Providing low-sulfur fuel (1981),
- ▶ Prohibition of use of solid fuel in city area(1985)
- ▶ Mandatory use of Clean fuel(LNG, LPG) for house heating (1988)
- ▶ Supplying unleaded gasoline (1987) / Prohibition of leaded gasoline (1996)

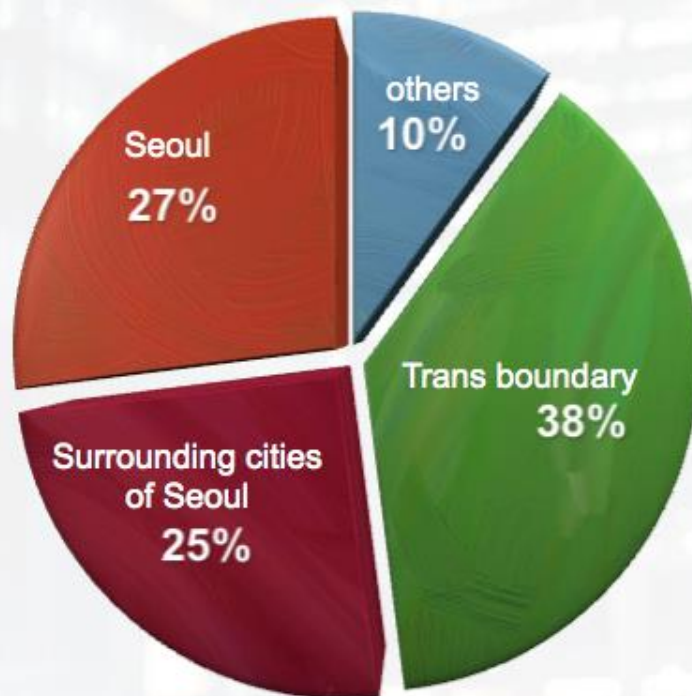
2000~

Diverse environmental regulation for 2nd air pollutants

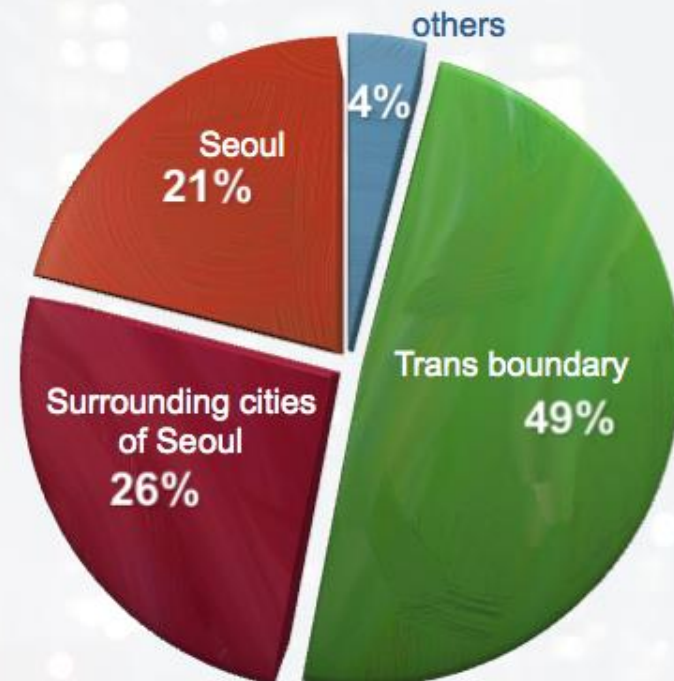
- ▶ cap-and-trade, environment-friendly energy, Urban management
- ▶ Total business emission management system
- ▶ Focus on reducing PM-10 in transportation sector since 2012
ex) Change the bus fuel from diesel to CNG(Compressed Natural Gas)

Pollution Sources of PM₁₀ and PM_{2.5} in Seoul

PM₁₀



PM_{2.5}



Source: Mitigation measurements of fine particulate matters, 2011

Transboundary Air Pollutants: Yellow Dust



After occurrence, yellow dust arrive in Korea within **48 hours**

Yellow dust contribution

Inner Mongolian high-land	37%
Gobi Desert	24%
Keerqin Desert	19%
Taklamakan Desert	10%
Manchuria	10%



Cooperative Research between Ulaanbaatar and Seoul

1

Support air quality measuring instruments for cooperative research

- **Real-time measuring instruments**
: PM-10, PM-2.5, SO₂, NO_x, CO etc.
- **High volume PM sampler**
: chemical analysis for ionic compounds and heavy metals

2

Technical assistants and personnel support

- **Air quality measuring technique instruction**
- **visiting support: 2 personnel 2 times/ year (from 2016)**

Air Quality Measuring Instruments

Air Quality Measurement System



PM-10 Analyzer

NOx Analyzer

SO₂ Analyzer

PM-2.5 Analyzer

Data Logger
(Acquisition)

CO Analyzer

Zero Gas
Generator

Gas calibrator

High Volume air Sampler



Hazardous Material Sampling

- Heavy metals
- Ionic Compounds
- PAHs



Analyzing

With ICP, IC, GC, etc.

Expected Cooperative Research Project

1

Comparative evaluation of air quality in Ulaanbaatar with Seoul through detailed air quality monitoring

2

Investigation on Influence of air quality between Unlaan baatar and Seoul by identification of air pollution source contribution in Unlaanbaatar and backward-trajectory analysis in Seoul.

3

Sharing and suggestion of air quality reduction policy through main air pollution source investigation in Unlaanbaatar.

4

Health impact assessment and cost-benefit analysis for yellow dust transport between Mongolia and Korea.

Seoul Metropolitan Government Research Institute of Public health & environment (SIHE)



SIHE ORGANIZATION (281 people)

General Director

Research support Department

Food and Drug Administration Department

- Food Safety Team
- Nutritional Evaluation Team
- Food Additives Test Team
- Pharmaceutical Analysis Team
- Cosmetics Analysis Team
- Health Life Team
- Special Test Team
- Research and Planning Team

Disease Research Department

- Microbial Inspection Team
- Virus Team
- Immunodiagnosis Team
- Infection Test Team

Atmospheric Research Department

- Atmospheric Environment Team
- Atmospheric Chemistry Team
- Indoor Air Quality Team
- Roadside Air Monitoring Network Team
- Particle Research Team
- Noise and Vibration Team

Aquatic Research Department

- Water Chemistry Team
- Drinking & Ground Water Team
- Aquatic Ecology Team
- Waste Engineering Team
- Environmental Microbiol Team

Livestock Products Department

- Livestock Safety Team
- Hazard Analysis Team
- Zoonosis Team

Gangnam Agro-Fishery Products Inspection Center

Gangbuk Agro-Fishery Products Inspection Center

SIHE WORK

Safety for Public health



Experiments

- Food, food additives, food hygiene
- Containers and packaging materials
- Drug and quasi-drug
- Cosmetics
- Agricultural products, marine products
- Livestock Products

Precedence Investigations

- products concerned to the public health

Monitoring of radioactivity and irradiation in foods

- Radionuclide : Cesium(^{134}Cs , ^{137}Cs)
- Food irradiation : γ -radiation, electroration

SIHE WORK

Disease Surveillance



Tracking pathogen & Identifying sources for bacterial infectious disease

- waterborne & foodborne diarrhoeal disease
- latent TB infections : examination of a contacts
- legionella in the hazardous environment
- bacterial respiratory infections : pertussis, scarlet fever

National surveillance network of infectious disease

- acute diarrheal disease active surveillance network (EnterNet)
- testing foodborne and diarrheal organisms against antibiotic drugs
- molecular subtyping network for foodborne infections (PulseNet)
- laboratory response network for biological terrorism

SIHE WORK

Air Quality Protection & Increasing Living Condition



Investigation of Indoor Air Quality & Radon contamination inspection

- Public utilization facilities
- Public transport vehicles
- Newly-constructed apartment



Research of Particle and Airborne asbestos

- Particulate monitoring network operation and risk assessment
- Research on the particulate characteristics and damage prevention for human and ecosystem
- Analysis and monitoring of Asbestos on environment



A Inspection of noise and vibration

- Online real time noise monitoring system
- Environmental noise measurement and monitoring network in the main areas of Seoul
- Effect evaluation of traffic noise and noise impact assessment in Apartment

SIHE WORK

Water Environmental Monitoring System



Automatic Water Quality Monitoring System

- 24hr monitoring to prevent Han-river from water pollution accidents
- Biomonitoring toxicity : Daphnia, Zebra fish, closterium, Bacteria
- Items : DO, TN, TP, Phenol, Hg, ABS, Chl-a, etc



Measurement of the current status on water quality of the streams in Seoul

- Investigation points : Godeok, Seongnae, Yangjae, etc(17 Points)
- Items : pH, DO, BOD, SS, TN, TP, Coliforms, Metals, etc(27 items)



Soil Contamination Survey in Seoul Area

- Heavy Metal Inspection in Urban Agriculture Garden
- Survey of Environmentally Hazardous Factors in Children's Activity Zone

Future Cooperation in Other Fields



Water Quality

Joint Research and Technical Support for Ground water and drinking water analysis



Food and Drug

Joint Research and Technical Support for food and pharmaceutical analysis



Infectious disease Control

Joint Research and Technical Support for Infections disease Control



Seoul

Together we stand

Thank you
for your kind attention!