Overview of EANET (Acid Deposition Monitoring Network in East Asia) Activities

Hiromasa UEDA (ADORC)

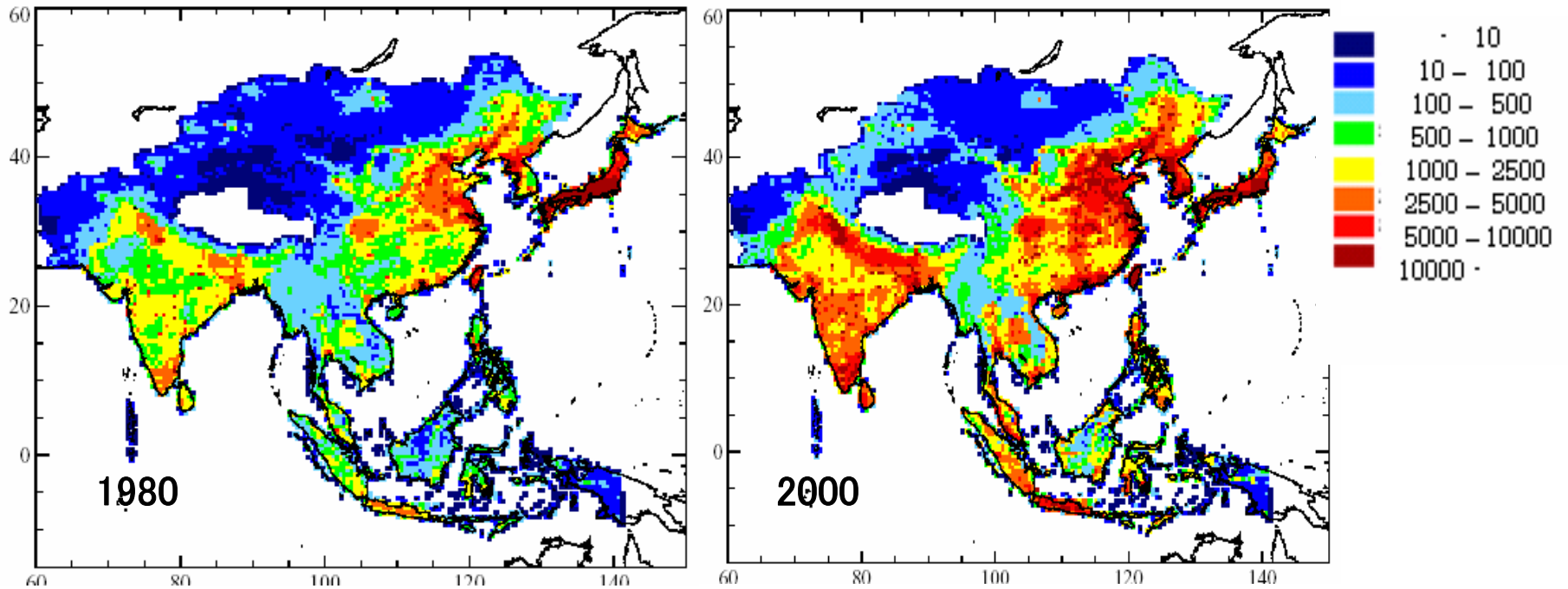# Asia: its significance to the rest of the world

- **60% of the world's population live in Asia**

- **Asia is the fastest developing region in the world**

- **WHO estimated that nearly 700,000 deaths worldwide are related to air pollution and this number may increase to 8 million by 2020**

- **About 50 times more people die from health problems related to air and water pollution in developing countries compared with highly developed countries**

- **Anthropogenic emissions of air pollutants in Asia are projected to become the most dominant component of air pollution worldwide in the next 25 years**
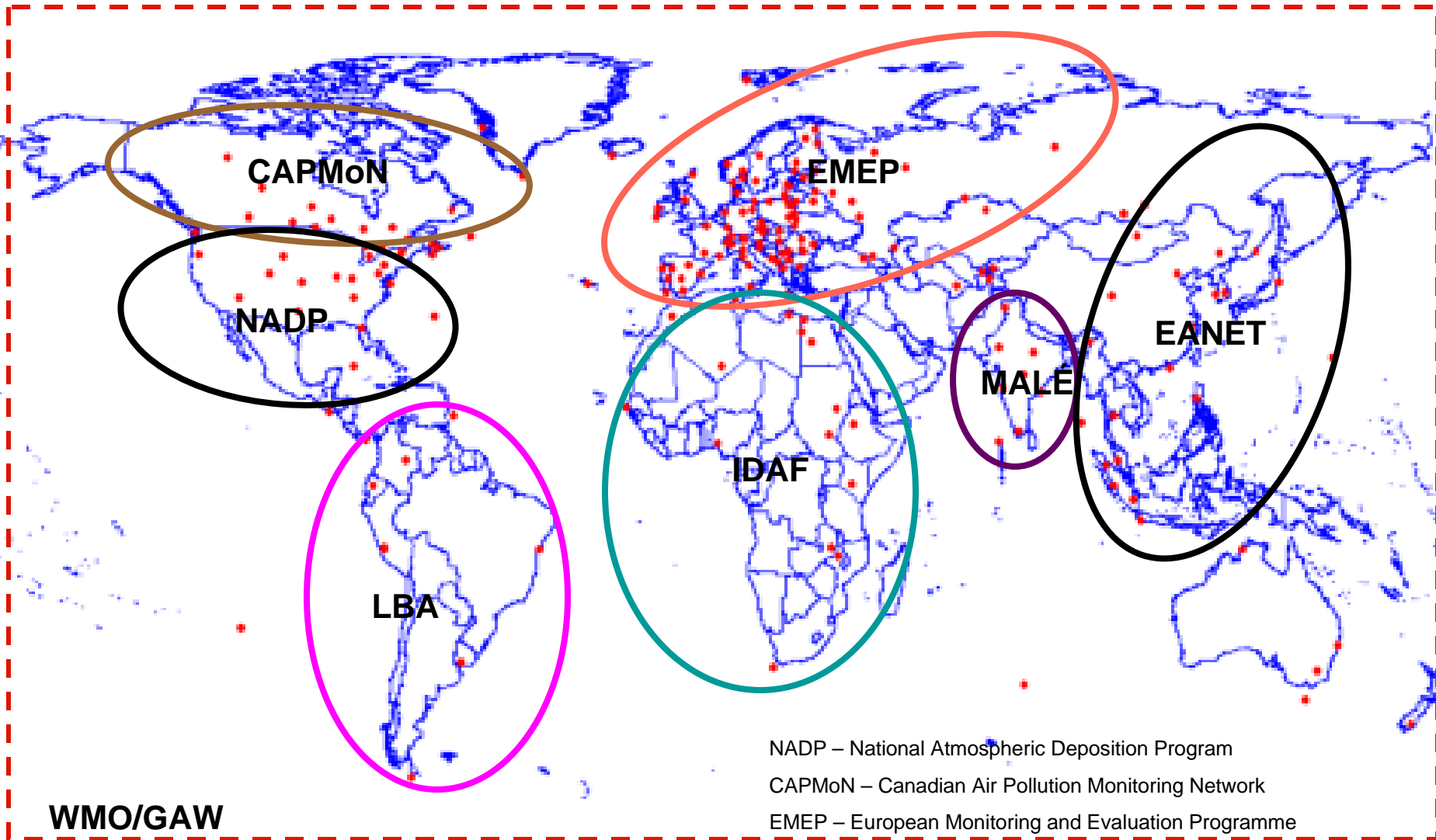
NOx-emission

Legend		
China	India	Japan
E Asia	SE Asia	S.Asia

(kt) axis values: 0, 5000, 10000, 15000, 20000, 25000, 30000

Years: 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000

VOC-emission

(kt) axis values: 0, 5000, 10000, 15000, 20000, 25000, 30000, 35000, 40000, 45000

Years: 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000
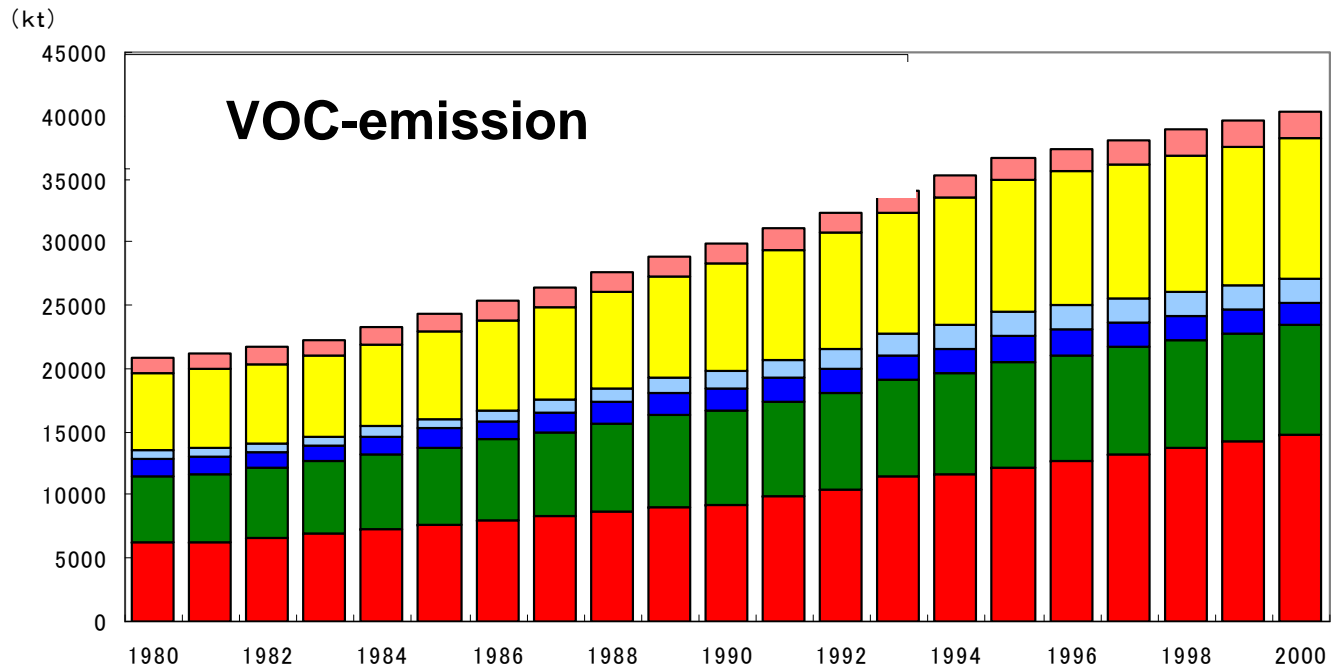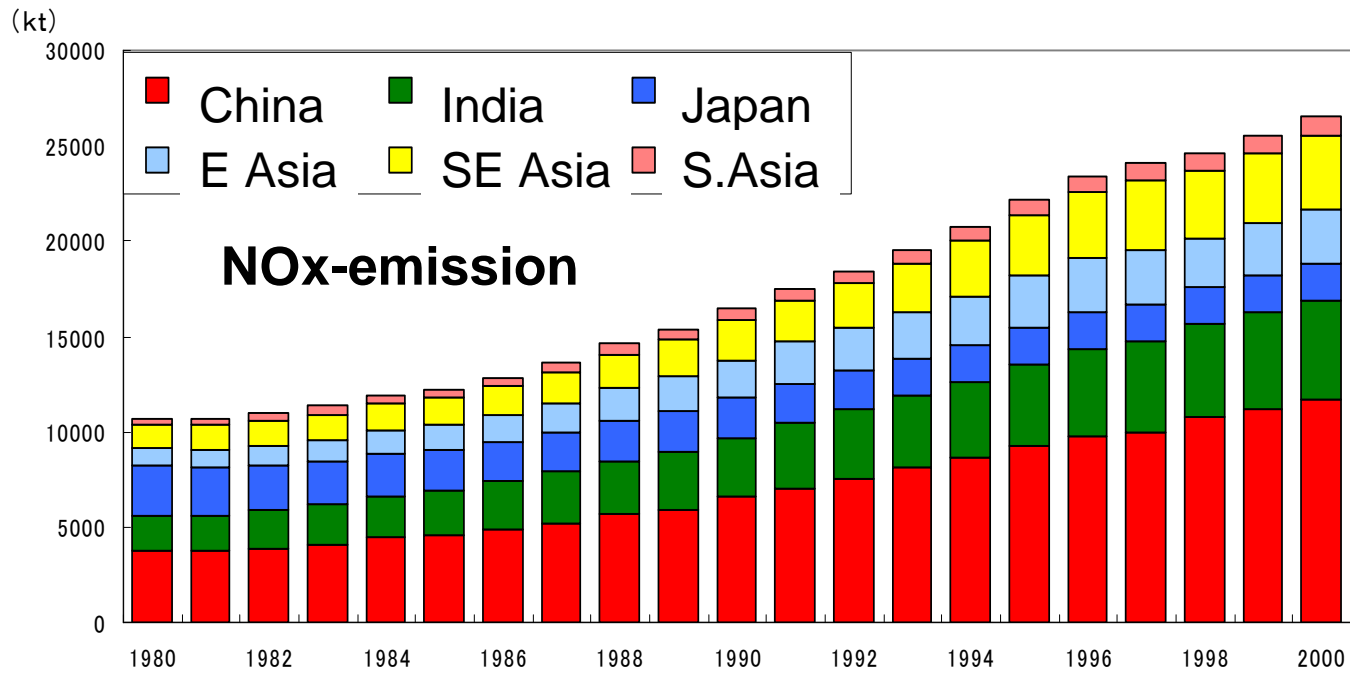
VOC-emissi

NOx Emission

Regional Air Pollution Monitoring Networks

NADP – National Atmospheric Deposition Program

CAPMoN – Canadian Air Pollution Monitoring Network

EMEP – European Monitoring and Evaluation Programme

LBA - Large-scale Biosphere-Atmosphere Experiment in Amazonia

Regional Air Pollution Monitoring Networks

- **Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP)**

- **National Atmospheric Deposition Program (NADP) of North America**

- **Canadian Air and Precipitation Monitoring Network (CAPMoN)**

- **Acid Deposition Monitoring Network of East Asia (EANET)**

- **International Global Atmospheric Chemistry Project – Deposition of Biogeochemically Important Trace Species (IGAC/DEBITS)**

- **World Meteorological Organization Global Atmosphere Watch (WMO/GAW) Programme**

Network Center NC for EANET
Acid Deposition and Oxidant Research Center (ADORC)

http://www.adorc.gr.jp

Director General DG: Dr. Ueda (Emeritus Prof. of Kyoto Univ.)
Deputy DG for NC: Ms. Leong Chow Peng (former DDG of MMD, Malaysia)

History of EANET development

- **1993 - 1997** *4 scientific/technical meetings*

  ◆ Necessity, Design of network and
  Guidelines and Manuals for monitoring methodologies

- **1998 - 2000** *Preparatory Phase*

  ◆ 1st Intergovernmental (IG) Meeting (1998, Japan): Objectives,
  Activities, Schedules, Institutional and financial matters.
  Started in April 1998 on an interim basis

  2nd IG meeting (Oct.2000, Japan): Evaluation of preparatory phase,
  Decision on regular phase

- **2001 - current** *Regular Phase*

  ◆ 3rd IG Meeting (2001, Thailand): EANET Data disclosure,
  Designation UNEP.RRC.AP as the Secretariat for EANET
  4th-8th IG Meetings (2002-2006): Current EANET activities,
  Financial arrangement

Objectives of EANET (Joint Announcement)

- to create a common understanding of the state of the acid deposition problems in East Asia

- to provide useful inputs for decision-making at local, national and regional levels aimed at preventing or reducing adverse impacts on the environment caused by acid deposition

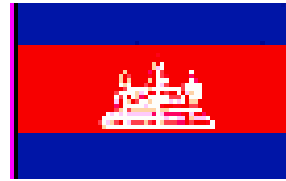- to contribute to cooperation on the issues related to acid deposition among the participating countries

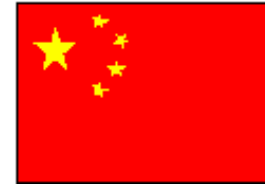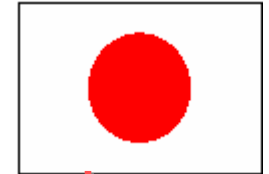The regular phase activities were started in January 2001 :

Viet Nam
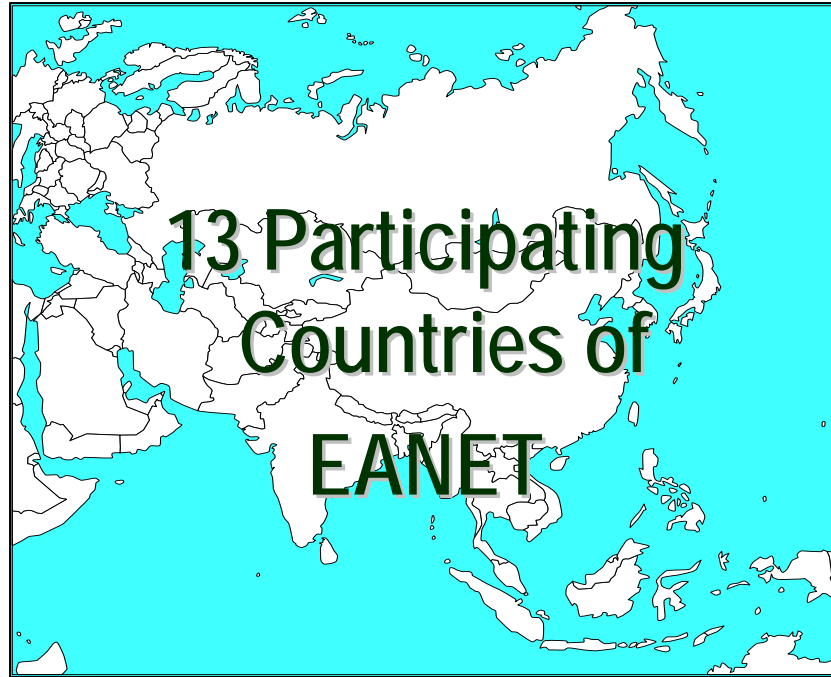
Cambodia

China

Thailand

Indonesia

Russia

Japan

Republic of Korea

13 Participating Countries of EANET

Lao PDR

Philippines
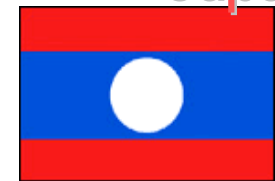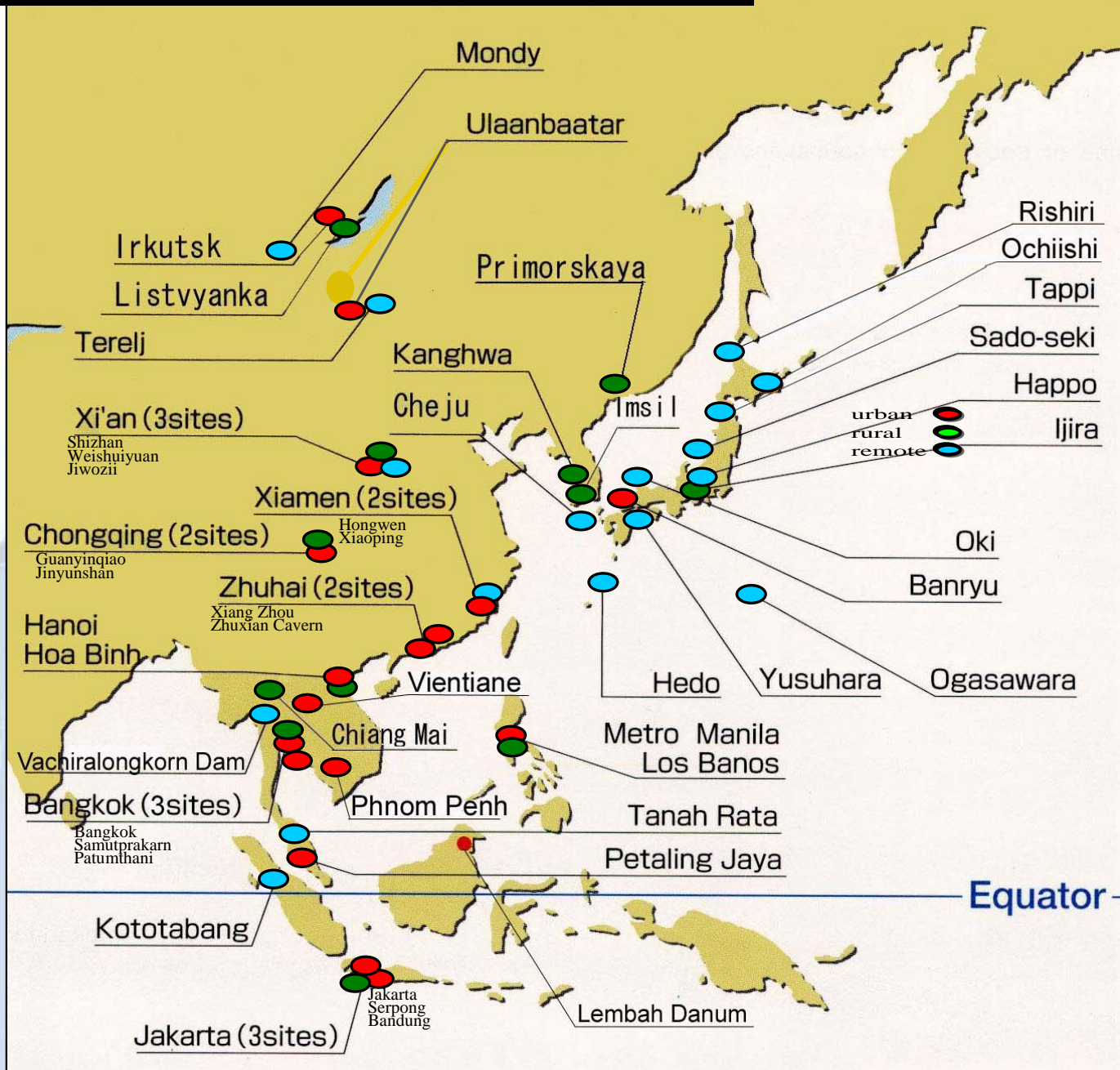
Myanmar

Mongolia

Malaysia

the greatest achievement of EANET

Achievements of EANET

- Network development

- Development of a high quality dataset

- Enhancement of technical capacity in participating countries

- Raising public awareness

- Enhancing knowledge and understanding through research

- Promotion of cooperation between countries and with other regional/international programs

Framework of EANET

Intergovernmental Meeting

International Level

Scientific Advisory Committee

TF on Dry dep.

TF on S & V

Secretariat (UNEP RRCAP)

Network Center (ADORC)

National Level

National Focal Point

National Center

QA/QC Manager

Participating Country
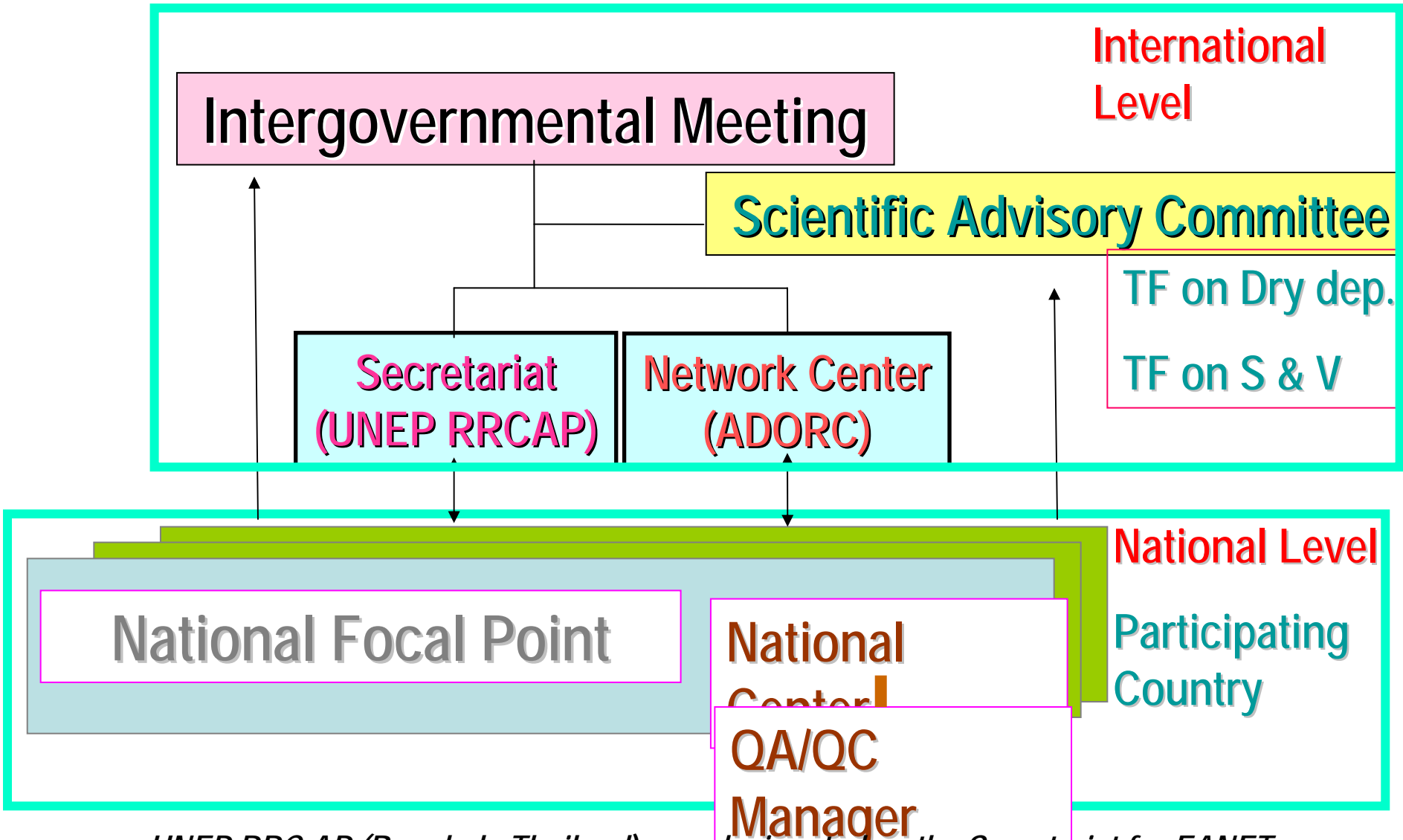
UNEP RRC.AP (Bangkok, Thailand) was designated as the Secretariat for EANET
Acid Deposition and Oxidant Research Center (ADORC, Japan) – as Network Center

Scientific Advisory Committee (Oct. 2007)

Task Force on Dry Deposition Monitoring
Task Force on Soil and vegetation Monitoring
　　　—Network of Soil and Vegetation Specialists
Task Force on Monitoring Instrumentation
Task Force on Research Coordination

Expert Group on Dry Deposition Flux Estimation
Expert Group on Preparation of Second Periodic Report on State of Acid Deposition
　　　　　　　　　　　　　　　　　　　　　　　　　　　　in East Asia
Expert Group on Revision of Technical Manual on Wet Deposition Monitoring
Expert Group on Revision of Technical Manual on Inland Aquatic Environment Monitoring

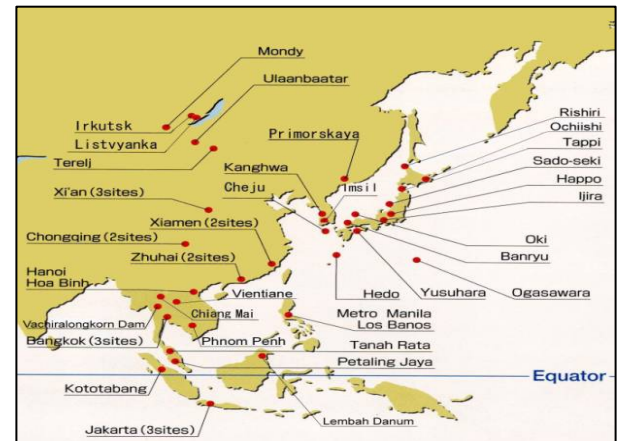(Expert Group to Review Substances to be Monitored in the EANET Network)
(Expert Group for Promotion on Emission Inventories and Modeling Activities).

EANET Activity 1 : Monitoring

Number of sites (Dec. 2006):

- **Wet deposition - 47**
- Dry deposition (air concentration) -35
- Inland aquatic (surface water) – 13
- Soil and vegetation – up to 25 in total

EANET 47 sites of wet deposition monitoring

Monitoring activities

- **Wet deposition:** daily/ every precipitation event

- **Dry deposition (air concentration monitoring):** (bi)weekly (filter pack)/ hourly (automatic monitor)

- **Soil and vegetation:** every 3-5 years

  Forest soil: pH, exchangeable bases and acidity, ECEC

  Forest vegetation: General description of forest, observation of tree decline

- **Inland aquatic environment:** four times a year

Emission inventory, simulation modeling, integrated monitoring on the catchment scale, and effects of ozone are discussed for future development.

Thank you for your attention !!

Objectives the Workshop

MICS-Asia 10th Workshop

18-19 February 2008

IIASA

Hiromasa UEDA

Objectives of Phase II

- To make a common understanding of model performance and uncertainties in Asia

- To make good use of EANET monitoring activities

- To explore the possibilities of EANET modeling activities

Progress of Phase II

- 4th workshop 22-23 October 2001, IIASA
    - Review of Phase I
    - Wider perspective: nitrogen compounds, ozone and aerosols

- 5th Workshop 20-21 January 2003, IIASA, Phase II Start
    - Specifics of Phase II
    - Web: http://www.adorc.gr.jp/adorc/mics.html
    - Standard input data were prepared and distributed.

- 6th Workshop 9-10 February 2004, IIASA
    - Introduction of preliminary results
    - Data protocol was prepared

Progress of Phase II (2)

- 1st Working Group Meeting 18−20 November 2004, Kyoto
  - Preliminary analyses were conducted
  - 7th Workshop 14−15 February 2005, IIASA
  - 8 modeling groups submitted their model results
    - Discussion on publication strategy
- 8th Workshop 18-19 January 2006, IIASA
  - Review and progress of papers prepared
  - **Review and progress of individual modeling activity**
  - Introduction of the relevant activities
  - Discussion about the next activities
  - 9th Workshop 27-28 February 2007, IIASA
    - Review and progress of papers prepared
    - **Review and progress of individual modeling activity**
    - **Introduction of the relevant activities**
  - **Discussion about the next activities**

Objectives of 10th Workshop

- Progress of papers submitted

- Introduction of the relevant activities

- Discussion about the next activities and for the project preparation

MICS-Asia Phase Ⅲ (Modeling and Emission Inventories)
"Multi-scale model (Global, regional, meso and urban)"

Tentative target: Photochemical oxidants (tropospheric zone) and aerosols

Scales: Mega-cities, City clusters:
Japan (Tokyo and Osaka Metropolitan areas)
      Increase of ozone conc. despite of NOx and VOC reduction,
China (Beijing, Pearl River Delta: Hundred-Million Yen Project)
Thailand (VOCs emission is controlled by Environmental Standard and then
      photochemical ozone)

Scales: Regional and global
Increase of annual average concentration of ozone
  Decline of crops and forests (AOT40)
  Global warming
Passive sampler campaign (Workshop and observation in EANET sites

Collaborating with
WMO GAW Urban Research Meteorology and Environment (**GRUME**) Programme
                   Supported by
                   Ministry of Environment, MEXT(Japan)
                   SEPA, Agency of Science and Technology (China)

Framework of EANET emission inventory

Reporting system of inventories from individual countries : EMEP- type activity
(LTP: China, Korea and Japan)

Emission inventory in Asia
RAINS-GAINS(IIASA), ACESS(Streets), REAS, EA-Grid

MICS-Asia Phase Ⅳ (in future)

Integrated numerical model for assessment and policy analysis

 to support decision-makers
   analyses of long-term strategies to address air pollution problems
   analyses of future trends in emissions,
   estimation of long-range transboundary transport of air pollutants
             and the regional consequences for acid deposition levels,
   evaluation of vulnerability of natural and artificial systems, and
   estimation of cost-effectiveness of alternative mitigation actions

e.g., **RAINS model**, Regional Acidification Information and Simulation model
     developed by IIASA.

Thank you for your attention !

Global Chemical Transport Model, GCTM
Inter-regional transport, Hemispherical transport
   → Global air pollution

Global Circulation Model combined Atmosphere and Ocean
 Effects sulfate, nitrate, organic aerosols on global warming or global cooling
   Indirect effects on radiation (cloud formation, cloud lifetime etc.): Large uncertainty:

   Hydrostatic assumption →→ Non-hydrostatic model
            (Extension of regional, meso-scale models to GCM)
                         e.g., Tropopause folding