

Report for Policy Makers
on Acid Deposition Monitoring Network in East Asia (EANET)

Goals, Achievements and Way Forward

EANET



Secretariat
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This report has been prepared on the basis of the available reports, scientific data from EANET, and it is also supplemented with information obtained from various sources, which are duly acknowledged. The contents of the report do not necessarily reflect the views, policies or opinions of any participating country and organization.

FOREWORD

① would like to note important dates in our endeavors concerning Acid Deposition Monitoring Network in East Asia (EANET). Following the recommendations on transboundary air pollution problems at the Rio Summit in 1992, expert meetings were held in East Asia from 1993 to 1997 to discuss the issue of acid deposition. At that time, there was a shared feeling among the East Asian countries that something had to be done to cope with acid deposition problems. EANET started its preparatory-phase based on the decision of the First Session of the Intergovernmental Meeting in March 1998 in Yokohama, Japan. Ten countries in East Asia, which include China, Indonesia, Japan, Malaysia, Mongolia, Philippines, Republic of Korea, Russia, Thailand and Vietnam, participated in the preparatory-phase activities. At the Second Session of the Intergovernmental Meeting (IG2) in October 2000, the session concluded that the preparatory-phase was successful and IG2 decided to start the EANET activities on a regular basis from January 2001. Cambodia and Lao P.D. R. joined EANET from 2001 and 2002, respectively.

EANET was established as an important initiative for regional cooperation among the participating countries' creation of a common understanding on the state of acid deposition problems and for providing useful inputs to policy makers at various levels. We've proved over the past years that we can work together for the success of EANET. I am confident that we can continue that track record into the coming years for the future development of EANET.

This Report for the Policy Makers is timely and meaningful to the EANET participating countries. Recognizing the necessity of EANET activities, the policy makers must play an increasingly important role in promoting EANET at international fora as well as in their countries.



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INSTITUTIONAL FRAMEWORK FOR EANET

As the institutional framework for EANET, the Intergovernmental Meeting is the decision-making body of EANET. The Scientific Advisory Committee was established under the Intergovernmental Meeting, and the Secretariat and Network Center were designated to support the network. These organizations promote the network activities in close communication, coordination and collaboration with the National Focal Points, National Centers and National Quality Assurance/Quality Control (QA/QC) Managers in the participating countries.

ORGANIZATIONAL CHART OF EANET

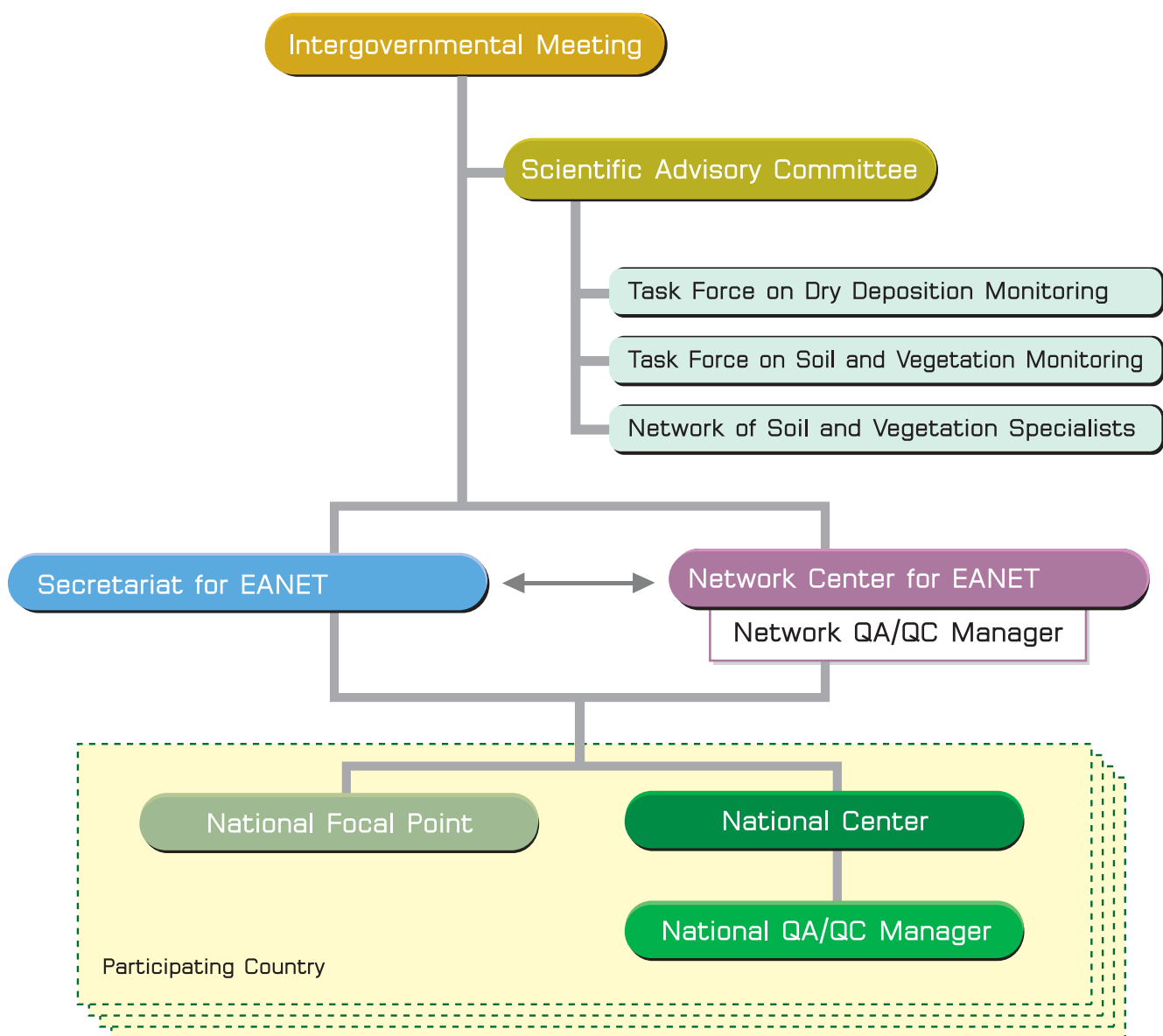


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EXECUTIVE SUMMARY

Ⓜapid industrialization in the East Asian countries has helped in achieving economic growth. Alongside, it has also created increasing threats of air pollution at the national and regional levels, which could be detrimental to the sustainable development of East Asia in the near future, if there are no coordinated efforts to manage air quality in the region.

Combustion of fossil fuels for industrial activities and transport are among the major anthropogenic causes of air pollution. In East Asia, primary energy consumption in 2002 was 2.5 billion tons (oil equivalent). The major energy source consumed in East Asia is coal, accounting for 38% of the total in 2002. The total primary energy consumption in 2030 is estimated to be 4.7 billion tons (oil equivalent)(International Energy Agency, World Energy Outlook 2004), twice larger than in 2002. The high consumption of energy increases the amount of acid deposition, which may seriously affect the ecosystems if no effective measures are taken.

Acid deposition being a significant regional problem needs collaborative initiatives for assessment, researches and control measures. In Europe, such collaboration was achieved through the agreement on the Convention on Long-Range Transboundary Air Pollution (CLRTAP) in 1979. Transboundary air pollution issues are also addressed in Asian countries. ASEAN countries have established a regional agreement for solving transboundary haze

pollution and South Asian countries launched programs related to transboundary air pollution under the Malé Declaration. The project on Long-Range Transboundary Air Pollutants (LTP) has led to collaborative research efforts for comprehensive analysis of transboundary air pollutants in three countries of North East Asia.

Acid Deposition Monitoring Network in East Asia (EANET) has been established as an important initiative for regional cooperation among the participating countries, creation of a common understanding on the state of acid deposition problems and for providing useful inputs to policy makers at various levels. The monitoring and research activities of EANET need to be further improved, particularly in terms of accuracy and expanded in number of sites to efficiently address the relevant issues at the national and regional levels.

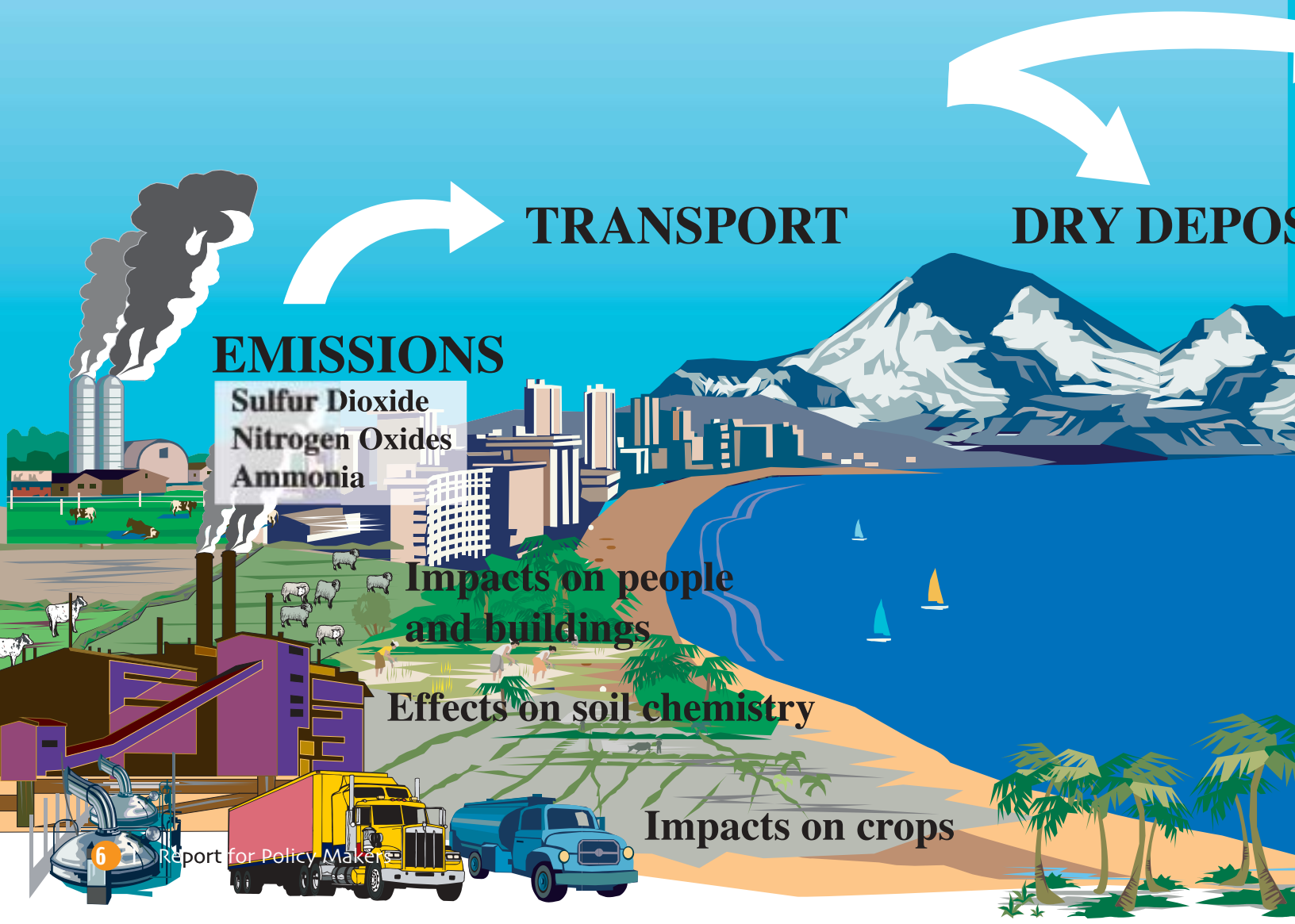
The policy makers have an important role in rendering their leadership support for coordination among the concerned agencies, creation of awareness and promotion of national and regional initiatives to take appropriate measures for acid deposition. The policy makers may consider the possibility to further strengthen the basis of EANET in the form of an appropriate instrument. Recognizing the necessity of EANET activities, policy makers are encouraged to play an important role in promoting EANET at the international fora as well as in their countries.

1. BACKGROUND

1.1 Mechanism of Acid Deposition

⑤ Sulfur and nitrogen oxides are emitted into the atmosphere with other pollutant when fossil fuels (oil, coal, etc) are burnt at factories and power plants as well as automobiles. These gases are transformed by chemical reactions with air constituents into sulfuric and nitric acids which come down to the ground far from emission sources. This phenomenon called “Acid Deposition” is realized in two processes.

One process is wet deposition when acids are taken by cloud waters and fall down into land and water bodies with rain, snow or fog. The large amount of dissolved acids cause the strong acidity of precipitation known well as “Acid Rain”. By another process called dry deposition, airborne acids are removed from the air during fine and cloudy days. They pass through air to the ground and deposit on water bodies, grasses, trees or buildings, and even inside human respiratory system.



1.2 Increasing Consumption of Fossil Fuel

Ⓜapid industrialization in the East Asian countries has helped in achieving economic growth. Along with industrialization, primary energy consumption has also rapidly increased in East Asia. In 2002, total primary energy consumption in East Asia was 2.5 billion tons (oil equivalent). The major energy source consumed in East Asia is coal, accounting for 38% of the total in 2002. Oil and natural gas follow at a rate of 33% and 8.7%, respectively. The combustion of these fossil fuels is the main source of air pollutants such as sulfur dioxide and nitrogen oxides. East Asia's total primary

energy consumption in 2030 is estimated to be 4.7 billion tons (oil equivalent), twice larger than in 2002 (International Energy Agency (IEA), World Energy Outlook 2004). If there is no efficient control, the emission of air pollutants will also increase.

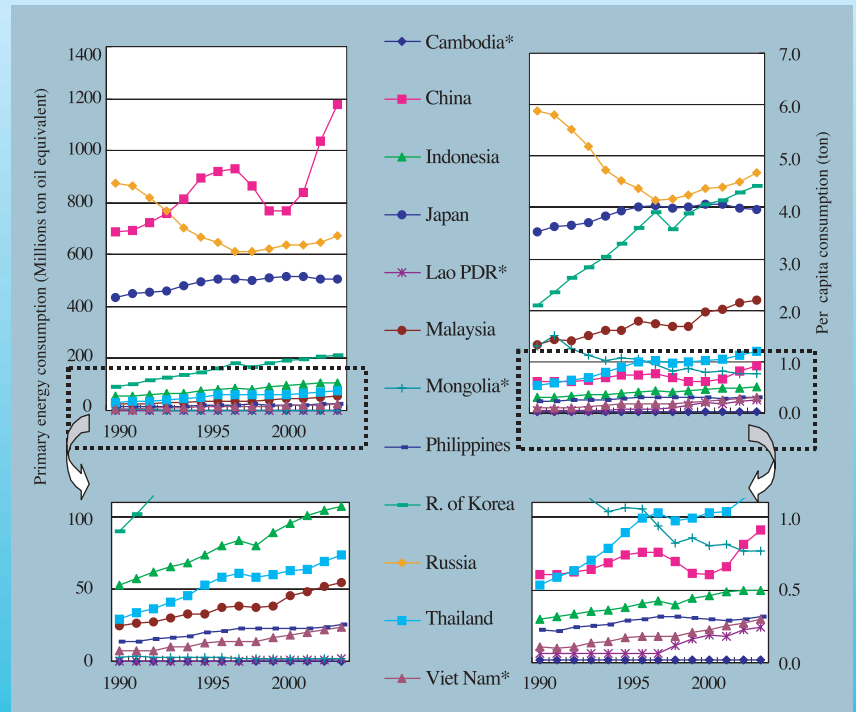


Fig.1. Trends of primary energy consumption (total and per capita) in East Asia
Source: BP, Statistical Review of World Energy 2004, World Bank, World Development Indicators 2005, *US EIA International Energy Annual 2002

SITATION

WET DEPOSITION

Impacts on forests

Effects on water chemistry

Impacts on fish

1.3 Trend of pH and Acid Deposition

① In East Asian region, monitoring for wet and dry deposition are implemented under the EANET program in order to measure concentrations and fluxes of acidic substances deposited to the ground. The annual average pH level in precipitation at each monitoring site in the period (2001–2004) of EANET regular basis activities ranged from pH 4.18 (China) in 2001 to pH 6.51 (Lao PDR) in 2003 (Fig. 2).

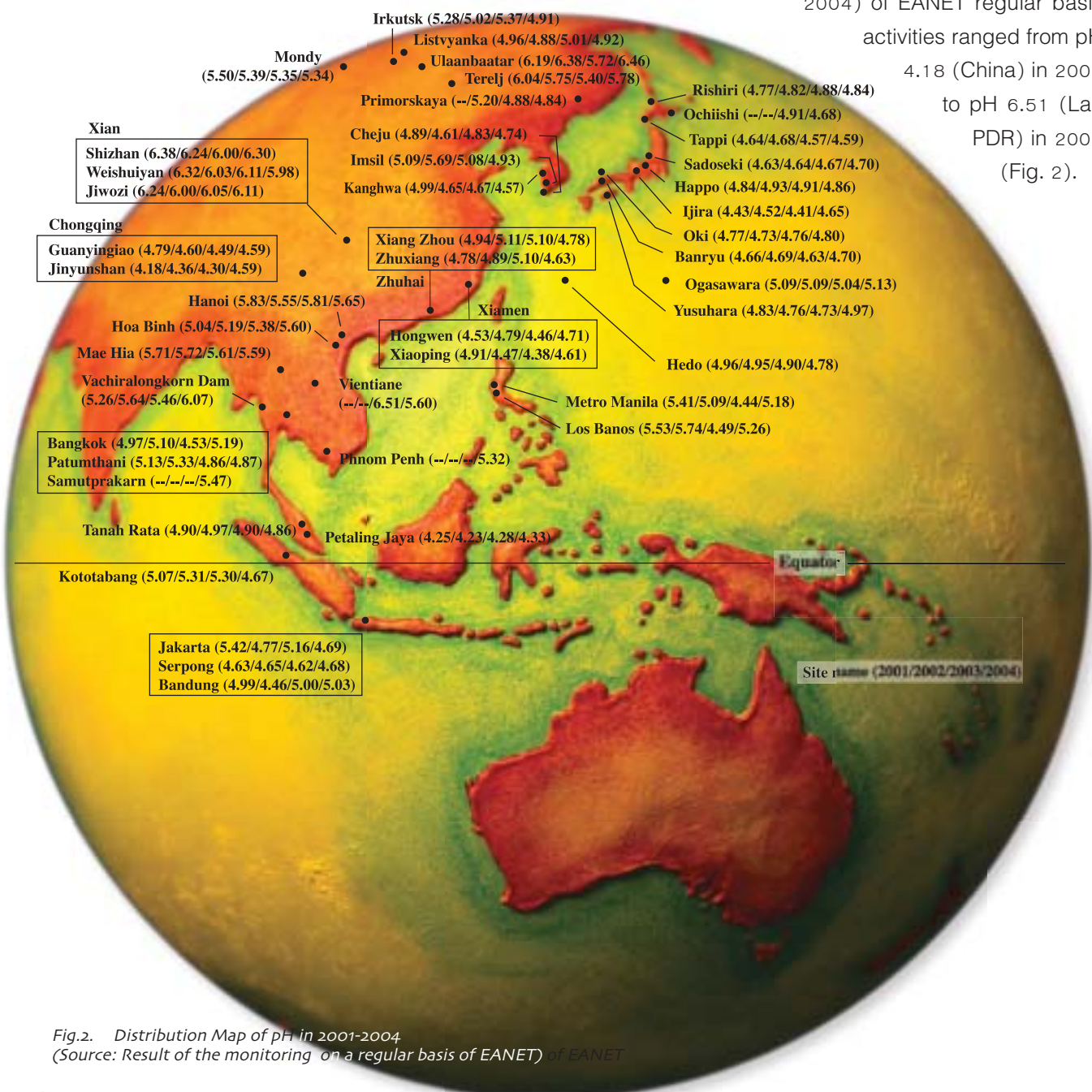


Fig.2. Distribution Map of pH in 2001-2004
(Source: Result of the monitoring on a regular basis of EANET) of EANET

Sulfuric and nitric acids are recognized as major causes of acidifying rainwater and subsequently lowering the pH. Sulfur dioxide and nitrogen oxides emitted from the burning of coal and oil react in the atmosphere to form sulfuric acid and other acidic substances that are deposited on the earth. Sulfuric acid is one of the most important components to evaluate acid deposition. As shown in Fig 3, in some major cities in East Asia, the annual wet deposition of sulfate amounts to more than 100 kg/ha. Sulfuric acid is not only deposited with precipitation in the cities but also

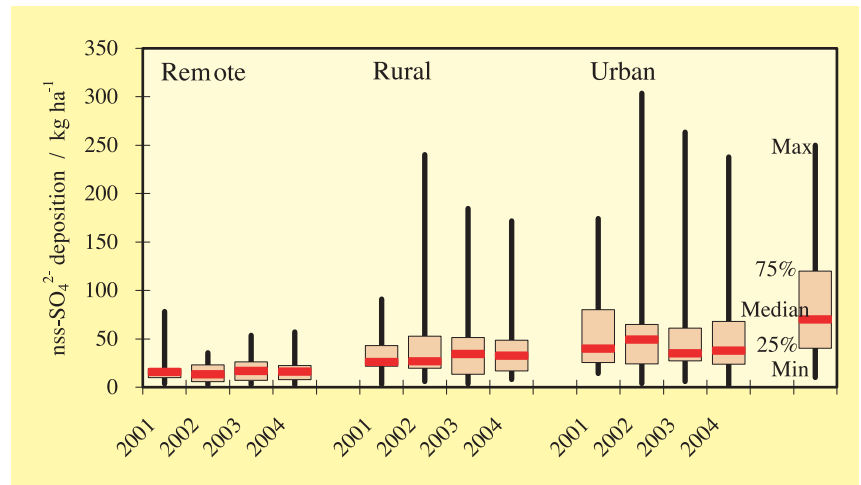


Fig.3. Annual nss-SO₄²⁻ deposition at EANET monitoring sites ("nss" means non-sea-salt, which excludes SO₄²⁻ derived from sea salt.)

transported together with sulfur dioxide and sulfate to surrounding areas and may affect natural ecosystems.

1.4 Effects of Acid Deposition on Ecosystems

Ⓐ Acid deposition can cause various effects on the ecosystems through acidification of soil and waters as well as on building and cultural assets through corrosion of metals,

concrete, and stone. In Northern Europe and America, effects of acid deposition have appeared since 1970s and damages such as devastation of fauna and flora were often reported from many places.



Fig.4. Damage on Forest (Norway Spruce) in Europe (Czech Republic)

It is known that in Central Europe's "Black Triangle," a large swath of Poland, the Czech Republic, and southeast Germany, both acid rain levels and forest damage were acute in the 1980s (Downing et al. 1997). The damages on forest are considered to be caused by various factors such as acid deposition, ozone and/or nitrogen increase in soil water, in combination with environmental stress from drought and pest attacks.

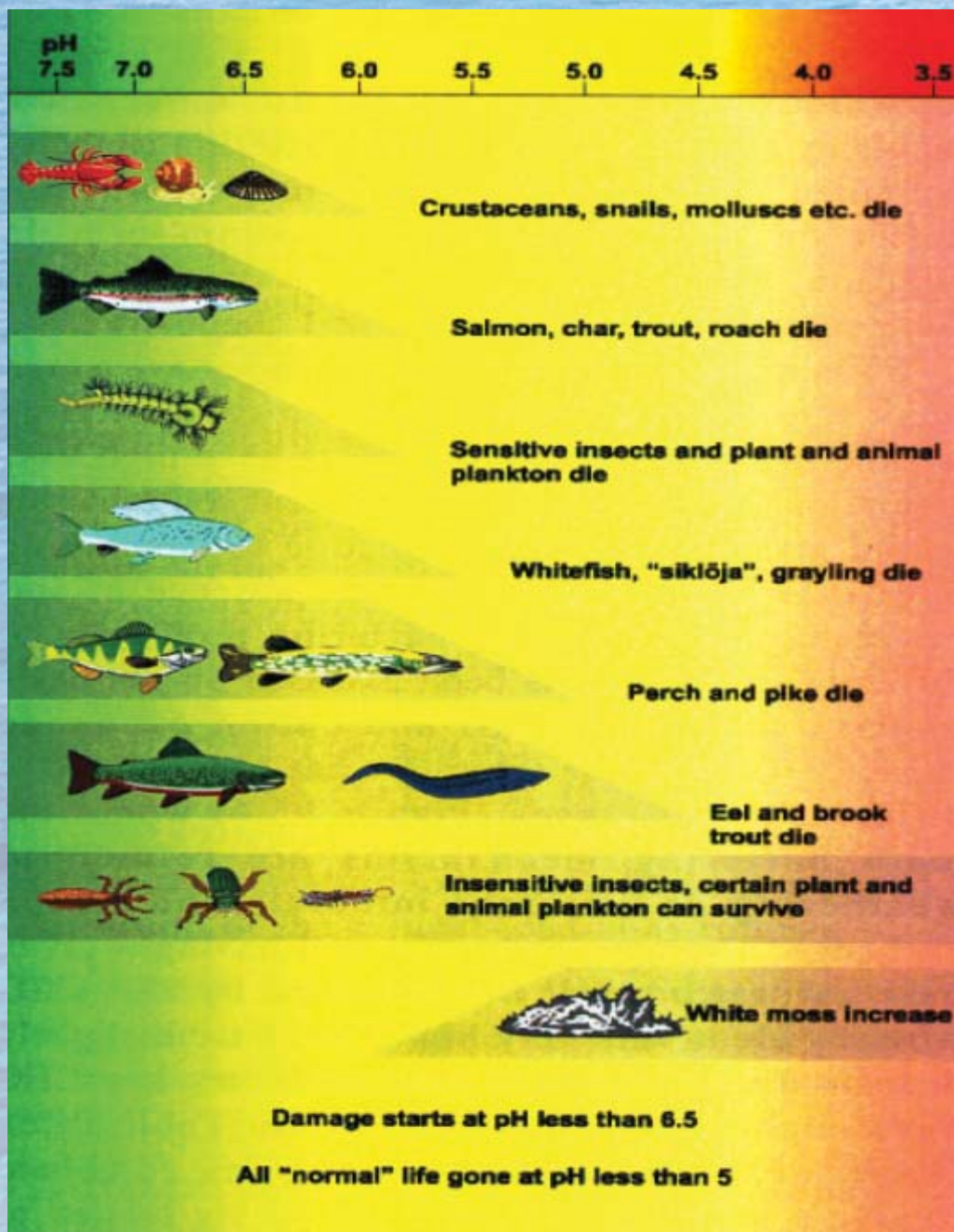


Fig.5. The sensitivity of aquatic organisms to a lowered pH in freshwater showing approximate limits for the existence of different freshwater species. Many species cannot tolerate water with pH below 6; on pH 5 fishes are lost from the lakes

(Source: Swedish Ministry of Agriculture and Environment 82 Committee, 1982)

The ill effects of acid deposition in water bodies are well known from the experience of Northern Europe and America. The incidences of 'Fish Kill' in Europe as reported during the nineties are attributed to increasing acidity caused by loading of acidifying substances along with the snow melt and rainfall (See Fig. 5).

In order to assess the adverse effects on ecosystems, it is necessary to identify the

dose-effect relationship of acid and eutrophic substances in the environment. It is also important to quantitatively evaluate the effects on ecosystems, estimate the necessary amount of reduction of emission, and consider the most cost-effective policy option. Determination of emission reduction target may require the identification of the threshold level of acidic and eutrophic substances that do not cause any adverse effect on ecosystems.

1.5 Other Transboundary Air Pollution Issues

Ⓐcid deposition has been recognized as one of classical transboundary air pollution issues. Recently ozone and dust have been gaining attention as other transboundary air pollutants.

The tropospheric or ground-level ozone concentrations increased constantly over

the last one hundred years. The long range transport of ozone and its precursors are considered as a main cause of this increase in ozone concentration.

On the other hand, particulate matters may also travel a long distance to affect human health and to damage materials.

2. EANET AND ITS ACHIEVEMENTS

2.1 EANET Background

Ⓐcid Deposition Monitoring Network in East Asia (EANET) has been established as an important initiative for regional cooperation among the participating countries.

Four expert meetings were held in East Asia from 1993 to 1997 to discuss the issue of acid deposition and agreed on the necessity for establishing a regional collaborative monitoring network for acid deposition. Based on the discussion at the expert meetings, the First Session of the Intergovernmental Meeting (IG) on the Acid Deposition Monitoring Network in East Asia

(EANET) was held in March 1998. The preparatory phase monitoring was implemented from 1998 to 2000 by ten countries: China, Indonesia, Japan, Malaysia, Mongolia, Philippines, Republic of Korea, Russia, Thailand and Vietnam. It was concluded at the Second Session of IG in October 2000 that the preparatory phase activities had been successful and was decided to start the EANET activities on a regular basis from January 2001. Cambodia and Lao P.D.R. have joined the network in November 2001 and November 2002, respectively, and their monitoring activities have started since 2003.

2.2 Objectives of EANET

- 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; and
- To contribute to cooperation on the issues related to acid deposition among the participating countries.



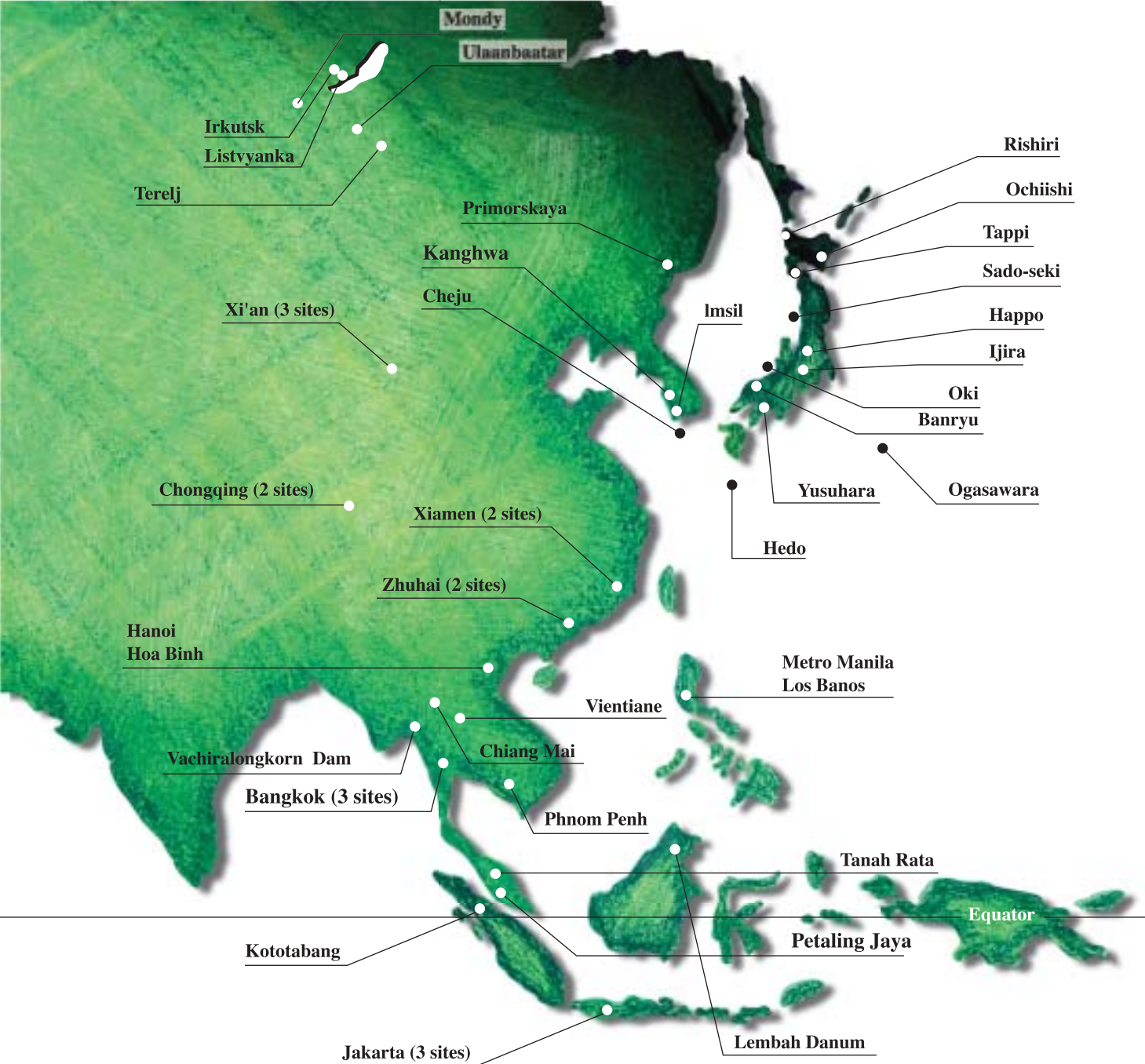


Fig.6. EANET wet deposition monitoring sites (47 sites)

2.3 Major Activities

- Acid deposition monitoring in the participating countries using common methodologies. The monitoring covers four environmental fields: wet deposition, dry deposition, and soil/vegetation and inland water. See Figure 6 for EANET wet deposition monitoring sites.
- Compilation, evaluation, storage and provision of data obtained through the monitoring.
- Promotion of quality assurance and quality control (QA/QC) activities to obtain high quality monitoring data.
- Capacity building including implementation of training programs.
- Promotion of research, studies and public awareness related to acid deposition problems.

2.4 Major Achievements

Over the years, significant achievements such as monitoring result which shows the state of acid deposition and its effect, improvement of monitoring capacity of participating countries, unified monitoring methodologies and QA/QC activities have been made through EANET activities. Some of the important activities are mentioned below:

- Development of technical documents related to acid deposition

Taking into account the latest scientific information and the experiences, the Guidelines and Technical Manuals for EANET were developed and used as the technical documents for EANET. The training materials on acid deposition, soil and inland aquatic environment monitoring, and data management have been developed.

- Publication of Annual Data Reports from 2001–2004

The Data Report on the Acid Deposition in the East Asian Region has been finalized and issued annually by the Network Center (NC) since 2001. The reports can also be found on the EANET web site.

- Conduct of Inter-laboratory Comparison Projects

As one of QA/QC activities of EANET, Inter-laboratory comparison projects (round robin

analysis survey of uniformly prepared artificial samples) were annually conducted among the analytical laboratories of EANET by the Network Center (NC), in order to determine the analytical precision and accuracy in each participating laboratory through the evaluation of analytical results, and to provide an opportunity to improve the quality of monitoring data.

- Strengthening technical capacity in the participating countries

The Network Center (NC) regularly dispatched technical missions to the participating countries to exchange information and experiences, to provide technical advice and to disseminate the latest technical information. The Network Center (NC) also dispatched experts to participating countries to provide technical support for national training program on acid deposition monitoring upon request.

- Conduct of Joint Research Projects

Various joint researches, which relate to acid deposition and its effects were conducted in Mongolia, Russia, Thailand and Republic of Korea.

- Implementation of Joint Projects on Public Awareness

Since 1999, the Network Center (NC) has been undertaking joint projects with selected participating countries to develop

their own national brochures and/or videotapes on acid deposition. Moreover, Workshops on Public Awareness for Acid Deposition Problems were held annually.

- Development of e-Learning program

NC also has been developing an e-Learning program on acid deposition problems for environmental education in collaboration with Institute for Global Environmental Strategies (IGES) since 2002. This educational software could be accessed at the EANET website.

Through these activities, participating countries have achieved various scientific base and capacity. For example, participating countries have shared the monitoring result which shows the state of acid deposition and its effect. Improvement of monitoring capacity of participating countries based on unified monitoring methodologies and QA/QC activities is useful to cope with the national and regional level issues.

- Achievements at national level

At the national level, the East Asian countries have taken various measures for monitoring and control of air pollution. These include establishment of local network for air quality monitoring, regulations on ambient air quality standards and source-specific emission standards, improvement in fuel quality and initiatives for control of emissions from different sources including industries and motor vehicles. The countries have also taken steps for compliance of various regional and international commitments concerning air pollution and protection of atmosphere.

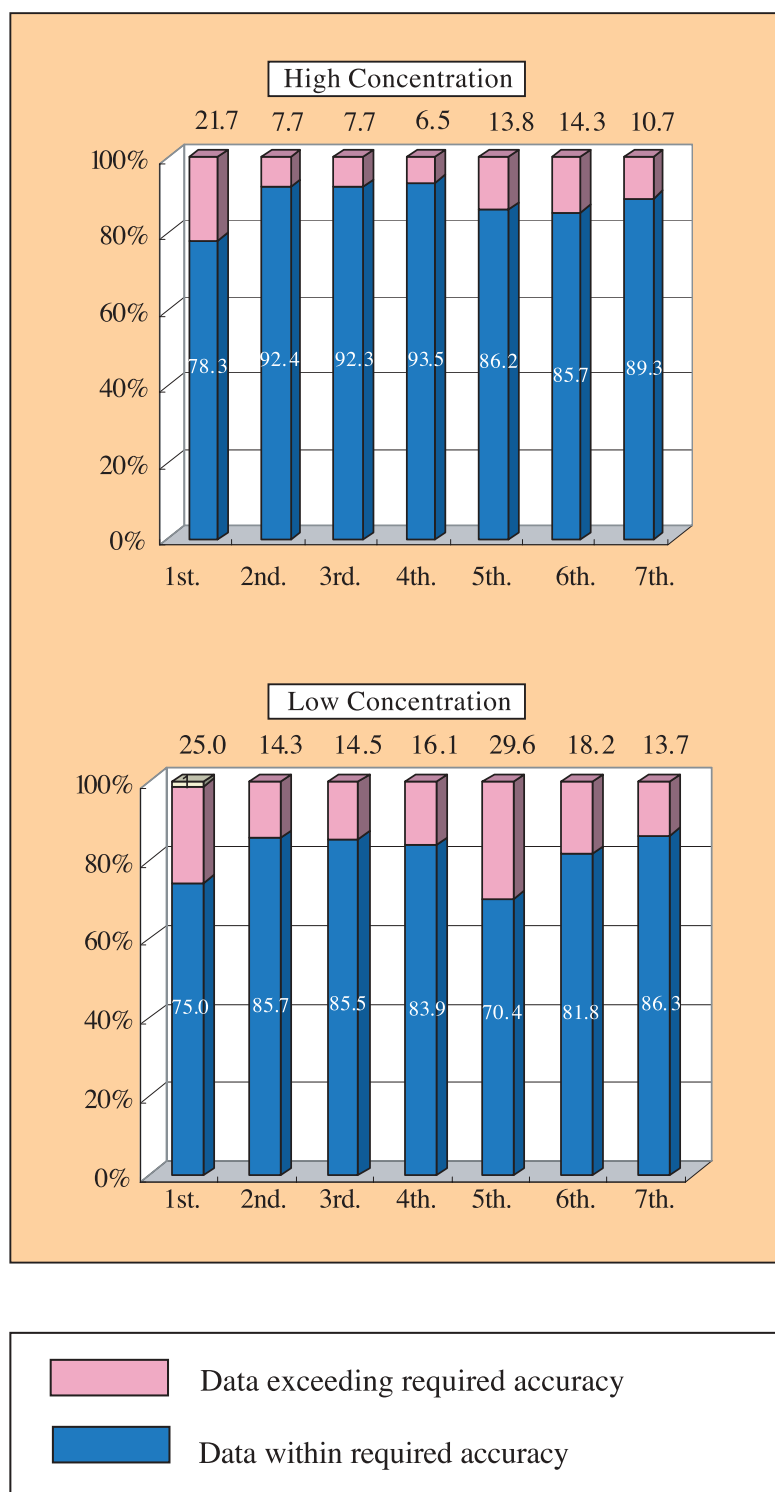


Fig.7. Results of Inter-laboratory Comparison Projects (From 1998 to 2004)

3. INTEGRATED APPROACH

3.1 Improvement of activities

Based on the Tentative Design of EANET, monitoring has been one of the major activities. Monitoring of designated parameters at proper sites makes it possible to know the state of the environment, and if necessary to issue an early warning. Therefore, further efforts should be made in promoting EANET activities, such as expansion of the number of the monitoring sites, compliance of the quality assurance/ quality control program, improvement of monitoring methodologies applicable to East Asia.

starting the consideration of further scientific issues such as emission inventory studies and numerical modeling.

To combat various environmental threats including acid deposition, initiatives at the global, regional and national level include the monitoring, evaluation, promotion of studies of other scientific issues in order to improve understanding of the risks, as well as measures to reduce pollutions using regulatory measures, economic instruments and technological tools.

Some efforts have led us further ahead in some of the participating countries at the national level as shown in Fig. 8. In the work program and budget in 2001 for EANET, there also included the activities aiming at

The acid deposition problems could also be managed both at the regional and the national levels. Some activities that can be taken at national level, if appropriate, are presented below:

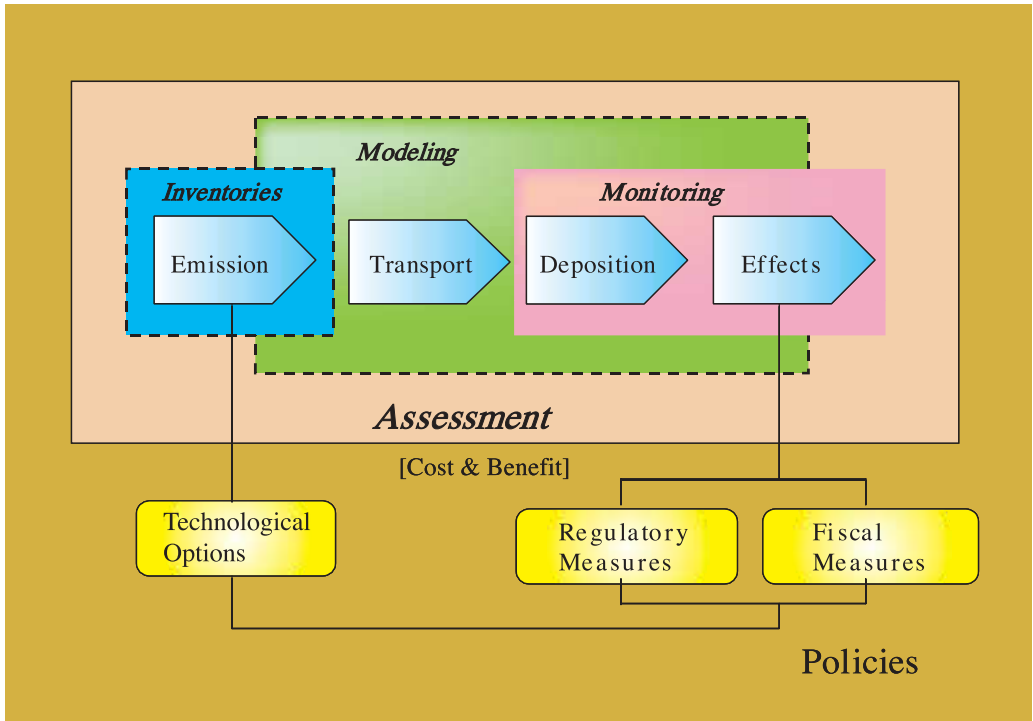


Fig.8. Integrated Approach for Air Quality Management

3.2 Regulatory Measures

Most of the countries have laid down ambient air quality standards for criteria pollutants as well as emission standards for the polluting sources such as power plants, industries and motor vehicles. The procedure of Strategic Environmental Assessment (SEA) and/or Environmental Impact Assessment (EIA) prior to investment decisions for industrial and other development projects have been introduced in many countries. Land use controls through zoning of areas for different activities have also been practised.

3.3 Fiscal Measures

Financial incentives/ disincentives in the form of taxes, concessions and subsidies have been practised in some countries for achieving the desired standards and pollution control requirements. Taxation on the basis of pollution load (e.g. China) and incentives for clean fuels, technologies and products can serve as potent Market Based Instruments (MBIs). Emission trading and preferential price for environment friendly products are among the instruments. With the increased role of the private sector in economic development and limitations of regulatory 'command and control' measures, the combination of regulatory and fiscal measures may be suggested.

3.4 Technological Options

Energy efficient technologies widely adopted in the region have shown promising possibilities for energy conservation and consequent air pollution control. On the other hand, add-on devices such as electrostatic precipitators /fabric filters and flue gas desulphurisation systems in power plants and catalytic converters in automobiles are among the technological measures for air pollution control, which are now increasingly used in several countries.

Some countries (e.g. Japan and Republic of Korea) have taken policy decision for fuel substitution by switching over to alternate fuels (such as, liquefied gas) to reduce the consumption of coal and oil. Clean energy technology such as Fluidised Bed Combustion, which helps in reduction of emissions have also been introduced in some countries (e.g. China and Japan).

4. WAY FORWARD AND POLICY IMPERATIVES

4.1 Collaborative Framework

Many of the environmental problems which are localized in nature, need to be addressed at the national level. On the other hand, there are several issues, which have regional as well as global implications. Acid deposition is one of such issues. To address these issues, it is useful to adopt a collaborative approach at various levels.

For reference, there are some examples of such collaborative framework. Europe and North America adopted the Convention on Long-Range Transboundary Air Pollution (CLRTAP) in 1979 to tackle their transboundary air pollution. Agenda 21, adopted by the United Nations Conference on Environment and Development in 1992, recommends that the experience of Europe and North America needs to be shared with other regions of the world and encourages the establishment of new regional agreements for limiting transboundary air pollution. ASEAN countries have established a regional agreement for solving transboundary haze pollution. South Asian countries also launched programs related to transboundary air pollution under the Malé Declaration. The project on Long-Range Transboundary Air Pollutants (LTP) has led to collaborative research efforts for comprehensive analysis of transboundary air pollutants in three countries of North East Asia. In some projects, reduction of air pollutants is efficiently implemented combined with the efforts to reduce greenhouse gases. An illustrative list of various international/regional initiatives is given in the following Table.

Table. Major international/regional initiatives for the protection of the atmosphere

International/regional initiatives		Issues	Member countries
International agreements	UNFCCC Kyoto Protocol	Climate change	Global
	Vienna Convention Montreal Protocol	Depletion of the ozone layer	Global
Regional Agreement	ASEAN Transboundary Haze Agreement	Haze pollution	ASEAN countries
	CLRTAP	Transboundary air pollution	Europe, USA, Canada etc.
Regional Declaration	Malé Declaration	Transboundary air pollution	South Asia
	Canñuelas Declaration	Transboundary air pollution	Latin America
	Maputo Declaration (Draft)	Transboundary air pollution	Southern Africa
Network	EANET	Acid deposition	East Asia
Project	LTP	Transboundary air pollution	China, Japan and Republic of Korea

UNFCCC: United Nations Framework Convention on Climate Change

CLRTAP: Convention on Long-Range Transboundary Air Pollution

LTP: Long-range Transboundary Air Pollutants in Northeast Asia

4.2 Funding Support

Development of EANET

Recognizing the importance of long-term, secured financial arrangement for the EANET activities, the Fifth Session of the Intergovernmental Meeting (IG5) in November 2003 adopted the Decision on Further Financial Arrangement for EANET. The decision states that, “countries will make effort on a voluntary basis to contribute to the budget to be directly spent by the Secretariat using fully the UN assessment scale-based burden sharing as a first step and shall apply from 2005 budget. After three years, the performance and transparency of the Network should be reviewed to explore the possibility of strengthening the burden sharing”.

External funding support

So far, the countries in East Asia have funded EANET activities without seeking external financial support. It has enabled the countries to conceive and implement the programme based on their capabilities and priorities. For further development of EANET initiatives, it might be considered necessary to mobilize additional resources not only from the government exchequer but also from international funding agencies and private sector.

In order to get funding support, it should be emphasized that coordinated efforts of EANET bring a lot of benefits both to the developing countries and the developed countries that tackle their local air pollution, which is very serious in some mega cities. Through the collaborations mentioned above, they could build their capacity for monitoring, modeling, development of inventories and integrated assessment.

4.3 Role of Policy Makers

Recognizing that the threat of acid deposition may become significant in East Asia, the policy makers have an important role in rendering their leadership support.

In addition to the existing significant air pollution problems in East Asian countries, the adverse impacts of the increasing acid deposition in East Asia may cause serious problem in the near future.

The policy makers have an important role in rendering their leadership support for coordination among the concerned agencies, creation of awareness and promotion of national and regional initiatives to take appropriate measures for acid deposition.

Recognizing the achievements attained through EANET activities, the policy makers

may consider the possibility to further strengthen the basis of EANET in the form of an appropriate instrument.

Acid Deposition Monitoring Network in East Asia (EANET) has been established as an important initiative for regional cooperation among the participating countries, creation of a common understanding on the state of acid deposition problems and for providing useful inputs to policy makers at various levels. The achievements in various aspects of EANET are significant for example, monitoring result which shows the state of acid deposition and its effect, improvement of monitoring capacity of participating countries, unified monitoring methodologies and QA/QC activities. The monitoring and research activities of EANET need to be further improved, particularly in terms of accuracies and expanded in number of sites to efficiently address the relevant issues at the national and regional levels.

The Sixth Session of the Intergovernmental Meeting (IG6) decided to develop the Five-Year Medium Term Plan in which one of the targets is to strengthen policy relevance of EANET activities. A conduct of a feasibility study on an appropriate instrument to provide a sound basis for financial contribution was also decided in IG6 for future development of EANET.



Further strengthening the basis of EANET in the form of an appropriate instrument, would be effective for enhancing various donors' understanding of the necessity and feasibility of relevant projects in participating countries, and for facilitating financing for such projects.

Recognizing that the EANET activities are effective in the context of acid deposition not only in regional level but also in the national level, the policy makers may wish to utilize the built capacity through EANET activities to cope with both.

The monitoring, analysis and measures for acid deposition issues can be applied nationally and regionally. The trained human resources and technical capacity built through EANET for the purpose of

improvement of monitoring and analysis of acid deposition can gainfully contribute to the improvement of national air management abilities of participating countries.

Recognizing the necessity of EANET activities, the policy makers are encouraged to play an important role in promoting EANET at international fora as well as in their countries.

References:

1. International Energy Agency, World Energy Outlook, 2004.
2. BP, Statistical Review of World Energy, 2004.
3. World Bank, World Development Indicators, 2004. <http://www.worldbank.org/data/wdi2005/index.html>
4. US EIA International Energy Annual, 2002.
5. World Resources Institute, World Resources 1998–99: Environmental change and human health.
6. Swedish Ministry of Agriculture and Environment '82 Committee, 1982.
7. Handbook for the 1979 Convention on Long-Range Transboundary Air Pollution (CLRTAP) and its protocols, 2004.
8. Summaries and Proceedings of Intergovernmental Meetings and Scientific Advisory Committee of EANET, 2000–2004.

**Acid Deposition
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