

ASIAN DEVELOPMENT BANK

TAR: OTH 37014

**TECHNICAL ASSISTANCE
(Financed by the Japan Special Fund)**

TO THE

SOUTH ASIAN SUBREGIONAL ECONOMIC COOPERATION COUNTRIES

FOR

REGIONAL AIR QUALITY MANAGEMENT

December 2003

ABBREVIATIONS

AQM	–	air quality management
CAI-ASIA	–	Clean Air Initiative-Asia
SASEC	–	South Asia Subregional Economic Cooperation
TA	–	technical assistance

NOTE

In this report, "\$" refers to US dollars.

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I. INTRODUCTION

1. Facing the growing problem of a deteriorating environment (air, water, and land), initiatives for regional environmental cooperation in the South Asian countries have been gathering momentum. After a series of working group meetings in the environment sector under the South Asia Subregional Economic Cooperation (SASEC) program, participating countries (Bangladesh, Bhutan, India, and Nepal) identified, among others, air quality management (AQM) as an important area for subregional cooperation. This technical assistance (TA)¹ will complement the Male Declaration² and support the efforts of the SASEC countries in promoting AQM in the subregion by strengthening the network and sharing of data, monitoring practices, and AQM best practices in other countries; and by formulating an integrated AQM system and action plan that will enhance AQM in the SASEC countries. The TA will complement³ the programs initiated under the Clean Air Initiative-Asia (CAI-Asia) and the TA for better air quality management.⁴ Consultations in all four countries were carried out with key government line agencies, city officials, research groups, the industrial and transport sectors, nongovernmental organizations (NGOs), and donor agencies. The TA framework is in Appendix 1.

II. ISSUES

2. Air pollution is one of many human-made environmental disasters. It is a major environmental concern in South Asia and internationally. Heavy air pollution affects a person's health directly, and the productivity of the labor force, indirectly through ill health. In Dhaka alone, air-pollution related illnesses claim 15,000 lives each year. In Bhutan, acute respiratory tract diseases have affected from 10.1% of the total population in 1990 to over 14% of the total population in 2002. In Nepal, the cases of chronic obstructive pulmonary disease increased four times in the last 10 years and soared to more than 800 cases in 2002. In India, the air quality index in 20 cities fall in the "dangerous category", while in 14 cities the values are in the "bad category." Other impacts of air pollution include increased health expenditure (for example, a recent study on the economic costs associated with environmental degradation in India found that the total health costs due to air pollution averaged \$1.3 billion per annum);⁵ reduced quality of life; premature deaths; corroded building materials; and disturbed ecosystem and conditions of livestock and vegetation.

3. The major causes of air pollution in SASEC countries include rapid industrialization, urbanization, and increased nonenvironment-friendly energy production. Regional air pollution,

¹ The TA first appeared in *ADB Business Opportunities* (Internet edition) on 7 May 2003.

² The Male Declaration on Control and Prevention of Air Pollution and Its Likely Transboundary Effects in South Asia was adopted by Bangladesh, Bhutan, India, Iran, Maldives, Nepal, Pakistan, and Sri Lanka in 1988. The Declaration calls on those countries to assess and analyze origins and causes of regional air pollution, develop and adopt strategies for minimizing air pollution, cooperate and set up monitoring arrangements, and build up standardized methods to monitor air quality and analyze their impact without prejudice to national activities.

³ CAI-Asia is an Asia-wide initiative, which focuses on knowledge management, capacity building, regional policies and standards, formulation of city-based air quality management strategies, and pilot projects. The TA, through its activities will make an important contribution to the activities of CAI-Asia in the South Asian region.

⁴ Proposed TA for better air quality management in Asia.

⁵ Brandon, C., K. Hommann, and N.M. Kishor 1995. The Cost of Inaction: Valuing the Economy-wide Cost of Environmental Degradation in India. Paper presented at the UNU conference on the Sustainable Future of the Global System, Organized by the United Nations University/Institute of Advanced Studies, National Institute for Environmental Studies, Tokyo, Japan, 16–18 October.

especially from emissions of sulfur and nitrogen compounds, is increasingly a problem as industrialization speeds up in the subregion. The impacts of these emissions are felt locally, nationally, and regionally. Acid deposition is not just a national concern; it is also a regional environmental problem that transcends national boundaries. Although reports of acid deposition in the region have been few, the damage from acid deposition has been detrimental to biodiversity. Therefore, there is a need for an effective ambient air quality surveillance program, which would serve as an early warning system to identify the trend of air pollutants and monitor transboundary air pollutants. However, management of these air pollution problems poses huge financial, technical, and logistical constraints for urban and national authorities. Furthermore, current trends in urbanization do not suggest any rapid abatement in the problem posed.⁶

4. Systematic air quality monitoring is a relatively new initiative in Bangladesh. The Department of Environment in Bangladesh started collecting data on ambient air quality in 1992 in four divisional towns (Bogra, Chittagong, Dhaka, and Khulna). At present, there is no monitoring program for assessing air quality in Bhutan. Some monitoring of air quality is being conducted in Kathmandu, Nepal. India is the only country with a large number of air quality monitoring stations in urban and industrial areas. The National Environmental Engineering Research Institute in India monitors ambient air quality in 30 stations covering 10 major cities. Currently there is no monitoring network to monitor transboundary movement of air pollutants and their effects in the subregion. Other common weaknesses hindering effective air quality management in the SASEC subregion are described in paras. 5-9.

5. **Weak Institutional Capacity and Lack of Data.** Air quality monitoring is becoming an increasingly important issue in the SASEC countries. As a result, some governments in the subregion have proposed new air quality initiatives. However, there is a considerable shortfall in national and local governments' capacity to implement an effective pollution control plan, as critical data—such as long-term quality-controlled air-quality monitoring for basic pollutants, an inventory of emission sources, appropriate dispersion modeling, and exposure to information—are insufficient.

6. **Lack of Coordination.** The responsibility for AQM is divided between a number of government ministries and local administrations thus complicating policy making, systematic air quality monitoring, and enforcement of air quality standards. Lack of coordination has impeded the development of a strategic framework for air quality management systems that will cover all centers of air pollution.

7. **Poor Information Exchange.** At the national level, there is a large amount of information on air quality and AQM initiatives in SASEC countries, but the information is often not readily available. As a consequence, there is duplication in collection and available information is not always consulted before to decision making.

8. Poor information exchange on best practices in AQM and lack of harmonized air pollution policies in the region have contributed to the absence of regional cooperation in addressing air quality. Although several attempts have been made at regional cooperation to address air pollution in South Asia much work needs to be done to deal with the issue of air quality management in the SASEC countries. Countries will best improve their AQM by working together and exchanging experiences on common practices. Strong coordinative approaches

⁶ Haq G., W-J. Han, C. Kim, H. Callack. 2002 *Benchmarking Urban Air Quality Management and Practice in Major and Mega Cities in Asia—Stage 1*. Korea Environment Institute: Seoul.

will be required for effective dissemination of information on air quality issues, collective learning, and the formulation of comprehensive AQM strategies.

9. **Toward a Regional Approach to Air Quality Management.** Previous internationally funded initiatives have focused on raising awareness, but they have been localized with limited sharing of information among cities, stakeholders, and across borders. Air pollution management is a relatively new effort for the SASEC countries. The World Bank is supporting the implementation of a learning and innovation loan to Bangladesh to address AQM issues related to vehicular emissions. The first really comprehensive program is CAI-Asia, which provides support to (i) sharing of knowledge and experiences on AQM, (ii) improve policy and regulatory frameworks at the regional level and pilot projects and (iii) encourage innovation.⁷ A greater degree of sharing successes and failures in a full range of air pollution control management initiatives should continue and be more rigorously promoted. The TA will closely coordinate with CAI-Asia to set up a subregional network for collecting more comprehensive and up-to-date documentation on air quality in the SASEC countries to inform the consultation process, and create stakeholder awareness of the sources and impacts as well as solutions. The TA will build on ongoing programs, such as the local city initiatives; and initiatives of United-States Environmental Protection Agency (US-EPA), the World Bank, and bilateral agencies, to develop a subregional action plan to address urban air quality problems in the subregion. Strong cooperative linkages between SASEC countries will be promoted and will be taken into consideration in conceptualizing of the strategic AQM plans.

III. THE TECHNICAL ASSISTANCE

A. Purpose and Output

10. The TA will provide continued support to the AQM ongoing initiatives in the SASEC countries and establish a well coordinated information sharing and cooperation network. By building stakeholder awareness and capacity, the TA aims to emphasize the priority given to air pollution, and enhance the expertise and capabilities to formulate AQM policies and strategic frameworks in their respective countries, thereby improving the health and well-being of urban populations.

B. Methodology and Key Activities

11. The TA will undertake the following key activities.

1. Establish local air quality networks

12. This activity will entail the setting up of a unit in the Implementing Agency⁸, which will have as its main task, to collect and organize the wealth of information on air quality and AQM in each of the four countries. In addition, it will involve setting up and maintaining a detailed overview of all ongoing and planned AQM-related activities. The collected information will be documented and stored on the web-site of CAI-Asia. The Ministry of Environment in each SASEC country will nominate its implementing agency.

⁷ ADB. 2001. *Technical Assistance for the Clean Air Initiative for Asian Cities*. Manila (RETA 6016).

⁸ It is recommended that the implementing agency be an academic or research institution.

13. The nominated Implementing Agency will develop the SASEC component of the CAI-Asia network. The network's functions will include, but will not be limited to (i) promoting exchange of collected information on air quality and AQM in the respective countries; (ii) promoting the discussion on a medium-term agenda for AQM in the each of the countries; (iii) contributing to the discussion on the development of a comprehensive, integrated AQM system, in each country, which has the capacity to address AQM in all places where required; (iv) acting as a forum for discussion on best approaches for managing stationary, indoor, and mobile sources of pollution; and (v) identifying capacity building needs of the AQM sector in the South Asian Subregional Economic Cooperation countries and identifying strategies to overcome shortcomings.

2. Develop an appropriate integrated air quality management system for SASEC countries

14. The SASEC countries have over the years adopted air quality standards and emission standards and have also made a substantive start with monitoring air quality as well as adopting selected control strategies in a number of cities. A study will be carried out to analyze the current strengths and weaknesses of the AQM systems in the four countries. The study will also analyze AQM systems adopted in the United States, Europe, and other parts of Asia, to determine their suitability for each of the four countries. The results and recommendations will be validated with stakeholders from the SASEC countries.

3. Upgrade the capacity of key technical staff responsible for air quality analysis in SASEC countries

15. Staff responsible for air quality monitoring at central level in the SASEC countries will be trained to upgrade their technical capacity. Areas that covered under the training program will be analysis and development of emission inventories, dispersion models, and source apportionment. Exchange of information on best practices in AQM will be critical.

4. Formulate action plans for selected cities in SASEC countries

16. Action plans, based on the results of air quality monitoring have been formulated for a number of cities in India and to some extent in Bangladesh. The action plans were developed largely on an ad hoc basis. The TA will support the development of a low-cost approach to the development of action plans that can be easily replicated across all four countries.

C. Cost and Financing

17. The total cost of the TA is estimated at \$400,000. The TA will be financed on a grant basis by the Japan Special Fund, funded by the Government of Japan. The cost estimates provide for consulting services, international travel, administrative costs, and workshop and training expenses. A summary of the cost estimates is in Appendix 2.

D. Implementation Arrangements

18. The TA will be implemented over 12 months, starting in February 2004 and will be completed in January 2005. The TA will be executed by ADB and will be supervised by the South Asia Regional Department in close cooperation with the Regional Sustainable Development Department. ADB will coordinate closely with the SASEC countries and CAI-Asia in implementing the TA. In the SASEC countries, the ministries of environment will be the

national focal points and will be responsible for policy-related matters relating to the implementation of the TA. The focal points will also nominate their respective implementing agencies. Coordination at the subregional level will be through the SASEC Working Group on Environment.

19. The TA will require about 3 person-months of international consulting services to assist with training. A total of 68 person-months of domestic consulting services will be required to assist in establishing the local networks and to support the formulation of the integrated AQM systems and the local action plans. ADB will engage the consultants in accordance with its *Guidelines on the Use of Consultants* and other arrangements for engaging domestic consultants as individuals. The outline terms of reference are in Appendix 3.

IV. THE PRESIDENT'S DECISION

20. The President, acting under the authority delegated by the Board, has approved the provision of technical assistance not exceeding the equivalent of \$400,000 on a grant basis for the South Asian Subregional Economic Cooperation Countries for Regional Air Quality Management, and hereby reports this action to the Board.

TECHNICAL ASSISTANCE FRAMEWORK

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
Goal Systematic approach to air quality management (AQM) by key stakeholders	Harmonization of appropriate standards, regulations, control options, and enforcement mechanisms in all four countries Greater institutional capacity for AQM	Annual state-of-the-environment report Benchmarking reports on AQM	Government commitment and priority to investing in AQM
Purpose Organize key stakeholders in AQM and facilitate the implementation of strategic air quality action for SASEC countries	Regional cooperation on AQM strengthened Budget for AQM activities increased by at least 50%. Increased compliance with standards and regulations	Regional networking and events strengthened National and local government budget reports Supervision and evaluation reports	Various government and nongovernment stakeholders can work together effectively. Qualified staff are available to formulate policy. Lessons learned from one city will be useful for other urban areas and implemented. Awareness raising activities are successful in securing the interest of key stakeholders in Asia to increase AQM activities.
Outputs and Activities Output 1 Local air quality networks established and developed	National networks with the participation of national government agencies, local government units, nongovernment	Web-site and web statistics Evaluation reports	CAI-Asia has the capacity to assist in the establishing of the local networks and provide inputs for their development.

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>Activities Establish local network unit with academic or research institution</p> <p>Collect and organize information on air quality and AQM available in each of the four countries</p> <p>Develop SASEC component of the CAI-Asia Network</p> <p>Output 2 Integrated air quality management system appropriate for the SASEC context conceptualized and discussed</p> <p>Activities Analyze emission inventory and source apportionment, and assess the social, economic, and environmental impact of air quality and concept for a strategy</p> <p>Hold stakeholder workshop and consultation to discuss the strengths and weaknesses of</p>	<p>organizations, academia, and private sector by end-2004</p> <p>Academic institution selected by March 2004</p> <p>Database established and functioning by August 2004.</p> <p>SASEC network incorporated into the CAI-Asia network by December 2004</p> <p>Concept in all four countries formulated in a participatory manner</p> <p>Local and regional stakeholder workshops held in key cities to discuss key concepts</p> <p>Reports on data prepared on a quarterly basis. Draft concept of air quality management strategy prepared by September 2004</p> <p>4 in-country workshops to be carried out by September 2004</p>	<p>Concept agreed upon</p> <p>Evaluation reports and results from consultation process</p>	<p>Domestic consultants in Bangladesh, Bhutan, India, and Nepal are recruited.</p> <p>Various government and nongovernment participants can work together effectively.</p> <p>Qualified staff are available to formulate policy.</p> <p>Coordination with other ongoing programs will take place.</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>the AQM system of each of the countries</p> <p>Output 3 Capacity of key technical staff enhanced</p> <p>Activities Training in analyzing and developing emission inventory, dispersion model, and source apportionment</p> <p>Exchange of information on best practices in air quality management</p> <p>Output 4 Action plans for selected SASEC cities formulated and agreed upon</p> <p>Activities Coordinate with on-going activities of the selected city</p> <p>Hold stakeholder consultation</p>	<p>Greater institutional capacity for air pollution management</p> <p>Availability to public of data on air pollutants collected regularly</p> <p>City-specific emissions inventory and source apportionment</p> <p>Training program developed and implemented by August 2004</p> <p>First subregional workshop to take place by July 2004</p> <p>Comprehensive action plans for Dhaka, Thimphu, a key city in India, and Kathmandu formulated in a participatory manner</p> <p>SASEC network in place by February 2005</p> <p>Second subregional workshop to take</p>	<p>Air quality reports published by the respective ministries of environment</p> <p>Evaluation reports</p> <p>Benchmarking reports on AQM</p> <p>Reports from stakeholder meetings and workshops</p> <p>Evaluation reports</p> <p>Reports from stakeholder meetings and subregional workshops</p>	<p>Subregional cooperation, training exchange, and workshops will take place.</p> <p>Public data on air pollutants and impact on health, environment, and economy are available.</p>

Design Summary	Performance Indicators/Targets	Monitoring Mechanisms	Assumptions and Risks
<p>workshop to identify measures to adopt to improve air quality</p> <p>Build support for change among the public to adopt measures to improve air quality</p>	<p>place by November 2004</p> <p>Action plans agreed upon by February 2005</p>		
<p>Inputs</p> <p>TA budget</p> <p>International consulting services</p> <p>Domestic consulting services</p> <p>TA support and coordination</p>	<p>\$400,000</p> <p>3 person-months</p> <p>68 person-months</p> <p>5 person-months</p> <p>Equipment (4 computers and printers)</p> <p>4 in-country workshops Bangladesh, Bhutan, India, and Nepal</p> <p>2 subregional workshops</p>	<p>ADB review missions, workshop reference materials, progress and completion reports</p> <p>\$17,000</p> <p>\$50,000</p> <p>\$50,000</p>	<p>Timely recruitment of consultants</p>

COST ESTIMATES AND FINANCING PLAN
(\$'000)

Item	Total Cost
Japan Special Fund Financing	
1. Consultants	
a. Remuneration and Per Diem	
i. International Consultants	58.0
ii. Domestic Consultants	136.0
b. International and Local Travel	10.0
c. Reports and Communications	5.0
2. Sector Adviser and Coordinator	32.5
3. Equipment ^b	17.0
4. Workshops, Training and Conferences	100.0
5. Miscellaneous Administration and Support Costs	5.0
6. Contingencies	36.5
Total	400.0

^a Includes 4 desktop computers and printers. Each government is responsible for all taxes and duties, if any. The equipment will be turned over to each of the local SASEC Network units.
Source: Asian Development Bank estimates.

OUTLINE TERMS OF REFERENCE FOR CONSULTANTS

A. International Consultant (3 person-months)

1. The consultant will be an air quality management (AQM) specialist and will have the following tasks:

- (i) Evaluate the quality of data analysis, emission inventories, and source apportionment methods in the agencies responsible for these tasks at the national level.
- (ii) Identify gaps in the technical know-how to carry out the analyses.
- (iii) With the evaluation as basis, draw up and implement a training plan for controlled air quality monitoring for basic pollutants (particulate matter, lead, carbon monoxide, ozone, sulfur dioxide and oxides of nitrogen), source apportionment and appropriate dispersion modeling.

B. Domestic Consultants

1. **Unit Coordinator** (one in each of the four countries, 8 person-months each)

2. The consultant will have the following tasks:

- (i) Conduct literature review of all documentation pertinent to AQM.
- (ii) Coordinate with Clean Air Initiative-Asia (CAI-Asia) Secretariat to set up the local CAI-Asia network.
- (iii) Maintain regular contact with CAI-Asia member.
- (iv) Provide and disseminate any information required on AQM.
- (v) Dialogue with the other local CAI-Asia networks to ensure sharing of information on AQM.
- (vi) Contribute awareness campaigns intended to raise the importance of air pollution in Bangladesh, Bhutan, India, and Nepal.
- (vii) Assist in preparing, organizing, and coordinating the national and regional workshops.
- (viii) Support Asian Development Bank (ADB) staff in their activities.

2. **Researcher** (one in each country, 3 person-months each)

3. The consultant will have the following tasks:

- (i) Collect, organize and update documentation, data, information on AQM.
- (ii) Assist the unit coordinator with the literature review.
- (iii) Coordinate inputs to the local CAI-Asia web-site with those of the secretariat.
- (iv) Review and assess best practices in AQM systems and determine their suitability for the countries included in the technical assistance (TA).
- (v) Present the findings at the consultation workshops for the integrated AQM systems.

3. **Air Quality Management Experts** (2 experts per country, 3 person-months each)
4. The consultants will have the following tasks:
 - (i) Analyze the current strengths and weaknesses of the existing AQM system.
 - (ii) Use the assessment and best practices in other countries, and conduct a stakeholder workshop to conceptualize and get consensus on the integrated AQM system for the country.
 - (iii) Assess existing local action plans and analyze their strengths and weaknesses.
 - (iv) In consultation and cooperation with stakeholders develop an easily replicable yet comprehensive action plan.
 - (v) Determine with stakeholders the appropriate city to pilot the action plan.
 - (vi) Facilitate the implementation of the action plan.
4. **Sector Adviser and Coordinator** (5 person-months)
5. The consultant will have experience in AQM and will have the following tasks:
 - (i) Assist the ADB project officer in the implementation of the TA.
 - (ii) Assist in recruiting domestic consultants and coordinating their activities.
 - (iii) Assist the domestic consultants with policy dialogue to raise awareness.
 - (iv) Provide inputs in formulating local action plans and integrated AQM systems.
 - (v) Conduct dialogues with multilateral and bilateral development organizations as well as with nongovernmental organizations and private sector organizations.
 - (vi) Liaise with the CAI-Asia secretariat.
 - (vii) Assist with organizing the regional workshops.
 - (viii) Support ADB staff and the consultants in their activities.