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**US-AEP STRATEGY AND
PROGRAM DESIGN:
Strategic Assessment Report**



International Resources Group

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
APMA	Air Pollution in Mega-cities of Asia
AQM	Air Quality Management
ASEAN	Association of South East Asian Nations
AUSaid	Australian Agency for International Development
BAQ	Better Air Quality (Conference)
BMR	Bangkok Metropolitan Region
CAI-Asia	Clean Air Initiative for Asia
CATNET	Clean Air Initiative Training Network
CCP	Cities for Climate Protection (Campaign)
CDS	City Development Strategy
CIDA	Canadian International Development Agency
CNG	Compressed Natural Gas
CPCB	Central Pollution Control Board (India)
CSE	Center for Science and Environment (India)
CUP	Clean Up Pollution (India Campaign)
DFID	Department for International Development
DIESEL	Developing Integrated Emissions Strategies for Existing Land Transport
EPIQ	Environmental Policy and Institutional Strengthening Indefinite Quantities Contract
ESC	(ASEAN Working Group on) Environmentally Sustainable Cities
GHG	Greenhouse Gas
GWP	Global Water Partnership
I&M	Inspection and Maintenance (Program)
ICLEI	International Council for Local Environmental Initiatives
IES	Integrated Environmental Strategies (Program)
IEST	Initiative on Environmentally Sustainable Transport
IWRM	Integrated Water Resources Management

JICA	Japan International Cooperation Agency
MDG	Millennium Development Goal
MRC	Mekong River Commission
NARBO	Network of Asian River Basin Organizations
NRW	Non-revenue Water
O&M	Operations and Maintenance (Costs)
PCB	Pollution Control Board (India)
PM-2.5	Particulate Matter – less than 2.5 microns in diameter
PM-10	Particulate Matter – less than 10 microns in diameter
PSUTA	Partnership for Sustainable Urban Transport in Asia
RDM	USAID Regional Development Mission (Bangkok)
SASEC	South Asia Sub-regional Economic Cooperation
SDWA	Safe Drinking Water Alliance
SEAWUN	Southeast Asia Water Utilities Network
SPM	Suspended Particulate Matter
SSWP	Small Scale Water Provider
TSP	Total Suspended Particulates
UNEP	United Nations Environmental Programme
UNESCAP	UN Economic and Social Commission for Asia and the Pacific
US-AEP	US Asia Environmental Partnership
USAID	US Agency for International Development
USEPA	US Environmental Protection Agency
WAC	Water for Asian Cities
WHO	World Health Organization
WPI	Water for the Poor Presidential Initiative

EXECUTIVE SUMMARY

Under the Environmental Policy and Institutional Strengthening IQC (EPIQ II), International Resources Group (IRG) has been tasked to assist US-AEP in preparing its new five-year strategy. This report is among the key deliverables requested from IRG by US-AEP.

In preparing this report, IRG conducted consultations in the U.S, visited the six current US-AEP countries (India, Indonesia, Philippines, Sri Lanka, Thailand, and Vietnam), Bangladesh and Laos, and conducted telephone and email interviews with experts in Cambodia, China, Nepal, and Pakistan. The Assessment Team also reviewed a large volume of reports and documents related to environmental problems in Asia, current USAID and US-AEP programs, and assistance programs executed by other bilateral and multilateral donors.

Why focus on urban development challenges?

The Concept Paper proposes to concentrate US-AEP program resources on urban problems. Although rural populations suffer from many of the same water and air-related diseases and illnesses as residents in cities, a case can be made for an urban focus. In the next 20 years, the population of the region will grow by more than one billion people with virtually all of Asia's population growth concentrated in cities. The consequences of the urban growth will be the rapid growth of mega-cities, with many of the major cities in the developing countries of Asia reaching populations of between 15 and 20 million people by 2015.

The growth of cities will result from population increases among current urban residents, combined with rural-urban migration. Rural-urban migration trends are influenced by the inability of rural areas to sustain economic livelihoods for the rural population. For many, the only possible option if they are to feed their families is to move to the urban area in the hope of finding work.

In Asia's cities, the health and economic impacts of poor water, sanitation, and air pollution are borne mainly by low income groups living in informal settlements. Most of new arrivals from rural areas are absorbed by the informal settlements, already poorly served by public services. The inadequate provision of services such as sanitation and water has severe consequences for these populations. The lack of sanitation, coupled with the density of population in urban areas, serves to pollute the surface and groundwater resources within the urban area and this compounds the problem.

Urban growth also will result in commensurate increases in motorization and energy consumption, both expected to adversely affect urban air quality and increase greenhouse gas (GHG) emissions substantially within the region.

Urban water or air?

IRG examined urban water and air issues from three perspectives – economic growth, health, and impact on low income groups – to better determine the relative importance of addressing these in terms of the division of program resources. The findings of this report confirm the value of focusing the US-

AEP program on urban water and air, with governance as a crosscutting issue. However, we believe there is a compelling case for focusing more program resources on urban water than air when these program areas are evaluated in terms of the three perspectives above.

For water:

- ◆ 63% of the population of Asia does not have access to clean water and 80% do not have access to improved sanitation.
- ◆ Unsafe drinking water and sanitation contribute to high rates of morbidity and mortality, particularly among children five years old and younger. In Asia, diarrhea accounts for 18% of infant mortality compared to malaria (2%) and HIV/AIDS (1%).
- ◆ Asian cities are plagued by high incidence of diarrheal illnesses and episodic outbreaks of water-related diseases such as cholera. Infant mortality rates are 10 to 20 times higher in cities without adequate water and sanitation services.
- ◆ The lack of access to safe sources of drinking water has direct and significant economic impacts on the urban poor, as they often pay appreciably more in absolute terms for water and/or invest time to “harvest” water at wells and public standpipes.
- ◆ Poor water quality and availability can be a significant constraint on economic growth, discouraging large companies from locating in urban areas with poor water services, and limiting the growth of small and medium enterprises.
- ◆ Given that gathering water is a very time-consuming job, generally assigned to women, in many cases, it presents a barrier that precludes women from seeking more productive employment and young girls from attending school.

For air:

- ◆ Urban air pollution is a significant source of health risk, accounting for 500,000 to 1 million deaths per year in Asia. Air pollution results in respiratory illness and premature death, but ranks behind water in terms of mortality and morbidity impacts.
- ◆ All urban residents suffer economic losses because of air pollution due to lost wages from respiratory illness and higher medical costs, but poor air quality does not have the same impact of discouraging economic growth.
- ◆ The overall health burden of air pollution is greater for the poor because of longer daily outdoor exposure to air pollution, their proximity to roadways and industry, poor ventilation of their sub-standard housing, and reliance on biomass fuels for cooking and heating.

In virtually all of the consultations, weak governance was noted as one of the major barriers to improved access to clean water, urban air quality, and environmental quality in general. Asian nations have made strides in enacting environmental legislation, but there are still significant gaps to be addressed to

strengthen public participation in environmental governance, facilitate the implementation of investments in water access and sanitation, and design effective air quality programs. There is a need to improve policies and legislation in combination with capacity building to ensure staff has the appropriate skills and resources to execute management authorities. The lack of institutional capacity is particularly problematic where management and enforcement responsibilities are devolved to poorly staffed and financed regional and local authorities. Urban residents appear to be more keenly attuned to air pollution issues than to water access and quality. Improved public awareness can provide a catalyst for a greater role for civil society in decision making and prepare public groups to make better contributions, once they have secured a greater role.

What can US-AEP do to address these problems?

US-AEP is already engaged in providing technical assistance in the six program countries in the areas of water, urban air, and governance. This experience provides an important base and set of lessons learned that will be important to consider in developing the new regional US-AEP program. Both urban problems pose major challenges and US-AEP must continue to draw on its strengths: facilitating partnerships, leveraging other donors' resources and capitalizing on its capacity to share experiences across the region. As a regional program, US-AEP can look widely for partners in Asia, draw from its pool of US private and public sector partners, and work at the local level to achieve impact that can then be aggregated or even multiplied across the region. The focus on urban water and air also plays to regional sharing of experience because all Asian cities face the same set of challenges – legal structures and institutions may differ but they all strive to reduce the impacts of unsafe water and air.

As US-AEP looks to the future, it will need to cultivate strategic partners that bring resources and influence that can be leveraged, multiplied, and sustained. In the past, many of US-AEP's Asian partners were simply beneficiaries of program activities such as exchanges and workshops. Given the emerging model in Asia of development *cooperation* instead of development *assistance*, Asian partners will be called on more often to lead and implement US-AEP activities. US-AEP will need to work closely with governmental agencies and water utilities in Asia, and will need to expand its cooperation with NGOs and community groups in addressing water access issues.

U.S. private and public sector partners will still be featured prominently in the US-AEP program to transfer technologies and expertise and participate in twinning arrangements to improve enabling conditions in water and air and build institutional capacity. In order to leverage resources, US-AEP also will need to cultivate more international partners and look for opportunities to work with USAID/Washington programs and the bilateral missions in the region, as well as other donors and with multi-donor initiatives.

1 INTRODUCTION

1.1 Background

The US-Asia Environmental Partnership (US-AEP) program was created in 1992 to foster the transfer of environmental technology and expertise to Asia. The program works predominantly through direct peer-to-peer contacts to develop and implement practical solutions to environmental problems, bringing experts and practitioners together to share knowledge and to act directly and in concert to solve problems. Some activities create private-private and private-public partnerships that endure beyond US-AEP funding. US-AEP also has a small grants component that brings environmental experts, NGOs, and government entities into the program to share knowledge and expertise.

In its 12-year tenure, US-AEP has retained the “partnership” as its salient feature, but has transitioned through three phases. In the **first phase**, the focus was on the promotion of trade opportunities for US firms to sell environmental technologies to Asia. US-AEP staff facilitated partnerships between private companies in the US and Asian facilities. These partnerships have reportedly generated over \$1 billion of US environmental technology exports to Asia since 1992.¹

In the mid-90s, following an assessment of US-AEP, the program adopted a new strategic vision related to a “clean revolution” for Asia. Trade promotion activities continued during this **second phase**, but were more narrowly focused on greening of Asian businesses amidst growing environmental problems associated with widespread and rapid urbanization and industrialization.

The current approved goal of US-AEP, adopted in the mid-90s, is to encourage a clean revolution in Asia. However, with the withdrawal of the Department of Commerce’s support for US-AEP in 2002, the program entered a **third phase**. Absent a new strategic plan, the US-AEP program has shifted its activities closer to USAID bilateral programs in select Asian countries. While the transfer of environmental technologies continues as a program component, US-AEP has expanded its reach to include greater focus on improved environmental governance and has fostered a broad array of partnerships involving Asian governments, NGOs, trade associations, and the private sector. In addition, US-AEP has facilitated exchanges between Asian countries.

US-AEP has also undergone additional program and management changes, namely: (1) a reduction in the number of countries covered by the program, from the original 11 to the current six; (2) a shift in management in late 2003 from USAID/W to the new Regional Development Mission (RDM/A) in Bangkok; and (3) the extension of the program through September 30, 2006.

¹ The US-Asia Environmental Partnership (US-AEP) Program: Concept Paper, USAID/RDM/A, April 5, 2004, p.4.

1.2 A New US-AEP Strategy

To help set the programmatic direction for the next few years, the RDM/A prepared the Concept Paper² that proposes to focus US-AEP on water and air issues and build on its “comparative advantages” in facilitating partnerships. These new focus areas were approved by USAID/W in April 2004. In the Final Planning Parameters Cable,³ RDM/A received the following guidance to help it prepare a new strategy and revised program description for the FY 2005-2009 period:

- ◆ The Strategic Objective should continue to reflect the Mission’s commitment to critical development priorities, including the Presidential Initiatives *Water for the Poor* and *Global Climate Change*;
- ◆ In preparing the revised program description, RDM/A may also wish to consider and describe the health impacts of the US-AEP Program;
- ◆ USAID/W approves the overall conceptual approach for the revised US-AEP Strategic Objective “Cleaner Air and Water for Asian Cities;”
- ◆ Environmental governance should be an integral, cross-cutting theme.

Under the Environmental Policy and Institutional Strengthening IQC (EPIQ II), International Resources Group (IRG)⁴ has been tasked to assist US-AEP in preparing the new five-year strategy. The key deliverables requested from IRG by US-AEP include this document – the ***Strategic Assessment Report*** – and a second document provided under separate cover – the ***Strategic Objective Plan***.

In preparing the Strategic Assessment Report, IRG conducted consultations in the US, visited the six current US-AEP countries (India, Indonesia, Philippines, Sri Lanka, Thailand, and Vietnam), as well as Bangladesh and Laos, and conducted telephone and email interviews with experts in Cambodia, China, Nepal, and Pakistan. The Assessment Team also reviewed a large volume of reports and documents related to environmental problems in Asia, current USAID and US-AEP programs, and assistance programs executed by other bilateral and multilateral donors.⁵

1.3 Outline of the Report

The *Strategic Assessment Report* presents the findings of IRG’s team and has been structured to answer the following questions:

² Op. cit.

³ US Department of State, *Final Planning Parameters Cable*, April 29, 2004.

⁴ The IRG team included: IRG Staff, Glen Anderson (Team Leader) and Leticia Orti (Management Specialist); and IRG consultants, John Core (Air Quality Specialist), Jeffrey Jacobs (Water Management Specialist), Robert Kenson (Air Quality Specialist), Frank Peacock (Water Management Specialist), and Whitney Sims (Administrative Specialist).

⁵ Lists of all institutions and individuals consulted and documents reviewed are provided as attachments to this report.

- ◆ What are the key development challenges in urban air, water, and environmental governance?
- ◆ What are the best opportunities for US-AEP to address these development challenges?
- ◆ What is rationale for a regional US-AEP program?
- ◆ What types of partnerships will be needed in the new US-AEP program?

The remainder of the report is divided into four sections. Section 2 provides a region-wide synthesis of the development challenges for urban air, water, and governance. Section 2 and Annex 1 - which provides a summary of the key environmental issues for each of the Asian countries included in the assessment – are designed to help US-AEP better focus its regional strategy in countries of opportunity and identify and target interventions.

Section 3 provides an overview of current assistance programs in Asia, in the areas of urban air, water, and governance. The first part of this section summarizes US-AEP activities that are directly related to urban air, water, and governance. The remainder of the section describes multilateral donor programs, including those of the World Bank and the Asian Development Bank, and multi-donor regional initiatives. Other bilateral donor programs are noted in the discussion of regional initiatives, where appropriate.

2 DEVELOPMENT CHALLENGES: REGION-WIDE SYNTHESIS

Why focus on urban development challenges? The Concept Paper proposes US-AEP concentrate its program resources on urban problems. Rural populations suffer from many of the same water and air-related diseases and illnesses as residents in cities. While the incidence of illness and death associated with indoor air pollution is significant in rural areas, where dung and biomass are used for cooking and heating and access to water and sanitation is limited, a case can be made for an urban focus.

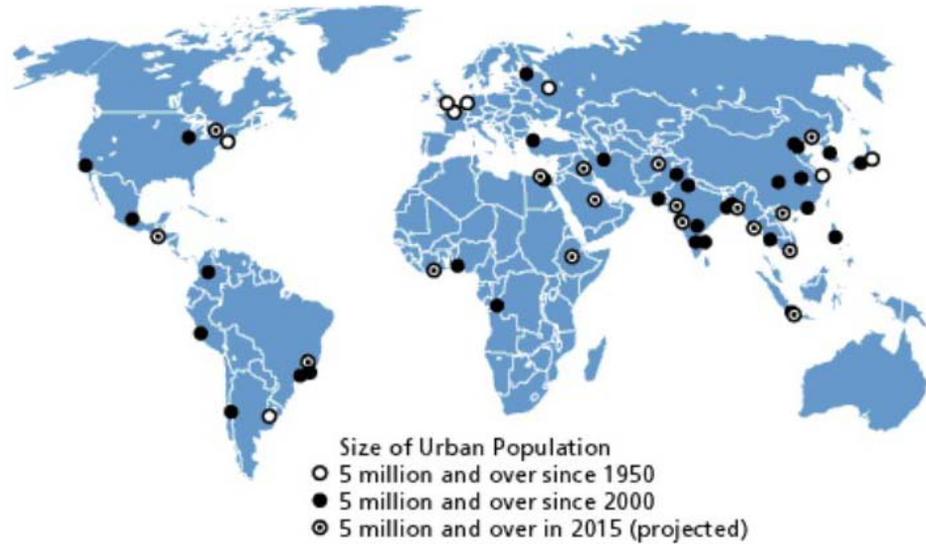
In the next 20 years, the population of the region will grow by more than one billion people – with virtually all of Asia’s population growth concentrated in cities.⁶ As shown in the map below, the urbanization of Asia is faster than urbanization of any other world region. The consequences of this urbanization will be the rapid growth of mega-cities, as shown in Table 2-1. Many of these major Asian cities will reach populations of 15 to 20 million people within the next ten years.

In addition to an increasing number of urban residents, rural-urban migration plays an important role in city growth. Such migration trends are stimulated by the inability of the rural population to sustain economic livelihoods in rural areas. Throughout Asia, cultivatable land has been exhausted. Many of the rural population are forced to farm on one hectare or less and the number of landless squatters continues to rise. For many, the only option is to move to urban areas in the hope of finding work, if they are to feed their families.

In Asia’s cities, it is mainly low-income groups living in informal settlements who suffer poor health and unstable finances resulting from inadequate public services, such as poor water quality, lack of sanitation, and air pollution. Ultimately, the health of the urban poor is worse than their rural counterparts – infant mortality rates are higher and children are more likely to be underweight and malnourished. Lack of sanitation, coupled with a dense urban population, leads to polluted surface and groundwater resources. Most new arrivals from rural areas are absorbed by these informal settlements, only to face similar circumstances.⁷

⁶ United Nations, *The World Urbanization Prospect*, 1999 revision.

⁷ According to UN-Habitat’s report *The Challenges of Slums: Global Report on Human Settlements 2003*, over 78% of the urban populations in the Least Developed Countries live in slums. In Asia, 45% of the urban population in 2001 lived in slums (UN-Habitat, *Slums of the World: The Face of Urban Poverty in the New Millennium?*, 2003)

Figure 2-1: Urbanization

Source: United Nations, World Urbanization Prospects, The 1999 Revision.

Table 2-1: Projected Urban Growth – South and Southeast Asia

	1995	2015
Mumbai (Bombay)	15.1	26.2
Kolkata (Calcutta)	11.9	17.3
Delhi	9.9	16.9
Karachi	9.7	19.4
Metro Manila	9.3	14.7
Jakarta	8.6	12.9
Dhaka	8.6	19.5
Bangkok Metropolitan Region (BMR)	7.6	10.1

Source: United Nations Population Division. Urban Agglomerations 1950-2015

Urban growth also will result in commensurate increases in motorization⁸ and energy consumption, both of which will adversely affect urban air quality and substantially increase greenhouse gas (GHG) emissions throughout the region.

2.1 Air Quality

In most Asian cities, air quality is declining as a result of increased emissions associated with motorization, industrialization, and urban population growth. Deteriorated air quality has a profound

⁸ There are 500 additional cars on the roads each day in Bangkok and 400 daily in Chennai.

effect on health, resulting in premature death, acute and chronic illness, and significant economic ramifications due to lost work and increased healthcare costs.

The major pollutant of concern throughout Asia is particulate matter (TSP or SPM) and/or PM-10 and PM-2.5.⁹ Levels of PM-10 are very high and rising, usually exceeding USEPA and WHO Ambient Air Quality Standards established to protect public health. The estimated effect on human health of air pollution associated with PM-10 is shown for select Asian cities in Table 2-2.

Table 2-2: Urban Air Quality Impacts

City ¹⁰	Year	Chronic Bronchitis Cases	Deaths Associated with PM-10	Annual Costs (\$ million)
Manila	2001	8,439	1,915	\$392
Shanghai	2000	15,188	7,261	\$880
Bangkok	2000	1,092	4,550	\$424
India (25 cities)	--	--	--	\$14-\$191/city
Jakarta	2002	--	--	\$100

Source: *CAI-Asia, A Strategic Framework for Air Quality Management in Asia, 2004*

In addition to particulates, there are a number of other pollutants of concern in urban areas, including ground-level ozone and carbon monoxide, which are mainly associated with increased morbidity, and a group of pollutants that are either carcinogenic or highly toxic: polycyclic aromatic hydrocarbons such as benzopyrene and heavy metals such as lead and chromium.

While everyone in the city suffers from air pollution, low income residents can be affected more than higher income groups because of a combination of factors: proximity to heavy road traffic and industry, open burning of solid waste in their communities, and indoor air pollution associated with the burning of biomass for cooking and heating. Air pollution generated by cities can also have transboundary and global impacts – a portion of airborne mercury observed in the US might have originated in Asia or other regions of the world, and the vehicles, industry, and power plants burning fossil fuels contribute greenhouse gases.

USEPA and WHO guidance on “safe” levels of ambient air quality stress the importance of meeting 1-hour, 8-hour, or 24-hour standards because of the strong correlation between short-term exposure and acute illness. Thus, annual air pollution levels estimated on an annual basis may have little bearing on pollution-related illnesses. For example, New Delhi has achieved annual reductions in particulates, but still exceeds the standards for TSP and PM-10. In most cities in the countries covered by this report, it is difficult to accurately assess the extent of the air pollution problem because of limited capabilities to

⁹ This was raised as an issue in every one of the countries visited by the team, with the exception of Lao PDR.

¹⁰ Sources: World Bank, *Philippines Environment Monitor, 2002*. Washington, DC.

Chet, et.al. *Integrated Risk Assessment of Human Health and Energy Options in Shanghai*.2002

World Bank. *Thailand Environment Monitor, 2002*. Washington, DC

Mashelkar Committee. *India Fuel Policy Report*. August 2002.

monitor ambient air quality. Even in those cities with adequate monitoring networks, many of the pollutants of concern are not monitored on a frequent or continuous basis.

To improve urban air quality, the basic challenge is to control emissions from mobile, stationary, and area sources within urban environments and in areas from which pollutants may be transported. To meet this challenge, authorities in urban areas must establish appropriate policies to reduce emissions. Air quality managers must have a thorough understanding of the sources of emissions, their relationship to ambient concentrations, how these sources are affected by emission controls, and other contributing factors. Also of critical importance is the capacity of city authorities to monitor and enforce air quality regulations and policies.

Evaluations of air quality management (AQM) programs in Asia have recently been completed by the Clean Air Initiative for Asian Cities (CAI-Asia) working in cooperation with other donors.¹¹ The CAI-Asia Strategic Framework report is a broad, high-level evaluation that provides recommendations for key components of the AQM systems in Asia. In summary, the report concludes:

AQM challenges in Asia range from a lack of government commitment and stakeholder participation, weaknesses in policies, standards and regulations, through to deficiencies in data on emissions, air quality and impacts on human health and the environment. Emission inventories are often absent, incomplete or inaccurate. Emissions standards are sometimes obsolete and do not reflect best technical practice. Measures to prevent and reduce air emissions are often hampered by lack of source apportionment. Low-cost and effective alternative technologies are rarely available. Outdoor air quality monitoring systems are often limited in spatial coverage, are not harmonized or are absent altogether. Trans-boundary air pollution is rarely monitored.

The lack of quality assurance/quality control procedures means that data quality is often unknown, or poor. In many Asian countries insufficient information exists on the health, environmental and economic impacts of air pollution. Risk perception, risk communication, information dissemination and awareness raising are often issues to be addressed. The relatively low priority of AQM means that funding is often a problem. Key barriers to the adoption and implementation of the Strategic Framework include lack of political will, inadequate infrastructure, lack of reliable data for emissions and air quality monitoring and poor surveillance of health impacts caused by air pollution.

In a report presented by CAI-Asia in Bangkok in June 2004, the Secretariat largely concurred with the findings presented in the ***Strategic Framework for AQM in Asia***, noting that the weakest link in AQM in Asia was air quality, made evident by a complete absence of emission inventories that are needed to identify contributing sources, support modeling, track emission trends, and evaluate the effectiveness of control strategies.

¹¹ CAI-Asia is an initiative that is the focal point of the assistance efforts of many donors to address urban air quality throughout Asia. It was mentioned favorably in consultations in Thailand (which also hosts the CAI-Asia CATNET training program), the Philippines and Vietnam.

The World Bank's March 2003 report on air quality in South Asia concluded that uncertainties in the quality of air monitoring data throughout the region and a weak understanding of the sources of air pollution in many Asian countries were major pitfalls to effective air quality management.

CAI-Asia has recently completed an inventory of initiatives and organizations working in Asia, identifying some 155 AQM projects, most of which deal with local air pollution issues, including ambient air monitoring, mobile and stationary sources, or GHG abatement. The authors conclude that since there is no established database of programs and projects, there is duplication of efforts. In addition, although the projects have produced a substantial body of knowledge, results are not well-documented, shared or fully utilized in the formation of AQM policy and practices, and skills from special projects are not transferred to regulatory agencies.

The findings from IRG's consultations in Asia are consistent with those recently completed by CAI-Asia Secretariat, ADB and the World Bank. The greatest development challenges in the urban air sector include the prevention of further air quality deterioration that will likely result from increased motorization and urbanization of mega-cities within the region. The consultations underscored the lack of air quality and transportation management planning required to meet this challenge. Understandably, the current focus of interventions in all of the countries visited was on the important and immediate need to reduce emissions from motor vehicles, with little or no emphasis on air quality planning.

2.1.1 AIR QUALITY PLANNING

Air quality planning is a multi-stage process involving the characterization of current emissions and emission trends, modeling of emissions dispersion patterns and resulting ambient concentrations, and identification and assessment of policy options for reducing emissions to achieve target levels of ambient air quality. In the team's consultations, the emissions inventory was highlighted as the Achilles' heel of air quality planning – without an accurate emissions inventory, the analyses in later stages of planning would not be reliable or credible with policymakers or the public.

A presentation at the Better Air Quality 2003 Workshop¹² in Manila indicated that there has been recent progress in preparing emission inventories in Asian cities, but these efforts are flawed in a few significant areas:

- ◆ Level of detail and degree of disaggregation varies greatly across cities – the lack of a common methodology complicates the task of air quality modeling and determining the impacts of policies;
- ◆ Questions have been raised about the reliability of activity data and emission factors, with large error margins resulting because of explicit assumptions about maintenance and operation of vehicles and process technologies;¹³

¹² Cornie Huizenga, CAI-Asia Secretariat. *First Coordination Meeting of Regional Air Quality Initiatives and Programs in Asia*. June 16, 2004. Bangkok, Thailand.

- ◆ Many of the inventories have been conducted by outside groups, a missed opportunity to build capacity within air quality management agencies.

There is a poor understanding of the sources of air pollution beyond (and sometimes even within) the mobile sources sector. However, some progress in building capacity and producing a credible emissions inventory was noted in the team's consultations at the US-AEP India Country Office in Delhi and the US-AEP Mumbai Office. The USEPA-Pune Regional Emission Inventory Study represents an important step in the air quality planning process, as it has identified several major contributing sources that were previously unknown.¹⁴ This was an innovative, cooperative, and highly successful effort to demonstrate emission inventory techniques in Asia. The software and methods developed during the Pune work will be replicated in Mumbai, Kolkata and other Asian countries in the future. Significantly, new source apportionment studies are identifying the importance of re-suspended road dust, vegetative burning, and other sources to PM-10 levels in Asia.

Some progress has been made in monitoring air quality in the region, although not in most of the cities the assessment team visited. According to CAI-Asia, several cities have set up continuous air quality monitoring stations, including Bangkok, Ho Chi Minh City, Kolkata, Manila, and Surabaya.¹⁵ In most cases, these stations are not linked as a network and do not measure ozone or fine particulate matter.

2.1.2 EMISSION REDUCTION POLICIES

In the countries assessed, cities, and in some cases, countries, are making progress in addressing emission levels. The greatest air quality success has been the phase-out of leaded gasoline in most countries. This measure not only reduces lead emissions, but also is a critical step in introducing stricter vehicle emission standards that can only be achieved by vehicles fitted with catalytic converters and fueled with unleaded gasoline.

Vehicle emission standards can be an effective mechanism for reducing mobile source emissions, if properly enforced. Most countries have committed to these standards. In some countries, stricter standards will be phased in over several years. However, to meet these stricter standards, vehicles must use modern emissions control systems, which are costly to retrofit to older vehicles. As a result, the stricter standards apply only to new vehicles. Because of the sluggish retirement of older, high pollution vehicles and the pervasive practice of importing second-hand vehicles (or engines), stricter emission standards will not have an immediate effect.

Diesel emissions are a significant source of particulate matter and their reduction has been a challenge throughout Asia. India's leading environmental NGO, Center for Science and Environment (CSE),

¹³ In the Assessment Team's discussions with Dr. Supat Wangwongwatana, Deputy Director General, Pollution Control Department, MoNRE, in Thailand, he raised a similar point about the need to develop emission factors appropriate for cities in South and Southeast Asia.

¹⁴ Round Table Meeting in Mumbai, July 19, 2004.

¹⁵ Cornie Huizenga, CAI-Asia Secretariat, *First Coordination Meeting of Regional Air Quality Initiatives and Programs in Asia*, June 16, 2004, Bangkok, Thailand.

succeeded in obtaining a court-mandated change-over of diesel buses to CNG fuels. These actions have spurred interest in alternative fuels throughout Asia.¹⁶ The change over from diesel to CNG can significantly reduce emissions from diesel vehicles. However, the retail pricing of CNG (and gasoline) compared to diesel (due to differentiated taxation in South Asia), promotes fuel switching between gasoline and CNG, but not between diesel and CNG. Moreover, diesel technology is robust, and experience with heavy-duty vehicles switching to CNG (buses being the most common example) shows that maintenance costs tend to increase. The greater maintenance difficulties of CNG vehicles compared to diesel means that fleet operators must be strongly committed to CNG, provide the necessary staff training, and cover the incremental costs. Clean fuels are required to assure that air quality in Asia is not further deteriorated by urbanization and is therefore an important development challenge.

Another major cause of pollution is the emissions from 2-stroke engines typically found in small motorcycles and 3-wheeled taxis. Visible emissions, CO and hydrocarbon emissions are of great concern in Hanoi, Jakarta, Manila and many other major cities. Outreach efforts to drivers and mechanics urging the use of smokeless lubricants, premixed oil-petrol fuels, efforts to restrict the number of vehicles allowed on the streets during specific times, and demonstration projects to encourage changeover to 4-stroke (or CNG) engines have all met with limited success.

The Assessment Team's consultations focused mainly on mobile sources of pollution and policies to reduce them directly through technical controls or fuel quality improvements or substitutions. Interviewees acknowledged the long-term role of urban transportation policies and highlighted some efforts to address congestion and encourage the use of public transportation options to reduce emissions and energy consumption, important initiatives in a GHG mitigation strategy. In general, the challenges in tackling the transportation conundrum were viewed as too overwhelming for US-AEP.

In a few consultations, interviewees also addressed the difficulties of reducing stationary and area emission sources. While there are emission standards in most countries, they are seldom enforced except among the large industrial facilities. Small and medium enterprises are largely unregulated and regulatory agencies often lack appropriate tools such as penalties and fines to discourage non-compliance. In consultations in Delhi, it was noted that the only enforcement tool available the Central and State Pollution Control Departments to address non-compliance is facility closure.

2.1.3 INSTITUTIONAL CAPACITY

In all of the team's consultations, a lack of institutional capacity to plan and manage air quality was highlighted as a major barrier. The problems mostly relate to understaffing, gaps in technical and enforcement skills of staff, and inadequate funding to operate air quality monitoring networks. In many cases, management responsibilities have been devolved to local agencies, but without concomitant authority to self-finance these management activities.

¹⁶The possibility of funding an NGO to sue government was raised in the Sri Lanka Meeting on July 22, 2004 at the Ministry of Transport in Colombo.

Universally, motor vehicle inspection and maintenance (I&M) programs throughout Asia (and in other regions of the world as well) have been ineffective. In Manila, DENR has registered some 400 independently owned inspection stations. A survey of 500 vehicles that “passed” inspection found that only 25 vehicles had been actually “tested.” Such stories are common. India’s Clean Up Pollution (CUP) system, Bangkok’s vehicle inspection program, the Bangladesh I&M and others are failures.¹⁷ Without effective I&M, it will be extremely difficult to control in-use vehicle emissions, especially those that are “gross emitters.” There is debate as to whether it is possible to mount an effective I&M program in Asia in the near future.¹⁸

2.1.4 PUBLIC AWARENESS

A key development challenge throughout Asia is the public’s poor understanding of urban air pollution issues, its responsibilities to minimize emissions, and its right to clean air. As a result, the public takes little personal responsibility to reduce the problem and political leaders place a low priority on dealing with urban air pollution. Lack of awareness adds to the ineffectiveness of vehicle inspection programs and weakens public support for regulatory action, resulting in poor governance. Promoting clean air within the public and political sectors is essential for success, as demonstrated during the efforts to ban leaded fuels throughout Asia.

2.1.5 CONCLUSION

There has been some progress in improving air quality in Bangkok, Delhi, Katmandu, and Dhaka. In every case, the banning or reduction of 2-stroke engines has been instrumental in this effort, although both Bangkok and Delhi have gone much further in reducing mobile sources of emissions.¹⁹

The IRG Strategic Assessment of urban air quality in Asia is consistent with the findings of other organizations. There is little question that the issue of good governance is key to meeting the future urban air development challenges. In the technical area, the most consistent need is for an improved, very basic understanding of the air quality and transportation planning in Asia, specifically in the emission inventory development and air quality monitoring fields. An inadequate or incomplete understanding of the sources of air pollution and existing air quality conditions results in misunderstanding about how to improve air quality and action plans that only address some sectors of the problem: most notably mobile sources. Other important challenges include diesel emissions and

¹⁷ It became clear during consultations in each of these countries that I&M of vehicles had failed to achieve any improvement in vehicle emissions. In every case this was because emission certificates were obtainable by payment with no inspection having taken place.

¹⁸ A recent presentation for USAID by PA Government Services, *Vehicle Inspection and Maintenance Programs: International Experience and Best Practices*, September 23, 2004, reinforces the findings of the Assessment Team and concludes that the timing is not yet “ripe” for a major effort on I&M.

¹⁹ Team members who had long-term familiarity with Delhi, Bangkok, and Dhaka attested to the visibly improved air quality in these cities compared to five to ten years ago.

fuels,²⁰ 2-stroke engines, I&M, fuel adulteration, and public awareness. If these governance and technical challenges are not addressed, future urbanization and motorization of Asia will further deteriorate urban air quality and further increase mortality and morbidity throughout Asia.

2.2 Water

Poor access to clean water and safe sanitation is one of the major problems facing Asia. Sixty-three percent of the population of Asia does not have access to clean water and 80% are without access to sanitation. None of the countries in which US-AEP is currently operating provide all of their urban population with a supply of clean drinking water.²¹ Within South Asia the common model is that of an interrupted flow of water, rather than continuous service (24 hours a day, seven days a week); unlimited accessibility to water is generally confined to the more affluent and influential sections of the urban area. In Southeast Asia there is more likely to be more continuous supply, but only to parts of the urban areas. Large areas of the cities are not supplied with municipal water and people rely on purchasing water from small scale water providers (SSWPs). In the six US-AEP countries, even where water is supplied, none of the urban areas provide piped water that meets minimum acceptable drinking water standards.

Infant mortality rates are 10 to 20 times higher in cities without adequate water and sanitation. In Asia, diarrheal diseases account for 18% of infant mortality while malaria and HIV/AIDs only account for 2% and 1%, respectively. Poor water quality and limited access to piped water have significant economic growth implications for urban areas. These problems may affect location decisions of industries and limit opportunities for small businesses to operate in urban areas without access to water.

The urban water situation is getting worse. Most urban water authorities are in a slow, downward spiral as years of neglected maintenance reduce the effectiveness of the existing systems. Systems that cannot meet existing needs are going to face a rapidly growing demand for water in the coming years; a demand that, under existing circumstances, they are incapable of meeting.

2.2.1 COPING WITH INADEQUATE WATER SUPPLY

The Millennium Development Goal (MDG) for water access commits the global community to reduce by half the proportion of people without sustainable access to safe drinking water by 2015. Since 1990, Asian countries have made considerable progress in providing the public with improved water resources. As indicated in Table 2-3, although a large proportion of the urban population has improved access, it is important to note that this access is not by piped connection. Some of the “improved” access options may require a considerable investment of time by the poor to gather water, especially if the source is not served or capable of supplying continuous water. Family members may spend a significant amount time queuing at wells or standpipes and require several trips to meet their needs.

²⁰ Of the countries visited, only Delhi in India has addressed the problem of diesel emissions.

²¹ In none of the countries visited were local people advised to only drink tap water that has been purified. For low income households, the cost of additional purification such as boiling or filtering may be prohibitive.

In South Asia, even where there is access, water is most likely to be available only on an intermittent basis a few hours a day – or in some cases, for a few hours every two or three days. This limited availability engenders water capture strategies that undermine the distribution system and can adversely affect the quality of piped water. With a pump to draw the water out of the system quickly (and by doing so, reducing water pressure elsewhere), and a tank to store the water in, higher income households can ensure a *de facto* continuous supply. If necessary, they can also put in tube wells and pumps to supplement the municipal supply, buy water from tankers to top up the tanks, and purchase bottled drinking water. By such expenditures they ensure that there is water available to them around the clock. However, the cost is well above what one would pay for a well-managed, constant supply of municipal water.

For the poor, pumps and tanks are not options they can afford. In addition, the areas they live in are likely to be the worst affected by intermittent supply and low water pressures. In Delhi, for example, the standpipes on which many of the poor depend, generally supply water for about four hours a day. With each standpipe supplying around 500 families,²² and water pressure often low, filling of containers is a slow business; those who arrive in line late often find that they do not reach the water supply at all.

Table 2-3: Urban Access to Drinking Water (% urban population)

Country	1990		2002	
	Improved Access ¹	Piped Connection	Improved Access	Piped Connection
Bangladesh	83%	28%	82%	26%
Cambodia	-	-	58%	31%
China	100%	80%	92%	91%
India	88%	51%	96%	51%
Indonesia	92%	26%	89%	31%
Laos	-	-	66%	25%
Nepal	94%	42%	93%	48%
Pakistan	95%	61%	95%	50%
Philippines	93%	37%	90%	60%
Sri Lanka	91%	37%	99%	35%
Thailand	87%	69%	95%	80%
Vietnam	93%	51%	93%	51%

Source: WHO and UNICEF, Meeting the MDG Drinking Water and Sanitation Target – A Mid-term Assessment of Progress, 2004

¹ Improved access to water is achieved by household connection, public standpipe, borehole, protected dug well, protected spring, and rainwater collection

To ensure that they receive water, many arrive early and then spend a great deal of time in the queue waiting to collect water. In some areas, however, the water supply is only turned on at night or early morning; this is a burden that is disproportionately borne by women and girls who are responsible for water collection. In Chennai, where there is an acute problem, the team heard stories of women losing

²² ADB, Asian Water Supplies – Reaching the Urban Poor. ADB, Manila 2003,

wage paying jobs in order to spend the day standing in line for water.²³ Girls forced to stand in line often give up valuable school time.

In Southeast Asia the water supply is often intermittent, but generally not to the extent that it is in South Asia. The problem in countries such as the Philippines and Indonesia is that large urban areas, at times, have no municipal supply of water. These are the circumstances which cause people to purchase water from small scale water providers (SSWPs). This water is not inexpensive, especially in comparison to piped water. In Manila, around five million people obtain water from SSWPs at an average cost per month of US\$10-\$20, based on household consumption rate of 6 m³ per month. Households with piped connections are paying less than half as much (US\$3 to \$6) as other residents, but receiving five times as much water (30 m³ per month). So the poor in the Philippines are paying 12 to 30 times as much for a cubic meter of water as connected households. In the Philippines, water expenditures may account for 10% of household expenses.²⁴ The poor in the Philippines are relatively well-off compared to the urban poor in Jakarta. Interviewees reported that the poor may spend as much as 30% of their income to purchase water, often at prices that are 50 to 90 times the cost of piped water.²⁵

A common perception in the development community is that tariff increases for water supplies will impact unfairly on the poor. The reality is that the poor in Asia are already paying dearly for water, either in terms of the opportunity cost for valuable time lost, or in terms of the real cost of payment to SSWPs. A piped supply of municipal water would, at almost any tariff, decrease the price, as well as increase the quantity available for the poor.

2.2.2 WATER SANITATION AND HEALTH

The MDG for sanitation is comparable to the goal for drinking water – to halve the population lacking basic sanitation by 2015. Table 2-4 shows the trends in urban access to sanitation between 1990 and 2002. In comparison to water access, smaller advances were made between 1990 and 2002 in improving access to sanitation. When urban population growth is taken into account, the number of urban poor without safe sanitation has actually increased, not decreased as the statistics would suggest.

In many urban areas of Asia, lack of access means that even the most rudimentary contained sanitation facilities are absent. Overhung latrines, where excretion is discharged directly to a water body, bucket latrines, and defecation on barren ground are all common options for poor urban residents. Effective public health measures require that human waste be removed and treated in areas where hundreds of thousands of people are densely packed. A sewerage system is the most feasible way of doing this. Slums located at the edges of cities, where population densities are less, might be eligible for other measures involving local disposal. What is clear is that there is a need for explicit government policies on urban sanitation, specifically addressing the needs of slum areas.

²³ Meeting in Chennai July 19, 2004 with the Tamil Nadu Urban Infrastructure Commercial Services.

²⁴ ADB, Asian Water Supplies – Reaching the Urban Poor. ADB, Manila 2003,

²⁵ Meeting at the World Bank Water and Sanitation Program, August 6, 2004.

The statistics on sanitation access are misleading – suggesting that the sanitation problem has been adequately solved for those with access. In fact, access focuses on the facility, not on the ultimate disposal and treatment of human waste. In Bangkok, for example, virtually the entire city relies on septic systems with few businesses and household connected to sewers. These septic tanks are generally not desludged until they back up or overflow; when they are desludged, the sludge is frequently disposed of in the nearest convenient landfill or dumped in a watercourse. The result is that both ground and surface water in Bangkok is heavily contaminated with fecal coliform. Bangkok is not alone - virtually every major city in South and Southeast Asia relies upon septic systems for most of their sanitation, and all share the same problem as Bangkok. In fact, only 30% of the populations of Asian cities have access to sewage.

Both inadequate water supply, and water that does not meet acceptable quality standards, has a huge health impact. A supply of clean piped water and adequate sanitation would be the most important public health measure that could be implemented in Asia. Diarrheal diseases kill six times as many infants as HIV/AIDS and malaria combined. Cholera and typhoid epidemics kill both young and old. At the time of the IRG team's visit to India, cholera had just broken out in Delhi, with 945 reported cases as of June 2004.²⁶

Table 2-4: Urban Access to Sanitation¹ (% of population)

Country	1990	2002
Bangladesh	71%	75%
Cambodia	-	53%
China	64%	69%
India	43%	58%
Indonesia	66%	71%
Laos	-	61%
Nepal	62%	68%
Pakistan	81%	92%
Philippines	63%	81%
Sri Lanka	89%	98%
Thailand	95%	97%
Vietnam	46%	84%

Source: WHO and UNICEF, Meeting the MDG Drinking Water and Sanitation Target – A Mid-term Assessment of Progress, 2004

¹ Improved access to sanitation is achieved by: connection to a public sewer, connection to a septic tank, pour-flush latrine, ventilated improved pit latrine, and some categories of pit latrines

Table 2-5 shows some of the major water and sanitation diseases that impact on the urban areas of Asia. It is not just the lack of available drinking water that causes health problems. The shortage of water for bathing and sanitation is also a major health issue, especially among the poor. Within the poor population, those most affected are babies and infants followed by women.

²⁶ Times of India. July 21, 2004.

As South and Southeastern Asian cities, particularly the slums, grow ever larger, the incidence of disease will rise unless measures are undertaken to address the issues of water and sanitation in order to improve morbidity and mortality rates.

Table 2-5: Common Water and Sanitation Related Diseases in Asia

Disease	Description
Diarrhea	Caused by micro-organisms including viruses, bacteria, and protozoas. About 4 billion cases a year cause 2.2 million deaths. 1.8 million of these deaths are children under 5. This is the most common cause of infant death in South and Southeast Asia.
Arsenicosis	Long-term exposure to low concentrations of arsenic in water causes skin keratosis and cancer of the skin, lungs, bladder and kidneys. Water supplies in West Bengal, Bangladesh and parts of Vietnam are contaminated with arsenic.
Cholera	An acute bacterial infection that can quickly lead to dehydration and death. In 2002, over 120,000 cases were reported worldwide.
Fluorosis	A serious bone disease that is endemic in at least 25 countries, including India and Pakistan.
Intestinal Worms	Parasitic worms also known as helminthes that spread through contact with soil contaminated with human feces or from contaminated food. Ten percent of the developing world's population is infected. Severe infection leads to malnutrition and can lead to anemia or retarded growth. Common throughout Asia.
Malaria	Each year there are 300 to 500 million cases of malaria and about 1 million child deaths. Standing water produces the breeding ground for the mosquitoes that carry the infection. All US-AEP countries have areas of malarial infection.
Trachoma	An eye infection spread by poor hygiene caused by a lack of adequate water supplies and unsafe environmental sanitation conditions. Children are particularly susceptible. About 6 million people are blind today because of trachoma.
Typhoid	A bacterial infection caused by ingesting contaminated food or water. About 12 million people are affected by typhoid each year. Common throughout the region.

UNICEF, Water Environment and Sanitation Website

2.2.3 THE PROBLEM

Every Asian country has committed to the Millennium Development Goals, including sustainable access to safe drinking water. However, this commitment has not been reinforced by the preparation of action plans or programs designed to increase access – in fact, countries have committed to the goals but have not yet considered the changes that would be needed in policy, other enabling conditions, and institutional capacity, or looked closely at the financial requirements to increase access, particularly for the poor. Worldwide, there is a huge financing gap in water: \$70 billion is spent annually, but \$170 billion is needed.

2.2.4 GOVERNANCE

Governance is a large part of the problem. At a national level, governments make regulations that impact on water supply, such as regulations governing water tariffs, but have no responsibility for the water supply itself; this responsibility resides with provincial and municipal level government and water supply entities. So the local supplier of water may well have no control over the tariff they are able to charge for the water.

Surprisingly, one area over which there is no regulation is water quality where there are seldom any standards set for the water at point of delivery – in other words, the supplier has no enforceable legal obligation to deliver water that is actually fit to drink. This can result in perverse incentive structures for water suppliers. For example, to meet their contractual requirements for water quantity, interviewees reported that the two water concessionaires in Jakarta are mixing canal water with the raw water supply in low flow periods.²⁷ This canal water is only of slightly higher quality than diluted sewage.

Although municipal governments and local authorities are the ostensible suppliers of urban water, they do not have a mandate to supply potable water to the entire urban population. In fact, regulation might actually prohibit them from doing so. For example, on occasion, authorities are prohibited from supplying water connections or sanitation to informal settlements in the urban area. The rationale often provided for denying access is that a piped connection confers legal recognition to essentially illegal settlements. This, of course, directly restricts access to water and sanitation for the poor who usually occupy these settlements. In addition, officials have expressed the view that the provision of piped water would accelerate rural-urban migration, when in fact the number of urban poor without access is many times the incremental number of rural households that might respond to this incentive. Another effective barrier can be the cost of connection – in Manila and Colombo, first-time connection charges are \$107 and \$129, a substantial share of a low-income household's annual budget.²⁸

Within Asia, the water supply authority is almost always managed as an extension of local government with civil service rules and salaries and staffing levels. A water supply authority is a business, and in some cases a very large one (e.g., the Delhi Jal Board employs 27,000 staff). In discussions with the Delhi Jal Board, their managers indicated that despite the large number of employees, they lack basic strategic planning, technical, and financial skills needed for effective performance. Supplying water to 15 to 20 million people is a huge undertaking requiring an effectively managed and staffed organization.

2.2.5 PARTICIPATION AND AWARENESS

There is seldom public input into the provision of water in urban areas. Consumers who suffer the most from the inadequacy of the service – the urban poor – are not organized to press for improvements and may not be afforded an avenue by government or utilities. While there is a large, visible, and effective

²⁷Reported in consultation with PERPAMSI and BAPPENAS in Jakarta August 9, 2004. PT PAM Lyonnaise Jaya (Palyja) serves West Jakarta and PT Thames Pam Jaya (TPJ) serves East Jakarta. See consultation notes at Annex 2.

²⁸Asian Development Bank, *Water in Asian Cities. Utilities' Performance and Civil Society Views*, ADB, 2004.

lobby for control of vehicle emissions in some cities, there is little public outcry or articulated demand for the provision of clean water.²⁹

In part, urban residents appear to accept the inadequate provision of water and its poor quality. One interviewee in Thailand noted that from a young age, residents have relied on bottled water for drinking purposes. There appears to be limited awareness of the quality of drinking water or the public health issues associated with unsafe water and sanitation services.

2.2.6 WATER SOURCES

One of the consequences of the increasing urbanization in Asia, frequently coupled with increasing industrialization, as both human settlements and industry expand, is the pollution of urban water at its source.³⁰ In fact, the water quality can become so poor that it is not even acceptable for treatment at drinking water treatment plants. A further cause of urban water pollution is the growth of rural agriculture which, upstream of intakes, pollutes water sources with runoff from animal waste, fertilizer and pesticides. Additionally, deforestation or overgrazing of watersheds can denude vegetation causing fluctuations in both water quantity and water quality – increasing the turbidity and flows of water during the wet season³¹ and decreasing the flows in the dry season. All of these factors can lead to an effective decrease in the amount of available water at the source.

The lack of sanitation also impacts on potential water supply, as it leads to groundwater and surface water pollution.³² In none of the countries visited was there any effective means of treating wastewater or desludging septic systems and disposing of the sludge. Typically, sewers discharge directly into rivers, canals, and lakes, and sewage is dumped wherever possible, frequently directly into water bodies.³³

2.2.7 THE WATER SUPPLY SYSTEM

Water supply systems require constant maintenance. Without this attention, they deteriorate and eventually collapse. In the six US-AEP countries, water supply systems run the gamut from slow deterioration (Bangkok, Colombo) to imminent collapse (Chennai, Jakarta). In few cities in the countries examined, with the exception of many cities in China and Phnom Penh in Cambodia, is there an ongoing program of maintenance that would keep the system running effectively.

²⁹ This was probably one of the biggest surprises for the team. In every country visited there were active NGOs bringing advocacy pressure on Government – or in the case of Delhi, taking government to court – to improve air quality. This NGO advocacy seemed to be entirely lacking with respect to water.

³⁰ This was identified as a problem in consultations in Mumbai, Chennai, Bangkok, Manila, Dhaka, and Jakarta.

³¹ The paradox is that the water supply is reduced in the wet season because the treatment plants slow down to handle the turbidity.

³² In Dhaka, a city surrounded by rivers, all water sources – both surface and ground – have heavy fecal contamination. Reported in consultations with Dr. Mohamed Mujibur Rahman, University of Engineering and Technology, and members of the National Sanitation Task Force, July 22, 2004.

³³ There was not a country visited that was not dumping untreated sewage into its water courses and, as explained by the Secretary of the DENR in Manila, this is not perceived as a problem by most people. In Vietnam there is no sewage treatment at all in the country.

Water supply systems also require operation at a constant pressure. When the water supply is intermittent, with constant pressure changes as the water is pumped into the system and then drawn down, it causes a rapid deterioration to joints, which then leak. This not only causes high water losses, but also draws pollutants into the pipes through the leaking joints. At best, these pollutants are mud and soil, at worst, sewage. The effect is that even if water is adequately treated at the plant before distribution, it can degrade in quality before reaching the tap.

The failure to maintain systems is due to a number of factors. First is the lack of commitment and managerial ability to set up and run effective maintenance programs. Second, tariffs are often so low they do not cover O&M costs. The third problem is the overstaffing of the utilities so that virtually all revenue must cover payroll costs, reducing funding levels for system maintenance and rehabilitation.³⁴

2.2.8 NON REVENUE WATER

Non revenue water (NRW) is one of the significant indicators of the effectiveness of management of a water utility. When NRW increases as a proportion of the total amount of water entering the distribution system, it indicates that the utility is losing potential revenues, thereby reducing revenues needed for proper system operations. Effective water utilities such as the Singapore Water Utilities board have reduced NRW to 5%, while NRW is much higher in poorly managed utilities: NRW in Dhaka is 40%; in Jakarta, 50%; in Delhi and Colombo, 55%; and in Manila, more than 60%.³⁵

Non revenue water is created due to several factors. The first is leakage through the system. Poorly maintained pipes leak, many of them visibly at surface level. All water systems leak, those that are well maintained stop the leaks. A system that is poorly managed will face ever mounting losses through leaks; this is the situation in much of South and Southeast Asia. Given that there is a cost to the production of water through its treatment and distribution, the financial viability of the system can only go from bad to worse.

The other sources of NRW include water that is used but not allocated due to inadequate metering or inadequate collection,³⁶ standpipes where water is freely accessible, and SSWPs who obtain water to sell to their customers without official payment.

Insofar as some of the NRW reaches the poorer parts of the community, a service is being provided, although there is a loss of potential income to the utility.

³⁴ Kuala Lumpur, a well run utility, has 1.4 staff members per connection. Delhi has 19.9, Dhaka 11.6, Katmandu 15.2, and Vientiane 10.6

³⁵ Asian Development Bank, *Water in Asian Cities: Utilities' Performance and Civil Society Views*, ADB 2004.

³⁶ In many Asian countries, one of the "perks" of being in a position of political or bureaucratic influence is ignoring payment of the water bill, with no threat of sanction.

2.2.9 TARIFFS

In all of the US-AEP countries, water tariffs are subject to government approval. In every case there is great reluctance on the part of government to authorize tariff increases. Table 2-6 shows the existing tariffs in some South and Southeast Asian cities. These tariffs are insufficient to cover the running costs of the utilities.

Table 2-6: Water Tariffs per m³ Selected Asian Cities

City	Tariff
Colombo	\$0.22
Delhi	\$0.07
Dhaka	\$0.06
Jakarta	\$0.29
Katmandu	\$0.09
Kuala Lumpur	\$0.30
Manila	\$0.14
Phnom Penh	\$0.24
Vientiane	\$0.04

The argument against increasing tariffs often promoted by government and water customers is that the poor cannot afford to pay. In fact, the poor are not connected to water sources; it is the middle- and upper-income households with access to water who benefit from these low, government-subsidized tariffs. As explained above, the poor are paying considerably more for their water. The average water tariff in Europe³⁷ is US\$1.20 to \$1.80 m⁻². This reflects the price of providing a continuous and reliable water supply of drinking water quality. Costs will be a little lower in Asia, as salary levels are lower.

The tariff needs to be set at a level that enables connection of the urban poor to piped water, but allows the utility to manage for a high level of performance in terms of continuous supply and low rates of NRW.

2.2.10 CONCLUSION

Given the coverage provided to water and sanitation in the Millennium Development Goals, and the ensuing conferences and declarations, it was a surprise to observe how little is actually being done within the US-AEP countries to try to meet the goals. US-AEP has, to this point, been only marginally involved in urban water supply through initiatives such as urban water harvesting in Mumbai and Kolkata.

One of the problems facing any action on urban water supply is that the measures required are not incremental; all of the problems outlined above will need to be resolved in concert in order to turn around a situation that is presently worsening. The problems to be resolved range from the adoption of

³⁷ ADB, Asian Water Supplies – Reaching the Urban Poor. ADB, Manila 2003.

policies and enactment of legislation to multi-million dollar engineering projects. None of these problems is beyond the ability of the Governments of the countries to resolve if there is political will.³⁸

The possibility of tackling the problem is demonstrated by Cambodia, where the Phnom Penh Water Supply Authority managed to take a utility that was as bad as any in Asia and, with the help of the international community, turn it around to make it a model for the region.³⁹ This has involved a corporatization of the utility; the employment of effective managers – particularly an efficient and inspired chief executive officer; a massive capacity building effort and re-engineering of the system.

2.3 Environmental Governance

The previous sections describe the development challenges that need to be solved in order to achieve desired levels of urban air quality, water and sanitation access, and water quality. While some of these development challenges can be met through increased investments in infrastructure or the implementation of technical solutions, effective and appropriate governance structures are prerequisites for desired change. Thus, whether the new regional US-AEP program addresses urban air and/or water, some of the program's resources will need to be focused on strengthening governance.

In 1960, none of the Asian countries included in this assessment had democratic governments. In 2004, many of these countries have elected governments and are reasonably stable from a political perspective. However, governance structures still lag far behind the more developed countries in Asia, Europe, and North America. Illustratively, 9 of the 12 countries covered by this report (the other three were not rated) ranked from 50 to 94 in the Economic Freedom Ratings in 2002.⁴⁰ Thus, development challenges in economic governance can be viewed as part of an overall political and economic pattern faced by Asian countries.

This section provides a synthesis of the key challenges in environmental governance facing Asian countries, with special emphasis placed on urban air and water. Most of these observations are based on the comments of individuals interviewed during consultations, supplemented by information from documents and secondary sources. Governance topics are divided into three parts:

- 1) **Enabling conditions** refer to laws, policies, rules, and regulations that define the roles and responsibilities of implementing authorities and the obligations imposed on individuals, and public and private facilities and institutions;
- 2) **Institutional capacity** refers to the human, physical, and financial resources of implementing agencies and stakeholder groups; and

³⁸ ... Or financial will. Bangkok, which lacks a functioning sewage system, has just spent \$2.75 billion constructing a subway system.

³⁹ Recounted in ADB, *Asian Water Supplies – Reaching the Urban Poor*. Manila, 2003 and discussed in meetings at the World Bank on July 14, 2004 with Luiz Claudio Tavares, Senior Water and Sanitation Engineer and Task Manager for Phnom Penh Water Supply; and meeting at the Asian Development Bank on August 3, 2004 with Bert van Ommen, Water Team Leader and Francisco Roble Jr., Water Knowledge Management Advisor.

⁴⁰ James Gwartney and Robert Lawson, *Economic Freedom of the World 2004 Annual Report*, The Frazier Institute, 2004.

- 3) **Public participation** relates to the involvement of civic society in the formulation and implementation of environmental enabling conditions.

2.3.1 ENABLING CONDITIONS

The key challenges in improving environmental enabling conditions include addressing legislative and regulatory gaps, expanding the level of strategic planning, and clarifying roles and responsibilities for environmental management, particularly between national and regional authorities and between government authorities and environmental service providers.

Legislative and regulatory gaps

All of the Asian countries in the assessment have enacted environmental legislation and promulgated regulations to implement these laws, modeled after similar regulations in the United States, Europe, or Japan. For ambient water and air standards, some Asian countries have adopted World Health Organization guidelines. European vehicle emission standards (e.g., EURO1, EURO2, etc.) have also been adopted by several Asian countries. However, a major gap in environmental regulations has been the implementation of emission and discharge standards for industrial facilities, a prerequisite for compliance monitoring, inspection, and enforcement. Even in countries with standards for large sources, emission and discharge standards have not been promulgated for small- and medium-sized enterprises. In Indonesia, there is no regulation on water quality at the point of delivery, resulting in a perverse set of incentives that lead water concessions in Jakarta to mix polluted canal water with raw water in order to meet contractual obligations for water supply.⁴¹

A related regulatory gap concerns the lack of provisions for redressing non-compliance with standards and other regulatory requirements. Administrative and criminal penalties and fines, when provided for in regulations, are often very small in comparison to the costs of complying with the standard. In some countries, such as India, environmental authorities cannot levy penalties and have only one legal option available to them – closing down the offending facility. In consultations with Indian industrial associations, it was noted that the government has utilized this option, even in cases where there were no viable options for addressing the violation.

With the exception of India, laws concerning public information, public participation in environmental decision making, and public access to the courts to file grievances against polluters or regulatory agencies are not well developed in the countries assessed. However, some countries are making a concerted effort to close these gaps.

Illustratively, in Thailand, a Public Participation Act has been drafted but proponents are currently stymied in efforts to press for enactment because of recent changes in the senior management of the Ministry of Environment and Natural Resources. Thailand has made progress in increasing awareness

⁴¹ See footnote to paragraph 2.2.5.

of environmental issues in the judiciary (US-AEP's Green Bench program), but still lacks legislation establishing standing to sue for NGOs or community groups.⁴²

Strategic Planning

In all the countries the assessment team visited, strategic planning was identified as a current weakness in the environmental arena, specifically for air quality and water. While air quality management plans are vital to identifying and implementing priority policies and actions, they have not been prepared in most countries, in part because there is insufficient data on ambient air quality and emission sources needed to analyze current problems and the potential benefits of proposed changes.

When strategic planning is undertaken, it is usually conducted on a sector-by-sector basis rather than in an integrated way. For example, air quality plans are not coordinated with transportation planning, energy policies, or industrial/economic plans. In water utilities, when they engage in strategic planning, the quantity and quality of the raw water supplied to the utility is an exogenous parameter, with the strategic planning focused on treatment and distribution of water services.

In Indonesia, there is little or no work going on to manage the total water resources of Indonesia even though deforestation, contaminated ground water, extensive agriculture use and expanding urban populations will make water supply scarce and adversely affect water quality. By 2010, Jakarta will face serious seasonal shortages of raw water.⁴³

However, in a number of countries, interviewees indicated the need for integrated water management to account for both competing demands for raw water and the quality of water. It was noted that river basin management efforts have been launched in several countries including the Philippines, Thailand, and Vietnam.

Roles and responsibilities for management

Most of the countries in the assessment have, to some extent, decentralized environmental management responsibilities to regional, state, provincial, or local authorities. In many cases, this decentralization has not been accompanied by devolution of financial authority or transfer of resources to adequately fund staff and execute these added responsibilities. In many cases, interviewees noted that national agencies have not anticipated or provided training for sub-national agencies. Fortunately, donors have assisted in building local capacity in many instances.

A related issue concerns the coordination of water tariffs, with water utilities expressing the view that they often are stymied to plan investments and recover costs because they have no control in the setting of tariffs. Water utilities have also encountered difficulties in providing potable water to the entire urban population because they lack the mandate or are prohibited from supplying residents in informal settlements because of land tenure policies. In the case of land tenure, the concern of government

⁴² Meeting with Mr. Pongdej Wanichkittikul, Office of the President of the Supreme Court of Thailand, July, 29, 2004.

⁴³ Meeting with PERPAMSI and BAPPENAS, Jakarta, August 9, 2004.

authorities is that access to water and sanitation will confer legal recognition to essentially illegal settlements, as mentioned in section 2.2.4. This, of course, directly restricts access to water and sanitation services for these communities. In the case of securing potable water, the poor will often spend considerably more on water than wealthier residents or invest considerable time in “harvesting” water. Estimates of the costs of water for the urban poor are 10 to 90 times the costs of water for other urban residents and annual expenditures are as much as one-third of income. In both India and Vietnam, it was noted that water vendors that reap large profits in providing water to informal settlements have lobbied government authorities to maintain access restrictions.⁴⁴

2.3.2 INSTITUTIONAL CAPACITY

In the consultations, limited institutional capacity in national and sub-national environmental agencies and water utilities was the most commonly identified governance issue impeding improved air and water quality and water and sanitation services. Three interrelated capacity issues were noted: lack of human and technical resources, limited skills of staff to carry out responsibilities, and the poor performance of institutions in terms of efficiency, transparency, and accountability.

Institutional Resources

All countries indicated that limited staff resources constrain their ability to carry out compliance monitoring and enforcement activities. Some illustrations from the consultations include the following:⁴⁵

- ◆ In Bangladesh, institutional capacity is one of the two most important issues facing the Department of Environment, particularly staff to carry out enforcement activities. GoB efforts to require non-motorized transport to use separate traffic lanes failed due to lack of enforcement.
- ◆ In India, the National Pollution Control Board has 200 employees only. The district offices have a total of 2,000 employees. They noted, however, that there are 3 million small businesses that largely are unregulated because the PCB lacks capacity to conduct inspections every 3-12 months, as mandated by the Air Pollution Control Act.
- ◆ In Bangkok, small- and medium-sized enterprises – which cannot afford environmental measures – wait until the inspectors go home at 4:00 p.m. to engage in polluting activities, including burning of solid and hazardous wastes and discharges of metal and pollutant-laden process water into the river and canals?

In addition to staff, resources such as monitoring equipment, laboratory chemicals and instruments, and vehicles are often in short supply. Even when donors provide equipment for these purposes, budget

⁴⁴ Meeting with Rick McGowan, Project Planning Specialist, Rural Water and Sanitation Infrastructure and Health Improvement on July 27, 2004, Hanoi.

⁴⁵ Meetings: Bangladesh, Mr. M. Reazuddin, Technical Director, Doe. July 22, 2004. India, Dr. V. Rajagopalan, Chairman CPCB, July 21, 2004. Thailand, Mr. Anthony Zola, Advisor, Mae Fah Luang foundation, July 29, 2004.

constraints often preclude proper maintenance and replacement of equipment components. In Chennai, air quality monitoring equipment is out of date and not always properly located to characterize urban air quality.⁴⁶ In Sri Lanka,⁴⁷ air quality management is stymied by the lack of air quality data, monitoring equipment, and staff funding (as well as deficiencies in the technical expertise of staff).

Staff skills and training

In most interviews with government agencies, a lack of technical skills was identified as the second most important capacity constraint. Most countries are trying to upgrade staff skills to international standards, seeking assistance from donor organizations in order to address this need. In all cases, training needs are greater in sub-regional agencies than in national agencies, the latter better positioned (and located) to receive training assistance from bilateral and multilateral donors and international financial institutions.

The list of skills that are needed includes technical, financial, and management skills including strategic planning and policy analysis, air and water quality monitoring and modeling, inspection and enforcement, operations and maintenance of water and wastewater systems, financial and investment planning and pollution control technologies.

Institutional performance

In the consultations, there was a strong consensus that institutional performance among government agencies needs to be significantly improved in order to meet the development challenges in urban air and water. Although weak performance is treated separately from resource and skill constraints, it is obviously a product of other deficiencies in capacity, as well as weaknesses in enabling conditions and public participation and awareness.

The challenges in improving institutional performance have been articulated in a variety of ways by interviewees. A lack of *transparency* was cited numerous times. Interviewees provided examples where information is not shared with the public, decisions are made in secret or are taken without considering public comments (when there is such a mechanism). In India, a leading NGO⁴⁸ observed that they were committed to a fuel testing program because if the State does the testing alone, no one ever sees the results, but an NGO can let the public know the results and pressure for changes in fuel quality regulations.

A second performance issue is *accountability*, which refers to the agency's obligation to protect the public and promote environmental goals in their mandate. One aspect of accountability is efficiency – the ability of the agency to utilize its resources to meet the stated goals of the agency. National and sub-national agencies were widely criticized by interviewees in terms of their ability to conduct air and water quality monitoring, provide continuous supplies of water, and carry out inspections and enforcement

⁴⁶ Meeting with CONCERT on July 19, 2004.

⁴⁷ Meeting with AirMac on July 22, 2004.

⁴⁸ CONCERT in Chennai.

activities. The second element of accountability is corruption, widely acknowledged as a pervasive problem. Inefficiency and corruption are illustrated in vehicle inspection and maintenance programs throughout the region:

- ◆ In the Philippines, private emission testing centers have come under scrutiny because vehicles are passing tests without being tested. In one case, 500 vehicles passed the test but only 25 were actually tested.⁴⁹ Operations at some of these centers have been suspended because of these problems.
- ◆ Random on-road testing of vehicles in Bangkok was viewed by one group of interviewees as an opportunity for local police to take bribes, as the costs of repairs were often significantly higher than the alternative.

2.3.3 PUBLIC PARTICIPATION

The public has an important role to play in environmental governance, but is often constrained in two significant ways in Asia. First, as noted earlier in Section 3.1, there is often a lack of legislation that provides access for the public to participate in environmental decision making. Probably the most impressive example of what can be accomplished when the public (NGOs) have access to the environmental decision making apparatus is the effective use of lawsuits in India to compel policy changes that require improved air quality.

Second, in order to participate effectively, the public needs to understand the environmental problems and solutions. In all countries, public awareness is weak and needs to be improved. In Bangladesh, it was suggested that the use of Environmental Score Cards to bring public attention to urban air and water quality could be effective.⁵⁰ In Indonesia, the Ministry of Environment staff indicated that they would like to have resources to carry out public awareness campaigns related to changes in vehicle emission standards and that their roadside inspections are the only mechanism they currently have for increasing awareness. In India, it was noted that air pollution issues were difficult for the politicians and public to understand and required a focused awareness campaign by NGOs to promote policy changes. In many instances, awareness is directly related to the lack of data available to the public. As “representatives” of the public, NGOs also need to upgrade their technical skills in order to participate more effectively in environmental decision making and to better communicate information to the public. However, it was pointed out by all NGOs and many others during the consultations that NGOs are seriously constrained by limited funding that precludes hiring full-time staff and recruiting competent technical experts.

Many of the awareness and public participation issues are illustrated in the provision of urban water. There is seldom little or any public input, particularly from the people who suffer the most from the inadequacy of the service – the urban poor – in any of the US-AEP countries. What is also surprising is

⁴⁹ Meeting at the Manila Observatory of Ateneo de Manila, Quezon city, August 4, 2004

⁵⁰ Mamumul Khan, Natural Resource Management Specialist, USAID, meeting at the US Embassy, July 21, 2004.

that, when compared to the large and visible lobby for control of vehicle emissions, there is little public for the provision of clean water.

2.3.4 CONCLUSIONS

Improved governance is not merely desirable if changes are to be brought about in air quality and water and sanitation, it is a precondition. There will need to be institutions in place that are capable of planning, implementing and managing programs; they will need to be transparent, committed and effective; they will need to be responsive to public need and encourage public participation. They will, in short, be everything that the civil service, in the US-AEP counties, currently, is not. The present model is broken. Whether it can be fixed is doubtful; the answer is almost certainly to replace it with autonomous agencies that are outside of civil service norms and are held to a higher standard of accountability, effectiveness and integrity. Phnom Penh achieved this in reforming its Water Authority. It is a model that needs to be emulated.

3 OVERVIEW OF ASSISTANCE PROGRAMS

All of the Asian development challenges described in the previous section are being addressed to some degree by US-AEP, multilateral donors and development banks, other bilateral donors, and by multi-donor initiatives. This section presents a brief description of three groups of assistance programs: US-AEP, multilateral donors and development banks and regional initiatives on urban air, water, and urban environment. Other bilateral donor assistance programs also play an important role in addressing Asian environmental problems but are not discussed in this section, except to note their role in regional initiatives.

3.1 US-AEP Program

The US-AEP Program consists of six country programs and regional activities involving multiple countries. In 2004, the program activities, as described in the Regional and Country Work Plans, involved urban air, water, and governance as well as solid waste, hazardous waste, energy efficiency, and eco-housing. Table 3-1 provides a summary of US-AEP activities for water, urban air, and environmental governance. For each program topic, the table indicates the countries in which these topics are the focus of activities, the types of activities undertaken by US-AEP partners and the principal beneficiaries of the assistance.

Table 3-1: US-AEP Activities in Water, Air, and Governance

Program Topic	Countries ¹	Assistance Activities ²	Beneficiaries ³
WATER:			
▪ Strengthening of SEAWUN	ID VN PH TH	CB TR	LG
▪ Consensus building and community participation in the Mekong	TH VN	CB TR	RC NG
▪ Safe drinking water treatment technologies	IN	EW PP	LG CS
▪ River/lake restoration	IN	EW PP TT	LG CS
▪ Rainwater harvesting	IN	BP TR PP	CS
▪ Decentralized wastewater treatment and wastewater recycle and reuse	IN	EW PP TT	LG
▪ Local government responsibilities for quality control in water supply	ID	TR	LG
▪ Improved energy efficiency in water management (Watergy)	IN PH	EW PP	LG
▪ Clean Water Act implementation support	PH	EW LP	NG LG CS
▪ Community-based environmental management of river basins	PH TH VN	BP EW	LG CS

Program Topic	Countries ¹	Assistance Activities ²	Beneficiaries ³
▪ Oil spill contingency planning in Saigon River	VN	CB EW TR	NG PS
▪ Fundraising strategy for organizational sustainability of the Mactan Channel Council	PH	OF	LG CS PS
▪ Local initiatives for affordable wastewater treatment	PH	EW PP TT	LG
URBAN AIR:			
▪ Support to the Clean Air Initiative for Asian Cities	All	EW TR	NG LG
▪ Air quality control strategies	IN, ID	CB EW PP	LG
▪ Delhi vehicle inspection maintenance pilot	IN	PP TT	LG
▪ Clean fuels for vehicles	IN ID VN	EW PP TT	NG LG
▪ Clean vehicles (engines, emission standards, inspection and maintenance)	IN PH SL TH VN	CB EW LP PP	NG LG
▪ Public awareness of health effects of air pollution	ID PH SL	PA	LG CS
▪ Environmental Governance:			
▪ Regional Environmental Enforcement and Compliance Forum	All	CB, EW, LP	NG
▪ Strengthening of compliance and enforcement	IN PH	CB EW TR	NG LG
▪ Voluntary compliance programs	IN PH VN	EW TR	NG LG PS CS
▪ Civil society participation in environmental decision making	IN	EW LP PA	CS LG
▪ Strengthening of urban environmental management	IN SL TH	CB EW TR	LG
▪ Improved environmental dispute resolution	TH	CB EW TR	NG LG
▪ Strengthening of court policies, practices, and institutions	TH	EW	NG
▪ Support for Public Consultation Act	TH	EW LP	CS

¹ Countries are as follows: IN – India, ID – Indonesia, PH – Philippines, SL – Sri Lanka, TH – Thailand, VN – Vietnam

² Assistance activities are as follows: BP – best practices, CB – capacity building, EW – exchanges and workshops, LP – legal/policy development and analysis, PA – Public awareness and education, PP – pilot projects and demonstrations, OF – organizational financing, TT – technology transfer, TR – training

³ Beneficiaries include the following: NG – national government, LG – local government, CS – civil society, NGO – non-governmental organizations, PS – private sector companies and associations, RC – regional committee/commission

Since its inception, the salient and sustained feature of the US-AEP program has been partnerships. The partners have included institutions in the US and US-AEP countries including national, regional, and local government agencies, research and educational institutions, NGOs and private sector associations, and private companies, as well as international organizations and donors. In the majority of US-AEP partnerships, the partners can be designated as the *assistance* partner(s) and the *beneficiary(ies)*, although in some instances, the relationship has involved more of a mutual sharing of expertise and/or information, particularly when the partners are from Asian countries.

3.1.1 US PARTNERS

In all cases, US partners under US-AEP have provided assistance to Asian partners. One group of partners includes the so-called US-AEP Partners, which are contractually linked to the program. This group has included the private contractors involved in providing technical assistance and staff involved in the management and coordination of US-AEP activities in the six country programs, organizations supporting US-AEP through cooperative agreements, plus USEPA, which cooperates with US-AEP through an interagency agreement.

Through the cooperative agreements, US-AEP has been able to access university staff, state and local government experts, and NGOs, and arrange study tours, exchanges, workshops, and technical assistance not covered by the private contractors. In addition, USEPA has provided access to headquarters and regional staff as well as its affiliated centers (e.g., the EPA Center for Conflict Prevention and Resolution). Private sector companies have participated in US-AEP primarily as equipment vendors, demonstrating technologies and providing training assistance on the use of equipment.

Under the cooperative agreements and partnerships with private companies, US-AEP has been able to leverage resources of the partners. For government agencies, the leverage has been mainly in terms of in-kind contributions of staff time and salaries to participate in US-AEP activities. Private companies involved in trade promotion and transfer of technology have covered their time and expenses to host study tours and travel to Asia to install and demonstrate equipment.

In all consultations, Asian interviewees expressed a great deal of satisfaction with the assistance they received from US partners through US-AEP. In most countries, the comments were in reference to US government and NGO partners involved in sharing legal, policy, management, and institutional experience with their Asian partners. In India, US-AEP also was praised for arranging private sector partnerships focused on the transfer of environmental technologies.

3.1.2 INTERNATIONAL PARTNERS

US-AEP has also cooperated with international partners such as the World Bank, the Asian Development Bank, and with multi-donor initiatives in air and water. In most instances US-AEP has played a gap-filling role to complement an initiative or planned loan program, by providing resources for travel to meetings and workshops, or supporting training activities. In some cases, US-AEP has been involved from the outset of the collaboration, helping the international partner to design and implement the program (e.g., the new DIESEL Alliance).

In discussions with ADB, the World Bank, and the Mekong River Commission, interviewees acknowledged US-AEP's limited resources but were very appreciative of the ability of US-AEP to respond to gap financing needs and to help expand the participant base for regional programs and initiatives.

In reviewing US-AEP documents, the assessment team noted that the full value of the international partner's contribution was often presented as "leverage." As US-AEP develops its new strategy, it will be useful to examine partnerships with international organizations and initiatives to determine whether US-AEP participation is catalytic (in mobilizing additional assistance resources) or gap-filling.

3.1.3 ASIAN PARTNERS

In a given year, US-AEP has cooperated with hundreds of Asian partners, drawn from government, the private sector, NGOs and industry associations. The bulk of the Asian partners are beneficiaries of US-AEP assistance, participating in exchanges, study tours, conferences, and training workshops. Another group of Asian partners have worked side-by-side with US partners to carry out environmental assistance activities for other Asian partners within their respective country or, in some cases, in another Asian country. For example, the Laguna Lake Development Authority is both a recipient of assistance from US-AEP and cooperates with Thai partners⁵¹ on community-based environmental management at the river basin level.

3.1.4 CONCLUSION

As is clear from the table at the beginning of this section, US-AEP is already engaged in a significant volume of assistance in the areas of water, urban air, and governance. This experience provides an important base and set of lessons learned that will be important to consider in developing the new regional US-AEP program.

From its inception, US-AEP has been about partnering. This focus has been maintained at the core of the program, even as the program shifted from trade promotion to more demand-driven development assistance. Partnerships today are more diverse and involve a substantial number of local Asian partners, many of whom play an important role in delivering US-AEP assistance.

3.2 USAID and USEPA

In the area of environmental issues, two of the bilateral missions in the region (India and Indonesia) are working on water issues in their assistance programs and the Philippines mission is addressing vehicle emissions issues. In India, USAID's FIRE-D (Financial Institutions Reform and Expansion – Debt market component) is working to develop viable urban infrastructure finance systems and under IR 4.3, USAID-India will be working to improve management of urban water and sanitation systems, in many cases in cooperation with USAID/EGAT and other donors.

USAID in Indonesia is launching its Environmental Services Program, which includes a major component to improve and expand access to key environmental services, including water and sanitation. This new program is linked to the Presidential Initiative, *Water for the Poor*.

⁵¹ Ta Chin River Basin Coordinating Management Sub-committee.

The Office of Urban Programs in USAID/EGAT is implementing the Making Cities Work program and is also a participating member in the Cities Alliance. The water and energy programs in USAID/EGAT are also actively supporting assistance efforts related to integrated water resources management, water access, quality, and sanitation, and air quality.

USEPA cooperates directly with US-AEP in five of the six current program countries (not including Indonesia) but also is involved in activities in the region independently of US-AEP. Notably, the Integrated Environmental Strategies (IES) Program helps countries develop integrated strategies focusing on the reduction of GHG emissions and urban and transboundary/global air emissions in China, India, and the Philippines. USEPA also actively participates in Asian air networks and workshops, and is collaborating with WHO on a new, safe drinking water initiative.

3.3 Development Banks

The major development lenders for South and Southeast Asia are the two development banks: The World Bank and the Asian Development Bank. Annex 2 summarizes their current lending in projects that include urban air quality and water and sanitation.

Relatively few of the projects are specifically directed at urban air quality – just two World Bank projects, one in Bangladesh and one in Thailand. Urban water and sanitation is attracting more project funding, but this is dominated by funding to China, with more than half of all water and sanitation projects in that country. In part, this is a reflection of China’s size, but also of the priority that the Government of China is giving to water and sanitation compared to the relatively low priority being assigned by other Asian governments. It also reflects the fact that municipal government and the water authorities are creditworthy institutions in China. In most other Asian countries, this is not the case. The World Bank made a major loan for water and sanitation to Indonesia; the development banks only lend money in countries where it has passed through various parts of the national government before reaching the municipalities. If there were leakages as the money passed through government, then municipalities only received around 70% of the money lent – but were held liable for 100% of the loan.⁵² To date, there has been no repayment.

Until such time as the development banks find a modality that will enable them to lend to water authorities directly, and until such time as these water authorities become responsible, creditworthy institutions, the flow of funds into water and sanitation from the development banks is going to remain limited.

3.4 Multi-donor Regional Initiatives

Asian countries are receiving assistance through a variety of regional initiatives, alliances, and networks. In some cases the initiatives are global in scope with components tailored to individual geographical

⁵² Meeting with the World Bank Water and Sanitation Program, Jakarta, August 6, 2004.

regions, while some of these initiatives are specifically tailored to Asia. In most cases, the regional initiatives have been created and sustained financially and operationally through the collaborative efforts of donors (including USAID, JICA, AUSAID, and development agencies of Canada and European countries), UN programs, the WHO, and international financial institutions (mainly the World Bank and the Asian Development Bank), partnered with Asian governments. In some cases, NGOs and the private sector are participating in the regional initiatives. In this section, an overview is provided of regional initiatives on urban air and water as well as urban environment. The section concludes with a summary of the key findings on the role and value of these initiatives and potential gaps that might be filled by US-AEP.

3.4.1 URBAN AIR INITIATIVES

Clean Air Initiative for Asian Cities (CAI-Asia)

CAI-Asia was established by the World Bank, ADB, US-AEP and USEPA in February 2001 to “promote and demonstrate innovative ways to improve the air quality of Asian cities.” CAI-Asia strives to bring international partners together with stakeholders from government, the private sector and civil society in Asian countries and cities. In June 2004, the CAI-Asia Network included 114 institutions, including 28 cities, 19 national government agencies, 50 NGOs and academic institutions, 13 private sector companies, and 7 multi- and bi-lateral development agencies. The major activities carried out under CAI-Asia include:

- ◆ organizational strengthening of local networks in participating cities (currently 28 cities have joined CAI-Asia) to involve the private sector and civil society in addressing air quality problems;
- ◆ knowledge management featuring a CAI-Asia Website, <http://www.cleanairnet.org/caiasia>, the Listserv forum, and the implementation of an air quality management benchmarking task;
- ◆ capacity building mainly through the Clean Air Training Network (CATNET) and the World Bank Institute’s Distance Learning Course;
- ◆ development of air quality policies and harmonization of standards;
- ◆ promotion of air quality management strategies; and
- ◆ CAI-Asia studies and pilot projects on topics such as CNG policy and regulatory framework, public health and air pollution in Asia, and assessment and recommendations for fuel additives testing protocol.

CAI-Asia also co-organizes the annual Better Air Quality (BAQ) workshop with ADB and has co-financed training programs with Environment Australia, and training and studies with CIDA, DFID, and other donors.

DIESEL Alliance

The DIESEL (Developing Integrated Emission Strategies for Existing Land Transport) Alliance was recently created to assist major Asian cities in reducing public health risks associated mainly with particulate matter emissions from diesel engines. The DIESEL Alliance has been created by USAID, US-AEP, USEPA, ADB, the World Bank and GTZ. Initially, DIESEL will focus efforts to design and implement appropriate policies and technologic solutions in the pilot area of Bangkok. Subsequently, it will replicate and expand the pilot approach to other urban areas through regional exchanges, presentations of workshops, and meetings of existing networks such as CAI-Asia. The impetus for the DIESEL Alliance was the Diesel Emission Reduction Program, a pilot study implemented under CAI-Asia.

Air Pollution in the Mega-cities of Asia (APMA)

APMA was initiated in November 2000 through the collaboration of UNEP, the World Health Organization, the Korean Environmental Institute, and the Stockholm Environment Institute to assist mega-cities in Asia in developing policies that address urban air pollution. Its primary thrust is to build the capacity of Asian governments and city authorities to prepare air quality management strategies and to establish an urban air pollution network in the Asian mega-cities.

APMA collaborated with CAI-Asia on the Air Quality Management benchmarking study of 22 Asian cities and has recently published the guidance document (also in collaboration with CAI-Asia) titled, *A Strategic Framework for Air Quality Management in Asia*. Sixteen Asian mega-cities are the focus of APMA, including five cities featured in US-AEP country programs: Kolkata, New Delhi, and Mumbai in India; Bangkok, Thailand; and Manila, Philippines.

Initiative on Environmentally Sustainable Transport (IEST)

This is a new initiative created by the United Nations Centre for Regional Development in collaboration with the Ministry of Environment-Government of Japan and other governments. IEST will promote the concept of environmentally sustainable transport (EST) in Asia and catalyze actions to formulate appropriate policy instruments, adopt cleaner and efficient technologies, mobilize research, and strengthen or enhance the information base, education, and public awareness. National EST strategies and action plans are currently being prepared for Vietnam, Laos, and Cambodia and will be presented at the EST Regional Forum meeting next year.

Partnership for Sustainable Urban Transport in Asia (PSUTA)

In June 2004, ADB and the World Resources Institute launched a new partnership to enhance the environmental sustainability of transport and mobility throughout Asia. This activity is funded by the Swedish International Development Cooperation Agency and is part of CAI-Asia's Business Plan. PSUTA will involve the review of existing experiences and capacities on sustainable transport in Asia and the preparation of three cases studies, the first two for Hanoi and Xian, China, and the third still to be determined.

Regional Air Quality Management for SASEC Countries

ADB is implementing the Regional Air Quality Management project in the four countries (Bangladesh, Bhutan, India, and Nepal) that comprise South Asian Sub-Regional Economic Cooperation (SASEC). The project is designed to set up local air quality networks, develop appropriate integrated air quality management systems for the SASEC countries, upgrade staff capacities in air quality monitoring, and formulate action plans for selected cities in the four countries. This a small initiative supported by \$400,000 from the Japan Special Fund. The project will be closely coordinated with the SASEC countries and CAI-Asia.

Integrated Environmental Strategies (IES) Program

IES is an international program conducted by USEPA in nine countries, including three countries covered by this report: China, India, and Philippines. The program is designed to help host countries prepare baseline air emissions inventories, identify and analyze measures to reduce air pollutants of concern, as well as greenhouse gases, and integrate the most promising measures into the country's planning process.

Cities for Climate Protection (CCP) Campaign

The CCP campaign was established in 1993 by the International Council for Local Environmental Initiatives (ICLEI) to help cities meet their air emission reduction goals for carbon dioxide, methane, and conventional air pollutants produced by combustion of fossil fuels (often from vehicles and stationary sources). More than 100 cities have participated in the CCP campaign, including four in Indonesia, seven in the Philippines, and two in Thailand. The campaign features software to assist cities to carry out energy and emissions inventories and forecasts, develop local action plans, and implement policies and measures to meet established emission targets.

Conclusion

The initiatives in urban air quality are having an impact. Virtually every country in Asia has passed legislation aimed at improving air quality and attempts are under way to follow up on these initiatives. There is still a long way to go, but the issue of air quality is in the public's consciousness and there are NGOs working very actively to bring pressure on governments to follow through. This effort has been most striking in Delhi, where an NGO brought government to the Supreme Court and had the court rule on a range of measures to improve the air quality in the capital.

3.4.2 WATER INITIATIVES

For air initiatives described in the previous section, there were several regional initiatives specifically oriented to Asia. Although a number of water initiatives are described in this section, few focus

exclusively on Asia.⁵³ In addition, even those water initiatives tailored to Asia do not currently enjoy the widespread participation of Asian countries, with the notable exception of ADB's Water Week workshop.

Water for Asian Cities (WAC)

WAC is an initiative of UN-Habitat and ADB, modeled after the Water for African Cities. The WAC has five major objectives: 1) strengthen governance in water and sanitation; 2) mobilize political will; 3) enhance human resources and institutional capacity; 4) Improve water, sanitation, and hygiene; and 5) promote pro-poor investments. UN-Habitat will provide \$10 million in grants, ADB will provide \$500 million for loans over the next five years, and the Netherlands will contribute \$2.8 million for capacity building activities.

Five cities – one from each of five UN sub-regions – were to be selected for demonstrations of pro-poor investments and development of city action plans. Illustrative criteria for selecting demonstration cities included: 1) an urgent need for improvement in service provisions for the poor; 2) climate and capacity for delivery; and 3) demonstrated commitment to change on the part of local authorities. In India, \$200 million in ADB loans has been earmarked for pro-poor water investments in and around the city of Indore, the largest city in the state of Madhya Pradesh.

Water for the Poor Initiative (WPI)

At the World Summit on Sustainable Development in August 2002, the US and Japan announced the Water for the People Initiative, a joint endeavor of the two countries to clean water, sanitation, and improved management of water resources. In March 2003, the US contribution to the US-Japan Water for the People Initiative was unveiled as the Water for the Poor Initiative of President George Bush. WPI represents a commitment of \$970 million over three years, with the goals of expanded access to clean water and sanitation, improved watershed management, and increased efficiency of water use in agriculture and industry. The WPI sets a goal of leveraging an additional \$1.6 billion for water-related activities globally.

The bulk of committed resources are to be managed by USAID missions, including several in Asia. Thus, the initiative is global in the sense that proposed interventions are distributed throughout the regions of the world, but it is largely a portfolio of bilaterally implemented activities in select countries, with a few notable exceptions. The investigation of arsenic in drinking water is to be conducted in South Asia and the development of effective management approaches will be conducted in coastal areas of Asia. While the WPI provides some financing for capacity building activities and research, most proposed interventions are designed to directly increase water access and quality.

⁵³ WHO hosted a meeting on September 27-28, 2004 to initiate the creation of a new Asian water initiative, tentatively titled the Asia Safe Water Initiative. During the start-up of this new initiative, WHO will provide the Secretariat with the first task, to set up a Website dedicated to the sharing of regional best practices. The anticipated coverage of the initiative will be broad in terms of type of water issues (e.g., arsenic in groundwater, access, and irrigation) and geographical scope (all of Asia, rural and urban).

Global Water Partnership (GWP)

The GWP is one of the oldest water initiatives, established in 1996 by the World Bank, UNDP, and the Swedish International Development Agency. GWP is both a global partnership and a network of regional partnerships, including one in South Asia (Bangladesh, Bhutan, India, Nepal, Pakistan, and Sri Lanka) and another in Southeast Asia (Cambodia, Indonesia, Laos, Malaysia, Philippines, and Thailand).

The goals of the GWP are: 1) to establish the principles of sustainable management of water resources; 2) identify gaps and encourage countries to address critical management needs; and 3) support actions at the local, national, and river basin level. At the regional level, GWP features water forums which focus on key themes such as meeting the Millennium Development Goals or integrated water resources management. In South Asia, GWP countries have formulated South Asia Water Vision 2025 and a Framework for Action for a range of water topics.

Southeast Asia Water Utilities Network (SEAWUN)

SEAWUN is a regional network of water and sanitation utilities established in 2002. SEAWUN is comprised of 13 water utilities in Indonesia, Philippines, Malaysia, Thailand and Vietnam and 4 national water associations in all of these countries except Thailand. SEAWUN strives to help its members improve service delivery, attain operational and management efficiency, achieve financial viability and advocate for water sector reforms and improved water policies.

SEAWUN receives financial support from ADB and other donors, including DANIDA (funding for the SEAWUN 2004 Convention) and US-AEP (training programs and operator certification programs). In 2004, SEAWUN is trying to expand its base and has targeted 40 utilities and associations as potential members.

ADB Water Week

ADB Water Week is not an initiative in the sense of established day-to-day activities, but a platform for stimulating knowledge development in the water sector, particularly focused on addressing the water needs of the poor. Water Week is organized by ADB's Water Sector Committee, which includes representatives from ADB's five regional departments, the Private Sector Operations Department and the Regional and Sustainable Development Department. The first Water Week was held in 2002 and the second Water Week was convened in 2004. These conferences have been organized around a theme – in 2004, the theme was “Water for the Poor – Setting the Rules and Finding the Money.”

Safe Drinking Water Alliance (SDWA)

The SDWA is a public-private collaboration announced in April 2004 at the UN Commission on Sustainable Development meeting. It is a limited-term partnership between USAID, Johns Hopkins University, CARE, Population Services International (PSI), and Proctor & Gamble. The goal of SDWA is to reduce the incidence of illness and disease related to unsafe drinking water. The Alliance will demonstrate low cost solutions to unsafe drinking water in Pakistan, Haiti, and another country to be

selected. The technology demonstrations will be complemented by a communications strategy and guidance to better manage water-borne disease outbreaks.

Network of Asian River Basin Organizations (NARBO)

NARBO was established in 2003 by the Japan Water Agency, ADB, and the ADB Institute to promote the exchange of information and experience among river basin organizations, strengthen their capacity for IWRM, and improve water governance. NARBO's members include 12 river basin organizations from 8 Asian countries, governmental organizations from 9 countries and 12 regional knowledge partners such as GWP for South and Southeast Asia, research institutes and universities.

NARBO's activities are expected to include the following: 1) advocacy and improved awareness of IWRM; 2) sharing of good practices and lessons learned; 3) support for members in governance, enabling policy, and formulation of action plans; 4) capacity building through exchanges, training, and technical advice; and 5) fostering regional cooperation on water management in transboundary river basins.

ASEAN Working Group on Water Resources Management

The ASEAN Working Group on Water Resources Management was created in response to the GWP Southeast Asia Partnership's request to place water resources high on the ASEAN agenda. The Working Group is focusing its activities on a survey and data collection effort funded by Australia and the development of an "ASEAN Strategic Plan of Action on Water Resources Management."

Gender and Water Alliance

The Gender and Water Alliance is a network of 300 organizations and individuals throughout the world, associated with the GWP, and funded by governments in the Netherlands and United Kingdom. Its major functions include information and knowledge sharing through its Website, electronic conferencing, and capacity building and pilot programs.

Conclusions

There are as many initiatives in urban water supply as there are in urban air but, by contrast, urban water seems to have achieved little progress or even public awareness. Given the magnitude of the problems caused by lack of access to a supply of clean drinking water, and the high social and financial costs that procuring water imposes on the urban poor, this is surprising. The difference might be that, while CAI-Asia has become an effective advocacy institution to promote air initiatives, there is no such advocacy institution for water.

In addition, successful air initiatives have been technological initiatives at the Central Government level, such as the removal of lead from gasoline. When initiatives have had to involve management and capacity at any lower level – vehicle inspection and maintenance, for example – there has been failure. Urban drinking water mostly involves a level below national government and requires a great deal of management and capacity.

3.4.3 URBAN INITIATIVES

Cities Alliance

The Cities Alliance was established in 1999 to combine the resources of development partners with cities throughout the world to improve living conditions of the urban poor. The Alliance's development partners include the World Bank and ADB, UN-Habitat, and donor organizations from the United States, Canada, Japan, and seven European countries.

The two key areas of focus for the Cities Alliance are the design and implementation of city development strategies (CDS) and support for actions to upgrade city-wide and nation-wide slums. A centerpiece of the Alliance's efforts, bridging the two key areas, is the *Cities Without Slums* Action Plan developed in 1999 and endorsed during the September 2000, UN Millennium Summit. The Cities Alliance has been active in Asia, assisting with the preparation of CDS in China, the Philippines, and Pakistan, and with slum upgrading projects in the Philippines, Thailand, and Vietnam.

ASEAN Working Group on Environmentally Sustainable Cities (ESC)

The concept for the ESC program was proposed by Singapore and endorsed by ASEAN members in 2003. A framework for ESC was drafted and approved in December 2003 calling for the ESC program to build on the ASEAN Vision 2020 and ASEAN Hanoi Plan of Action. The initial focus of the ESC program will be on clean air (stationary and mobile sources of air pollution), clean water (reduced pollution in surface and ground water to allow treatment for potable use), and clean land (improved waste management, waste minimization and recycling, and development and safeguarding of green areas in cities).

ASEAN has asked its members to select one or more cities to participate in ESC and 19 cities have already been selected. These cities will be invited to participate in a workshop planned for Singapore and will be the focus of demonstrations and a source of case studies. The working group will work with ASEAN member countries, ESC cities, partner countries (China, Japan, and South Korea), and international donor and financial organizations.

Kitakyushu Initiative Network for a Clean Environment

Kitakyushu is a city in Japan that has successfully addressed severe pollution problems. City leaders proposed an initiative in 2000 at the Ministerial Conference on Environment and Development in Asia and the Pacific to provide a mechanism for sharing the city's experience with other cities in the Asian and Pacific region. With support from the Japanese government, UNESCAP (UN Economic and Social Commission for Asia and the Pacific), and the City of Kitakyushu, the initiative was launched in 2001. As of June 2004, 60 cities from 18 countries had joined the Initiative.

The initiative's goal is to assist cities in the region to address environmental quality and human health concerns through local initiatives to control urban air and water pollution, minimize waste, and alleviate other urban environmental problems. Cities like Kitakyushu that have been successful in addressing

environmental problems share ideas and experiences with other cities through various information transfer mechanisms, including an annual meeting. Cities may also request technical assistance from UNESCAP and from Japanese donor agencies to develop policies and standards for air, water, and waste, and for activities such as capacity building, awareness raising, and fostering stakeholder participation.

Conclusions

The Cities Alliance is the oldest, most funded, and most active of the three urban initiatives. The ASEAN Working Group has the potential to involve a large number of cities and includes many which are facing a litany of urban environmental problems, as well as some of the region's success stories, such as Singapore. While all three initiatives might conceivably focus on air quality issues, the Cities Alliance focuses mainly on the problems of the urban poor with shelter, water, and sanitation as the main priorities. Most of the participating cities in the ASEAN Working Group are small- and medium-sized cities and are more likely to work on water and waste issues than air. The Kitakyushu Initiative has a broad base of cities, including several in East Asia, and could be a source of lessons learned for South and Southeast Asian cities.

4 CONCLUSIONS

This strategic assessment has been conducted in the context of an approved concept paper for the new US-AEP regional program and in response to the guidance and direction provided in the Final Parameters Cable. We affirm that the proposed program content responds to the most important urban development challenges in Asia. The assessment team examined water and governance in terms of the broad parameters specified in the concept paper, but evaluated urban air in narrower terms, based on instructions to disregard “roads not taken” (solid waste management, hazardous waste, and energy).

After more than 100 consultations and the review of an enormous volume of material, IRG examined urban water and air issues from three areas of focus – economic growth, health, and impact on low income groups – to better determine the relative importance of addressing these in terms of the division of program resources. The findings of this report confirm the value of focusing the US-AEP program on urban water and air, with governance as a crosscutting issue. However, we believe there is a compelling case for focusing more program resources on urban water than air when these program areas are evaluated in terms of the three perspectives mentioned above. Our findings in support of this conclusion can be summarized as follows.

For water:

- ◆ Unsafe drinking water and sanitation contribute to high rates of morbidity and mortality, particularly among children five years old and younger.
- ◆ Asian cities are plagued by high incidences of diarrheal illnesses and episodic outbreaks of water-related diseases, such as cholera.
- ◆ The lack of access to safe sources of drinking water has direct and significant economic impacts on the urban poor, as they often pay appreciably more in absolute terms for water and/or invest time to “harvest” water at wells and public standpipes.
- ◆ Poor water quality and availability can be a significant constraint on economic growth, discouraging large companies from locating in urban areas with poor water services, and limiting the growth of small and medium enterprises.
- ◆ Given that gathering water for families is a very time consuming job, usually assigned to women, it presents a barrier that precludes women from seeking more productive employment and young girls from attending school.

For air:

- ◆ Urban air pollution is a significant source of health risk, resulting in respiratory illness and premature death, but ranks behind water in terms of mortality and morbidity impacts.

- ◆ All urban residents suffer economically because of health-related challenges caused by air pollution, including wages lost due to respiratory illness and higher medical costs, but poor air quality does not have the same effect of discouraging economic growth.
- ◆ The overall health burden of air pollution is greater for the poor because of longer daily outdoor exposure to air pollution, the poor population's proximity to roadways and industry, inadequate ventilation of their sub-standard housing, and reliance on biomass fuels for cooking and heating. But the associated economic costs of air pollution do not fall more on the poor than on other income groups.

For water, there is also the likelihood that with continued urban growth, the problems will worsen. In addition, the team believes that water access has received substantially less donor attention than air, and US-AEP has an opportunity as a highly flexible and catalytic entity to elevate concerns and mobilize resources to solve water access problems.

In virtually all of the consultations, weak governance was noted as one of the major barriers to accessing clean water, urban air quality, and environmental quality in general. While Asian nations have made strides in enacting environmental legislation, there are still significant gaps to be addressed to strengthen public participation in environmental governance and to facilitate the implementation of investments in water access, and design of effective air quality programs. Even more challenging is the problem of how environmental governance relates to institutional capacity, particularly where management and enforcement responsibilities are devolved to poorly staffed and financed regional and local authorities. The team also noted the need to increase public awareness of environmental problems. Urban residents appear to be more keenly attuned to air pollution issues than to water access and quality. Improved public awareness can provide a catalyst for a greater role for civil society in decision making and prepare public groups to make better contributions, once they have secured a greater role.

What can US-AEP do to address these problems? Both urban problems pose major challenges and US-AEP must continue to draw on its strengths: facilitating partnerships, leveraging other donors' resources and capitalizing on its capacity to share experiences across the region. The US Consul General in Kolkata, India, likened US-AEP to a speedboat among supertankers because of the program's flexibility and maneuverability. As a regional program, US-AEP can look widely for partners in Asia, draw from its pool of US private and public sector partners, and work at the local level to achieve impact that can then be aggregated or even multiplied across the region. The focus on urban water and air also plays to regional sharing of experience because all Asian cities face the same set of challenges – legal structures and institutions may differ but they all strive to reduce the impacts of unsafe water and air.

As US-AEP looks to the future, it will need to cultivate strategic partners that bring resources and influence that can be leveraged, multiplied, and sustained. In the past, many of US-AEP's Asian partners were simply beneficiaries of program activities such as exchanges and workshops. Given the emerging model in Asia of development *cooperation* instead of development *assistance*, Asian partners will be called on more often to lead and implement US-AEP activities. US-AEP will work closely with governmental agencies and water utilities in Asia, and will need to expand its cooperation with NGOs and community groups in addressing water access issues.

US private and public sector partners will still be featured prominently in the US-AEP program to transfer technologies and expertise and participate in twinning arrangements to improve enabling conditions in water and air and build institutional capacity. In order to leverage resources, US-AEP also will need to cultivate more international partners and look for opportunities to work with USAID/Washington programs and the bilateral missions in the region, as well as other donors and multi-donor initiatives.

ANNEX 1: DEVELOPMENT CHALLENGES: COUNTRY-BY-COUNTRY ASSESSMENTS

Bangladesh

OVERVIEW

Bangladesh, with 133 million people settled on a land area about the size of Wisconsin, is one of the most densely populated countries in the world. Fully half the population lives below the poverty line, which makes Bangladesh one of the poorest countries in the world. It is a low-lying country formed by the deltaic plain at the confluence of three rivers: the Ganges, the Brahmaputra (Jamuna) and Meghna. It is cursed with more than its share of natural calamities including annual floods, cyclones, tornadoes, and tidal bores. With the surface water polluted by man and the groundwater polluted by naturally occurring arsenic, much of the country's plentiful water is not safe to drink.

Major impediments to growth in the country include inefficient state-owned enterprises, inadequate port facilities, insufficient power supplies, an unwillingness to exploit and export its abundant natural gas, and the slow implementation of necessary economic reforms. In addition, Bangladesh is rated by *Transparency International* as the most corrupt country on earth.

The country's NGO's are amongst the largest and most active in the world and tend to fill many of the roles that the State has difficulty playing. They are important players in education, health, micro-credit, and social mobilization, especially for the poorest people.

URBANIZATION

In 1995 Dhaka was a city of 8.5 million people. The UN estimates that by 2025 it will have a population of 19.49 million, making it the fastest growing city in South Asia. This is the result of both a 2% population growth rate and the inability of rural areas to absorb most of the resulting increase in labor. Dhaka cannot provide basic services for the bulk of its existing population and the prospects for addressing future growth are dim.

Other than Dhaka, the major cities are Chittagong with a current population of 2.8 million, Khulna with 1.8 million, and Rajshahi with 1 million.

PUBLIC HEALTH

The infant mortality rate at 64.32 deaths per 1,000 live births is high as is the maternal mortality rate of 350 per 10,000; both are a reflection of early marriage and child bearing, widespread malnutrition, and poor pre- and post-natal health care. Life expectancy is 61.75 years. All of the water borne disease

prevalent in Asia is endemic in Bangladesh—it is one of the 11 countries in the world where TB is endemic.

URBAN WATER & SANITATION

The Dhaka Water Supply and Sewerage Authority (DWSSA) is the sole authority responsible for the provision of water and sewerage in the Dhaka urban area. Since 1998 there has been a national policy for Safe Water Supply and Sanitation that promotes the provision to the urban poor at cost, mentions private sector participation in the sector, and aims to reduce non-revenue water (NRW). In spite of the policy, none of the above has been undertaken in Dhaka. With 11.6 staff per 1,000 connections, DWSSA is clearly overstaffed. Management is poor, technical capacity is low, and management-union tensions limit the Authority's flexibility.

Most of the water supply for Dhaka is from deep tube wells, which has resulted in the lowering of the groundwater table. The Authority has just commissioned a treatment plant with a capacity of 225,000 m³ a day, and is harnessing surface water from the Buri Ganga (River) and the Shitalakhya River. Both are subject to pollution from toxic discharges despite legislation to control this.⁵⁴

DWSSA claims service coverage of 72% of the urban population but this appears to exclude large parts of the periurban area. NGOs have established 126 locations at which they buy water from the authority and then sell it to slum dwellers. There are some 1,209 public taps in the city at which water is supplied free. More than 1.5 million people do not have access to DWSSA water; they meet their needs by forming joint undertakings and sinking tube wells or by purchasing water from small-scale water providers (SSWPs).

The DWSS supply in all areas is intermittent. This is due to mechanical failure, inadequate supply, and electricity load shedding. NRW is 40% and usage is 115 l/c/d. The water supplied by DWSSA is not of drinking water quality nor is there any authority that is mandated to monitor the water to ensure that it is of any set standard.

There is a simple tariff structure for water. Domestic usage is charged at \$0.079 and non-domestic at \$0.263. Use that is not metered is based upon property tax and, for the heaviest users this is the method of choice, ensuring that there is little incentive to conserve water.

Around 30% of the population of Dhaka is connected to the sewerage system. Some household use septic tanks, other dispose of wastewater through surface drains or into storm water sewers and water bodies. No pollution controls are enforced.⁵⁵

⁵⁴ Mr. Mamumul Khan, Natural Resource Management Specialist, USAID

Mr. Khan discussed the problem of contamination and management of open water areas and wetlands in Bangladesh. Institutional conflicts between ministries which manage different forms of land use have resulted in reduced fish productivity in these waters that poor people depend on for their food source.

⁵⁵ Univ. Bangladesh) Traditional septic tank-drain field systems do not work because they are often flooded. Inexpensive, but effective technologies are badly needed in Bangladesh. Dhaka, specifically, has an old and leaking sewage system

AIR QUALITY⁵⁶

The Ministry of Environment and Forestry have overall responsibility for air quality in Bangladesh. They are actively implementing the World Bank funded Air Quality Management Program aimed primarily at improving the air quality in Dhaka. The AQMP has been extended through 2005. In January 2006, the World Bank expects that government staff and all air monitoring activities will be funded by the GoB. There is much concern, however, that GoB may not meet this commitment, thereby terminating all air quality work in Bangladesh.

The Ministry has completed work on the adoption of new vehicle emission standards and an air quality index for Dhaka and forwarded it to the cabinet for adoption.

Until recently there was essentially no air quality management system in place to tackle pollution. The Government has now set up a regulatory and institutional framework to address urban air quality.

The addition of lead to petrol was terminated in 1999. Air quality has improved measurably in Dhaka as the result of this government effort to remove lead from petrol, together with the banning of 2-stroke three-wheel implementation of CNG as an alternative fuel.

To address particulate matter the government has had to deal with the 50,000 three-wheel taxis in Dhaka. In 2000, 427 mechanics were trained on proper repair and tuning to reduce emissions. In addition workshops were held for drivers and the adverse health affects of emissions explained. Government also worked with the Bangladesh Petroleum Corporation to set minimum standards for fuels and lubricants for 2 and 4-stroke engines.

Two-stroke, three-wheel vehicles were phased out with the last phase-out occurring in December 2000. The Government also imposed a 200% import duty on the vehicles. This was done in the face of strong opposition from the operators of the vehicles.

Old diesel trucks and buses remain a significant problem however. A further problem is the mix of motorized traffic and non-motorized rickshaws on Dhaka streets. This leads to traffic jams that contribute to vehicular air pollution. The other problem that has not yet been addressed is that of fuel adulteration which is universal in Bangladesh.

with only 20% of the population receiving properly treated drinking water. Three-fourths of the sewage goes into open water bodies in and around Dhaka. No other cities or towns in Bangladesh have sewage treatment facilities.

⁵⁶ Mr. Khan described the air quality issues in Dhaka and the importance of CNG fueled vehicles as replacements for the 2-stroke, 3-wheeled taxis that were banned by GoB in January 2001. He cited successes in CNG conversion of vehicle fleets and the current need to control diesel emissions from buses and trucks.

According to USAID's Khan, the most needed USAEP interventions are in the areas of:

- Brick kiln construction standards, fuel use and best management practices to save energy and reduce air pollution emissions
- Urban waste management
- Strengthened compliance and improved governance
- Use of Environmental Score Cards to bring public attention to urban air and water quality.
- CNG technology transfer to allow local people to learn from others in Asia

New programs to deal with gross polluters through roadside vehicle inspections are under way, but enforcement suffers from inadequate staffing and a general lack of resources.

Other than vehicles, the brick kilns surrounding Dhaka are significant sources of air pollution burning poor quality coal, wood, or waste oil.

CONCLUSIONS AND COMMENTS

Water and sanitation are the two huge issues that need to be addressed in Bangladesh. Efforts are being made by some NGO's in Dhaka and there are small success stories; but given the projected growth of Dhaka it will have to be addressed and dealt with at government level.

Bangladesh is a country where the donors can point to more failures than successes, but the ongoing Air Quality Management Program in Dhaka has had some successes in advancing air monitoring activities, program development, staff training, and real emission reductions. If GoB fails to fund these programs after completion of the AQMP, much of the progress made to date may be lost. It has made a visible difference to air quality in the city and pressing ahead with these measures should continue this improvement.

Cambodia

OVERVIEW

Cambodia is one of the smaller countries of Asia. It covers an area slightly smaller than Oklahoma and has a population of just over 13 million. The country suffers from a legacy of decades of war and internal strife which destroyed much of the economy and has left it with income levels that are lower than its most of its neighbors. Infrastructure, education, and health facilities all remain inadequate.

Although it is now in an era of relative peace, political infighting, an inadequate legal system, and an underlying feeling of instability have hindered private foreign investment. The two bright spots in the economy have been tourism and the garment industry which have helped to keep GNP growth at around 5% a year.

Cambodia is a constitutional monarchy with a constitution that provides for a multi-party democracy. The king is the head of state and the prime minister the head of government. There are seven deputy prime ministers, 40 ministers, 135 secretaries of state and 146 undersecretaries of state in the executive branch.

URBANIZATION

Cambodia is still a predominantly agricultural country with most of its population living in the rural areas. Phnom Penh, with around 1.5 million people, is the only urban area of any size.

PUBLIC HEALTH

Cambodia has a high infant mortality rate of 73.67 deaths per 1,000 live births. Life expectancy is also low for a Southeast Asian country at 58.41 years.

WATER & SANITATION

In 1996 the Government of Cambodia determined that the people of Phnom Penh should get clean drinking water and sanitation. On advice from the donor community it formed the Phnom Penh Water Supply Authority (PPWSA), a truly autonomous corporate body responsible for the provision of that supply.

The Phnom Penh Water Supply Authority is answerable to the Phnom Penh Municipal Government for its performance and, although not privatized, as an autonomous body, is not subject to civil service terms and conditions of service. This gives it the freedom to pay competitive salaries and demand performance from its staff.

Ek Sonn Chan, Director of PPWSA describes the situation in the first half of the 1990's as one where the authority was heavily subsidized by government. It had 500 staff that was on an average salary of \$20 a month. The staff was under-qualified, under-paid, and inefficient. Nepotism was widely practiced, and both discipline and morale were low. They were running a distribution system that covered 40% of the city area and served 20% of the population. Of the water supplied around 14% was paid for. The system was, in fact, amongst the worst of any Capital city in Asia.

In order to change this, and with the help of the development partners including the World Bank, ADB, France, and Japan, the entire organization was restructured. Higher management was given more direct responsibility; Members of the younger generation were promoted to higher levels while older managers were put into dormant roles. These younger managers were given training including some of them being sent overseas to obtain MBA's. Salaries up to 10 times higher and bonus payments were introduced, and the number of staff reduced.

The distribution network inherited by the new management team consisted of 280 kilometers of pipe that had been put in place by the French, the Chinese, and the Russian, all using different, and mutually incompatible standards. Illegal connections were the norm, and collection the exception. Politicians and bureaucrats generally did not pay water bills.

Change required strong political support which was forthcoming. The Prime Minister set the example by paying his water bill and other people of influence followed. Meters were installed, illegal connections attracted high fines, and the authority embarked upon a 24-hour leak repair and maintenance system. In 1996, with donor funding, PPWSA started to renew and rehabilitate its network; work that was completed by 2002. Treatment plants were also rehabilitated and constructed. A new 16 km transmission line has been built and 600 km of distribution line laid.

Today, PPWSA has 84% coverage with 24-hour supply. Revenue collection efficiency is 99% with all connections metered and a computerized billing system in place. NRW is 26% and the staff per 10,000 connections is 5.4. Consumption is 104 l/c/d. the tap water is safe to drink.

Coupled with all of the improvements to service were large increases in tariffs. Current tariffs are on a block basis with domestic rates starting at \$0.141 for the first 7 m³ a month rising to \$0.325. Non-residential tariffs run from \$0.243 to \$0.371 m³.

PPWSA takes its raw water from the Mekong and Bassac Rivers and from Tongle Sap.

Within Phnom Penh, the majority of households have access to flush toilets connected to septic systems or sewerage; all sewers are discharging, without treatment, into rivers and water bodies.

AIR QUALITY

Cambodia is one of the few countries in Asia that has done little or nothing to improve air quality in its urban areas. Arguably its problems are less than many other Asian countries with its largely rural environment and no mega-cities.

Where the country has taken action on the environment has been under the World Bank funded *National Environmental Action Plan*. This concentrated mainly on the rural and coastal areas with one urban component—solid waste management.

There are environmental regulations including fuel and emission standards but currently the Ministry of Environment has no ongoing initiatives dealing with urban air quality.

CONCLUSIONS AND COMMENTS

While nationally Cambodia suffers from a number of governance issues, it has taken a barely functioning water authority and made it into one of the best in the developing countries of Asia. This has been achieved through incorporating PPWSA, giving it real autonomy, clear government policy and support for such autonomy, and completely restructuring the management of the organization. This has led to massive improvements in service and coverage and allowed it to increase tariffs in order to cover costs. It should be noted that this was achieved without privatization of the authority.

China

OVERVIEW

China has a population of 1.3 billion. Its per capita GDP is \$1,090 with a growth rate of 9.1%. Since the late 1970s China has been moving from a centrally planned to a market economy. Its GDP has quadrupled in 25 years and its economy (in purchasing power parity) ranks second after the US. Foreign investment is strong. Petroleum imports are rising annually. Ten years ago China was the seventh largest importer of forest products. Now it is the second.

GOVERNANCE

The political system of China is under strict Communist control. However, collectivization has been abandoned in favor of village and household responsibility. Private organizations and individuals play increasingly important roles in the economy.

URBANIZATION

China has undergone a policy shift in favor of industrialization and mega-cities. 38% of China's population is now urban, up from 26% in 1990. Shanghai's, Beijing's, and Tianjin's populations are projected to reach 24, 19, and 16 million respectively by 2015. This rapid urbanization has resulted in 80 to 120 surplus workers from the rural areas migrating to the cities and surviving on part-time, low-paying jobs. Environmental pollution and insufficient housing are serious.

PUBLIC HEALTH

Infant mortality is 25 per 1,000 live births and life expectancy is 72 years. Respiratory and heart diseases due to air pollution are the leading causes of death.

URBAN WATER & SANITATION

Policy, governance and regulatory framework

The State Environmental Protection Administration (SEPA) was upgraded to a ministry-level agency in 1998. SEPA's is responsible for environmental management, pollution control, and environmental impact assessments of development plans and technological policies. Its functions related to water, sanitation and air pollution include:

- ◆ Formulating and enforcing guidelines, policies, laws, and regulations.
- ◆ Formulating national standards for environmental quality and for pollutant emissions.
- ◆ Coordinating efforts to deal with major environmental problems involving different agencies, regions, and provinces.
- ◆ Overseeing environmental monitoring and statistics.
- ◆ Legislation regarding water and sanitation includes:
 - Implementing Rules on the Law of PRC on the Prevention and Control of Water Pollution, 2000.
 - Interim Measures on the Administration of Key Water Pollutants Discharge Permit in Huai River Basin and Tai Lake Basin, 2001.
 - Circular on Urban Water Supply, Water Saving and Water Pollution Control by the State Council, 2000.

- Implementation of the Law of the PRC on the Water Pollution Prevention and Control, 2000.
- Regulations on Pollution Prevention of Yangtze River from Vessels Disposal and Coastal Solid Wastes, 1998.
- Regulations on the Inspection and Treatment Procedure of the Pollution Accidents in Fisheries Water Areas, 1997.
- Interim Regulations on the Prevention of Water Pollution in the Huai River Valley, 1995.
- Provisions for the Administration of the Prevention and Control of Pollution in Protected Areas for Drinking Water Sources, 1989.
- Supervision for the Sewage Treatment Facilities, 1998
- Interim Measures on the Administration of Water Pollutants Discharge Permit, 1998.

The Water Authorities

The water and sanitation authorities in China are the regional and municipal water supply companies. Chengdu Municipal Water Supply General Company with a staff of 1,691 supplies 917,562 m³ daily through 50,077 connections to 2,400,000 people. Shanghai Water Bureau with a staff of 17,000 supplies 4,946,904 m³ daily through 2,995,000 connections to 10,500,000 people. The capital expenditures per connection are \$170 and \$40 respectively.

Water sources

Water supply coverage is 82% in Chengdu and 100% in Shanghai. Urban dwellers not connected to the supply generally take drinking water directly from the rivers, 80% of the rivers flowing through cities are polluted.

The distribution system

Urban access to improved drinking water⁵⁷ dropped from 100% to 92% between 1990 and 2002. Whereas urban household connections rose from 80% to 91% during this period

Water quality

Drinking water in China is highly contaminated with human, animal, industrial, and agricultural wastes. Nearly 700 million Chinese drink water with fecal coliform contamination that exceeds the maximum permissible levels by 86% in rural areas and 28% in urban areas.

⁵⁷ Includes household connection, public standpipe, borehole, protected dug well, and rainwater collection: WHO and UNICEF, 2004

Tariffs

Chengdu and Shanghai have single tier domestic tariffs of just under \$0.13/m³. The surcharges for sewerage are 45% and 61% respectively.

Sanitation

Urban sanitation coverage rose from 64% in 1990 to 69% 2002⁵⁸. However, China's handful of wastewater treatment plants cannot keep pace with the increasing amounts of sewage. In 1995, Beijing had only one secondary sewage treatment plant and there were only 100 in the whole country. Only 5% of urban wastewater and 17% of industrial wastewater receives any treatment before entering the rivers and lakes. Chengdu has about 85% sewerage coverage, and Shanghai 67%.

AIR QUALITY

Policy, governance and regulatory framework

In the past ten years China has rapidly passed new environmental regulations. However, compliance is still low.

Legislation regarding air pollution includes:

- ◆ Law of the PRC on the Environmental Impact Assessment, 2002.
- ◆ Circular of Stopping Production, Sale and Use of the Leaded Gasoline Within a Time Limit by the General Office of the State Council, 2000.
- ◆ Technical Policies on the Prevention and Control of Pollution by Motor Vehicle Emissions, 1999.
- ◆ The First Catalogue of Eliminated Technologies & Equipment Causing Serious Air Pollution, 1997.
- ◆ Industrial Policy on Automobiles (excerpts of environment-related provisions), 1994.
- ◆ Regulations on the Administration of National Monitoring for Tailing Gas Exhaust Emission of Motor Vehicles (Tentative), 1991.
- ◆ Supervision for the Automobile Exhaust Pollution, 1990.

Regulatory

The concerned agency for air and water pollution is SEPA.

⁵⁸ Includes connection to public sewer, connection to septic system, pour-flush latrines, and ventilated improved pit latrines: WHO and UNICEF, 2004

Extent of air pollution and source

Seven of the ten most polluted cities in the world are in China⁵⁹. China itself considers that two thirds of the 338 cities, for which there are data, are moderately to severely polluted. Bituminous coal makes up 75% of China's primary energy sources, exposing the population to high levels of SO₂ and the carcinogen benzopyrene. Serious levels of CO come from vehicles in Beijing. Compared to developed countries China's vehicles emit 2.5 to 7.5 times more hydrocarbons, 2 to 7 times more NO_x, and 6 to 12 times more CO.

OVERALL CONCLUSIONS AND COMMENTS

China is well aware of her problems with urbanization and pollution, and second wave of urbanization may well include eco-cities. A May 2004 report on Suzhou states that this city of 2.2 million has attracted an estimated \$5.3 billion in foreign investment. It is one of 10 nationally designated "model environmental cities" and is "one that isn't inextricably linked to social and ecological devastation."

Tianjin, the sister city of Beijing, hopes to cash in on the 2008 Olympics and become the "Beijing-Tianjin Ecological Zone" by drastically improving its air and water quality. As part of its bid for the 2008 Olympics, China committed \$17.9 billion for infrastructure and environmental improvement. Tianjin's environmental protection bureau is embarking on six projects to improve the environment before 2008. The program includes:

- ◆ Expand domestic sewage treatment to 84% by building two additional treatment plants with total daily capacity of 890,000 m³.
- ◆ Continue to convert coal-burning facilities to natural gas and begin to convert public transport to run on LPG and CNG.
- ◆ Expand cogeneration of municipal steam heat from power plants.
- ◆ Increase the sulfur emission levy on factories and power plants so as to encourage them to invest in desulphurization technology.
- ◆ Reduce TSP pollution 10% and SO₂ by 20%. Attain national level II daily air quality standard 70% of the time by 2005.
- ◆ Strengthen automobile emissions inspection so as to effectively enforce national emissions standards. Improve the quality of automotive fuel.
- ◆ Implement a "total emissions control" system (i.e. cap total emissions) for power plants within the municipality.
- ◆ Increase sanitary treatment of municipal solid waste to 70% and of hazardous waste to 100%.

⁵⁹ WHO, 1998

- ◆ Increase urban green space to 30% and rural forest cover to 17.6%.

India

OVERVIEW

With a population of over 1 billion people and the 12th largest economy in the world, India is the dominant power in South Asia. Of that population, one third is aged below 15 years, presenting the need for a rapid growth of jobs in the coming years. India is still predominantly a rural society with 70% of the population living in rural villages and the remainder in 200 towns and cities.

More than 25% of India's population is poor, and many of these are illiterate. In contrast to this large number of illiterate poor, India boasts a dynamic and rapidly growing IT sector with revenue estimated at \$8 billion a year

India is the World's largest democracy with a President and a bicameral parliamentary system. Real national executive power lies with the council of ministers led by the Prime Minister. Like the United States, India has a federal form of government with 28 States and 7 Union Territories. Each State has a presidentially-appointed governor who can assume broad powers when directed by central government. This has been exercised by central government in the past.

URBANIZATION

India is still at a relatively early stage of urbanization with the rate of growth of urban conurbations certain to increase over the next two decades. India has three cities that presently qualify as mega-cities, all of which will attain populations greater than 15 million by 2025. One—Mumbai (formerly Bombay)—will be closer to 30 million. The other two—Delhi and Kolkata (formerly Calcutta)—will be around the 16 to 17 million mark. Unemployed rural labor and small farmers who will move to these cities in search of work will fuel much of this growth. These people will settle into the existing informal settlements, already under-provided with basic services.

PUBLIC HEALTH

Maternal mortality in India at 540 deaths per 10,000 live births gives the country the dubious distinction of accounting for 25% of the world's childbirth-related deaths. Malnutrition affects half of all children under the age of five, 34% of newborns are significantly underweight, and 60% of the female population is malnourished with anemia.

All water related diseases common in Asia are endemic in India with the incidence falling mainly on the poor.

WATER & SANITATION

Central government has limited responsibility for water supply with financing left to state governments and management to the municipal authorities. Decades of Gandhian socialism have left a legacy of dependency, with the widely held belief that “government will provide.” This has created a situation in which tariff increases are seen as politically risky for parties operating within the Indian democratic system. In fact, one of the perennial vote getters for politicians is the promise to roll back any fee increases, forgive debt, or even make a service free. While it is often argued that the poor cannot afford to pay for services, subsidies for water, electricity, and other basic services benefit the people who are connected to the service; this does not include the poor.

The water authorities in the major Indian cities are typically under-funded, overstaffed, open to corruption, and deficient in management ability. They are all essentially an extension of the local government service with salaries, job security, and terms and conditions of service that reflect this. There are, within all of the authorities, people of real technical ability but in the absence of any effective management they have limited ability to improve the system.

Given the political importance in generating jobs, many of the water boards are overstaffed. The Delhi Jal Board, for example, has 27,000 staff of whom 25,000 are unskilled. This represents 19.9 staff members per thousand connections.

Water quality in India is steadily degrading due to a combination of factors including saline intrusion, sewage effluent, industrial effluent, and urban and agricultural runoff. Problems of pathogenic agents in the water are particularly severe. Of the major cities, Chennai is suffering an acute shortage of raw water.

The priority for water use in India is: agriculture – urban drinking water – industry – commerce. In practical terms the existing priority has meant that vast sums of money have been poured into the provision of water for irrigation and much less for urban water supply, and that the direct competition for scarce water resources is frequently between irrigation for agriculture and water for the urban supply.

All of the major cities are served by systems which were largely constructed during the colonial era and which, through lack of maintenance, are in an advanced state of deterioration. Virtually no one in Delhi, Kolkata, or Chennai has a continuous supply but in Mumbai a large part of the services area receive water on an ongoing basis. Typically water utilities in India supply standpipes and taps in poorer areas and, when necessary, supplement this with tanker supplies.⁶⁰

⁶⁰ With water supply available for only for a few hours a day – or in some case - for a few hours every two or three days urban dwellers have developed coping strategies.

With a pump to draw the water out of the system quickly (and in doing so reducing water pressure elsewhere), and a tank to store the water in, the better-off can ensure a *de facto* 24/7 supply. If needs be they can also put in tube wells and pumps to supplement the municipal supply, buy water from tankers to top up the tanks, and purchase bottled drinking water. By such expenditures they ensure that there is, in fact, water available to them around the clock. However, the cost is well above what one would pay for a well managed, constant supply of municipal water.

For the poor, pumps and tanks are not options they can afford. In addition, the areas they live in are likely to be the worst affected by intermittent supply and low water pressures. In Delhi, for example, the standpipes on which many of

Water supply systems require operation at a constant pressure. Where there is intermittent water supply the constant pressure changes as water is pumped into the system, and then drawn down, causing a rapid deterioration to joints which then leak. This not only causes high water losses but also sucks pollutants into the pipes through the leaking joints. At best these pollutants are mud and soil, at worst sewage. The effect is that even if water is adequately treated at the plant, the water coming out of the tap is not potable.⁶¹

AIR QUALITY

The Central Pollution Control Board (CPCB) is responsible for the monitoring and regulation of air quality in India.

CPCB operate 290 stations covering 90 towns and cities in India. In general there is a correlation between city size and the degree of air pollution although Mumbai, which is on the Arabian Sea, has better levels than Delhi, which is inland. The four largest cities, Delhi, Mumbai, Kolkata, and Chennai all suffer with severe air pollution. The principal pollutant of concern is suspended particulate matter (SPM) and PM-10. The source contributions to SPM and PM-10 are poorly understood due to the inadequacy of emission inventory and source apportionment data. An issue somewhat unique to India, however, is coal-fired power plant fly ash associated with the burning of poor quality coal mined in India. Funeral pyres are another unique emission source.

Air quality planning for Delhi is virtually nonexistent with no data on sources or apportionment of source. In the mid 1990s, Euro 1 vehicle emission standards were adopted after vehicle fuel quality standards were adopted. Vehicle maintenance was not good, and the Pollution under Control (PUC) private facility testing program had problems of technical competence and corruption. Today, the PUC program still fails to be a credible, useful program.

Industry and vehicles both play their part in pollution the air in urban areas but studies in Pune also point to road dust as a major pollutant together with agricultural burning.

the poor depend, generally supply water for about four hours a day. With each standpipe supplying around 500 families, and pressure often low, filling of containers is a slow business; those who arrive in line late often find that they do not reach the water supply at all

The response to this is to get in line early and then spend a great deal of time in line waiting to collect water. With water in some areas likely to come on at night or early morning this is a real burden, a burden that is disproportionately borne by women and girls who are responsible for the water collection. In Chennai, where the problem is particularly acute, stories of women having to give up wage paying jobs in order to spend the day standing in line for water are common; equally common is the case of girls being denied schooling as they are needed to stand in the water line for hours each day.

⁶¹ Low domestic tariffs are the norm for all of the water utilities in India. These represent a subsidy for the better off. In Delhi, the poor, who rely on public taps or tinkered water, get 25-30 l/c/d while those in high income areas get 380-400 l/c/d. Delhi has a World Bank funded Pilot Project through the Water and Sanitation Program (WSP). The Delhi Jal Board has selected two pilot areas in the city to try to bring onto 24/7 water and at the same time increase the tariff. Both of these areas are affluent. If the pilot works the intention would be to try to move the whole city onto a 24/7 supply with a realistic tariff.

In 2000 a group of NGO's filed suite with the Indian Supreme Court that addressed the poor air quality in Delhi. The Supreme Court ruled that polluting industries should be relocated outside of the city and a series of fuel, lubricant, and vehicle technology measures designed to reduce pollution. The Supreme Court has, therefore, become the *de facto* regulator for urban air quality in India.

In Delhi the measures it has introduced have included the relocation of industry, conversion of the diesel bus fleet to CNG, the banning of the sale of loose lubricant for use in 2-strokes, the progressive lowering of sulfur and benzene in gasoline and sulfur in diesel, the elimination of lead in gasoline, and mandating Bharat Stage II emission standards (Euro stage 2) for vehicles by 2001. The measures adopted in Delhi will be followed by other large cities in India.

The Delhi model of using the Supreme Court to mandate and enforce clean air standards has worked in India, with its independent Judiciary, and has attracted attention throughout the region, but the key is the independence shown by the judges and their willingness to play a proactive role in cleaning up air quality. This may not be replicable in those Asian countries where the Judiciary is subservient to the Executive.

Indonesia

OVERVIEW

Indonesia is the world's largest archipelago and, by population, the world's fourth largest country after China, India, and the United States. Indonesia was badly hit by the 1997 Asian crisis and has lagged behind the rest of Asia in its recovery. It has 27% of its population living below the poverty level.

Indonesia is a Republic with a President elected by direct popular vote (from this year). The president is both head of government and chief of state. The Armed forces have traditionally been heavily involved in political and social affairs in the country and, although this involvement is less direct today than it was in the past, they are still influential. Indonesia is dealing with ongoing low level insurrections in the island of Aceh and in Irian Jaya. There have been significant acts of terrorism in Jakarta and in Bali.

Indonesia has recently decentralized, giving greatly increased responsibility to the 30 Provinces and local government. The consequences of this are unclear at present although it should be noted that in some areas, such as the provision of urban water supply, the responsibility has always been a local one.

URBANIZATION

Jakarta is a mega-city that will reach a population of around 14 million people by the year 2025. Currently only a third of the population is connected to piped water and, at less than 2% of the population, Jakarta suffers from the lowest rate of sewerage connections of any major city in Southeast Asia.

PUBLIC HEALTH

Indonesia has the highest incidence of typhoid in Asia and suffers repeated local epidemics of gastrointestinal infection; the first leading cause of death in the country is diarrhea, which impacts mainly

upon infants and small children. It also suffers from some of the world's worst air quality with the sixth leading cause of death being inflammation of the respiratory tract. In Jakarta this accounts for 12.6% of all mortality, and is responsible for nearly half of reported morbidity cases.

WATER & SANITATION

Decentralization of government in Indonesia has placed water supply under local authorities whose next level of government is the provincial government. Central government is, therefore, two stages removed from any responsibility for the provision of urban water. For the capital area there is a Jakarta Water Supply Company which serves as a regulatory body; environmental regulation is the responsibility of the Jakarta Environmental Protection agency, while health regulations regarding water are the responsibility of the Ministry of Health.

Since 1998 two private companies PT Pam Lyonnaise Jaya and PT Thames Pam Jaya have operated the Jakarta water supply under 25 year concession contracts. NRW averaged 29% of production in 2001, down from 58% when they took the concessions. Staff per 1,000 connections is 5.3.

Jakarta's water supply comes from the Jatiluhur Water Reservoir. Although there are 13 rivers flowing through the city of Jakarta none are suitable as a supply source. But it is reported that in order to eke out supply the concessionaires are mixing canal water with the raw water supply. This canal water is little better than diluted sewage.

The extraction of groundwater, mainly by industry, has lowered levels in Jakarta by between 1 and 2.6 meters a year which has caused subsidence and seawater intrusion. A 2001 survey showed that 90% of shallow wells in Jakarta are contaminated by fecal coliform

There is around 51% coverage through household connections and public taps. This is up from 43% coverage at the start of the concessions. The remainder of the population rely on water vendors, supply at private operators water points, and wells. Vendors are able to charge 50 to 90 times the price of the municipal supply. Average per capita consumption of people on the piped system is 90 l/c/d.

There are no mandated standards for drinking water and there is no one monitoring the quality of water supplied by the concession holders. It is certainly not fit to drink but it might be minimally acceptable for bathing in.⁶²

⁶² At present there is little public awareness of the water quality – sanitation issue. Only 39% of the population has access to clean water in Jakarta and there is no apparent legal obligation for the government to furnish clean water to the public, nor is there a law requiring that water be provided to the entire population. The government does not want to provide piped water to informal settlements since to do so would provide encouragement to the poor so water is widely sold from vendor water trucks at enormous profit. Ground water is acceptable for many purposes but not for drinking and is sometimes supplemented with “black”, highly polluted canal water.

There is little or no work going on to manage the total water resources of Indonesia even though deforestation, contaminated ground water, extensive agriculture use and expanding urban populations will make water supply – water quality a very important future issue. Further, the water distribution system in Jakarta is very leaky to the point that the entire water system needs to be re-engineered and rebuilt at a very high price yet there are no plans to do so. Professional, efficient management of the entire water resource system is needed in Indonesia which should reach crisis

Jakarta has a complex tariff structure that is set to subsidize the poor, but the poor are not connected to the system anyway. Tariffs for domestic water start at \$0.04 m³ rising to \$0.39 m³. Industry and commerce is charged at \$0.58 m³.

With virtually no houses connected to the sewerage system (which mainly serves modern high rise buildings) most people who have flush toilets rely on septic systems. Around half of the population of Jakarta, including most of the urban poor, relies on communal facilities and water courses.

The two concession holders are investing around \$24 million a year on sanitation which is insufficient to connect the present population or meet existing demand. The effort that will be required to meet the demands of a population of 15 million people is almost certainly beyond the ability of the present organization to meet.

AIR QUALITY

The responsibility for the regulation of air quality is confused following the dissolution of the Environmental Impact Control body (Badepal) by President Megawati Soekarnoputri in 2002 and the decentralization of government. In theory the Office of the State Minister for Environment assumes the duties but it has not been given law enforcement powers.

In the 1990's UNEPS ranked Jakarta as the third most polluted mega city in the world after Mexico and Bangkok. Bangkok reacted to this with a determined (and successful) effort to reduce air pollution; Jakarta reacted by moving its pollution monitoring equipment to less polluted areas.

The Clean air Program (CAP) announced in 1991 is an effort by Jakarta to increase public awareness of air pollution. Under CAP, random emission tests were conducted by the Regional Environmental Authority (BAPEDALDA) and City Police between 1991 and 2000. In addition voluntary testing was carried out and cars that failed the test were serviced and tuned.

There are ten air pollution monitoring stations in Jakarta of which five are operational. The quality of the data generated is uncertain and government does not release it to the public.⁶³

Not only is air pollution a severe environmental problem it also imposes a high cost on the economy—by some estimates \$400 million a year. Motor vehicles have been identified as the major source of the pollution but industry also plays a large role and forest fires, often resulting from large scale illegal logging, are also a factor imposing a burden not only on Indonesia but on its neighbors, particularly Singapore and Malaysia. Jakarta and Bali have phased out lead in gasoline but this is not yet

levels by 2010 in cities such as Jakarta. Government managers do not know what the public health risks are, what the economic consequences may be to the economy of the nation or what needs to be done to solve these problems.

⁶³ Air quality monitoring & air pollution index development. There are 5 new continuous air monitoring stations in Jakarta for a total of ten but several of the older stations are no longer in operation. Quality of the data and availability of the data is uncertain. Swisscontact would like to sponsor development and daily release of an air pollution index but has not yet been able to acquire the necessary air monitoring data. They are also working with Osaka University on a project to interpret and report emissions and air quality data.

Indonesia-wide. The problem is that Pertamina, the state owned oil company, lacks the funding to upgrade an additional refinery to increase its production of unleaded fuel.

Although the government estimates that about 70% of the air pollution (all pollutants) comes from transportation sources, only 50 vehicle inspection stations are active in Indonesia and most of these are infrequently operated, are not well organized, and no enforcement occurs. The national regulations on air quality adopted in 1993 have not been implemented and the decentralization of the environmental programs to the local level has resulted in a uniform lack of capacity.

Regulation and enforcement is weak. Vehicle emission testing depends upon the private sector and emission certificates are issued without testing. It has not yet proved possible to reduce or eliminate the number of 2-stroke engines on the road and the one attempt to run a bus line using CNG buses fell foul of a deal by which second hand diesel buses were purchased instead.⁶⁴

CONCLUSIONS AND COMMENTS

Indonesia has some of the worst air pollution in Asia; getting lead out of gasoline in Jakarta and Bali is one step towards addressing this problem but a great deal more needs to be done if a major impact on air quality is to be made. Like other Asian countries, enforcement programs are weak, technical capabilities are inadequate, and air quality management capabilities are inadequate.

On urban drinking water it is clear that Jakarta will need to do a great deal more to have any hope of meeting present, much less future, demand. On sanitation, there is limited effort being made to address the problem.

Nepal

OVERVIEW

Nepal has a population of about 25 million with 42% living below the poverty line. Its per capita GDP is \$242 with an annual growth rate of 2.6%. About 80% of the population depends on agriculture, which accounts for 40% of the GDP. An on-going Maoist insurgency became more intense in late 2001 resulting in a significant drop in tourism, which is a major source of foreign exchange. For various reasons exports of carpets, pashmina shawls, and textiles have dropped during the past few years. Remittances from abroad are increasingly more important to the economy. Perhaps as many as one million Nepalese work abroad in countries such as Japan, South Korea, Thailand, the Philippines, and the Middle East. In many rural areas seasonal work laboring in India is the norm. The major natural

⁶⁴ The CO ambient air standards are commonly exceeded in Jakarta but that PM-10 and ozone were the biggest problem. They estimate that about 60% of the PM emissions are transport-related. For all pollutants, about 70% of the emissions are from mobile sources. Links to transport planning are weak and fuel adulteration is a problem as kerosene is often added to gasoline to reduce operating costs. 2-stroke vehicles have until 2007 to meet Euro I standards.

resource of Nepal is hydropower, but only 600 MW of the estimated potential of 44,000 MW has been developed so far.

GOVERNANCE

Nepal is the only country in the world that is a Hindu constitutional monarchy. A parliamentary democracy came into effect in 1990. However, in October 2002 the King applied Article 127 of the Constitution, sacked the Prime Minister, and selected and appointed his own cabinet. Elections have been promised in the near future, but cannot be held until the security situation improves.

The ethnic composition of Nepal is diverse with 75 groups speaking 50 different languages. Men from the Brahmin and Chetri castes dominate government and business.

URBANIZATION

Only 15% of Nepal's population is urban. There is one metropolitan city (Katmandu), and four sub-metropolitan cities (Lalitpur, Pokhara, Birgunj, and Biratnagar). The sub-metropolitan cities have populations of about 100,000. Katmandu and Lalitpur form a single metropolis within the Katmandu valley and are rapidly expanding and merging with outlying towns such as Kirtipur and Timi. The Katmandu valley floor, covering 400 km² is perceived as being much safer than rural Nepal, and an estimated 300,000 people have fled to Katmandu and its environs in the past 3 years, thus swelling the valley's population to an estimated 1.5 million.

PUBLIC HEALTH

Infant mortality is high at 69 per 1,000 live births and life expectancy is 59 years. Nepal is one of the few countries in the world where the life expectancy of women is slightly lower than that of men. There are less than 4,500 registered doctors in the whole country. Health posts, even within the Katmandu valley, are under-equipped, and often have no staff other than a cleaner. Outbreaks of cholera and other water borne diseases are so common that they rarely make front page news in the national dailies. One hospital in Katmandu reported that 16.5% of all deaths were due to water-borne diseases. In 1998 11.6% of total outpatient visits were for respiratory diseases.

WATER & SANITATION

The legislation to control water pollution includes:

- ◆ The Water Resources Act (1992) and Regulations (1993)
- ◆ The Solid Waste Act (1987) and Regulations (1989)
- ◆ The Environment Protection Act (1997) and Regulations (1997)

The government's Tenth Plan (2002 – 2007) includes setting standards for water pollution and to ban the connection of drainage systems to rivers.

The Nepal Water Supply Corporation (NWSC), under the Ministry of Physical Planning and Works, is responsible for water supply and sanitation in 28 municipalities in Nepal. It is supported by the World Bank's Urban Water Supply and Sewerage Project.⁶⁵

NWSC uses 24 surface water sources around the valley rim and 37 tube wells for its water sources. Many people still use ancient stone spouts, fed from springs, for drinking water, as well as for bathing and washing clothes. However, the increasing exploitation of underground water by tube wells and shallow tube wells has led to the decrease of water in the stone spouts. Almost 30% of the groundwater withdrawn from the Katmandu valley is from private wells.

Urban access to improved drinking water⁶⁶ dropped slightly from 94% to 93% between 1990 and 2002, whereas urban household connections rose from 42% to 48% during this period. NWSC currently supplies 80 million liters per day to 225,000 households during the dry season and 120 liters per day during the rainy season. NWSC distributes through 7 supply systems. There are about 100,000 connections and 1,300 public taps. The estimated demand is 160 million liters per day. In most of the Katmandu Valley NWSC water supply is intermittent during the rainy season and often non-existent during the dry season. People, mainly women and children, must spend many hours waiting for their turn at public taps and government water tankers. Many institutions, industries, and hotels have their own tube wells which extract about 20 million liters per day. Hotels and houses with large underground tanks purchase water from tankers during the dry season.

A study by the Ministry of Health in 2004 found that 75% of the water supplied by NWSC was contaminated with coliform bacteria, iron, ammonia and other contaminants (UNEP 2001). Water from traditional stone spouts is also contaminated with nitrates and ammonia.

⁶⁷Urban sanitation coverage rose slightly from 62% in 1990 to 68% in 2002⁶⁸. There are 170 km of sewers. About 34,000 houses have sewer connections. In 2000 there were only four lagoon-type treatment plants with a combined capacity of 19 million liters per day. However, 95% of their capacity was not operating. In addition, farmers intercept sewage to run it onto their fields. In 2000 a new plant with capacity for 17.3 million liters per day was under construction. Domestic wastewater from the areas not covered by NWSC is discharged directly into rivers and streams.

⁶⁵ The new Melamchi Water Supply Project (MWSP) is an inter-basin water supply project which could be completed by 2010 and provide an additional 170 million liters of water per day to the Katmandu valley. It will cost 500 million dollars and is financed by ADB, NORAD, JBIC, SIDA, NDF, and OPEC.

⁶⁶ Includes household connection, public standpipe, borehole, protected dug well, and rainwater collection: WHO and UNICEF, 2004

⁶⁷ About 75% of NWSC connections are metered, but half the meters do not work. User charges covered only 84% of NWSC's operational expenses in 2000. Bill collection efficiency runs at 70%. Currently consumers with un-metered taps pay \$4.42 per month for water and sewerage services. Consumers with meters pay approximately \$0.13 per m³. The government is considering raising the tariff by 15%. The government is preparing to stop distributing free drinking water through the public water taps. MWSP will provide community stand pipes only in those areas where local consumers' groups take responsibility to pay the tariff regularly.

⁶⁸ Includes connection to public sewer, connection to septic system, pour-flush latrines, and ventilated improved pit latrines: WHO and UNICEF, 2004

AIR QUALITY

The legislation to control air pollution includes:

- ◆ The Industrial Enterprises Act (1992)
- ◆ The Vehicles and Transport Management Act (1993)
- ◆ The Nepal Petroleum Producers Act (1993)
- ◆ The Nepal Mines Act (1996)
- ◆ The Nepal Vehicle Mass Emission Standard (2000)
- ◆ The Nepal Ambient Air Quality Standard (NAAQS) (2003)
- ◆ The Environment Protection Act (1997) and Regulations (1997)

The government's Tenth Plan includes setting standards for air pollution and involving local bodies in environmental awareness campaigns. The municipalities will be the authorities to issue compliance certificates for vehicles.

The concerned agency for air quality is the Ministry of Population and Environment (MOPE). MOPE records the particulate matter (PM10) at six monitoring stations daily. The results are published weekly in the national press and post on MOPE's Website. In downtown Katmandu dry season values have reached 446, which are considered "hazardous" and well above the government's standard of 120.

During the dry season heavy smog hangs over the Katmandu valley. The main sources of air pollution are diesel and gasoline⁶⁹ vehicles, brick kilns, re-suspended road dust, kerosene cooking stoves, and refuse burning.

Fuel quality is monitored by the Nepal Oil Corporation. Three stations test vehicular emissions. Two are run by the traffic police and one by the Department of Transport Management. Most vehicles fail their tests but have a 3 month grace period to comply.

CONCLUSIONS AND COMMENTS

Nepal has made some progress in reducing mobile emissions; lead was removed from gasoline in 1999 and three wheeled 2-strokes were banned from the Katmandu valley from the same year. There are now nearly 1,000 electric or LPG vehicles in the Katmandu valley.

⁶⁹ Commercially sold gasoline is adulterated with kerosene.

Philippines

OVERVIEW

Over the past 50 years the country is no longer one of the richest countries in the region, as their economy has stagnated, and other countries have moved forward. This resulted in part from the perception of political instability and an economic policy that largely closed the country to foreign investment. The economy is now opening up but still looks uncompetitive compared with many of its neighbors. This resulted from the perception of political instability and an economic policy that largely closed the country to foreign investment. The economy is now opening up but still looks uncompetitive compared with many of its neighbors.

The country is a Republic with a representative democracy modeled on the American system. It has a presidential system of government with a bicameral legislature and an independent judiciary

URBANIZATION

With a high population growth rate of 2.36%, and an inability of the rural sector to generate jobs, urbanization will accelerate in the country with Manila being the urban area of choice for many of these rural-urban migrants. By 2015 Metro Manilas population will have reached 15 million, up from 10 million in the year 2000.

PUBLIC HEALTH

Over 40% of Filipinos live on less than \$2 a day. Infant mortality rates are 49 per 1,000 live births and maternal mortality runs at 60 per 100,000 births. Cholera is a problem and fecal coliform contamination of drinking water a major issue. Dengue fever is also endemic with some 23,000 cases year of which 10% are fatal.

WATER & SANITATION

Urban water and sanitation is the responsibility of local government. Central government has just (March 2004) passed a “Clean Water Act” for which the implementing rules and regulation are currently being drafted. One organization that is seen as a model of competent water resource management, professionalism, and community involvement is the Laguna Lake Development Authority (LLDA).

The Manila Metropolitan Water and Sewerage System (MWSS) was turned over to two private concessionaires in 1997. At the time it was widely hailed as the largest “privatization” of a water authority ever carried out. The service area was divided into two zones, the east zone is a consortium led by the Ayala Corporation that contains Bechtel and Mitsubishi; the west zone is a consortium led by Benpres Holdings.

The basis for economic regulation is the concession agreement between MWSS and the two private operators. There is no official government policy that is used as the basis for contract or regulation so, essentially, it is regulation by contract.

The privatization does not appear to have led to any great gains in efficiency with Non revenue water at a massive 62% although collections for the other 38% are at 97%. Staff per 1,000 connections is 4.4.⁷⁰

98% of the water supply for Metro Manila is from surface water sources, mainly the Angat and Umirat Rivers. Ground water in the Metro Manila has, in the past, been over pumped leading to contamination from saline intrusion. In general, in the Philippines, deforestation of catchments is leading to water supply problems.

Less than 60% of the population receive piped water; of these 88% receive water 24/7. Close to a quarter of the Manila population receive water from SSWPs at a cost per m³ of around 15 times that of the municipal supply. Around 5% of the population gets water from small scale private operators who operate their own deep tubewells and small distribution networks.

There is no effective monitoring or regulation of water quality.

In 2001 the average domestic tariff was \$0.12 m³ with the non-domestic tariff at \$0.16 m³. Throughout 2001 and 2002 the concessionaires sought tariff increases. At the end of 2002 tariffs were adjusted and now run from \$0.25 m³ to \$0.50 m³.

Only 7% of people in the service area have access to the sewer system. Most people rely on septic systems with effluent being discharged to storm drains. The concessionaires have, to date, made little or no investment in sanitation.

AIR QUALITY

The responsibility for clean air rests with the Department of Environment and Natural Resources (DENR) which exercises its mandate through the Air Management Board. An Air Quality Monitoring and Training Center was completed and opened this year and a technical secretariat to advise the Air Management Board will commence work in December 2004. There is testing of vehicle emissions through 400 private test centers, but most of them will issue a certificate without testing, on receipt of a payment.

⁷⁰ The twin benefits normally ascribed to privatization: greater investments and improved efficiency, if measured by piped service coverage and NRW, have not been realized in Manila. There are two probable reasons for this, the first being the lack of a clear government policy regarding urban water supply, particularly as it affects the poor. This lack of policy meant the signing of contracts that lacked clear and meaningful conditionality directed towards improving the coverage of the system. The second reason is that the business model assumed by donor agencies and government is that of the private sector investing heavily in improving the system – whereas, it is doubtful that the private sector is working with a model that involves major capital inflows from its own resources.

DENR has nine air quality monitoring stations operating in Metro Manila. The ADB had a large Air quality program in Manila which ran until 2003 but was, at best, only a limited success. Much of the equipment purchased under the program for monitoring etc. has not been used.

Burning of waste, 2-stroke and diesel emissions and pollution from industry located within the Metro area are all major contributors to air pollution; but it is vehicle emissions that are thought to be responsible for 70% (all pollutants, annual average) of the pollution within Manila. The 70% estimate is, however, known to be subject to question. Particulate (SPM and PM10) are the principal pollutants of concern.

Within the Philippines there is no active move to substitute CNG as a fuel for public transport although the idea has been mooted by some NGO's.

Lead was banned from gasoline three years ago. There are efforts underway to persuade 2-stroke taxis to convert to 4-stroke engines but costs are a problem heavily polluting diesel buses are also a problem. Buses are old and are fitted with imported rebuilt diesel engines which are heavily polluting. Fares are regulated, and are so low that operators have no money for preventive maintenance or replacement of the older buses.

Corruption and vested interests are the major impediment to cleaning up air in Manila. The vehicle emissions inspections are a waste of time because of corruption; attempts to deal with the problem of old, heavily polluting, diesel buses is stymied because the Philippine army owns many of the bus companies – and so it goes on. To many observers Philippines is on a slow downward spiral in virtually all areas, urban air quality is just one of these areas.

CONCLUSIONS AND COMMENTS

The Philippines does not lack capacity, it produces many competent technical people and managers, but a large number of them look overseas for opportunity. The Philippines problem is one of governance – this is reflected in every area, including that of addressing the urban environmental problems of air quality and the supply of clean drinking water and sanitation.

Pakistan

OVERVIEW

Pakistan has a population of 160 million. Its per capita GDP is \$520 with an annual growth rate of 5.4%. 33% live of the population lives below the poverty line.

GOVERNANCE

Pakistan is a Federal Republic. Pakistan's constitution is currently suspended, and is governed directly by the administration of the Chief Executive, President Pervez Musharraf.

URBANIZATION

34% of Pakistan's population is urban. The annual urbanization rate is 4.5%. There are 66 urban areas⁷¹ in Pakistan. The largest is Karachi with a population 11 million, followed by Lahore with 6 million.

PUBLIC HEALTH

Infant mortality is 74 per 1,000 live births and life expectancy is slightly less than 63 years. The source of most water-borne disease is human excreta. The National Conservation Strategy estimates that almost 40% of all deaths are related to water-borne diseases.

URBAN WATER & SANITATION

Policy, governance and regulatory framework

Federal and Provincial governments are responsible for the policy and legal framework. Under the current government, a devolution plan was instituted all over the country with a view to addressing municipal issues like water supply. The district and city councils have been allocated funds for municipal development, but there are serious questions about the structure and their ability to deliver.⁷²

The water authorities

At the federal level the concerned agency is WASA (Water and Sanitation Authority). The Karachi Water and Sewerage Board is a semi-autonomous government agency responsible for water and sanitation in Karachi.

Water sources

Karachi's water supply comes from the Indus River (93%) and the Hub River (7%). Groundwater accounts for less than 1% of the city's water supply.

The distribution system

Urban access to improved drinking water⁷³ in Pakistan stayed at 92% between 1990 and 2002, whereas urban household connections dropped from 61% to 50% during this period. The KWSB supplies 2,193,182 m³ daily through 1,283,200 connections to about 58% of a population of 11 million. Small scale vendors supply water to another 20% of Karachi's population.

⁷¹ Population of 100,000 and above.

⁷² Arif Pervaiz, IUCN, *in litt*.

⁷³ Includes household connection, public standpipe, borehole, protected dug well, and rainwater collection: WHO and UNICEF, 2004

Water quality

The ADB⁷⁴ reports that Karachi's ground water supply sources are relatively unpolluted and only require chlorination and filtration. On the other hand, WWF⁷⁵ paints a very different picture. Discharging untreated sewage and chemical wastes directly into rivers, lakes and drains is the norm. Most main sewers are made of 10ft cement sections linked without proper safety seals. Poor connections combined with deteriorating low quality sewer pipes result in leakage. The outflow from the sewers mixes with the water table and the contamination is carried to deeper levels. Hence the ground water which is considered safe becomes adulterated with everything from PCBs, lead, cyanides, mercury, solvents, hydrocarbon compounds, hospital and pharmaceutical industry waste. Water in Karachi is so contaminated that almost all residents boil it before consuming it. Because sewerage and water lines have been laid side by side in most parts of the city, leakage is the main cause of contamination.

Tariffs

Residential tariffs are \$12.93 per month for the first floor, with a surcharge of 50% for each additional story. The monthly tariff for apartments is \$18.75. Metered supplies per m³ are \$0.16 for residential and \$0.26 for industrial and commercial. The provincial government regulates tariffs.

Sanitation

Urban sanitation coverage in Pakistan rose slightly from 81% in 1990 to 92% in 2002⁷⁶. In Karachi 50% of the population is connected to sewers. About 30% of wastewater is treated; the remainder is discharged untreated into the sea through open drains.

AIR QUALITY

Policy, governance and regulatory framework

Since the promulgation of the Environment Protection Act 1998, and the National Conservation Strategy in 1992, the government has:

- ◆ Established motor vehicle emission standards and strengthened the Motor Vehicle Examination system in the country.
- ◆ Constituted Environmental Squads of traffic police at federal and provincial levels.
- ◆ Started setting up 15 tune-up stations for gasoline and diesel vehicles and establishing a revolving loan of \$3 million to encourage installation of additional tune up stations by the private sector.

⁷⁴ Water in Asian Cities, ADB, 2004

⁷⁵ Hania Aslam, WWF – Pakistan, *in litt.*

⁷⁶ Includes connection to public sewer, connection to septic system, pour-flush latrines, and ventilated improved pit latrines: WHO and UNICEF, 2004

- ◆ Set up an incentive scheme whereby about 150,000 gasoline vehicles have so far been converted to CNG.
- ◆ Begun a lead and sulfur phase out program for providing clean fuels.
- ◆ Started implementing of industrial emission standards.

REGULATORY AUTHORITIES

The Pakistan Environment Protection Agency (PEPA), under the Ministry of Environment, is the statutory body responsible for enforcement of EPA98. In 2002 the Pakistan Environmental Protection Council established the National Environmental Quality Standards (NEQS), which prescribes the maximum emission limits. A system of self-monitoring and reporting is being implemented for the industrial sector.

Air pollution monitoring

Up until now lack of funds and trained staff has prevented systematic monitoring of urban air pollution. The available information is based on “one-off” surveys using mobile units. The most recent was carried out by PEPA and JICA during 1999-2000 in Lahore, Rawalpindi, and Islamabad in 1999-2000.

Extent of air pollution and source

Pakistan’s carbon emissions in 1998 had risen to nearly 27 million tons. Most air pollution comes from industry (45%) and transportation (27%), while the remainder is from residential (22%) and commercial sources (6%). In urban areas buses, motorcycles, and motorized rickshaws are major sources of pollution. Domestically produced fuel has high sulfur content. Fuel and lubricants are adulterated and this compounds the problem. Industrial units within urban areas use high sulfur content diesel and furnace oil. Industrial and vehicular emissions combined with air blown dust from brick kilns and unpaved roads have resulted in winter smog occurring frequently in Lahore.

Enforcement

Environmental squads of the federal and provincial civilian police monitor vehicular emissions.

OVERALL CONCLUSIONS AND COMMENTS

The profile of Pakistan is similar to that of other countries in South Asia.

One success story is the Orangi Pilot Project⁷⁷. Established in 1980, it is the Pakistan’s most successful urban development program. Orangi is Karachi’s largest unplanned settlement and has a population of 1.2 million. The OPP is a research institution whose objective is to analyze outstanding problems of

⁷⁷ Source: Arif Pervaiz, IUCN, *in litt*.

Orangi, and then through action research and extension education, discover viable solutions. These solutions are then applied, with modifications where necessary, to other settlements and become part of state policies. The OPP does not fund development but, by providing social and technical guidance, it encourages the mobilization of local resources and the practice of co-operative action. Based on these principles, the OPP has evolved a number of programs:

- ◆ The Low Cost Sanitation Program is managed by the OPP-RTI. It enables low-income families to construct and maintain an underground sewage system with their own funds and under their own management. For this program, the OPP provides social and technical guidance (based on action research), tools and supervision of implementation.
- ◆ The Family Enterprise Economic Program is run by the Orangi Charitable Trust, which was formed in 1987. The OCT borrows from commercial banks and then lends to small family businesses but without red-tape and collateral. These loans vary between \$17.00 and \$1,290.00. The aim of these loans is to increase production and generate jobs.
- ◆ The OPP's Low Cost Housing Program provides loans and technical assistance (based on research) to building component manufacturing yards in Orangi so that they can mechanize their production, improve their products, train their staff and increase their production. In addition, the program trains masons in using the new technologies and components that are being developed at the manufacturing yard.

Sri Lanka

OVERVIEW

Sri Lanka has a population of just fewer than 20 million people with the one major area of urbanization being the greater Colombo area with a population of around 3.5 million. Its per capita income is higher than most other countries in South Asia at \$880 with an economy that is growing at around 5% p.a. Despite this growth rate, 25% of the population lives below the poverty line. The country is just coming out of 20 years of civil war which has dominated the attention of both government and donors and has done little to encourage private foreign investment. In spite of this, the economy has shifted from one where the economy was dominated by agriculture, particularly plantation crops, in the 1970's to one where today agriculture accounts for less than 20% of the economy with industry accounting for 25% and services 55%.

Sri Lanka is a republic with a strong democratic tradition. The President is both the chief of state and the head of government. The country is ethnically and culturally diverse with the two major ethnic groups being Sinhalese and Tamil with the Sinhalese forming the majority. For twenty years the Tamil, who have historically been settled largely in the North and East of the country, have fought for separatism. In 2002, with the Norwegian Government as facilitator, the two sides agreed to a cease fire and negotiations. The peace talks are continuing at this time.

URBANIZATION

The Southwest of the Country is the most densely urbanized area with Colombo as its core. Twenty years of unrest and the resulting insecurity have mitigated against other cities, such as Jaffna, developing. Virtually all commerce and industry is centered on Colombo as well as the country's major port. With an urban growth rate of 2.6% a year, the urban area is expanding but, so far, although Colombo has some very poor areas, it does not have the extensive slums seen in many South Asian cities.

PUBLIC HEALTH

Sri Lanka has always understood the importance of investing in human capital and that has given it public health indicators that are the best in South Asia with infant mortality rates at 17 deaths per 1,000 live births and a life expectancy of 73 years. Within the overall population, 55% have access to sanitation and 61% to safe drinking water.

WATER & SANITATION

The National Water Supply and Drainage Board (NWSDB) is the government corporation that manages Sri Lanka's water supply, drainage and sewerage. It is both the provider and the regulator.

Government has set goals of 85% of the population having access to safe and adequate drinking water by 2010 and 100% of the population having such access by 2025. On sanitation - the figures are 70% by 2010 and 100% by 2025.

The NWSDB is generally seen as one of the more competent water authorities in South Asia with a technical staff who are fairly well trained and technically competent. Management suffers from being part of the Government service. Overstaffing is a high, with a rate of 7.6 staff per 1,000 connections.

Government is encouraging the private sector to enter partnerships with government and in 2001 some pilot concessions were signed.

The greater Colombo area is supplied from the Labugama and Kalatuwawa impounding reservoirs and the Kelani Ganga (River). The sources are threatened by two problems, the first is the untreated industrial effluent flowing into the Kelani Ganga and the second is sand mining in the rivers, which is leading to salt intrusion. A scheme is under discussion to bring in water from the Kalu Ganga, South of Colombo. This would involve some major engineering and an inter-basin transfer.

Groundwater is not a major contributor to the urban water supply although there are some private drilled wells.

The Greater Colombo Area is reasonably well covered by the NWSDB system with around 66% of the population served with piped connections and 26% by standpipes. There are no SSWPs. NWSDB claims that around 60% of the people with piped connections get a 24 hour supply; users say that the figure is much lower than the 60% claimed.

Average domestic consumption is around 119 l/c/d. Non revenue water is high at 55%.

Water quality is adversely affected by deficiencies in the distribution system caused by the inability to run the system at pressure at all times coupled with inadequate maintenance. This leads to treated water being polluted within the distribution system

A five tier tariff system is run for domestic water starting at \$0.013 m³ up to 10 m³ a month, and rising to \$0.483 from 20 m³ a month. The non-domestic tariff runs from \$0.451 to \$1.503 m³. With non-domestic use consuming 20% of the water supplied, and paying close to three quarters of the annual revenue, there is a huge cross-subsidy of domestic water by the commercial and industrial sectors.

Within the greater Colombo area there are just 33,000 sewer connections. Most people rely on septic tanks which tend to overflow as desludging is rarely done.

AIR QUALITY

Colombo, with its location on the coast, has less of an air quality problem than many major Asian cities but it has little cause for complacency. Vehicular emissions have been identified as the major cause of poor air quality and the main efforts at present are directed towards the reduction of these emissions.

The responsible environmental authority for air quality in Sri Lanka is the Central Environmental Authority. The World Bank has just completed a capacity building project in the authority and this is presently continuing under funding from a grant from the Netherlands.

The implementing authority for the reduction in vehicle emissions is the Ministry of Transport. With 34 vehicles per 1,000 people Sri Lanka has the highest number of vehicles per head of population in Asia. The government has set targets for vehicular emission control in greater Colombo. These are Euro 2 standards by 2006, Euro 3 by 2010 and Euro 4 by 2015. These standards do not include diesel trucks and buses nor do they include 2-stroke engines.

The Ministry of Transport would like to see 2-stroke engines included in the emission regulations. Three wheeled taxis are ubiquitous in Colombo and are a major source of pollution, but the importer of these 2-stroke vehicles from India has sufficient political influence to keep them outside of regulation.

The monitoring of air pollution is the responsibility of the Air Resource Management Centre (AIRMAC). Their responsibilities include the production of technical analysis for air regulation as well as monitoring. The staffs at AIRMAC is technically competent and committed but are stretched very thin. Currently they maintain one permanent monitoring station in downtown Colombo and also have one mobile station. Current monitoring indicates that vehicular emissions are the primary cause of poor air quality in Colombo.

Vehicle testing has been made the responsibility of the private sector, with little provision for control or supervision by the Ministry of Transport.

CONCLUSIONS AND COMMENTS

Urban air and water problems are not as severe in Colombo as they are in many cities of South Asia. This is a function of the relative lack of informal settlement, the higher per capita income levels, and past

investment in infrastructure. However, to keep up with the growth of the Greater Colombo area, and to meet government targets, major investments will need to be made in water supply and even larger one in sanitation

Government is making attempts to regulate mobile sources of air pollution but with 2-stroke engines and diesels outside of the regulation the improvements are going to be limited.

The one real success story in urban environmental clean up is not in air, or water and sanitation, but in solid waste. A private investor - BEL Ltd. – has set up a Composting Facility at Sedawatte with \$(US) 6 million of local funding. TA from the University of Minnesota is being provided, as well as support from US-AEP. The facility is taking approximately one third of Colombo's solid waste, separating it and composting. The separated solids are then put into a sanitary landfill. Within 2 years it hopes to be taking all of Colombo's solid waste. The compost is being mixed with chemical fertilizer and then sold as "Tea mixture" or "Paddy mixture" and is finding a ready market amongst farmers.

Thailand

OVERVIEW

With a per capita income of \$7,400⁷⁸ Thailand is amongst the middle income countries of Asia. It was badly hit by the 1997 Asian economic crisis but its growth rate has bounced back and is now running at around 7% p.a. Together with the growth and relative prosperity has come some major environmental problems which the country is now beginning to address. Thailand passed its first Environmental Protection Law in 1992 heralding the dawn of environmental awareness in the country. This was strengthened in 1997 with the requirement that there be an EIA carried out and the public consulted where large infrastructure projects are proposed.

Thailand is a constitutional monarchy with an elected bicameral assembly and a Prime Minister as head of Government. The present Prime Minister, a telecommunications multi-millionaire has strong pro-business leanings which causes disquiet amongst some environmentalists. In terms of enforcement of environmental regulation, the 2002 Environmental Sustainability index rated the country 46th out of 56 countries.

Environmental issues are the responsibility of an apex body, the National Environmental Board. The Ministry of Science, Technology and Environment (MoSTE) is responsible for environmental policy and planning and comprises the: Office of Environmental Policy and Planning; Pollution Control Department; and Department of Environmental Quality Promotion. Recent decentralization of government has moved enforcement responsibility to the provinces which are too ill equipped and understaffed to discharge the responsibility.

⁷⁸ At purchasing power parity (PPP)

URBANIZATION

The Bangkok Metropolitan Region (BMR) is the largest urban conurbation in Thailand and the center of both commerce and industry. It has been estimated that this area generates 60% of Thailand's GDP. It has major air quality problems and lacks adequate water supply and sanitation. The population of this region is expected to top 10 million people by 2025.

PUBLIC HEALTH

In Bangkok, 1,000,000 people suffer from allergies and respiratory problems due to air pollution. In 2000 airborne particulate matter is estimated to have caused 4,550 premature deaths and have led to 17,000 hospital admissions.

The quality of the rivers and other water bodies on which the Thais rely for water have deteriorated with consequent health impacts. Diseases resulting from contaminated water including diarrhea, dysentery and typhoid impose a health care cost of around \$25 million a year.

WATER & SANITATION

The Metropolitan Waterworks Authority (MWA) is responsible for water supply in the Bangkok Metropolitan Region and is answerable to the Bangkok Municipal Administration (BMA) The Department of Drainage and Sewerage (DDS) of BMA has the responsibility for sanitation and waste water. Standards for drinking water are set by the National Environmental Board.

MWA is a reasonably well run authority that provides 24/7 water to domestic consumers and business in the BMR. NRW runs at around 30%.

Thailand is suffering from increased levels of industrial wastewater, a dramatic rise in untreated domestic sewerage and severe degradation of its waters. On top of this, deforestation of catchments has led to increased soil erosion which in turn has meant increasing turbidity and declining flows in many of its rivers. The Pollution Control Department reports that only 14% of surface water is suitable for human consumption. Water pollution is most severe in the lower reaches of the Chao Phraya and Tha Chine – that is the Bangkok Metropolitan Region. This is due to industrial and agricultural pollution and the discharge of untreated sewerage.

Industry in BMR has typically relied upon groundwater for its source for water. This has led to severe depletion and land subsidence which could become a major economic cost.

85% of the population in the BMR is connected to the urban water supply. Those not connected are in informal settlements where connection is not made as it is seen as conferring legitimacy on the dwellers in these settlements.

BMR claims that it produces water from its treatment plants that meets drinking water standards. The high incidence of gastro-enteric ailments would seem to bring this claim into question and most consumers within the BMR prefer to rely on bottled water for drinking.

Private houses in Bangkok are required to have septic tanks, however much of the effluent finds its way into public drains and into the *kelongs* (Canals) and eventually into the Chao Phraya River. There are six wastewater treatment plants in the BMR.

The sewerage system is under-funded due to the belief that there is an unwillingness to pay for sewerage disposal; it is not clear that this is true, but there is certainly an unwillingness to charge; this has resulted in poor O&M at sewerage treatment plants. Bangkok has six operational wastewater treatment plants and there are twelve smaller community wastewater treatment plants that are also run by DDS.

AIR QUALITY

The Thai government has taken, and continues to take, steps to deal with air pollution in Bangkok. Leaded gasoline has been phased out and ambient lead levels plummeted as a result. Today they are one twentieth of the levels they had reached in 1991. Dust and carbon monoxide levels have also fallen. Particulate problems remain with rising PM₁₀ concentrations.

The MoSTE has initiated a plan to target smoke belching diesels and a law is about to be promulgated requiring low sulfur content in gasoline.

The Pollution Control Department and BMR do a reasonable job of monitoring its air pollution and makes the information on air quality available. Vehicle emissions are not the only source of air pollution. In Mae Moh, 13 lignite power plants with an installed capacity of 2,600 megawatts are major sources of sulfur dioxide. The Electricity Generating Authority of Thailand has been now installed scrubbers on these plants which have led to some improvement. Although the PCD has the responsibility of regulating industrial emission sources, they do not now have authority to require or enforce plant operating permits. Efforts are being made to rectify this matter.

The enforcement of environmental regulation in Thailand is far from perfect, but air quality has improved measurably in Bangkok so, it would appear to be having some impact. Air quality problems remain, however in Chang Mai and other Thai cities.

Vehicles numbers are increasing by 500 a day in Bangkok so it is going to be an uphill battle to maintain, let alone improve air quality standards. The reduction of particulates will require action on diesel vehicles which is the next issue for government to address.

CONCLUSIONS AND COMMENTS

The first steps have been taken in dealing with the rapid deterioration in the water bodies on which Bangkok relies for its water supplies. A River Basin Management Committee has been set up for the Tha Chin River Basin. The River is the most polluted in Thailand and one of the sources of drinking water for BMR.

Initial steps would seem to indicate that the Authority is facing real problems with enforcement. Pig farms are a major polluter of the river, but enforcement efforts have fallen foul of the farmers lobby and its support by politicians.

Vietnam

OVERVIEW

Vietnam has a population of 80.7 million. Vietnam's per capita GDP is \$485 (2003) with a growth rate averaging 6.1% between 1990 and 2003. Inflation is at 3% and the Vietnamese currency has only devalued by 27% since 1995. In spite of a trade deficit, Vietnam's foreign exchange reserves tripled between 1995 and 2001. This was in part due to yearly declared remittances of \$2 billion from overseas Vietnamese. It is estimated that an additional \$2.5 and 4 billion enters the economy through undeclared sources.

Vietnam is a one-party communist state rapidly transitioning from socialism to a mixed economy.

After the war ended in 1975, the economy crashed as Hanoi implemented socialist policies and collectivization in the south. For some 15 years the country was virtually isolated from the rest of the world, depending on the Soviet Union for aid. With the collapse of the Soviet Union, the Vietnamese government introduced a series of *doi moi* (renovation) reforms which began to attract foreign investment. The US trade embargo ended in 1994, and relations were normalized in 1995. In the late 1990s the GOV realized that there was a large parallel black-market economy. Their response was to legalize it and to allow Vietnamese nationals to have US dollar accounts from which they can withdraw dollars in cash. For the past few years a growing middle class with disposable income has further spurred the economy, especially in the south.

Vietnam is predominantly Buddhist, but in Southeast Asia it ranks second only to the Philippines with its population of Roman Catholics. The *Kinh* make up 85% to 90% of the population. Other ethnic groups, collectively referred to as *montagnards* in the US, are found in the highlands. During the 1970s and 1980s several million settlers from the north migrated into the areas historically occupied by these groups.

URBANIZATION

About 25% of Vietnam's population is now urban. Rapid urbanization and industrialization are taking place in the south. Between 2000 and 2002 there were 210,000 new jobs created in the four provinces around Ho Chi Minh city, which is three times the number of jobs created in the northern seven provinces which have double the population. In 2003 the exports per capita in the southern four provinces were \$785 against \$50 for the northern seven. HO CHI MINH CITY, with an official population of about 6 million inhabitants, is the largest urban area in Vietnam and growing at a much faster rate than Hanoi and Haiphong. There is a four tiered administrative system (central, province, district, and commune/ward). Officially, Vietnamese citizens require a permit from the local authorities to reside in any area. However, perhaps as many as 1.5 million workers are illegal residents in HO CHI MINH CITY. Ho Chi Minh City is now the most polluted city in Vietnam.

PUBLIC HEALTH

Infant mortality is 30 per 1,000 live births and life expectancy is 70 years. The Ministry of Environment and Natural Resources estimates that the Vietnamese spend 100 million dollars per year on medicine for illnesses caused by pollution. Some 50% of 8,000 factories reviewed did not meet minimum environmental standards.

URBAN WATER & SANITATION

The Ministry of Natural Resources and the Environment (MONRE) was established in 2002, replacing the former Ministry of Science Technology and Environment (MOSTE). Within MONRE the Department of Water Resources Management is now responsible for the state management of Water Resources.

Policies, laws, decrees and regulations regarding water and sanitation include:

- ◆ Law of Water Resource and Decree 179, 1999.
- ◆ Decree 200/TTg on guaranteeing clean water and rural environmental sanitation, 1994.
- ◆ Instruction 487/TTg on strengthening the State Management for water resources, 1996.
- ◆ Strategic Orientation of Urban Water Supply up to 2020, Ministry of Construction (MOC), Decision 63, 1998.

Three city government agencies are responsible for water and sanitation:

- ◆ The Department of Transport Communication and Public Works plans the water supply network and other infrastructures.
- ◆ The Water Supply Company operates the water supply.
- ◆ The Urban Water Drainage Company operates the waste and storm water networks.

This might change with privatization. In 1999 a Malaysian consortium was awarded a 20-year BOT contract by Ho Chi Minh City Water Supply Company and the People's Committee to build the first private sector water treatment plant. However, the agreement was terminated about one year later.

Most of the drinking water for Ho Chi Minh City is supplied from the Dong Nai River through the Hoa An pumping station. This is downstream from the massive Bien Hoa industrial park which discharges 200,000 m³ of industrial wastewater per day. In the outlying areas of the city many households and private companies use wells. Some small private companies also supply underground water to residential areas.

Urban access to improved drinking water remained at 93% between 1990 and 2002. Urban household connections also remained at 51% during this period. Only 60% of the population has access to clean water. In Ho Chi Minh City many resident takes their water directly from the canals. In order to improve

the situation, the government issued a development plan for water supply with the objective of providing clean water for 80% of the population by the year 2010.

Currently, all the provinces and cities have water, sewage, and drainage projects with about 200 water treatment plants throughout the country producing 2.7 million cubic meters per day. The Vietnam Water Supply and Sewage Association (VWSA) estimates that the total investment for water supply projects will be more than US\$ 2 billion for the next ten years.

At present, industrial wastewater, municipal wastewater, seepage from garbage dumps, and agricultural run-off all contribute to urban water pollution. Water sources are contaminated with PCBs, DDTs, heavy metals, and fecal bacteria. In some areas leakages of Agent Orange and other defoliants are a concern. Water pollution is serious in Hanoi, Ho Chi Minh City, Hai Phong, Da Nang, Hue, Nam Dinh, Hai Duong and other large cities and towns.

Urban households in Ho Chi Minh City pay monthly⁷⁹ \$0.17/m³ for the first 4m³ of domestic water supply and \$0.25/m³ for additional water. In 2003 MONRE issued Decree 67/2003 adding a 10% surcharge for sewage.

Urban sanitation coverage rose from 46% in 1990 to 84% in 2002⁸⁰. Combined drainage systems mix domestic and industrial wastewater with rainwater. At present no cities have centralized wastewater treatment plants. In April 2004 HO CHI MINH CITY municipal council approved the spending of \$1.85 million for a wastewater treatment plant at Phuoc Hiep. HO CHI MINH CITY Chairman estimates that they will need to spend \$128 million on environmental programs in 2005.

AIR QUALITY

In 1991 GOV approved the “National Plan on Environment and Sustainable Development, 1991-2000”. The former MOSTE prepared the “National Strategy for Environmental Protection to 2010”. Provinces and cities also formulated their local environment protection strategies to 2005 and 2010.

The laws related to air pollution include:

- ◆ The Law on Environmental Protection, 1993.
- ◆ Regulations on Traffic Safety and Order of Road and Urban Transport, Decree 36/CP, 1995.
- ◆ Ambient air quality standards TCVN 5937, 1995.

Instruction No24/2000/CT-TTg, issued on November 23, 2000, instructed unleaded gasoline to be phased out by July 1, 2001. This was hailed by the World Bank as a huge success story eliminating lead pollution “over night” and avoiding a lengthy and costly phase-out program⁸¹. One source of

⁷⁹ September 2004

⁸⁰ Includes connection to public sewer, connection to septic system, pour-flush latrines, and ventilated improved pit latrines: WHO and UNICEF, 2004

⁸¹ An overnight success - Vietnam’s switch to unleaded gasoline: World Bank ESMAP Paper

information suggests that this phase-out has take longer than planned and that, in 2004, Vietnam will still consume 700,000 tons of leaded gasoline and its ban is now scheduled for December 2005⁸².

The Vietnam Environment Protection Agency (VEPA) under MONRE is the concerned agency. VEPA set up a national environmental monitoring network in 1994. The network had grown to 19 stations by 1999, monitoring basic parameters of air and water quality every three months at 63 locations. Under MONRE, VEPA is increasing the intensity of monitoring and the number of monitoring stations.

Urban air quality is affected by particulates, lead, NO_x, SO_x, and carbon monoxide. The main sources of urban air pollution are:

- ◆ Industrial.
- ◆ Vehicular.
- ◆ Construction activities.
- ◆ Cooking.

In Ho Chi Minh City urban haze is rare, although trans-boundary haze from Indonesia sometimes covers southern Vietnam. In Ho Chi Min City, Hanoi, Haiphong and Da Nang CO and NO_x levels are with the prescribed limits.

CONCLUSIONS AND COMMENTS

On paper Vietnam has an adequate law and decree system at the central level, but implementation at the local level has been weak. There are several reasons for this including under-funding, under-staffing and the failure to mobilize public opinion in support of environmental regulation for clean air.

¹ A Strategic Framework for Air Quality Management in Asia. Produced in collaboration with the Air Pollution in the Mega-cities of Asia and the Clean Air Initiative for Asian Cities. ISBN 89-8464-095-6. Stockholm Environment Institute, Korea Environmental Institute, Ministry of Environment-Korea. 2004.

⁸² People's Army, September 6, 2004

ANNEX 2. MULTILATERAL DONOR PROJECTS IN AIR QUALITY AND URBAN WATER AND SANITATION

Donor	Project	Description
Bangladesh		
WB ⁸³	Bangladesh Water Supply Program Project	The Bangladesh water Supply Program Project contributes to Bangladesh's efforts to achieve the Millennium Development Goals (MDGs) in water supply and sanitation by 2015. Specifically, the project will pilot innovative measures to scale up the provision of safe water supply free from arsenic and pathogens in rural areas and small towns.
	Air Quality Management Project	Project components include: The first component includes enforcement of emissions regulations for in-use vehicles, development of vehicular emissions and fuel standards, lubricant regulations, and pilots for vehicular pollution control. The second component, essential air quality information and evaluation of pilot activities will include air quality monitoring in Dhaka, air quality laboratory upgrade, and four studies examining key issues affecting public health.
ADB	Secondary Towns Water Supply and Sanitation	The Project is designed to provide sustainable and safe water supply and sanitation facilities in selected district towns to (i) improve health conditions and introduce public health and hygiene concepts, (ii) enhance the standard of living and quality of life of households, and (iii) accelerate industrial and commercial development.
Cambodia		
WB	Provincial and Peri-Urban Water and Sanitation Project	The Cambodia Provincial and Peri-Urban Water and Sanitation Project aims to assist the country in moving forward to fulfill the Millennium Development Goals (MDGs) in water supply and sanitation by 2015. The project design aims at building partnerships with the private sector and user groups in financing, operating, and maintaining constructed facilities, after designing specific instruments that ensure inclusion of low income communities residing in the service areas.
ADB	Provincial Towns Improvement Project	The Project aims to support the Government's development objectives that give priority to human development and poverty reduction. The Project will rehabilitate the water supply systems in six towns, develop a sewerage collection and treatment system in Sihanoukville, improve community sanitation conditions in three towns, and help mobilize resources at the local government level.
China		
WB	Hai Basin Integrated Water and Environment Management Project	The overall objective is to catalyze an integrated approach to water resource management and pollution control in the Hai Basin. The project has the following four components: Component 1) Will finance consultant services, training, goods and small works. The Integrated Water and Environment Management (IWEM) will be divided into 3 subcomponents: (a) Strategic Studies at the central and Hai Basin levels; (b) integrated water and environment management planning; and (c) demonstration projects.

⁸³ WB World Bank. ADB Asian Development Bank

Donor	Project	Description
	Second Tianjin Urban Development and Environment Project	The Second Tianjin Urban Development and Environment Project will develop and implement physical and institutional measures to enhance the efficiency, and equity of urban wastewater management, and transportation systems. The project consists of the following components: 1) the construction of storm water drains, sanitary sewers, and pumping stations, in Nanbeicang and Fukangnanlu areas; drains and sewers in the south suburb district of Tianjin; construction of a WWTP in Shuanglin; construction of water reclamation plants at the Dongjiao and Shuanglin WWTPs, and reclaimed water distribution systems for industrial/landscape uses; dredging and rehabilitation of cross-sections, bridges and culverts, and pumping stations of the Dagu Canal; and, municipal wastewater collection, and treatment systems in suburban towns of Tianjin municipality.
	Guangdong Pearl River Delta Urban Environment Project	The Guangdong Pearl River Delta Urban Environment Project will assist in addressing the environmental problems of the Pearl River Delta in Guangdong Province and the South China Sea, through the improvement and rationalization of environmental service delivery based on a regional planning approach. The project's global environmental objective is to improve the environmental condition of the South China Sea's large marine ecosystem by addressing the major threat of land-based pollution. The project's five components support (1) Wastewater Management; (2) Hazardous Waste Management; (3) Inter-Municipal Environmental Infrastructure; 4) Water Quality Monitoring and Information Systems; and (5) Institutional Strengthening and Training.**
	Huai River Pollution Control Project	The Huai River Pollution Control Project aims at upgrading the water quality in the Huai River Basin, namely in the provinces of Anhui, and Shandong, through improved collection, and treatment of wastewater in the municipalities of these two provinces. The two main components will: 1) support wastewater investments in the Anhui Province in eight municipalities, through the implementation of the first phase of the Wastewater Master Plan. Investments include the construction of secondary sewers, and house connections; interceptors; pumping stations, and pumping/transmission mains. In addition, construction of wastewater treatment plants will also be financed in Guoyang, and Luan municipalities. The capacity of the Anhui Environmental Monitoring Center will be strengthened by upgrading its equipment, and municipal laboratories, providing vehicles for field sampling; and improving technical, and managerial skills.
	Hubei Urban Environment Project	Specific objectives of this project are to: 1) put in place institutions and policies able to sustain progress on the provincial plan for environmental improvement; 2) improve wastewater collection and treatment in three cities, thus maintaining and raising surface water quality to levels suitable for municipal supply, agricultural, or other purposes; 3) improve waste management in four cities, thus protecting water and land quality; and 4) identify the highest-impact industrial air and water polluters and significantly reduce their pollution. The project will support policy and institutional innovation, and provide physical works for wastewater handling, air pollution control, and solid waste management. Its components are the following: 1) wastewater management in Huangshi, Wuhan and Xiangfan, comprising sewer systems, pump stations, and wastewater treatment facilities; 2) municipal wastes management in Huangshi, Wuhan, Xiangfan and Yichang, comprising sanitary landfill development, waste transfer facilities, vehicles and equipment; 3) industrial pollution control; 4) Hubei environmental pollution control fund; 5) water quality monitoring and management in Hubei and Wuhan environmental monitoring centers, comprising water quality monitoring technology, data management equipment, and institutional development; and 6) institutional strengthening through technical assistance and training.
	Liao River Basin Project	The Liao River Basin Project will assist in the environmental recovery of, and enhance water quality management for an integrated river basin management approach, in the Liaoning Province. The components include: 1) construction of the wastewater interception, and treatment plant at Panjin, as well as interceptor sewers, and new pumping stations – including modifications to existing pumping stations. A sanitary landfill for sludge disposal will be in place; 2) wastewater treatment, recycling, and process modifications, for the recovery of processed raw materials, to obtain lignin products (lignosulfonate), a binding material used primarily for zinc manufacturing; 3) construction of the wastewater treatment plant at Xipaotai, to serve the southern/western catchments of Yingkou; 4) construction of a chlorine production facility, based on modern ion membrane cell technology; 5) works, and equipment for reinforced concrete pipe interceptors along the north bank of the Xiaoling River, a wastewater treatment plant, and a sanitary landfill for sludge disposal; 6) support for urban management information systems on infrastructure planning.
	Liaoning Environment Project	The Liaoning Environmental Project will support a sustainable environmental setting for the long-term economic and social development of the Province, through the provision of urban infrastructure, services, and management improvements. The project will assist in financing an investment program addressing: (a) deficiencies in wastewater treatment in Anshan, Benxi, Dalian, and Fushun; (b) improvements in solid waste collection and disposal and water conservation management in Dalian; (c) air pollution mitigation measures in enterprises, including improvements in district heating, in Benxi; (d) the shortages and poor quality of water supply in Jinzhou and the pollution load emanating from the Jincheng General Paper Mill in Jinzhou.

Donor	Project	Description
	Second Beijing Environment Project	The Second Beijing Environment Project aims at a visible and sustained alleviation of air and water pollution in Beijing. The project consists of the following components: 1) The first component will support the conversion of medium-sized heating boilers from coal to natural gas. 2) The Gas Boiler Market and Technology Development component will support activities to develop industry-wide technical capacity, remove market information gaps, facilitate and aggregate market demands, reduce excess costs incurred by early converters, and structurally reduce the costs of gas boiler equipment and services. 3) The Heating Energy Conservation component will support the establishment of the technical and institutional basis to encourage sustained market-based energy conservation in various elements of the heating systems. 4) The Air Quality Monitoring and Decision Support System Improvement component will upgrade and renovate the existing monitoring stations. 5) The Liangshui River System Sewers will be constructed. 6) The Liangshui River System Wastewater Treatment Plants will be constructed. 7) The Qing River System Sewers will be constructed.
	Shandong Environment Project	The project, part of a phased development program, comprises a blend of policy and investment initiatives, which support municipal strategies for environmental recovery and sustained use of natural water resources. The five core components are: 1) investments in the Jihan Municipality for surface-water storage, pumping, transmission, and distribution facilities to improve water supply system reliability and protect groundwater; and investments in wastewater collection and pumping stations to protect Xiaoqing River water quality and fully use existing treatment facilities; 2) investments in district heating systems in Weihai Municipality, comprising combined heat and power generation plant and facilities, distribution systems, and support services for improved air quality; 3) investments in district heating systems in Yantai Municipality, comprising peak boiler and heat exchange plant and facilities, distribution systems, and support services for improved air quality; 4) environmental pollution and control; and 5) investments to support and strengthen provincial, municipal, project, and financial management, as well as construction of supervision services, training in sector and utility operations, and updating of the Xiaoqing River Basin water quality and management database.
	Tai Basin Urban Environment Project	The project has the following components: 1) deals with the most-heavily polluted perimeter lake - Wuli Lake, and includes: (a) pollution control facilities (b) lake-bank restoration; and (c) pilot research in ecological restoration. 2) will control gates on Xujiang and Shangtang Rivers to enhance flood protection and prevent the intrusion of polluted water from the Grand Canal into Suzhou's urban canal system; and to prevent the loss of clean water diverted through Xitang River from the WangYu River. 3) Will include: (a) technical assistance for capacity building for wastewater utilities management, and financing; (b) training in project management; (c) technical assistance for engineering design and construction supervision.
	Shanghai Urban Environment Project	Project components address: 1) Shanghai's wastewater management, by financing both collection, trunk sewers, pumping stations, wastewater treatment plants, as well as outfall and sludge treatment methods; 2) urban solid waste management, to establish environmentally cost-effective municipal solid waste management services in urban areas, by adopting user tariffs to ensure cost recovery of municipal services, as well as adopting a market-oriented institutional arrangement for the provision of municipal solid waste management services; 3) urban planning, and pilot upgrading, will assist in the planning for institutional, and administrative frameworks, focused on the planning, construction, and management goals for urban infrastructure improvements, implemented in a three-phase adaptable program lending; 4) the Upper Huangpu River catchment environmental management, to improve its environmental management, and protection of its water resources.
	Zhejiang Urban Environment Project	The project has the following seven components: Component 1) Construction of sewerage trunk infrastructure in South Jiangdong of Ningbo municipality, including a wastewater treatment plant. Component 2) Construction of sewerage trunk infrastructure in Zhenhai district of Ningbo municipality, including a wastewater treatment plant. Component 3) The proposed infrastructure improvements under Zhejiang Urban Environment Project (ZUEP), which are complementary to a larger redevelopment and conservation of this historic town, consist of rehabilitation and expansion of the traditional road infrastructure with associated underground infrastructure, sewage collection, pumping main and treatment facilities. Component 4) The project is assisting the rapid development in the area through clean-up of the lake through additional sewerage and treatment infrastructure to intercept the numerous discharges of wastewater to the lake. Component 5) Housing Renovation and Heritage Conservation in the five historic precincts of the Old Town. 6) Provision of a new landfill and associated facilities, adjacent to and partially overlying the existing Tianziling landfill site located near the village of Qinglongwu. Component 7) Technical Assistance with Institutional/Financial Utility Reform, Design Review and Construction Management, Industrial Pollution Control, Tourism Development and Heritage Conservation.

Donor	Project	Description
ADB	Fuzhou Environmental Improvement Project	The Project seeks to improve the urban environment of Fuzhou through the construction and rehabilitation of sewer networks, rehabilitation of inland river system, and the strengthening of urban governance in water resource management. Specifically, the Project will (i) construct about 210 km of sewers that will improve the urban environment for 1.85 million urban residents; and (ii) improve the water quality to achieve targeted standards in the inland rivers and Min River that would support the integrated approach in water resources management.
	Harbin Water Supply	The main objectives of the Project are to (i) provide 450,000 m ³ /day of clean water supply in Harbin; (ii) improve public health by providing clean safe water; (iii) promote long-term urban development in Harbin city by avoiding water shortages; (iv) provide institutional strengthening of Harbin Municipal Water Supply Construction Company (HMWSCC) and Harbin Municipal Tap Water Company (HMTWC); and (v) use tariff reform to achieve full cost recovery.
	Wuhan Wastewater Management	To achieve sustainable wastewater management and protection of water resources, the overall objective of the WWMP is to increase wastewater treatment capacity in Wuhan from the current 6% (19% after completion of an ongoing World Bank project) to approximately 45% of generated wastewater. Achievement of this objective will be key to achievement of the related objectives of the WWMP to (i) improve water quality of rivers and lakes in Wuhan; (ii) protect drinking water resources; (iii) strengthening the capacity and efficiency of the WWWC; (iv) improve health and living standards of residents in Wuhan; and (v) improve water quality in downstream reaches of the Changjiang
	Hebei Wastewater Management	The main objectives are to improve the urban environment by reducing environmental pollution through improved wastewater management, and to improve the water quality of surface-water and groundwater resources within and downstream from the project cities. Related objectives include (i) creating or strengthening the capacity of municipal sewerage companies to be efficient and managed on commercial principles; (ii) introducing comprehensive approaches to basin-wide pollution prevention and control; and (iii) improving cost recovery from users through an improved tariff structure, with gradual increases to achieve full cost recovery.
	Tianjin Wastewater Treatment and Water Resources Protection	The main objectives of the Project are to improve: (i) the urban environment by reducing environmental contamination through improved wastewater management; and (ii) the quality of raw water supply in Tianjin. Related objectives include strengthening the capacity of the raw water supply and wastewater operations to be more efficient and managed on commercial principles, introduction of comprehensive watershed management approaches, and improvement of revenue collection through an improved tariff structure, with gradual increases to achieve full cost recovery.
	Fuzhou Water Supply and Wastewater Treatment	The objectives of the Project are to improve the quality and quantity of water supplied to Fuzhou City, and improve the urban environment by reducing contamination of the local water courses in Fuzhou City and the Min River. The objectives of Part A will be achieved by constructing the 22-kilometer (km) Ao River transfer scheme with capacity of 800,000 cubic meters/day to bring water to Fuzhou City, 1,300,000 cubic meters/day water treatment plant, and 25 kilometers of related supply mains to the eastern area of the city. The objectives of Part B will be addressed by constructing a 200,000 cubic meter/day wastewater treatment plant at Yang Li, 40 km of trunk sewers and interceptors, and five pump stations; and rehabilitating 53 km of the existing sewer network
	Jilin Water Supply and Sewerage Development	The objective of the project is to (i) increase the wastewater treatment capacity and improve the urban ecological environment in Changchun which would contribute to the clean-up of the Songhua river basin; (ii) address problems linked to drinking water shortages and water quality issues in Shuangyang district, and Liaoyuan and Meihoukou cities, and (iii) promote the sustainable economic development of the project cities.
	Henan Wastewater Management Project	The objectives of the Project are to improve the urban environment and public health through improved wastewater management, and to improve the quality of surface water and groundwater in and downstream of the project countries. Related objectives include: (i) creating municipal wastewater companies and making them efficient and commercially managed; (ii) supporting comprehensive approaches to river basin-wide pollution prevention and control; and (iii) improving cost recovery from users through improved tariffs with gradual increases to full cost recovery
	Shandong Hai River Basin Pollution Control Project	The Project will include (i) construction of wastewater treatment facilities to increase treatment capacity by 800,000 m ³ /day, (ii) installation of water recycling systems to increase production capacity by 60,000 m ³ /day, and (iii) development of appropriate solid waste management systems with treatment capacity of 1,300 tons/day. The Project will benefit both the poor and non-poor by improving the living environment in selected areas in the Shandong province.

Donor	Project	Description
	Zhejiang-Shanxi Water Supply Project (Phase II)	The main Project components consist of (i) connections from the existing water systems to the new raw water tunnels constructed under Phase I, including pipelines and raw water pumping stations; (ii) construction of three new water treatment plants; (iii) rehabilitation of four existing water treatment plants; (iv) treated water transmission mains and pump stations; (v) rehabilitation and expansion of the distribution systems including leakage repair and metering; (vi) construction of wastewater collection and disposal facilities; (vii) capacity building of Shanxi Water Supply Investment Company (SWSI) to implement, operate, manage the new systems with an emphasis on improved efficiency, commercial operations, cost recovery, and sustainability; and (viii) institutional strengthening of Wenzhou Municipal Government's (WWMG) capacity to set effective policies to ensure sustainability of SWSI and the Project through rational operational budgets and cost-recovery mechanisms
India		
WB	Karnataka Urban Water Sector Improvement Project	The Karnataka Urban Water sector Improvement Project components will: a) assist the State Government in finalizing its policy reform agenda, and carry out initial implementation steps of staged sector reforms; and, to prepare business model, and private sector participation processes for service provision in Karnataka. The second component will improve the service provision, and attain continuous service in selected demonstration zones; generate credibility in the overall program and learn lessons on the challenges faced in the demonstration zones for scaling up continuous service provision; and, simultaneously improve the efficiency of bulk supply operations, and distribution networks, attaining initial improvements in water service provision to all State residents. The third component will finance the project's incremental operational costs, and studies related to project management and implementation, including incremental, short term consultants for the Karnataka Urban Infrastructure Development and Finance Corporation (KUIDFC)
ADB	JFPR-Rainwater Harvesting and Slum Development In Rajasthan	The project aims at reducing water-related human poverty in slum areas in Rajasthan through rainwater harvesting, micro-drainage, sanitation, garbage collection and awareness generation.
	Urban Water Supply and Environmental Improvement in Madhya Pradesh	The primary objective of the Project is to promote sustainable growth and poverty reduction in the six Project cities in Madhya Pradesh, and thereafter in the other cities in the state. The Project comprises three parts. Part A for the urban water supply and environmental improvement covers the improvement and expansion of the following municipal infrastructure and services: (i) urban water supply, (ii) sewerage and sanitation, (iii) storm water drainage, and (iv) solid waste management.
	Calcutta Environmental Improvement	The Project will improve the welfare and well being of the people of Calcutta, especially the poor, through an improved urban environment, equitable access to municipal services, and more effective municipal management. It is a high priority investment for the Government of West Bengal, and is designed to support the Government's move to devolve responsibility for urban management from the states to the municipal administrations. Under the Project, a policy and institutional framework will be established to sustain the investments in sewerage and drainage, solid waste management, slum improvements, and canal rehabilitation.
	Karnataka Urban Development and Coastal Environmental Management Project	This integrated urban development project will help meet basic human needs by developing urban services for water supply and sanitation, solid waste and wastewater management, and slum and environmental improvements. The Project will also support street improvements and traffic management, and strengthen other municipal services required to improve the quality of life in urban areas. The Project will provide assistance in capacity building and community participation at the state and local levels and in Project implementation.
Indonesia		

Donor	Project	Description
ADB	Water Supply and Sanitation Sector Program Loan	The project will help operationalize the Government's policy and regulations governing local water enterprises (PDAMs) and (i) identify the improvements required in the management capacity of local governments and PDAMs to help them provide more efficient service and higher service levels, and to become financially self-sustaining; (ii) evaluate the levels, and causes of, unaccounted for water and recommend steps required to reduce both physical and administrative losses; (iii) determine the need for rehabilitation and maintenance of existing water supply and sanitation facilities; (iv) review the legislation and regulations governing PDAMs and recommend ways to streamline or strengthen them; (v) identify mechanisms to improve the water supply to meet national standards for human consumption; (vi) determine measures to increase the level of collection of solid wastes with proper disposal to controlled landfills; (vii) provide institutional strengthening to facilitate increased public participation, transparency, governance, local financing capability, private sector involvement, and long-term sustainability.
Lao PDR		
ADB	Water Supply and Sanitation Sector Program Loan	The Project is designed to support the decentralization of the water supply sector through the establishment of a regulatory framework and capacity building of locally managed water supplies. In addition, the Project will enable the Government to implement the provisions of its newly issued water supply and sanitation sector policy and investment plan through investments in water supply and sanitation systems in small towns and the periurban areas of Vientiane. It will improve environment health and enhance human development in the target communities.
Nepal		
ADB	Melamchi Water Supply Project	The Project will improve the health and well-being of the people in Kathmandu Valley by alleviating the critical water stress in the region, where one million urban dwellers receive piped water for only two hours every two days. This will be accomplished by tapping additional water resources from the Melamchi River, increasing the water treatment capacity, enhancing access to water, and optimizing the use of existing water resources. The Project will introduce institutional reforms with a view to ensuring sustainability of services.
	Small Towns Water Supply and Sanitation Sector	The Project will assist the Government in implementing a part of its 15-year plan for small towns' water supply and sanitation development. The Project will provide water supply, limited drainage, and sanitation facilities in selected small towns following a demand-driven, interactive procedure that ensures full participation of the local water users and non-government organizations in the formulation, implementation, and operation and maintenance of the subprojects.
The Philippines		
WB	LGU Urban Water and Sanitation Project APL2	The project objective of the Second LGU Urban Water and Sanitation Project (APL) for the Philippines is to extend the outreach of the project to approximately 40 more LGU-managed water utilities. The project objective is one of confirming in more LGUs that the project design concept in APL1 is robust enough to be mainstreamed into the water supply sector of the Philippines. There are four project components. The first finances civil works, equipment, and supervision for improved water supply systems in LGUs, water utilities where private operators were selected under procedures acceptable to the Bank, and regional water utilities. The second component finances physical infrastructure in household toilets, on-site sanitation facilities, including soakaway pits for septic tank effluents or the disposal of wastewater flows arising from augmented water supplies hygiene education. The third component finances investments and consultant services in micro-drainage infrastructure.
ADB	Laguna de Bay Institutional Strengthening and Community Participation/LISC OP	The Project will assist the Laguna Lake Development Authority (LLDA), Local Government Units (LGUs), and other stakeholders, improve the environmental quality of the Laguna De Bay watershed. The project will have two main components: 1) Support demand-driven investments (sub-projects), designed to improve the watershed environmental quality. Subproject selection, and prioritization will be based on the results of a participatory micro-watershed-based planning, and subproject identification process, within four categories: (a) waste management and sanitation; (b) natural resources management; (c) soil erosion and localized flood prevention; and (d) eco-tourism. The identified interventions will constitute an integrated program of sub-projects that will be implemented concurrently within a micro-watershed by multiple LGUs, with each LGU borrowing for a sub-project within its jurisdiction.
	MWSS New Water Source Development Project	The main objective of the Project is to provide Metropolitan Waterworks and Sewerage system (MWSS) with a technical assistance loan to engage consultants to prepare projects for new water source development. The resulting projects would be suitable for consideration for financing by ADB, the private sector, or other sources. They will improve the living conditions and health of the population in Metro Manila through providing safe water supply and will facilitate the expansion of the service area, particularly benefiting the urban poor. The Project scope consists of consulting services for Part A - Development of New Water Source Projects and for Part B - Capacity Building.

Donor	Project	Description
Sri Lanka		
ADB	Greater Colombo Wastewater Management Project	The project will cover rehabilitation to the existing systems, repairs to the sewer outfalls, upsizing of under capacity sewers, and upsizing of under capacity pumping stations. The project will have special focus on the methodology to include the low-income groups and poor communities in the urban and rural areas. In addition, institutional and capacity building components will be formulated for the purpose of improving asset management and operation and maintenance of the sewerage system. For onsite sanitation, the proposed investment project will assist with the development of appropriate treatment and disposal facilities.
Thailand		
WB	Clean Fuels and Environmental Improvement Project	The project comprises the following components: 1) a deep gas oil hydrotreater (DGOHT) of 30,000 barrels stream per day (bpsd) capacity to enable the production of 0.05 weight percent sulfur diesel oil; 2) a fluid catalytic cracker (FCC) of 16,000 bpsd capacity and modifications to existing naphtha reformer to produce high octane, low aromatic and low benzene content gasoline, in order to enable the refinery's gasoline pool to meet unleaded octane requirements, and permissible aromatics and benzene and other prescribed specifications; 3) the installation of equipment and facilities to further enhance the refinery's environmental mitigation system and safety; 4) the purchase of modern air quality monitoring equipment; 5) project engineering and management; 6) acquisition of technology and procurement of catalysts and chemicals; and 7) training.
ADB	Samut Prakarn Wastewater Management	The project comprises (i) wastewater collection systems including over 300 kilometers of interception and collection sewers, and associated pumping stations; (ii) central wastewater treatment including a 525,000 cubic meters/day extended aeration plant and associated disposal facilities; (iii) wastewater and effluent monitoring systems; (iv) industrial pollution prevention and a clean technology transfer program; and (v) strengthening the capacity of Government agencies responsible for planning and implementing wastewater management projects.
Vietnam		
WB	Ho Chi Minh City Environmental Sanitation (Nhieu Loc-Thi Nghe Basin) Project	The two components are: 1) Construction of the Nghie Loc Thi Nghe wastewater interceptor, to divert dry weather wastewater flows to the screening/pumping facility. In addition, combined sewer overflow structures will divert wastewater flows into the interceptor during dry weather. However, to mitigate the accumulated, odorous waters from the canal during rising tides, a canal flushing mechanism will be installed, drawing canal waters to the sewage interceptor, through withdrawal chambers located in the canal embankment, operated through automatic modes controlled from the pumping station. This pumping station will have hydraulic capacities, and is located at the confluence of the canal, and the Saigon River, with a river outfall discharge. 2) Drainage works to replace, and extend combined sewers to reduce overflows of storm-water, and wastewater. Includes dredging works for sludge transportation and disposal; cleaning inspection of secondary sewers; and, construction of tertiary sewers.
ADB	Central Region Urban Environmental Improvement	The Project will strengthen local management capacities and the institutional framework for providing sustainable urban environmental services and improving urban infrastructure. It will improve drainage, sanitation, and solid waste systems in five provincial towns and one district level town in the central region of Viet Nam, where inadequate infrastructure poses serious environmental and health risks, and inhibits social and economic development. The Project will also increase environmental and health awareness and promote the active participation of citizens, particularly women and the poor, in urban management and services.
	Third Provincial Towns Water Supply and Sanitation	The Project aims to improve water supply and environmental sanitation conditions in the Project towns through integrating critically-needed infrastructure developments with community awareness and participation, improved financial management and cost recovery by WSCs, and local regulations on sanitation, wastewater management, and water source protection. The scope of the Project includes the design, development and delivery of (i) community environmental sanitation improvement program in each Project town; (ii) water supply systems to provide better quality water and greater examination was carried out for each project town, and a supplementary analysis was coverage in the towns and adjoining districts; (iii) drainage and sanitation improvements; and (iv) project implementation assistance and capacity building.

ANNEX 3: LIST OF CONSULTATIONS – UNITED STATES AND ASIA

Bangladesh – July 21-22, 2004

Dhaka

- ◆ Bruce McMullen, Sr. Energy Advisor, USAID
- ◆ Mamumul Khan, Natural Resource Management Specialist, USAID
- ◆ Afroza Ahmed, Project Officer, Water and Environmental Sanitation Section, UNICEF
- ◆ Mohamed Monirul Alam, Water and Environmental Sanitation Section, UNICEF
- ◆ Mohamed Mujibur Rahman, Professor of Civil & Environ. Engineering, Bangladesh University for Engineering and Technology
- ◆ Iftekhar Enayetullah, Director, Civil Engineering-Urban Planning, Waste Concern
- ◆ M. Reazuddin, Technical Director, Ministry of Environment and Forests, Department of Environment

India – July 19-23, 2004

Chennai, July 19, 2004

- ◆ R. Desikan, CONCERT, and colleagues
- ◆ Leena Thomas, Alliance To Save Energy
- ◆ Karuthiya Pandian, I.A.S., Managing Director, Tamil Nadu Water and Drainage Board
- ◆ Joseph Ravikumar, Program Management Specialist, USAEP
- ◆ P. Vaidyanathan, Commercial Specialist, Foreign Commercial Service
- ◆ M. Ravikumar, Vice President, Tamil Nadu Urban Infrastructure Financial Services Ltd.
- ◆ Chad Peterson, Environment Specialist and Erike Martine, Environment Specialist, US Consulate

Mumbai, July 19, 2004

- ◆ Suneel Parasnis, Regional Director, USAEP/USAID, Western Region
- ◆ Nutan Zarakar, Deputy Director, USAEP/USAID, Western Region
- ◆ M.Janardhan, Program Advisor, Public Affairs Section
- ◆ Angus Simmons, Consul General
- ◆ Rebecca Frerichs, Economics Officer and Vice Consul
- ◆ Suneel Parasnis, Director Western Region
- ◆ Round Table Meeting at US Environmental Resource Center (US ERC):
 - Kamal Vora, Deputy Secretary General Indo-American Chamber of Commerce
 - Veena Dharmaraj, Assistant Manager, United States Environmental Resource Center; Mangesh Dighe, Traffic Planning Department, Pune Municipal Corporation
 - Ajit Kamar Jain, Senior advisor, Solid Waste Management Cell, Government of Maharashtra; Rakesh Kumar, Head, National Environmental Engineering Research Institute

- Nikesh P. Shah, EWM Services, Goodwill Builders
- Bharat Nimbarte, Regional Officer, Maharashtra Pollution Control Board

New Delhi, July 20-22, 2004

◆ *July 20*

- USAID Mission Meeting with Rebecca Black, John Smith Sreen, Jerry Tarter, N. Bhattacharjee, Renu Sehgal, David Foster, Madhumita Gupta, Sandeep Tandon, S. Padmanabhan, Archana Walia, Anand Rudra, Ram Berry, Don Brown
- Walter North, Mission Director, USAID/India
- Kris Easter and K. Balakrishnan, USAEP/India Country Manager and Program Specialist
- David Foster Urban Advisor, and N. Bhattacharjee, Program Manager (EC)/USAID
- S. Padmanabhan, Energy and Environment Adviser (EEE) and Archana Walia, Program Manager, EEE
- Amitabha Ray, PADCO
- Ram Berry, Program Manager, EEE
- Subrata Majumdar, Louis Berger

◆ *July 21*

- Pushkin Chandra and David Heeson, Program Support Office USAID
- Robert Beckman, Manager, SARI Energy project/USAID
- Seema Arora, Senior Counsellor, Environmental Division, Confederation of Indian Industry
- Sunita Naruain, Director, Anumita Roychowdhury, Air Specialist, and Sumita Dasgupta, Natural Resources Management specialist, Center for Science and Environment
- Salman Zaheer, Water and Sanitation Project for South Asia (World Bank)
- V. Rajagopalan, Chairman, Central Pollution Control Board of India

◆ *July 22*

- Satish Sinha, Chief Program Coordinator, Toxics Link
- Ashish Kundra, Additional CEO, and PK Tripathi, CEO, Delhi Jal Board
- KK Gandhi, Director, Society of Indian Automobile Manufacturers

Calcutta, July 23, 2004

- ◆ George N. Sibley, US Consul General, Calcutta
- ◆ Arup Mitra, USAEP Project Management Specialist
- ◆ Mrinal Banerjee, Minister in Charge Department of Power and Non-Conventional Energy Sources, Government of West Bengal; also present were Sibley and Mitra, and S.P. Gon Chaudhury, Director West Bengal Renewable Energy Development Agency
- ◆ Bhaskar Rajah, Second Secretary, Public Affairs Officer, US Dept of State
- ◆ Asok Bhattacharya, Minister in Charge, Department of Urban Development, Government of West Bengal and Mr. Arnab Roy, Secretary, Kolkata Metropolitan Development Authority (KMDA), with members of Kolkata Metropolitan Development Authority (KMDA)
- ◆ T.S. Bandyopadhyay, Director, Institute of Wetland Management and Ecological Design (IW MED) under the Dept. of Environment
- ◆ K.J. Nath, Chairman and PK De, Chief Engineer, Officials of Arsenic Task Force, Government of West Bengal
- ◆ Nazeeb Arif, Secretary-General, Indian Chamber of Commerce

Indonesia – August 5-9, 2004

Jakarta

- ◆ *August 5*
 - Suzanne Billharz, US-AEP Country Program Manager
 - Edi Setianto, Energy Program, USAID/Jakarta
 - Anne Patterson, Water and Environment Office Director, Ms. Amrita, Water and Sanitation Office, USAID/Jakarta, and Anthony Woods, Dept. of State, Environment, Science, Technology & Health, US Embassy
 - Theresa Tũaño, Education Officer, USAID/Jakarta
 - Richard Hough, Director of Programming, USAID/Jakarta
 - Zakki Husein, Legal Program Director, Agus Loekman, Program Officer, The Asia Foundation
 - Arie Istandar & Ms. Restiti Sekartini, and Paul Butarbutar, Swisscontact
 - Moechti Soejachmoen, Ananta Gondomondo, Shanty Syahril and Bambang Susantono, Pelangi & SUSTRAN
- ◆ *August 6*
 - James Woodcock, World Bank, Water and Sanitation Program
 - Basah Hernowo, Bappenas, Direktorat Pemukiman dan Perumahan; Godman Ambarita, Executive Director, Bustran Foort, Advisor, PERPAMSI
 - Ridwan Tamin, Head, Mobile Sources Division, Ministry of Environment; Pranciscus Soeseno, Chair (Partnership for Clean Emissions) (MEB) and Ahmad Safrudin, Coordinator, Committee for Leaded Gasoline Phase-out (KPBB)
- ◆ *August 9*
 - Raman Letchumanan, Head of Environment Unit, ASEAN Secretariat
 - ala Kumar Palaniappan, Senior External Relations Officer, ASEAN Secretariat
 - Muce Mochtar, Technical Assistant, ASEAN Secretariat
 - Wendy Yap Hwee Min, Environment Unit, ASEAN Secretariat
 - Adelina Kamal, Senior Officer, Haze, ASEAN Secretariat
 - Andrea Richhart, ACP Coordinator, US Embassy
 - Basah Hernowo, Director of Human Settlement and Housing, National Planning Agency (BAPPENAS); Foort Bustraan, Institutional and Technical Advisor, Indonesia Water Supply Association (PERPAMSI)
 - William Frei, USAID Mission Director, Jon Lindborg, Deputy Director, Richard Hough, Program Office, Anne Patterson, BHS, Water and Sanitation

Laos – July 30, 2004

Vientiane

- ◆ Winston Bowman, Glen Anderson, Frank Peacock, and Jeffrey Jacobs attended all meetings
- ◆ Mekong River Commission
- ◆ Hans Guttman, Program Coordinator Environment Division
- ◆ Chanthavong Saignasith, Director, Natural Resources Development Planning Division
- ◆ Khuon Komar, Head of Water Utilization Programme Working Group 3 (Rules)
- ◆ Chumnarn Pongsri, Director, Environment Division
- ◆ Scott Laird Rolston, Economics Officer at the US Embassy
- ◆ Meeting at the Asian Development Bank Resident Mission

- ◆ Edvard M. Baardsen, Deputy Head of Mission
- ◆ Keu Moua, Project Implementation Officer, Environment and Natural Resources

The Philippines – August 2-5, 2004

Manila

- ◆ *August 2, 2004*
 - Briefing on US-AEP/Philippines Program: Contractors and Grantees (PADCO, LBG, IIE, ASE)
 - Joy A. Jochico, Development Assistance Specialist, USAID
 - Jose “Boy” Dulce, Project Development Specialist, Office of Energy and Environment, USAID
 - Milag San Jose-Ballesteros, US-AEP Program Officer
 - Jose Gerardo A. Alampay, US-AEP Philippine Program Coordinator
 - Lisa Kircher Lumbao, Environmental Management Specialist, Sustainable Economic Development, PADCO
 - Mr. Gil R. Dy-Liacco, Mission Economist, Deputy Chief, Program Office
 - Fatima S. Verzosa, Project Development Specialist, Program Resources Management Office
 - Laurie de Freese, Acting Chief, Office of Energy and Environment
 - Michael J. Yates, Ph.D, USAID/Philippines Mission Director
 - Elisea “Bebet” Guzon, Secretary, Department of Environment and Natural Resources (DENR)
- ◆ *August 3, 2004*
 - Meetings at the Asian Development Bank (ADB)
 - C.R. Rajendran (Director, Agriculture, Environment, and Natural Resources Division, Mekong Department)
 - Ian Fox (Principal Project Specialist, Natural Resources)
 - Javid H. Mir, Senior Natural Resources Specialist (Forestry), Agriculture, Environment, and Natural Resources Division, Mekong Department
 - Herat Gunatilake
 - Fred Roche, Director, Agriculture, Environment, and Natural Resources Division, South Asia Department, ADB
 - Bindu N. Lohani, Secretary of the ADB
 - Muhammed Mannan, Director, Agriculture, Environment, and Natural Resources Division, and Tetsuro Miyazato, Senior Water Resources Specialist, ADB
 - Bert van Ommen, Water Team Leader, and Francisco Roble, Jr., Water Knowledge Management Adviser, ADB
- ◆ *August 4, 2004*
 - Mutli-sectoral Roundtable Discussion on Air Quality Management Issues—Manila Observatory, Ateneo De Manila University, Diliman, Quezon City
 - Participants:
 - ◆ Jean Rosete, Environmental Management Bureau/Department of Environment and Natural Resources (EMB/DENR)
 - ◆ Willie Nava, USAID-funded Reduction of Vehicle Emission Preventive Maintenance Program
 - ◆ Desiree Narvaez, Department of Health
 - ◆ Fr. Dan McNamara, Director, Manila Observatory
 - ◆ Jess Motomool, Department of Trade and Industry

- ◆ Bert Suansing, Transport Organization for Clean Air
- Florencia Creus, Chief, Operations Division, Land Transportation Office
- Roberta Domingo, Land Transportation Office
- Teresita Borra, Director, Energy Utilization Management Bureau/ Department of Energy (DOE)
- Vilma F. Co, DOE, Supervising Science Research Specialist
- Jaime Fresnedi, Local Initiatives for Affordable Wastewater Treatment Project (LINAWE), Mayor, Muntinlupa City
- Representative Augusto Baculio, Republic of the Philippines House of Representatives, Chairman, Committee on Ecology
- Bopeep Paloma, staff for Representative Baculio for environmental issues and legislation
- ◆ *August 5, 2004*
 - Terry Thompson, Regional Advisor of Environmental Health, World Health Organization (WHO)
 - Hisashi Ogawa, WHO, Regional Adviser, Healthy Settings and Environment
 - Joseph B. Tuyor, World Bank, Operations Officer, Environment
 - Maya Gabriela Q. Villaluz, World Bank, Operations Officer, Environment
 - Ato Cruz, Chief, Environmental Quality Division, Environmental Management Bureau (DENR)
 - Robert Blume, Director, American Desk at the Board of Investments
 - Mary Jane C. Ortega, Mayor, City of San Fernando
- ◆ *August 10, 2004 – conference call*
 - Charles T. Andrews, Principal Water Supply and Sanitation Specialist, ADB
 - Winston Bowman, US-AEP

Sri Lanka – July 22-23, 2004

Colombo

- ◆ *July 22, 2004*
 - D.S. Jayaweera, Secretary, Ministry of Transport
 - Manel Jayamanne, Director General, Central Environmental Authority
 - Nihal Abeysekera, President, Federation of Chamber of Commerce and Industries of Sri Lanka
- ◆ *July 23, 2004*
 - Carol R. Becker, Mission Director, USAID Sri Lanka
 - Jeffrey Allen, Director Economic Growth, USAID Sri Lanka
 - Dean Thomson, Head, Economic/Commercial, US Embassy Colombo
 - Teresa Manlowe, Economic and Commercial Officer
 - Ananda Mallawatantri, Coordinator, US-AEP Sri Lanka
 - Upali Daranagama, Project Specialist/ Energy, USAID Sri Lanka
 - Dinesha De Silva, Assistant Representative, The Asia Foundation
 - Meeting with Partners arranged by the Asia Foundation

Thailand – July 24-29, 2004

Bangkok

- ◆ *July 24, 2004*
 - PADCO Team:

- Paul Violette, Senior Policy Advisor
- Jane Nishida, Senior Policy Advisor
- Watcharee Limanon, Environmental Specialist
- ◆ *July 25, 2004*
 - Paul Wedel, Executive Director, Kenan Institute Asia
- ◆ *July 26, 2004*
 - Elaine Blatt, TSSC Chief of Party
 - James Klein, Representative, The Asia Foundation
 - P. Illangovan, Senior Environmental Specialist, World Bank
 - Sirinun Maitrawattana, Research Assistant, World Bank
 - Somrudee Nicro, Thailand Environment Institute (TEI)
 - Monthip S. Tabucanon, Pollution Control Division, Ministry of Environment and Natural Resources (MONRE)
- ◆ *July 27, 2004*
 - Ministry of Natural Resources and Environment, MoNRE
 - K. Minquan Wichayarangsaridh, Pollution Control Department, MoNRE
 - K. Panya Warapetcharayut, Pollution Control Department, MoNRE
 - Wijarn Simachaya, Water Quality Management Bureau (WQMB), Pollution Control Division
 - Suwan Nanthasarut, Environmental Office Region 5, Water Management Director
 - Patcharawadee Suwanathada, PCD and Clean Air Training Network (CATNET)
- ◆ *July 28, 2004*
 - Tim Higham, UNEP Regional Information Officer
 - Pathcaree Siroros, Lecturer, Faculty of Political Science, Thammasat University
 - Khun Wasant Techawongtham, Deputy News Editor, Environment and Urban Affairs, Bangkok Post
 - Charas Suwanmala, Faculty of Political Science, Chulalongkorn University
 - K. Suwat Singhapun, New Director General, Department of Environmental Quality Promotion
- ◆ *July 29, 2004*
 - Supat Wangwongwatana, Deputy Director General, Pollution Control Department, MoNRE
 - Pongdej Wanichkittikul, Office of the President of the Supreme Court of Thailand
 - Witoon Poemposacharoen, Director General, TERRA (Towards Ecological Recovery and Regional Alliance)
 - Suebsthira Jotikasthira The Federation of Thai Industries (FTI)
 - Jefferson Fox, Senior Fellow, East-West Center
 - Anthony M. Zola, Advisor, Mae Fah Luang Foundation
 - Charles B. Mehl, Assistant for International Matters, Mae Fah Luang Foundation
 - Judy Reinke, Commercial Attaché, US Department of State
 - Yuwaree In-na, UNEP Program at Asian Institute of Technology
- ◆ *July 30, 2004*
 - Weranit Thansuporn, Environmental Officer, Office of Natural Resources and Environmental Policy & Planning (ONREPP)
 - Natarika Vayuparb-Cooper, Environmental Official (ONREPP)
 - Mathya Raksasataya, Environmental Officer, Urban Planning (ONREPP)

Vietnam – July 25-27, 2004

- ◆ *Sunday, July 25*

- Meeting with Nathan Sage, USAEP Country Manager, Vietnam
- ◆ *Monday, July 26*
 - Mr. Philip Brylski Environmental Country Sector Coordinator, the World Bank
 - William Costin, Head, Infrastructure, Urban Development and Social Sectors
 - Pieter Smidt, Principal Project Implementation Officer
 - Jan Moller Hansen, Counsellor Development Cooperation, Danish Embassy/DANIDA
 - Dennis Zvinakis, past USAID/Vietnam Country Manager
 - Nathan Sage and Phung Van, US-AEP
- ◆ *Tuesday, July 27*
 - Hong Minh Dao, Deputy Director, Environment Department, MoNRE
 - Rick McGowan, Project Management Specialist, Rural Water and Sanitation Infrastructure and Health Improvement Project Preparation
 - Trinh Ngoc Giao, Director General, Vietnam Register (vehicle registration authority)
 - Nguyen Hoai Anh, Lawyer, International Cooperation Dept. Vietnam Register
 - Nguyen Phan Trung, International Cooperation Dept., Vietnam Register
 - Nguyen Thai Lai, Director, Resources Dept. Water Resources Management
 - Des Cleary, HydroSult, Inc. ADB Team Leader, National Coordination for Water Resource Management
 - Warren Martin, ADB Consultant
 - Nguyen Thi Ky Nam, Senior Program Officer Mekong River Committee
 - Nichole Motteux, Vietnam Program Coordinator, TSSD-Louis Berger
 - Phan Quynh Nhu, Clean Cities Coordinator, TSSD-Louis Berger

United States

- ◆ *June 30, 2004*
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID/W, US-AEP Liaison, John Wilson, USAID/W, ANE Environment
 - Asif Shaikh, President and CEO, IRG; Doug Clark, Corporate Vice President, IRG
- ◆ *July 1, 2004*
 - Dennis Cunningham and Ted MacDonald, Office of International Affairs, USEPA
- ◆ *July 7, 2004*
 - Anthony “Bud” Rock, Principle Deputy Assistant Secretary, Oceans and International Environmental and Scientific Affairs (OES), US State Department, Ann Stewart (OES), Diane Tate (OES)
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID
 - Vijitha Eyango, Senior Education/Gender Advisor, USAID
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID
 - Paul Procee, Air Quality Programs Coordinator, World Bank
- ◆ *July 8, 2004*
 - Gordon West, Acting Assistant Administrator, USAID/ANE
 - Winston Bowman, Regional Coordinator, US-AEP; Monica McQueary, USAID
 - US-AEP Strategic Advisory Committee
- ◆ *July 9, 2004*
 - US-AEP Partners Meeting (list of participants attached)
 - Kim Mihalik, Louis Berger, US-AEP TSSC

- Leslie Cordes, VP Program Development, Alliance to Save Energy (ASE)
- Christopher Godlove, Program Manager International (ASE)
- Lisa Surprenant, Standards & Labeling Program Manager (ASE)
- ◆ *July 13, 2004*
 - John H. (Jack) Andre, II, ASEAN Cooperation Plan Coordinator, US Department of State
 - Chris Whatley, Council of State Governments
- ◆ *July 14, 2004*
 - Greg J. Bowder, Water Resource Engineer, East Asia & Pacific Region, World Bank
 - Luiz Claudio Tavares, Senior Water and Sanitation Engineer Specialist, East Asia & Pacific Region, World Bank
- ◆ *July 27, 2004*
 - Ernest Bower, President, US-ASEAN Business Council
- ◆ *August 20, 2004*
 - Susan Wickwire, Chief, International Capacity Building Branch, Climate Change Division, USEPA, Kevin Rosseel, International Capacity Building Branch, Climate Change Division, USEPA, Katherine Sibold, Manager, Integrated Environmental Strategies Program, Global Programs Division, USEPA
- ◆ *Kickoff Meeting with USAID, June 30, 2004*
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID/W, US-AEP Liaison, John Wilson, USAID/W, ANE Environment
 - Asif Shaikh, President and CEO, IRG
 - Doug Clark, Corporate Vice President, IRG
 - Glen Anderson, Tony Pryor, Frank Peacock, Robert Kenson, Jeff Jacobs, and Whitney Sims, IRG
- ◆ *Meeting with USEPA, July 1, 2004*
 - Ted McDonald, USEPA, Office of International Affairs
 - Dennis Cunningham, USEPA, Office of International Affairs
 - Winston Bowman, Regional Coordinator, US-AEP
 - Monica McQueary, USAID/W, US-AEP Liaison
 - Glen Anderson, Frank Peacock, and Robert Kenson, IRG
- ◆ *Meeting with the Office of Oceans and International Environmental and Scientific Affairs (OES), US State Department, July 7, 2004*
 - Anthony “Bud” Rock, Principle Deputy Assistant Secretary, Oceans and International Environmental and Scientific Affairs (OES), US State Department, Ann Stewart (OES), Diane Tate (OES)
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID
 - Doug Clark, Tony Pryor, and Glen Anderson, IRG
- ◆ *Meeting with USAID Gender Advisor, July 7, 2004*
 - Vijitha Eyango, USAID; Winston Bowman, Regional Coordinator, US-AEP; Monica McQueary, USAID
 - Glen Anderson, Tony Pryor, Leticia Orti, Robert Kenson, and Frank Peacock, IRG
- ◆ *Meeting at the World Bank, July 7, 2004 (Note: Jitu Shah, World Bank SE Asia Coordinator was in Bangkok at the time of this consultation)*
 - Paul Procee, Air Quality Programs Coordinator, World Bank
 - John Core, IRG

- ◆ *Meeting with USAID, July 8, 2004*
 - Gordon West, Acting Assistant Administrator, USAID/ANE
 - Winston Bowman, Regional Coordinator, US-AEP, Monica McQueary, USAID
 - Doug Clark, Tony Pryor, and Glen Anderson, IRG
- ◆ *Meeting of the US-AEP Strategic Advisory Committee*
 - Owen Cylke, World Wildlife Federation
 - Alan Hurdus, USAID
 - Ted McDonald, USEPA
 - Ruth Greenspan Bell, Resources for the Future
 - Diane Tate, State Department
 - Del McCluskey, Development Alternatives, Inc.
 - Ann Stewart, State Department
 - Dennis Cunningham, USEPA
 - Karin Krchnak, World Resources Institute
 - Lindsey Fransen, World Resources Institute
 - Monica McQueary, USAID
 - Winston Bowman, US-AEP
 - Doug Clark, Tony Pryor, Glen Anderson, Leticia Orti, Frank Peacock, Robert Kenson, John Core, and Jeff Jacobs, IRG
 - Patricia Garcia, Training Resources Group, Inc.

Table A3-1: Meeting with US-AEP Partners

Name	Affiliation	Name	Affiliation
Tony Pryor	IRG	Lori Hatton	Louis Berger/TSSC
Von Millard	Louis Berger/TSSC	Chris Godlove	Alliance to Save Energy
Shehnez Atcha	Louis Berger/Energy Wise India	Ian Fitzsimmons	Institute of International Education
Diana Simon	Institute of International Education	John Speicher	Institute of International Education
Alex Patico	Institute of International Education	Jack Andre	TSSC/State Department
Chris Whatley	Council of State Governments	Jane Nishida	PADCO
Jill Lucas	Louis Berger/TSSC	Suzanne Young	Louis Berger/GET
Kim Mihalik	Louis Berger/TSSC	Martin Steinson	Louis Berger/TSSC
Shubhe Banskota	Louis Berger/TSSC	Robert Kenson	IRG
Whitney Sims	IRG	Frank Peacock	IRG
Glen Anderson	IRG	John Core	IRG
Jami Sachs	ICMA	Leslie Black Cordes	Alliance to Save Energy
Doug Clark	IRG	Leticia Orti	IRG
Winston Bowman	US-AEP Regional Coordinator	Julie Haines	Louis Berger

- ◆ *Meeting with Louis Berger, July 9, 2004*
 - Kim Mihalik, TSSC, Louis Berger
 - Robert Kenson, IRG
- ◆ *Meeting with the Alliance to Save Energy (ASE), July 9, 2004*

- Leslie Cordes, VP Program Development
- Christopher Godlove, Program Manager International
- Lisa Surprenant, Standards & Labeling Program Manager
- John Core, Frank Peacock, and Robert Kenson, IRG
- ◆ *Meeting with US Department of State, July 13, 2004*
 - John H. (Jack) Andre, II, ASEAN Cooperation Plan Coordinator, US Department of State
 - Doug Clark and Glen Anderson, IRG
- ◆ *Meeting with the Council of State Governments (CSG), July 13, 2004*
 - Chris Whatley, CSG
 - Doug Clark and Glen Anderson
- ◆ *Meeting at the World Bank, July 14, 2004*
 - Greg J. Bowder, Water Resource Engineer, East Asia & Pacific Region, World Bank
 - Frank Peacock and Jeff Jacobs, IRG
- ◆ *Meeting at the World Bank, July 14, 2004*
 - Luiz Claudio Tavares, Senior Water and Sanitation Engineer Specialist, East Asia & Pacific Region, World Bank
 - Frank Peacock and Jeff Jacobs, IRG
- ◆ *Meeting with US-ASEAN Business Council, July 27, 2004*
 - Ernest Bower, President, US-ASEAN Business Council
 - Doug Clark, Corporate Vice President, IRG
- ◆ *Meeting with USEPA, August 20, 2004*
 - Susan Wickwire, Chief, International Capacity Building Branch, Climate Change Division, USEPA
 - Kevin Rosseel, International Capacity Building Branch, Climate Change Division, USEPA
 - Katherine Sibold, Manager, Integrated Environmental Strategies Program, Global Programs Division, USEPA
 - Tony Pryor and Glen Anderson, IRG

Written Responses to United States-Asian Environmental Partnership (US-AEP) Questions for Strategic Assessment (Countries not visited by Assessment Team)

Cambodia

- ◆ Pam DeVolder, Economic and Labor Officer, US Embassy Phnom Penh

China

- ◆ Lixin Fu, Tshingua China

Nepal

- ◆ Sharada Jnawali, Urban Environment Program, USAID/Nepal
- ◆ Rajesh Manandhar, Engineer, Environment Department, Kathmandu Metropolitan City (KMC)
- ◆ Bhushan Tuladhar, Clean Energy Nepal
- ◆ Rajesh Manandhar, Engineer, Environment Department, Kathmandu Metropolitan City (KMC)
- ◆ Anil K. Raut, Kathmandu, NEPAL

Pakistan

- ◆ Arif Pervaiz, Head, Policy and International Agreements, IUCN-The World Conservation Union
- ◆ Hania Aslam, Toxics Programme, WWF - Pakistan

ANNEX 4: BACKGROUND MATERIALS AND REFERENCES

AIT Center in Vietnam, *Final Report on Environmental and Social Safeguards—Capacity Building Assessment and Strategy for Cambodia, Lao PDR, Thailand, and Vietnam*, for the World Bank (2002).

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The Asia Foundation, *Indonesia Rapid Decentralization Appraisal (IRDA)*, February 2004.

Asian Development Bank reports:

- ◆ Bangladesh Country Strategy and Program Update 2004-2006, July 2003.
- ◆ Cambodia Country Strategy and Program Update 2004-2006, July 2003.
- ◆ Gender Checklist: Water and Sanitation.
- ◆ Greater Mekong Subregion (GMS) Beyond Borders: Cooperation Regional Strategy and Program 2004-2008, March 2004.
- ◆ India Country Strategy and Program Update 2003-2006, April 2003.
- ◆ Indonesia Country Strategy and Program Update 2004-2006, September 2003.
- ◆ Lao, People's Democratic Republic of, Country Strategy and Program Update 2004-2006, July 2003.
- ◆ Maldives, Country Strategy and Program Update 2004-2006, August 2003.
- ◆ Nepal Country Strategy and Program Update 2004-2006, August 2003
- ◆ Philippines Country Strategy and Program Update 2004-2006, November 2003.
- ◆ Sri Lanka Country Strategy and Program Update 2004-2008, September 2003.
- ◆ Technical Assistance to the South Asian Subregional Economic Cooperation Countries for Regional Air Quality Management, Asian Development Bank Technical Assistance Report (OTH 37014), December 2003.
- ◆ Thailand Country Strategy and Program Update 2002-2004, July 2001.
- ◆ Vietnam Country Strategy and Program Update 2004-2006, July 2003.

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- ◆ Water for All: The Water Policy of the Asian Development Bank, June 2003.
- ◆ Water and Poverty: Fighting Poverty through Water Management, No. 1, ADB, 2004.

- ◆ Poverty and Water Security: Understanding How Water Affects the Poor, Number 2, ADB, 2004.
- ◆ Water Utilities and City Profiles, Number 3, ADB 2003.
- ◆ Water and Poverty: The Themes, Number 4, ADB 2004.
- ◆ Water and Poverty: The Realities, Experiences from the Field, Number 5, ADB, 2004.
- ◆ Water for the Poor: Partnerships for Action: How to bring Water to the Urban Poor, Number 6, ADB 2004.
- ◆ Water and Poverty and the 3rd World Water Forum, Number 7, ADB, 2004.
- ◆ Bringing Water to the Poor: Selected ADB Case Studies, Number 8, ADB, 2004.
- ◆ The Impact of Water on the Poor: Summary of an Impact Evaluation of Selected ADB Water Supply and Sanitation projects, Number 9, ADB, 2004.
- ◆ Water in Asian Cities: Utilities' Performance and Civil Society Views, Number 10, ADB, 2004.

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CAI-Asia notes and presentation materials: "First Coordination Meeting of Regional Programs and Initiatives on Air Quality Management (AQM) in Asia," June 16, 2004.

Consultation notes from consultations in the United States and Asia (Bangladesh, India, Indonesia, Laos, Philippines, Sri Lanka, Thailand, Vietnam) and phone conversations and email exchanges with Cambodia, China, Nepal, and Pakistan.

The Economist, "A Great Wall of Waste", August 19, 2004.

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Gwartney, James and Robert Lawson, *Economic Freedom of the World 2004 Annual Report*, The Frazier Institute, 2004.

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McIntosh, Arthur C., *Asian Water Supplies: Reaching the Urban Poor*, ADB and the International Water Association, 2003.

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Mekong River Commission, *State of the Basin Report*, 2003.

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- US-AEP, *Final Performance Monitoring Plan*, October 2001.
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- USAID, US-AEP, *Final Performance Monitoring Plan*, October 2001.
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- USAID, *Vehicle Inspection and Maintenance Programs: International Experience and Best Practices*, Presentation by Karl Hausker, PA Government Services September 23, 2004.
- USAID/ANE Bureau, *Gender and Regional Programs: The South Asia Regional Initiative on Equity for Women and Children (SARI/Q)*, Dolores A. Donovan, presentation for Workshop on Gender Integration in Regional Planning, August 18, 2004.
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- USAID/Indonesia Strategy 2004-2008.
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- ◆ "Towards Sustainability with Equity: WSP East-Asia Regional Conference Proceedings," Chiang Mai, Thailand, March 7-9, 2001.
- ◆ *Translating the Millennium Development Goals (MDGs) into Action through Water Supply and Sanitation*, WSP-EAP Regional Conference, Rayong, Thailand, February 2003.
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- ◆ Cities Alliance
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- ◆ Clean Air Initiative for Asian Cities (CAI-Asia)
<http://www.cleanairnet.org/caiasia>
- ◆ Global Development Alliance Partnerships
http://www.usaid.gov/our_work/global_partnerships/gda/
- ◆ People and Planet, urban poverty, urban population trends, <http://www.peopleandplanet.net/>
- ◆ Southeast Asia Water Utilities Network – SEAWUN <http://adb.org/Water/CFWS/SEAWUN.asp>
- ◆ Water, Environment and Sanitation, UNICEF http://www.unicef.org/wes/index_wes_related.html
- ◆ Water for Asian Cities Program
http://adb/Water/asian_cities.asp
- ◆ World Resources Institute, Global Trends, Population and Human Well-Being, Urban Growth
<http://www.wri.org/wr-98-99/citygrow.htm>