

November 2004

Asia Trade and Human Development Report
RAS/01/060

Revised Chapter on
Trade in Environmental Services and Human Development

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List of Acronyms

ADB	-	Asian Development Bank
APEC-VC	-	Asia-Pacific Economic Commission Virtual Centre
BIT	-	Bilateral Investment Treaty
BOT	-	Build operate transfer
BOO	-	Build operate own
CBD	-	Convention on Biological Diversity
CO ₂	-	Carbon Dioxide
CFC	-	Chlorofluorocarbons
CPC	-	Central Product Classification
CETP	-	Combined Effluent Treatment Plant
EC	-	European Commission
ES	-	Environmental Services
ESI	-	Environmental Sustainability Index
EIA	-	Environmental Impact Assessment
EU	-	European Union
EAWAG	-	Swiss Federal Institute for Environment and Technology
FTA	-	Free Trade Agreement
GATS	-	General Agreement on Trade in Services
HD	-	Human Development
HDI	-	Human Development Index
ISO	-	International Organization of Standards
ICRIER	-	Indian Council for Research on International Economic Relations
MDG	-	Millennium Development Goal
MBI	-	Market Based Instrument
MFN	-	Most Favoured Nation
NGO	-	Non Governmental Organization
NT	-	National Treatment
OECD	-	Organization for Economic Cooperation and Development
OPP	-	Pakistan's Orangi Pilot Project
OVI	-	Objectively Verifiable Indicator
PET	-	Polyethylene terephthalate
PIC	-	Pacific Island Country
R&D	-	Research and Development
SEPA	-	State Environment Protection Agency (China)
SEEP	-	Empowerment, productivity, equity and sustainability
SPREP	-	South Pacific Regional Environmental Programme
SODIS	-	Solar Water Disinfection
UN	-	United Nations
UNCTAD	-	United Nations Conference on Trade & Development
UNICEF	-	United Nations Children's Fund
UNDP	-	United Nations Development Programme
UNCPC	-	United Nations Central Product Classification system
US-AEP	-	United States-Asia Environmental Partnership
WHO	-	World Health Organization
WSSCC	-	Water Supply & Sanitation Collaborative Council
WSSD	-	World Summit on Sustainable Development
WTO	-	World Trade Organization

Glossary of Terms

Basel Convention: controls the trans-boundary movement of hazardous wastes and their disposal (adopted 1989, came into force 1992).

Bretton Woods institutions: International Monetary Fund and the World Bank

Convention on Biological Diversity: International law to conserve the variety of plants and animals, and their habitats, adopted at Rio 1992, came into force 1994.

Clean Air Act: US Federal law covering the entire country under which the limits are set on how much of a pollutant can be in the air anywhere in the United States. As air pollution moves across borders, the 1990 law covers pollution that originates in Mexico and Canada and drifts into the United States and vice versa.

Cleaner Production: reduces environmental impacts from processes, products and services by using better management strategies, methods and tools. Related terms include eco-efficiency and waste minimization.

Diarrhoeal diseases: are responsible for 2.2 million deaths and four billion acute episodes among children in developing countries each year. The loose watery stools are caused by infection with a variety of bacteria, parasites and viruses. Dehydration is the primary cause of morbidity and mortality.

Deregulation: is the process by which governments remove selected regulations on business in order to (in theory) encourage the efficient operation of markets.

End-of-pipe abatement: Measures for treatment of effluents, emissions and solid waste after production process.

Environmental Kuznets Curve (EKC): The hypothesis that pollution increases at the early stages of development but decreases after a certain income levels have been reached. It is supported by some empirical evidence for certain types of local pollution, primarily urban air pollution.

Environmental Services: Service activities that reduce environmental risk, minimize pollution, and enable efficient use of resources.

Environmental Impact Assessment: Environmental assessment is a procedure that ensures that the environmental implications of decisions are taken into account before the decisions are made.

Human Development: The process of enlarging people's choices, enabling them to lead a long and healthy life, to acquire knowledge, and have resources needed for a decent standard of life. Additional choices include socio-economic and political freedoms, opportunities for being creative and productive, enjoying personal self-respect and guaranteed human rights.

Mode 1: Cross-border mode that applies to services provided from the territory of one member into that of another, where only the service itself crosses the border.

Mode 2: Consumption abroad mode that applies to services consumed by citizens or firms of one member country in the territory of another member where the service is supplied.

Mode 3: Commercial presence mode that applies to services provided by a foreign service supplier through investment in the territory of another member, through branches, subsidiaries, offices or any type of business or professional establishment.

Mode 4: Natural persons mode that applies to services provided by nationals of one member who travel to another member country to provide the service.

Most-favoured-nation (MFN) treatment: requires that governments "immediately and unconditionally" extend the best treatment given to *any* foreign services or suppliers to *all* like foreign services and suppliers.

National treatment (NT): requires that governments give foreign services and suppliers the best treatment given to like domestic services and suppliers.

Organization for Economic Cooperation and Development (OECD): Club of 30 rich industrialized countries.

potable water: water that is fit to drink for humans.

Privatization: Any shift of the production of goods and services from the public to the private sector.

Quad: Canada, EU, Japan and the US.

Superfund Amendments and Reauthorization Act 1986: US law that stresses the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites with a focus on human health problems and encourages greater citizen participation in making decisions on how sites should be cleaned up.

Trade liberalization: Reduction of tariffs and removal or relaxation of non-tariff barriers

Watershed: American usage for catchments of a river, in addition to original meaning of the dividing line between two river basins.

U-5 child mortality: Number of under-5 year deaths per 1000 live births in a year.

Executive Summary

Environmental goods and services contribute directly to the goal of human development, which is to improve the well-being and quality of human life. Some 1.9 billion people lack access to basic sanitation and 658 million to safe drinking water in Asia and the Pacific, accounting for 79 and 60 percent respectively of the deprived population worldwide. Most Asia-Pacific countries have endorsed the Millennium Development Goals that aim to halve, by the year 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation, and improve the lives of slum dwellers. The countries have also committed to reducing atmospheric pollution. The treatment of liquid and solid wastes, including hazardous wastes, that contaminate the sources of water, and also the conservation of rich biological habitats are broad environmental concerns with a bearing on human health, and in turn peoples' capabilities to lead the kind of life they value.

But issues of large-scale, direct foreign investment and ownership of assets complicate the trade in environmental services. Unlike many service sectors, the supply of environmental services involves large investments, which become profitable over long periods of time, thus making effective control a major factor in investment. Large multinational corporations all headquartered in OECD countries dominate the supply of environmental services and view restrictions on Mode 3 (commercial presence) as a barrier. The exporting countries have an interest in pressing for the privatization of environmental services in developing countries. Privatization has also been included in conditions for loans that are provided to countries by the Bretton Woods institutions. The most controversial proposals for privatization and trade liberalization involve water and wastewater treatment. Civil society organizations are wary of such proposals because of their implications for access and affordability by the poor -- although there may be gains on efficiency, quality, transfer of technology, and even freeing up of public resources for urgent human development objectives like education and health.

Participatory, cost-effective, self-mobilized indigenous models of community-managed environmental services deserve notice and replication. Discussions on foreign investment often overshadow "alternative" success models of low-cost service delivery to the poor. There are abundant examples of self-help provision of environmental services from all parts of the Asia-Pacific region. The human development notions of empowerment, sustainability, as well as equity in access are often best served by such low-cost community-led initiatives. Their replication might be limited by their context specificity. However, models also exist of successful co-operative non-profit water and sanitation delivery systems that have been scaled up. A Local Government system that supports community-led initiatives is a common feature of innovations that have been replicated, province or nation-wide. Even more broadly, the importance of civic engagement in the reform of utilities is increasingly recognized, not least when sensitive consumer interests are involved.

Asian-Pacific countries need to frame their strategic responses so as to precede trade liberalization by enhanced domestic legislative, regulatory and institutional

infrastructure. The benefits from trade liberalization in environmental services are likely to include better quality of service delivery and technology transfer, while the non-benefits include threats to the livelihoods of existing service providers, dominance of the market by foreign interests, negative social and political impacts as a result of pricing, as well as social justice and access issues. The scale of demand for services implies that most Asia-Pacific countries will require foreign technology and capital to meet them, while building up domestic fiscal and institutional capacities. The question, thus, is not whether to open up, but when, how fast, and with what kind of policy safeguards in place. Asia-Pacific countries need to retain their prerogative to decide the sequencing and nature of roles, policies and capacities for the state and non-state entities. Foremost, governments need to adopt environmental laws and regulatory regimes to strengthen management and oversight of environmental services. The responses of the Ministries of Commerce to the requests for liberalization commitments ought to retain policy options that ensure that the poor are not penalised by aspects of liberalization. Other concerned ministries, departments and agencies should make certain that adequate opportunity is retained for the development of national capacities, including the acquisition of environmentally sound technologies. For an all-encompassing national preparedness, other measures include clarifying definitional issues and maintaining information systems, strengthening negotiation capabilities, and gradually encouraging private sector involvement in a manner that does not compromise the human development objectives of peoples' empowerment, productivity, equity and sustainability.

Key policy and negotiating options for Asia-Pacific countries include:

At the international level:

- Removal of restrictions on the provision of environmental services through Mode 4 as equal, if not higher priority, compared to the removal of barriers on Mode 3.
- Inclusion of national and local capacity building, and technology transfer as principles for trade in ES; backed up by detailed operational rules for attainment.
- The principles of transparent operations, user community oversight of regulator and operator, and the non-exclusion of the poor in all liberalized provisions of environmental services.
- The revised classification of environmental services proposed by OECD countries may be accepted as a conceptual advance, attuned to the way the sector is organized; with the
- Inclusion of traditional services, such as watershed and biodiversity management that enhance use and existence values, as categories of ES; and
- Separation of solid waste and hazardous waste management into two distinct categories of environmental services under GATS, with distinct comparative advantages.

At the national level:

- Adoption of human development principles in the governance and management of environmental services; and their
- Incorporation in national laws, regulatory frameworks, programmes, and practices.

1 – Introduction

1.1 Purpose, Methodology, Limitations and Structure of the Report

The purpose of this study is to identify the possible benefits and costs of progressive liberalization in the environmental services sector from a human development perspective, and to suggest policy and negotiating options for Asia-Pacific countries. Human development has four essential components: empowerment, productivity, equity and sustainability (SEEP). In brief, enhancing people's capability to shape the processes that affect their lives, investments in human potential, enlargement of people's choices, and governance of resources in a way that does not prevent the next generation from improving its own welfare.

This report is based on a review of four national case studies for China/Hong Kong, Pakistan, Thailand and Viet Nam. For a wider Asia-Pacific context, the literature reviewed includes relevant materials from the Asian Development Bank, environmental trade journals, European Commission, OECD, SPREP (for Pacific Island Countries), UNCTAD, World Bank, WSSCC and WTO, as well as academic work. Among the latter, a paper from the Indian perspective on trade in environmental services by ICRIER has been useful.

A limitation for such a study is the diversity of environment and human development situations across Asia and the Pacific. The 39 countries of UNDP's Asia Pacific Region range from large and densely populated countries, some with substantial emerging markets to small island states. They face distinct challenges with wide variability in their respective country-based experiences of the degree of environmental stress affecting their natural resource base, human vulnerability and capacities to cope with the attendant issues. This study is limited to a thematic analysis that is applicable to broad groups of developing countries in Asia and the Pacific.

This chapter is structured into nine sections. Following this Introduction, the challenges of environment and human development in Asia-Pacific are described in Section 2. How do Asia-Pacific countries measure up on environmental indicators, and what are the links between human development and environmental services? How have governments, the private sector and civil society responded to these issues? Section 3 looks at the characteristics, segments and trends in the environment industry and asks what they mean for human development. Section 4 reviews barriers to trade in environmental services, the current volumes and forecasts, especially the asymmetry between service providers, and evaluates what is at stake for human development in this trading system. Section 5 looks at the types of private participation in environmental services and what they imply for human development. Human development is---or should be---at the forefront of community-led initiatives for accessing environmental services. Section 6 reviews a number of such initiatives and draws some lessons relating to elements essential to their replication. The GATS negotiating offers on environmental services are described in Section 7. The implications of all of the above for human development are drawn together in Section 8, along with an analysis of the probable expectations and concerns of the main stakeholders. Section 9 provides the policy recommendations for international and (indicatively) for national levels.

2 – Environment and the Challenges of Human Development

2.1 How Asia-Pacific Countries Measure Up on Environmental Health

In the broadest sense, development is about improving quality of life. The well being of millions of people still living in absolute poverty in Asia depends in part on a wide range of environmental resources, including access to and use of fresh drinking water and sanitation. It is estimated that some 1.9 billion people in Asia lack access to basic sanitation, and 658 million to safe drinking water (WSSCC, 2004, 28). They comprise 79 percent and 60 percent of the global population respectively without access to basic sanitation and safe drinking water. The Pacific Island Countries are three orders of magnitude smaller in size and populations than Asia, but share the intensity of environmental problems (box 1).

Box 1 - Water and waste management problems in Pacific Island Countries

All PICs have critical problems associated with the disposal of waste and the prevention of pollution. Prior to the 1970s, most waste products were biodegradable and population concentrations were not high; both features have changed markedly over the last three decades. Growing urban populations, increasing imports of non-biodegradable materials and chemicals have brought about a rapid confrontation with the realities of waste and hazardous waste management. The physiographic characteristics of Pacific islands, their small size, isolation and oceanic location, and dependence on marine resources, make them highly vulnerable to contamination by solid and liquid wastes. Few PICs have enjoyed consistent investment, management and community support needed for a problem-free water supply. It is often difficult to balance the needs of various sectors, such as hydroelectric power generation, public water supplies and conservation. Local pollution and sedimentation owing to uncontrolled watershed development and poor conservation are common problems. Atolls have no surface water and limited groundwater resources. The limited supply is a major constraint to survival and development. Owing to high infiltration rates, the groundwater is susceptible to contamination, and the people to water-borne diseases (SPREP et al 2001, 24)

The developing countries of the Asia-Pacific region show a large (and perhaps widening) range of human development situations. Singapore, Taiwan, South Korea, and Brunei and Hong Kong (Special Autonomous Region of China) have followed Japan into the category of high human development. The bulk of Asia-Pacific countries (and populations) are currently at the stage of medium human development, led by Malaysia and Thailand. Barely making it into this category are Bangladesh and Bhutan, Papua New Guinea and Vanuatu. A category below, Nepal and Pakistan are experiencing low levels of human development, while the unfortunate Afghanistan is unranked (UNDP 2003, 26).

Greater production and consumption are associated with development, and imply a larger ecological footprint on Planet Earth. Are the higher levels of consumption sustainable? There have been attempts in recent years to develop international environmental indices.

Environmental Sustainability Index (ESI) was launched at the World Economic Forum and is based on an extensive set of indicators. The ESI set of rankings for Asia-Pacific countries are quite different from the HDI. For example, countries like Bhutan, Laos and Mongolia with their pristine environments rank high on the ESI, despite the vulnerability of their human populations to environmental health hazards (appendix 1). China and Republic of Korea fall to the bottom 10 percent because of their poor air & water quality, and contributions to cross-border transport of acid rain and marine over-fishing (World Economic Forum 2002, 30).

Cluster analysis by the ESI team helps in clarifying the differences between human vulnerability, environmental stresses and societal capacities to cope with related problems. Countries are grouped on the basis of their scores for these components of the ESI. Cluster 1 comprises countries with high human vulnerabilities but moderate environmental stresses. In Cluster 2 are countries with low vulnerabilities, a poor state of the environment with high stresses but an above average capacity to cope. Clusters 3 and 4 both with moderate vulnerabilities and stresses are distinguished by low or average social and institutional capacities to deal with the stresses and vulnerabilities (table 1).

Table 1 - Clusters of environmental vulnerabilities, stresses and coping capacities in Asia-Pacific

<u>Cluster 1</u> High human vulnerability; moderate stresses on environment	<u>Cluster 2</u> Low vulnerability; poor state and high stresses on environment; above average capacities	<u>Cluster 3</u> Moderate vulnerability, state and stresses, low capacities	<u>Cluster 4</u> Moderate vulnerability, state and stresses on environment; average capacity to cope
Bhutan, Cambodia Laos, Myanmar Nepal Pakistan Papua New Guinea	South Korea	North Korea	Bangladesh, China India Indonesia Iran Malaysia Mongolia Philippines Sri Lanka Thailand Viet Nam

Source: WEF et al 2002,30

The ESI has been widely critiqued from all quarters. For some, it has too many socio-economic indicators and not enough global indicators. For others, the selection of capacity indicators is naïve. In sum, it is not yet accepted as an authoritative index. This also holds for the ‘Wellbeing of Nations’ index that has not been repeated since its launch in 2001 (Prescott-Allen 2001, 21).

Though some scholars have deep misgivings about the ESI and ‘Wellbeing’ Index, this does not mean that there is no need for environmental sustainability indicators. While the conceptual debate goes on and the refinements to sustainable human development indices continue, analysis of country situations could be made on the basis of the widely accepted environmental targets and indicators in the Millennium Development Goals (MDGs).

All the countries of Asia-Pacific face challenges for meeting Millennium Development Goal 7 (MDG-7) over the coming ten years. Some countries made good progress on some indicators during the 1990s. A notable change is that forest regeneration now exceeds deforestation in China, Taiwan, Viet Nam, and also Bangladesh. But heavy deforestation continues in Indonesia, Malaysia, Myanmar, Nepal, Pakistan and Sri Lanka. After the coming into force of the Convention on Biological Diversity (CBD), most countries have extended natural parks and other types of protected areas, but questions remain about the quality of management. With greater awareness of the environmental consequences of energy use, many countries have improved energy efficiencies, particularly China (from a low base line) and Hong Kong, Bangladesh and Sri Lanka (from already high levels of energy efficiency). On the other hand, carbon dioxide emissions to the atmosphere continue to increase as a committed leadership on the global issue of climate change is lacking (appendix 2).

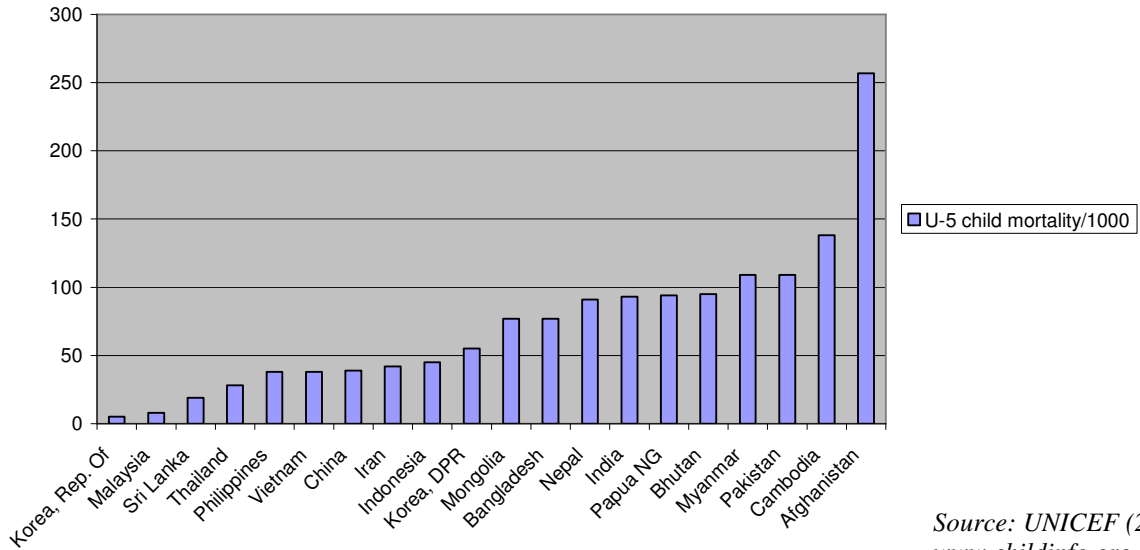
Reducing child mortality is a Millennium Development Goal by itself and under-five child mortality is a component of the HDI. The World Health Organization confirms that diarrhoea remains a principal cause of child illness and death (Kosek et al 2003, 16) and it is a water and sanitation-borne disease. Basic sanitation and hygiene can prevent the spread of the disease. As such, U-5 child mortality is an indicator of human vulnerability, stress on ecosystems and societal capacity to cope, all three being crucial aspects of environmental sustainability. Furthermore, child mortality is widely, uniformly and accurately reported across countries and therefore is a reliable and valid indicator of national environmental health.¹ In contrast, statistics for access to safe water and basic sanitation are suspect, partly because of definitional variations across the countries, partly because they are based on infrastructure installed rather than in actual use.

South Korea, Malaysia, Sri Lanka and Thailand have made most progress in reducing child mortality among the developing countries of Asia-Pacific (figure 1). The Philippines, Vietnam and China have also made notable progress in reducing child mortality to below 40 per thousand. Afghanistan, Cambodia, Laos, Myanmar, and Pakistan have the worst environmental health conditions for children. India, a populous country with bad sanitation, accounts for a quarter of the world’s child deaths owing poor hygiene. Appendix 3 provides health statistics along with indicative numbers on access to water and sanitation for 20 countries of the Asia-Pacific region for which such data is available.

¹ Future research on environmental indices should focus on establishing comparable data sets of child death rates from proximate environmental causes, intestinal infections and respiratory diseases. The existing regional coverage of these indicators is uneven and unreliable.

Figure 1 - Under-Five Child Mortality / 1000

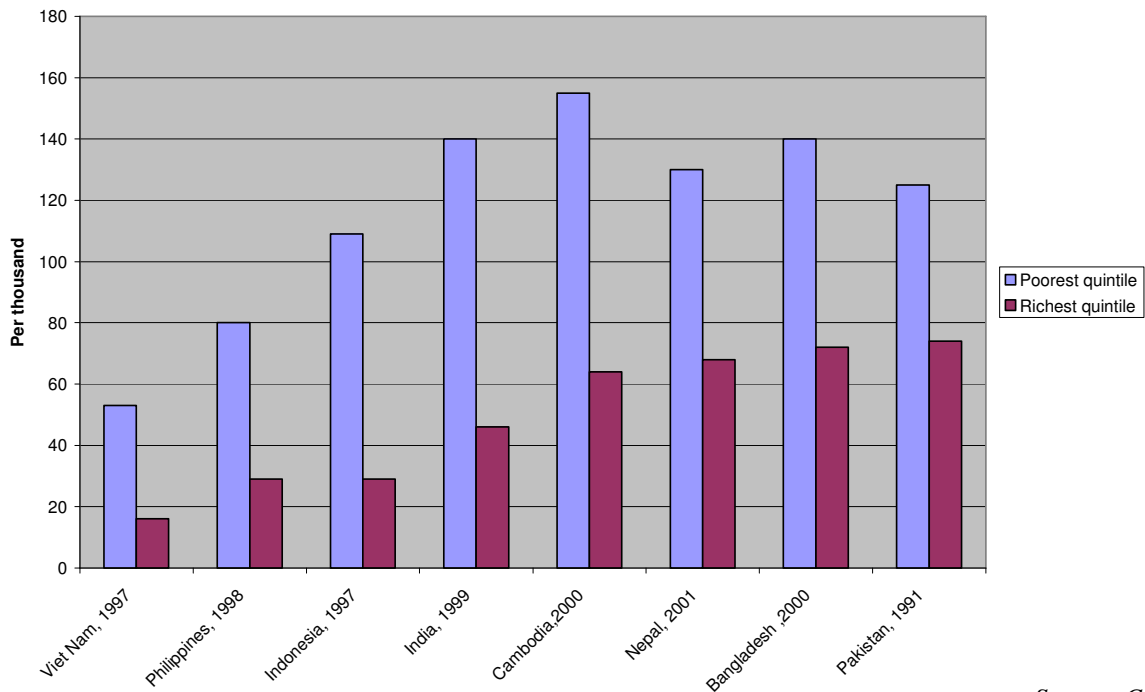
Under-five child mortality reflects the wide range of environmental conditions in Asia-Pacific countries



Source: UNICEF (2001)
www.childinfo.org

Figure 2 - Child Mortality Among Poor & Rich

But the poor suffer more everywhere



Source: Carr, 2004,6;
data in appendix 4

The burden of environmental health deprivations falls disproportionately on the poor and on women (figure 2). A number of researchers are reporting that marginality – as defined by low-income, limited access to education, and inadequate living conditions – explains more of the inequality in under-5 mortality than does unequal public health expenditures (Carr 2004, 6).

While they experience more severe public health problems, poor people in slums also generally pay more per unit of water and other environmental services that they do manage to obtain (table 2).

Table 2 - Ratios of prices charged by water vendors and public utilities

Country	City	Ratio
Bangladesh	Dhaka	12 – 25
Indonesia	Jakarta	4 – 60
	Surabaya	20 – 60
Pakistan	Karachi	23 – 83

Source: Bhatia and Falkenmark 1993, 5

2.2 Human Development Issues and Environmental Services

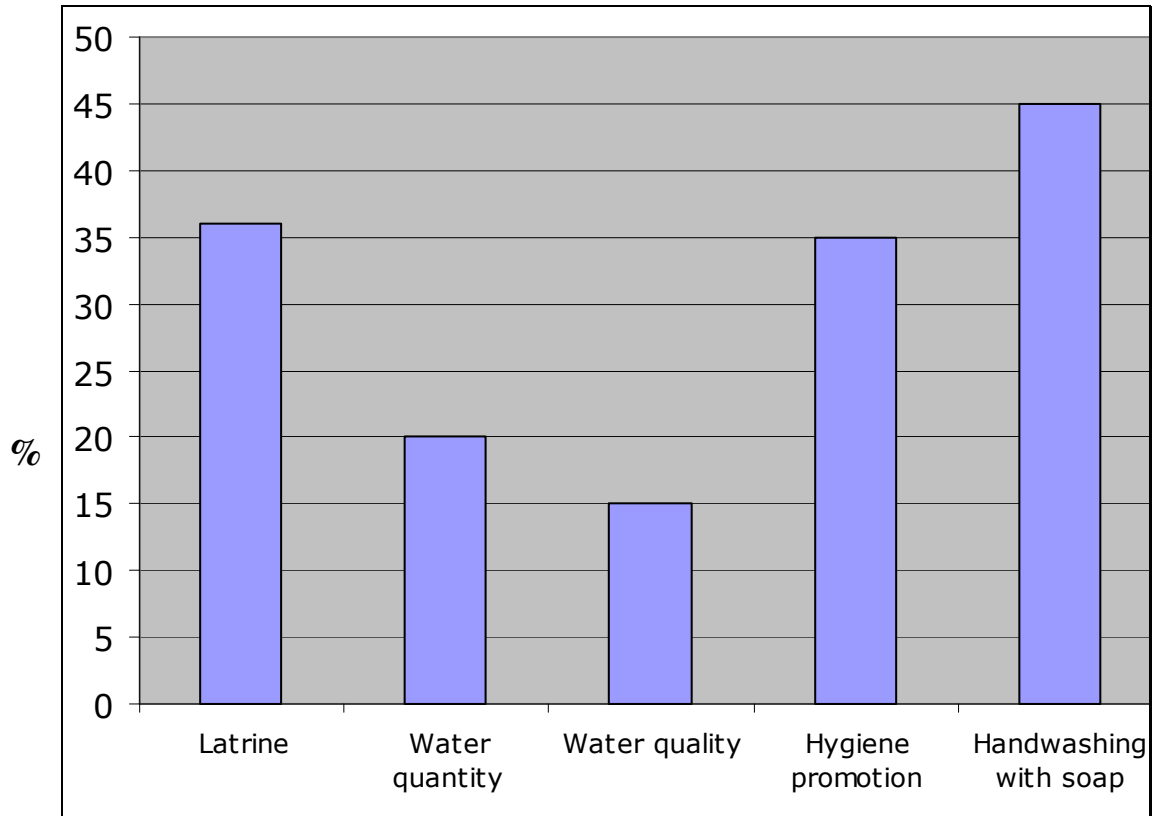
It has been argued that a number of human development issues are directly related to environmental vulnerabilities and stress². The burden of illness and death from diarrhoeal diseases in Asia-Pacific is truly staggering. It is especially pertinent that the human development approach, focusing on hygiene promotion and hand washing with soap after defecation is more effective in reducing the transmission of diarrhoeal diseases than installing infrastructure for more and better quality water, or even sanitary latrines (figure 3).

In turn, efficient and sustainable environmental services and support systems can make significant contributions toward the achievement of the MDGs in a number of ways (box 2). The vast unmet need and the scope for enhancing the dignity of hundreds of million women with the provision of clean, secure, and private sanitary facilities are particularly noteworthy.

² In addition, environmental goods and services constitute around 1.8% of global economic activity (EBJ, 2003, 8). Further rapid growth is forecast for environmental services in developing countries. National policies on growth-generation, fiscal allocations, and job creation in this growing sector will have an increasing potential to promote human development.

Figure 3 - Reduction in Diarrhoeal Incidence

Investment in human learning and hygienic behaviour is more effective than money spent on infrastructure



Source: WSSCC, 2004 www.wsscc.org

Box 2 - Environmental services contribute directly to all Millennium Development Goals

Millennium Development Goals	Human Development Issues related to Environmental Stresses and Vulnerabilities	Contribution of Environmental Services
Goal 1: Eradicate extreme poverty and hunger	Time and energy are lost collecting water; frequent illness leads to lower productivity and income; diarrhoeal diseases play a significant role in malnutrition, particularly in children	Environmental services contribute to better health, make time available for productive activity while health expenditures are reduced
Goal 2: Achieve universal primary education	Girls in slums and rural areas are obliged to stay home to help carry water; have higher drop out rates from school with no clean toilets	Education performance is significantly enhanced when infections arising from poor sanitation are brought under control
Goal 3: Promote gender equality and empower women	950 million women and girls in Asia-Pacific face daily inconvenience during defecation in the open or in un-sanitary latrines; a proportion are harassed	Women and girls with access to private sanitary facilities have more dignity, mobility, livelihood opportunities
Goal 4: Reduce child mortality	Diarrhoeal diseases continue to kill more than 800,000 children in Asia-Pacific every year; a third of all child deaths in the region	A sharp and significant decline in U-5 deaths with hygiene, sanitation, and clean water
Goal 5: Improve maternal health	Contaminated water increases chances of infection during labour	Reduced incidence of infections among mothers
Goal 6: Combat HIV/AIDS, malaria, and other diseases	Difficulties in cleaning, bathing, washing, cooking, and caring for ill family-members	Less contaminated water, fewer attacks on immune system; less stagnant water, less disease vectors
Goal 7: Ensure environmental sustainability	Contaminated water, uncollected waste, polluted air in cities, noise vibration in industrial areas, squalor, disease in slums, degraded river water; degraded forests and rangelands impact on people's quality of life	Less contamination by faeces, industrial wastewater; management of solid and hazardous wastes, control of air emissions, noise vibration, management of ecosystems, water & sanitation services
Goal 8: Develop a global partnership for development	Unattractive countryside, cities, regions and countries adversely impact on self-image and people's participation in local, regional, national and global governance	Efforts to reform water and sanitation institutions and to promote hygiene and conservation increase linkages, build development partnerships, boost tourism and national image

2.3 How Stakeholders have Responded to Environment-Development Challenges

2.3.1 Environmental Policies in Asia-Pacific Countries

The creation of environmental policies and programmes in the developing countries of Asia has taken quite a different course than in industrialised countries. Environmental laws and institutions in industrialised countries were formulated in response to industrial technologies of the time, popular demand, and public pressure on politicians, as a bottom up process. In Asia, environmental institutions have been formed by enlightened leaders and in response to the requirements of international funding agencies, and pressure from international NGOs; public interest has been important but not as powerful.

During the 1980s, Asian countries moved forward with the introduction of national environmental laws and regulations, especially those that controlled industrial pollution and required the use of EIA for large investment projects. EIA was extended to include both public and private investments, and became the most significant environmental policy measure to address environmental considerations in development decision-making. Urban and industrial control regulations set limits on industrial emissions, discharges, and on other industrial operations.

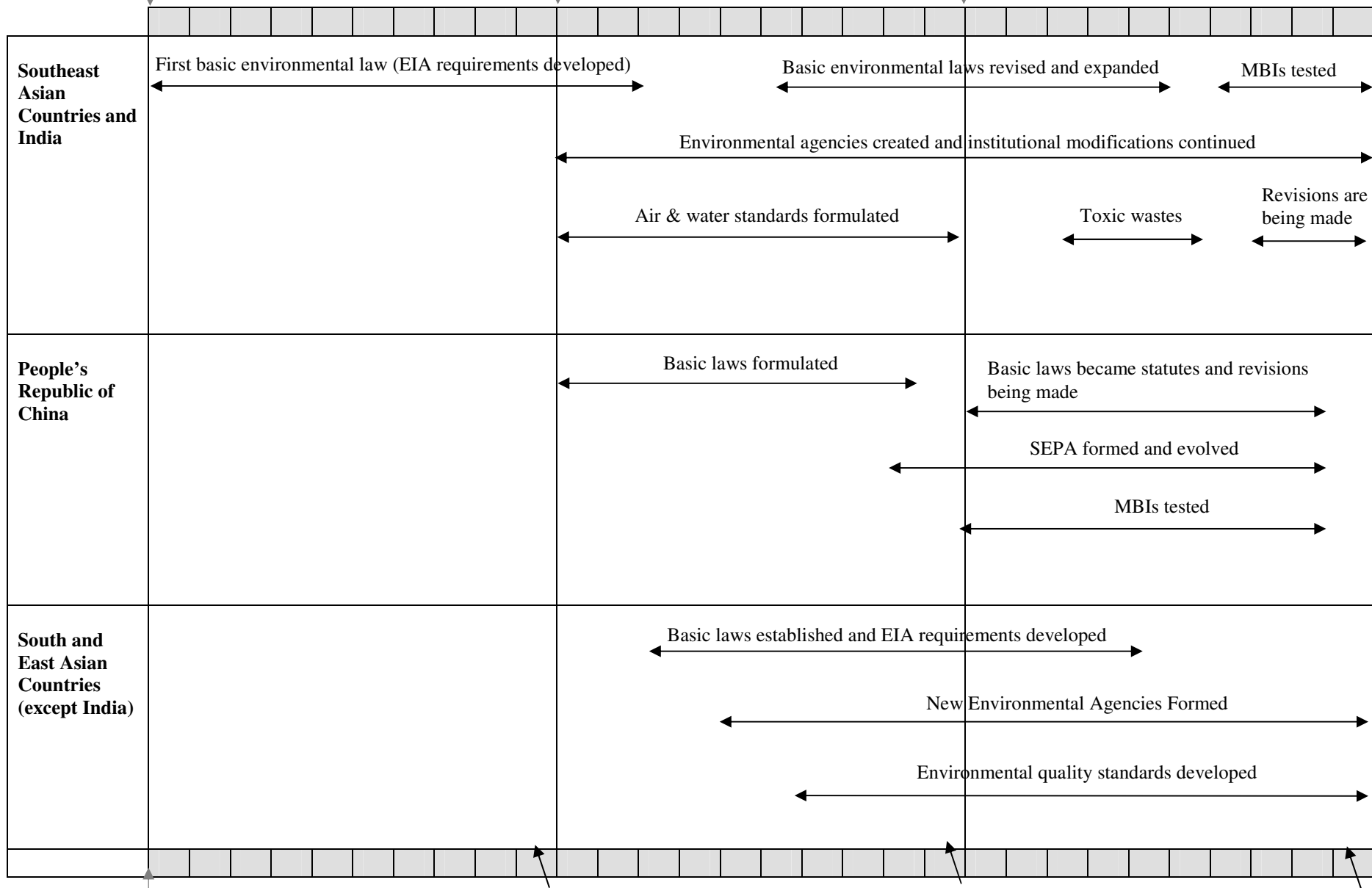
Unfortunately, because of weak or nonexistent enforcement, many statutory requirements were not met, and pollution control regulations went largely unimplemented. In the 1980s began a haphazard and ineffective government attention to environmental issues in the region that largely persists to date.

By the 1990s, almost all Asian developing countries had formulated legislative and environmental quality standards (figure 4). However, compliance did not materialise in spite of provisions for sanctions. Environmental agencies were marginalized compared to ministries charged with economic development. Weak judicial systems, lack of mechanisms and forums for citizens to express environmental concerns, resulted in the failure of environmental institutions to hold government and commercial interests accountable for poor environmental performance.

The late 1990s were punctuated by the disruptive financial crises in East Asia. Despite the subsequent decreases in production in many East Asian countries, pollution intensified as industries moved resources out of abatement activities and oversight further weakened. The fiscal constraints faced by national governments added impetus to the ongoing trend favouring decentralisation of responsibilities for environmental management from regional to local levels. However, capacity at these levels remained weak and continues to be so. Inaction during the 1990s has been attributed to the prevailing view that “the environment can wait”, which was subsequently overcompensated by unrealistic regulatory regimes that never found traction in Asia (ADB 2000, 2)

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Figure 4 - The Establishment of Environmental Institutions in Asian Countries



Source: ADB
2000, 2

1970

1980

1990

2000

Environmental institutions in Asia have begun testing two new approaches: use of market based instruments (MBIs) and increased disclosure of information on environmental violators. Experiments with MBIs have included pollution taxes and charges, user fees, and marketable pollution or resource-use permits. Information disclosure approaches have been tested in India and Indonesia. The use of MBIs remains modest, the region has examples of effluent charges for wastewater, sulphur dioxide emission charges, differential prices for unleaded petrol, and deposit refund schemes to promote recycling. MBIs that reduce pollution have been tested in China, Indonesia, Malaysia, Philippines, Republic of Korea, Singapore, Taiwan, and Thailand.

To date, most of the region's experience has been with fiscal instruments. Market creating MBIs have not been used extensively, and so far, only a few have been tested (wastewater permit trading in China, permit trading for CFCs and traffic congestion in Singapore). This is a critical deficit, because market creating instruments are particularly important in the regulation of privatized utilities and encouraging fair competition among them.

Most Pacific Island countries prepared State of the Environment reports in the early 1990s and followed them up with National Environmental Management Strategies and Integrated Coastal Management Programmes. Several countries have environmental regulations and some have financial incentives for waste management. In many PICs, freshwater management is integrated with coastal management, in others with watershed and waste control strategies. There has been limited introduction of small advanced water treatment systems. As in Asia, the transference of plans into action has been difficult (SPREP 2001, 24)

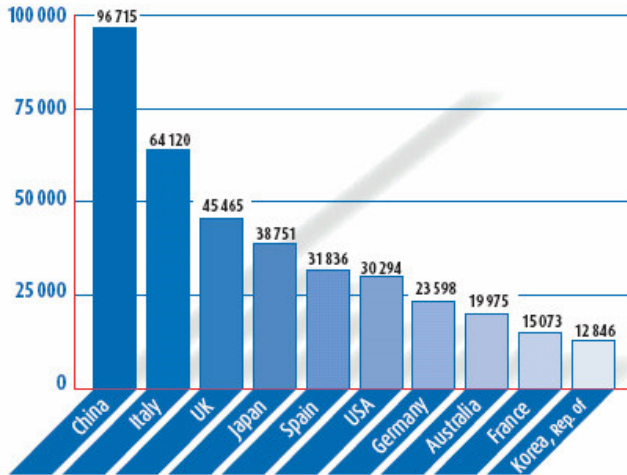
2.3.2 Private Sector Responses to Environment-Development Issues

The private sector in Asia-Pacific as in the rest of the world demonstrates a whole variety of divergent responses to environmental issues. They range from exemplary leadership, demonstrated by investment in cleaner production practices in advance of national regulations or end-of-pipe abatement or both; 'green-washing' that is lip-service to environmental issues; a negligent approach; and active contravention of regulations.

The comparative responsiveness of private sector may be assessed through the growth in the number of firms certified for ISO 9000 quality and ISO 14000 environmental management standards. China and the Republic of Korea have demonstrated remarkable growth in certification (figures 5 and 6). As recently as 2000, Asia-Pacific less Japan had 17 percent of the world's ISO 9000 certificates, and 11 percent of the world's ISO 14000 environmental management certificates. In three years, these shares have grown to 27 and 17 percent, respectively. China now leads the world with nearly 100,000 firms certified for quality management. It is in third place after Japan and the UK with more than 5,000 firms certified for environmental management after ten-fold growth in the last three years. Medium and even small enterprises appear to be adopting the standards. The private sector in the Republic of Korea has also demonstrated strong leadership with a trebling of ISO 14000 certificates in three years. In general, East and Southeast Asia countries are far ahead on both certification processes compared to South Asia (appendix 5).

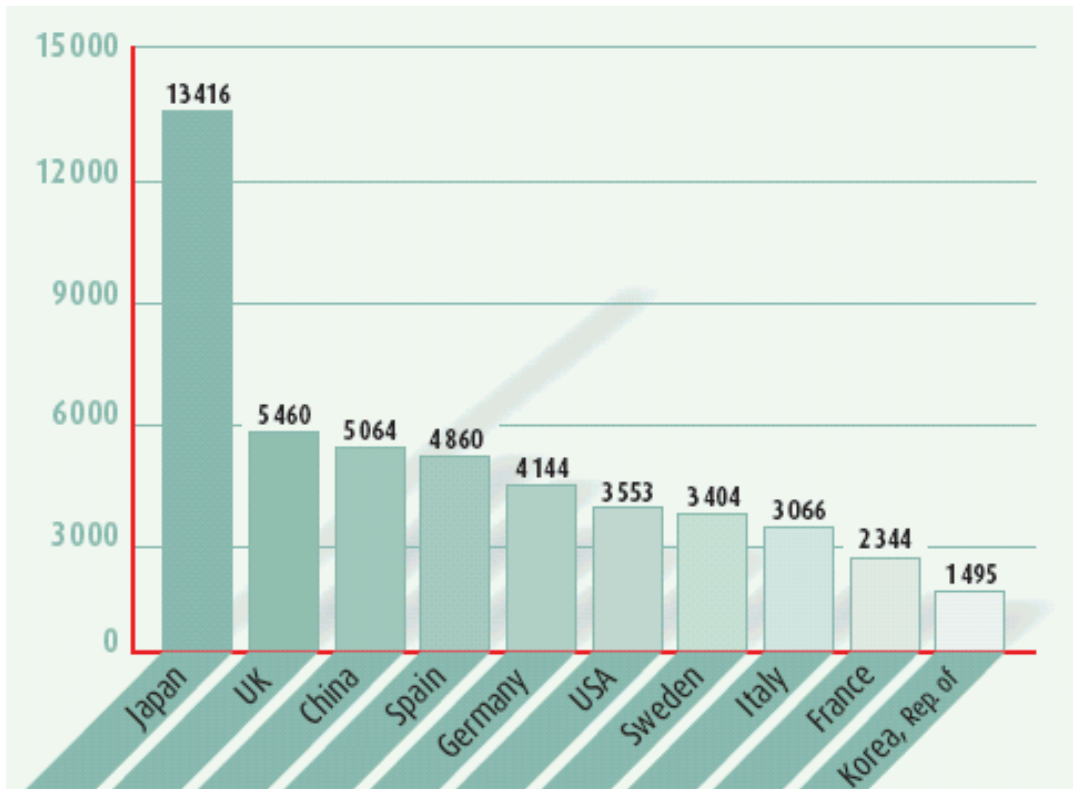
Figure 5 – China is now the leading country for firms with quality certification

Top ten countries for ISO 9001:2000 certificates



4 The ISO Survey of ISO 9001:2000 and ISO 14001 Certificates

Figure 6 – Asia – Pacific countries are now among the leaders for environmental management certification



2.3.3 The Growth of Environmental Consciousness

The rise of world environmental consciousness is generally dated to the Stockholm Conference on the Human Environment, 1972. Civil society in some countries, notably in India, was active even earlier, but was mobilised even more strongly after the Conference. In most countries of developing Asia, civil society took a decade or two to organise itself for environmental advocacy. Under the rising influence of NGOs engaged in environmental advocacy, environmental policies and institutions established during the 1990s were characterised by “overly ambitious, uniformly applied and inflexible pollution standards, technology specifications, subsidized provision of water, sanitation and waste treatment, inadequate monitoring, weak and erratic enforcement of environmental regulations” (ADB, 2000, 2).

This acknowledgement of the efficacy of NGOs in policy advocacy across most countries of developing Asia highlights an underlying reality. NGOs like the nation-state and the corporation are a global phenomenon, and civil society activism is here to stay. More particularly, civil society organizations in Asia-Pacific are aware of, and wary of, proposals for the privatization and liberalization of environmental services, as loudly articulated by them at the Third World Water Forum in Kyoto, March 2003 (also box 3).

2.4 Summing-Up the Situation

The Asia-Pacific region has diverse environment-development experiences, and the situation is evolving rapidly along different trajectories. All the countries face human development challenges and there are environmental management issues everywhere. However, some Asian countries are close to levels achieved in the industrialized countries in coping with environmental vulnerabilities, while the lagging countries of the region are stuck in a situation similar to that prevailing in Africa. In the leading countries, the dynamism of the private sector, especially of the small and medium enterprises, is a reason to be optimistic that society will be able to cope with looming issues, such as climate change. The lagging countries are not isolated from the impacts of modernity, but have far more fragile coping capacities, and their challenges of environment-development are truly staggering.

The environment industry claims to provide solutions to some of the above issues. The next section looks at the salient features and emerging trends in the industry. It does so from the perspective of the current and potential contributions of the environment industry to human development.

Box 3 - Women are getting ready to make waves for water and sanitation

Leading organizations of women environmentalists across the developing world are getting together to urge governments to make funds available to associations of poor women for water, sanitation and poverty alleviation schemes and ecosystem management. In particular, the organizations are promoting Water for African Cities, Water for Asian Cities, and the Sanitation Trust Fund, under the theme "Women as the Voice for the Environment (WAVE)". A recent WAVE assembly in Nairobi, Kenya representing women from 60 countries has reiterated support for the human right to water, with the mainstreaming of gender equality in all water and sanitation projects and the renewal of efforts to ensure adequate and safe public sanitation for women and girls.

Source: UN News Centre

<http://www.un.org/apps/news/story.asp?NewsID=12220&Cr=environment&Cr>

13 Oct 2004

3 – Environmental Industry and Human Development

The environmental industry comprising its equipment, services and resources components evolved from the need of industries and governments, particularly municipalities, to meet more stringent environmental regulations in the industrialised countries. The industry has grown to over \$556 billion in revenues in 2003, accounting for 1.8 percent of the global economy (Ferrier et al, 2003, 10). The global environment industry is dominated by OECD countries, with the US accounting for the largest share of this industry at about 40% of the world market, followed by the EU and Japan.

During the 1980s, the environment industry (equipment and services) experienced rapid growth in the industrialised countries, owing to increased enforcement of environmental regulations (command and control as well as economic instruments). However, there has been a notable decline in regulation driven demand for such services; and new demand has been driven by economic factors, i.e. of avoiding waste and improving efficiency. The supply of environmental services is being provided by the private sector to a greater extent than in the past. More recently, the industry has shown signs of maturity and stagnation even in these sectors with growth rates dropping sharply during the 1990s.³

The market for environmental goods and services in developing countries has been growing rapidly, with double-digit annual growth. The major factors responsible for the expansion of the global environment industry include the growing awareness of environmental problems and greater enforcement of environmental regulations, besides rapid population growth and urbanization that have put increased pressure on natural resources. Moreover, technological changes have also made possible new and innovative ways of dealing with environmental challenges, and increased global competition in this sector.

Some private firms are now operating on a world scale, and are seeking to enter the markets of developing countries where the need for such services is perceived as enormous. Since the markets in industrialised countries are saturated, negotiators in developing countries should be aware of the potential value their markets offer.

3.1 Definition of Environmental Services

The environmental services sector constitutes about half the total environment industry. In 2000, the value of the environmental services sector was approximately US\$270 billion (Zarrilli, 2003, 33). If the resources segment is considered a part of services, then over two-thirds of the industry is represented by services (Andrew, 2003, 1).

Broadly speaking, environmental services are defined as those service activities, which reduce environmental risk, minimize pollution, and enable efficient resource use. The OECD definition of environmental services describes the coverage of environmental

³ For instance, in the US the annual growth rate of the industry that ranged from 10-15% during 1985-1990, dropped to 2-5% during 1991-1995 and further to a low of 1.2% in 1996. It has been holding steady at 2.3% in recent years, partly on the basis of a growing overseas market.

services in terms of groups of activities and in terms of core and non-core areas of activity within each of these groups. The three broad groups of activities are recognized (WTO 1998, 32)

The first is the *pollution management group* which consists of activities such as air pollution control, waste water management, solid waste management, remediation, cleanup of soil and water, noise and vibration abatement, environmental monitoring, analysis, assessment, environmental research and development, and environmental construction and engineering. For instance, waste management services include core activities such as collection, transport and landfill operations, waste to energy conversion services, recycling, industrial resource recovery, and waste reduction services. In addition, there are non-core activities such as ecological consulting, legal, land use advisory and analytical services, which are also relevant to this group.

The second set of activities falls under the *cleaner technology group*. These activities are aimed at eliminating or reducing the impact of technologies, processes, and products. These include activities such as design of new processes and products, environmental research and development, and environmental monitoring and impact assessment. Again, non-core areas such as consulting, engineering, technical analysis and testing are relevant to this group of activities.

The third set of activities falls under the *resource management group*. This group includes activities that enable efficient and sustainable use of resources, for instance, solid waste recycling and resource recovery relating to disposal, management and recycling services.

The importance of the cleaner technology and resource management group of activities is on the rise, due to the recent shift in focus from end-of-pipe solutions towards prevention and control of environmental pollution. This shift has contributed to the increasing importance of the environmental services sector.

There is also a growing role of service activities beyond the traditional core environmental services. Although traditional activities such as waste management, water treatment, refuse disposal, and pollution abatement activities dominate the sector, other non-core services have also gained importance. These new services include those relating to compliance with environmental legislation and remediation, support services like environmental lab testing, monitoring, legal, consulting, auditing, research and development, strategic environmental management services, and consulting and engineering support services for building of environmental infrastructure. The inclusion of these non-traditional or non-core environmental services has led to an expansion of the environmental services sector.

From the human development perspective, these definitions are sound and conducive to promoting productivity and sustainability. However, the details of the classification reveal a bias toward recognition of white-collar jobs. The definitions need to take explicit account of the environmentally-friendly activities of the poor in developing countries, register their valuable work in the sector and support their empowerment. Such a revision of definitions would also lay the basis for promoting equity in development outcomes.

3.2 Characteristics of Environmental Services

The environmental services sector has three important characteristics. The first important characteristic is that it overlaps with activities in just about all other sectors of the economy. For instance, the sector overlaps with activities in sectors as diverse as architecture services, construction and related engineering services, technical analysis services, auditing and risk assessment, research and development, and consulting services. As a result, the range of establishments and occupations that are relevant to the environmental services sector is quite large and diverse. The range of occupations includes, for instance, environmental impact assessors, environmental consultants, ecological advisors, landscape consultants and urban planners, environmental management consultants, environmental law counsellors, and ecological marketing advisers. This overlap is due to the fact that activities within the environmental services sector, unlike those in other sectors, are meant to internalize the environmental costs of economic activities into the economic system.

A second important characteristic of this sector is that several environmental services have the properties of quasi-public goods, and this makes pricing based on consumer use difficult.⁴ Hence, considerations of equity, universal provision, and affordable access are very important in this sector.

The third important characteristic is that the provision of several environmental services typically requires large investment to ensure that collection and distribution networks reach the entire population (e.g. sewerage system network). This feature supports the emergence of natural monopoly for efficiency in the provision of environmental services requiring large capital investment (i.e. to minimize the cost of per unit provision of the service).

Owing to their nature as quasi-public goods coupled with the characteristic of natural monopoly, the public sector has been the primary provider of a range of environmental services. Several services including, sewage and refuse disposal, collection of garbage, cleaning of roads, parks and lakes, provision of (tapped) drinking water, have been traditionally provided by local government bodies. They are all services which are essential for ensuring a basic quality of life to the public. In some countries, some of them are being privatized (see below).

All these features (multi-sector activities, quasi-public goods, and a tendency to natural monopoly) reinforce the importance of a human development perspective. Only an alert society can identify and allocate environmental costs, exercise oversight over monopolies, and above all, ensure basic and fair access to essential services for all.

⁴ Environmental services are not pure public goods. The classical definition of *pure public goods* is based on certain properties as opposed to those of private goods. These include non-rivalry in consumption (consumption by one individual does not affect the consumption of others), non-excludability (once provided, it is hard to exclude others from consuming the good), and non-divisibility (the good can be provided to an additional person at no extra cost). Excludability in the provision of environmental services however could be introduced (e.g. disconnecting water supply to an individual household for non-payment), and rivalry in consumption also exists (due to congestion in use).

3.3 Structure of the Environment Services Industry

The environmental services industry consists of public sector environmental utilities and infrastructure as well as private sector environmental support services. Even with privatization in the infrastructure services, the public sector plays a large role in providing and consuming solid waste management, water utilities, and sewage treatment services. These are the most significant segments in terms of revenues generated (appendix 6).

The structure of the industry is not uniform across its sub-sectors. A few large firms dominate the sub-sectors that require large scale investments for economies of scale. For instance, sewage services need investment in collection and distribution networks, and are economical only for a single large operator. There has been a tendency towards increasing concentration in these sub-sectors to capture the scale benefits accruing to large capital investments and technological development. Moreover municipalities tend to use a few large environmental service suppliers owing to the ease in monitoring and tracing liability (WTO 1998, 31). In the USA, mergers and acquisitions are a regular feature in the environment industry. The top ten environmental services companies are estimated to control about half the private market. On the other hand, the specialised nature of analytical services and consulting supports the emergence of small and medium scale operators. These services are in fact provided widely by medium-sized and small firms, who are often sub-contractors for large projects.

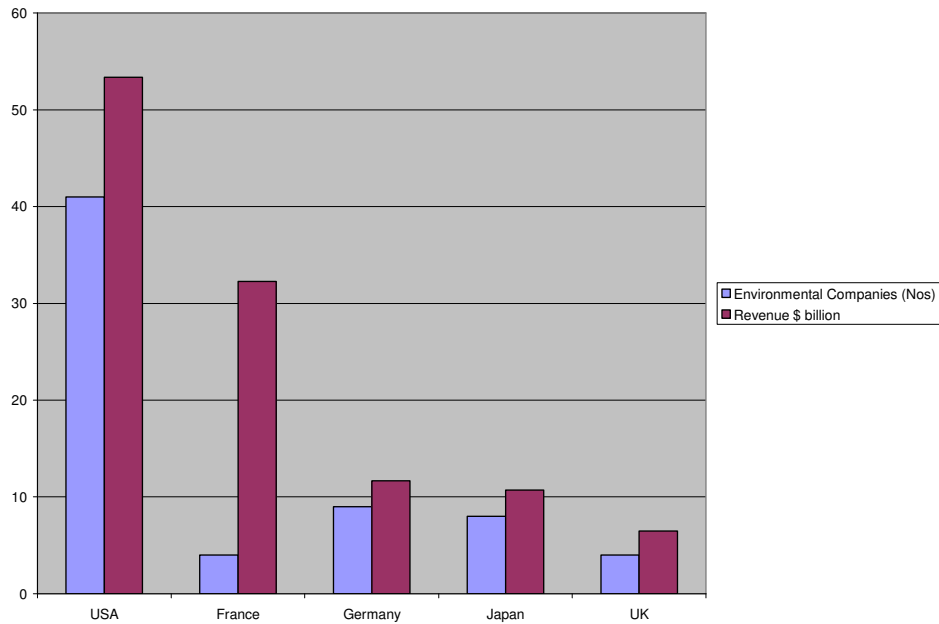
This industry structure is reflected in the global market with the emergence of large multinational corporations dominating a few market segments in water and wastewater treatment. The larger multinationals provide integrated products and services required for environmental systems management.

None of the largest environmental companies in the world are from developing Asia. All of them are based in the US, EU, Japan or Canada. The top 71 firms in the sector account for 20 percent of all the revenues generated in the sector (appendix 7). Most of the firms are from the USA, but two of the largest firms are French⁵. Other countries with a notable number of leading firms are Germany, Japan, and the UK. The precise share of these large firms in international trade in ES is not known, but given their span of operations, is likely to be much more than their considerable share in overall national and trans-national revenues (figure 7).

These structural elements raise concerns at several levels from the human development perspective. The exclusion of the poor, even society and countries as a whole, from critical decisions relating to environmental services is a risk associated with the domination of the sector by large OECD-based companies. However, the structure also reveals opportunities for technology acquisition, a potent instrument for human empowerment. Knowledge-based small and medium enterprises providing analytical and consulting services are best placed to grasp these opportunities.

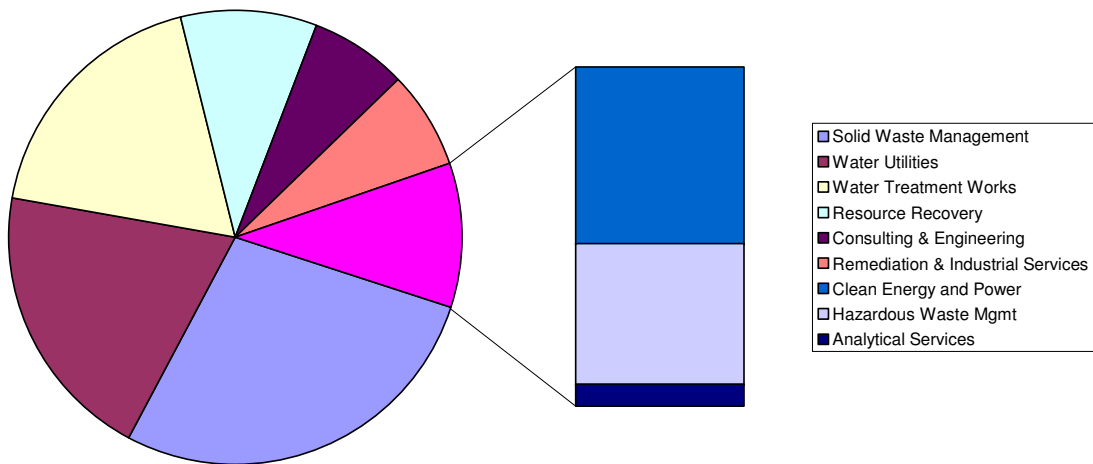
⁵ There are changes in the fortunes of individual companies in recent years. The aggregate analysis for the distribution of firms remains valid.

Figure 7 - All the 70 largest ES firms are based in the Quad countries



Source: EBI 2003,8 details at Appendix 7

Figure 8 - Solid Waste Management, Water Utilities and Sewage Treatment - the biggest Segments



Source: EBI 2003,8 for year 2000 details at Appendix 6

3.4 Segments of Environmental Services and Competitiveness

In terms of sectors within the environmental services industry, solid waste management, water utilities and water treatment works are the largest segments (figure 8; EBI 2003, 8). In terms of competitiveness, firms from different countries have emerged as leaders in the different segments of environmental services. Water treatment is by far the most capital-intensive segment, and firms in France and the UK have a lead in water and wastewater treatment, following privatization of the water segment more than a decade ago. In the past, US firms were the most competitive in the air pollution control services, largely owing to the fact that the first comprehensive air quality legislation, the Clean Air Act, was passed in 1970 in the USA. Subsequently, Western Europe and Japan have emerged as leaders following the introduction of more stringent air quality regulations in these countries (Ferrier 2003, 9).⁶ The US firms retain the edge in remediation services due to the strict legislation and enforcement under the 1986 Superfund Amendments and Reauthorization Act.

From the perspective of human development, one important feature to note is legislation-driven innovation and sub-sector competitiveness. Asia-Pacific countries need to be careful in their choice of approaches and technologies, noting how they are embedded in specific institutional contexts. Employment-displacing technologies, especially in the solid waste management sector, are one such element of concern. On the other hand, in the state-of-art sub-sectors, such as clean energy, Asia-Pacific countries need to be aware about the abundance of dated approaches, processes and technologies once appropriate for conditions in their countries of origin, but now abandoned or of scrap value there.

3.5 Recent Trends in Environmental Services

Given the public monopoly characteristic of many environmental services, opportunities for trade and foreign investment in this sector have traditionally been limited. However, in the last decade, the sector has undergone significant changes, with deregulation and privatization of many activities and a growing role for private sector participation. Increasingly, across developed and developing countries, regulated private ownership is being preferred to public monopoly in many environmental service activities. For instance, there is a trend towards the privatization of environmental infrastructure segments such as solid waste management, water treatment, and water utilities (see section below).

The mode of operations and delivery is also undergoing change, as firms are increasingly providing integrated packages, which include elements such as designing, building, managing, and even ownership of the infrastructure.⁷ As a result, there is growing scope for competition, and foreign provision of environmental services via commercial presence and via movement of persons is likely to become increasingly important in future.

⁶ Table 6 in Ferrier, 2003, 8

⁷ For instance, this is happening in the case of water treatment around the world, including in developing countries like Malaysia and Taiwan.

The increased outward orientation of the environmental services industry is indicated by the fact that export revenues of the environment industry as a whole constitute about 15-20% of the total output produced in Japan and Western Europe and about 10% for the US industry. Finland and Norway are extremely export-oriented with almost half their production being exported (Sawhney and Chanda 2003, 23)

Overall, given the growing trade orientation of the global environment industry (especially in the last decade), and the cross-cutting nature of the sector, environment services are set to become one of the fastest growing service sectors in the near future.⁸ Developing countries are emerging as important markets for environmental services. Firms in OECD countries are increasingly exporting environmental services to developing countries as their domestic environment markets reach saturation.

The median profit margins of US environmental firms exceeded 10 percent in the late 1980s, but dipped to 2 to 3 percent in the 1990s in the service segments (Berg and Ferrier 1998, 4). The environment market in the developed countries is considered to be mature, and with the saturation of the environment market, the growth rates of 2-3 percent in successive year are seen as a welcome measure of stability. A study of the US environment industry has noted that the sector was heavily dependent on the demand by regulations. The demand created by “predominantly punitive regulatory systems has levelled off as major industries have reached acceptable measures of compliance” (Ferrier et al 2003, 10).

On the other hand, the environment market in developing countries of Asia is expected to grow rapidly. These countries together account for less than 5 percent of the worldwide market, but some are expected to register double-digit annual growth. Among the factors supporting this trend are increasing stringency of domestic environmental regulations in these countries, enforcement of international environmental standards and pressure from consumers/ communities.

These trends provide opportunities and threats for human development in Asia-Pacific. Privatization is discussed in more detail below with respect to the types of public-private partnerships. Broadly, it can contribute to more transparency and accountability in operations of utilities, but this outcome is not necessary. The integrated packages provided by the largest firms can lead to increases in productivity, but also contain the risk enlarging the scope of monopolies and cartels. Clear policies, precise legislation, more effective regulatory agencies and better citizen oversight will be needed to govern large private utilities. The increasing outward orientation of the global environmental services industry is an opportunity for Asia-Pacific countries to improve their quality of environment through imports of knowledge and skills not domestically available at competitive rates.

The next section looks at the actual international trade in environmental services, forecasts for growth, and the implications of both for human development in Asia-Pacific.

⁸ During the last two decades, the growth in trade of commercial services outstripped that of merchandise trade. In 2001, the export value of commercial services stood at US\$1460 billion. For details see WTO *International Trade Statistics 2002*.

4 - Trade in Environmental Services and Human Development

4.1 Barriers to Trade in Environmental Services

The significant barriers to trade in environmental services pertain to restrictions on the establishment of commercial presence and on the movement or employment of nationals of the operating company (GATS supply Mode 3 and 4 respectively). The provision of environmental services like sewage services, sanitation, and refuse disposal are capital intensive. Among the different modes of supply of services, conditions and restrictions on commercial presence (Mode 3) can become a barrier to trade in this sector. Restrictions under Mode 3 take various forms: limits on foreign ownership of specific assets (e.g. landfills, sewage systems), the number and location of foreign companies, type of legal entity (e.g. requirement to incorporate locally), application of economic needs test. Trade in environmental services is also affected by market access barriers in other sectors, including environmental equipment, and services sectors like engineering, consulting, and analytical services.

Restrictions on movement of natural persons (Mode 4) are equally significant barriers to trade in environmental services. Professionals including environmental engineers, consultants and auditors face barriers to cross border movement and temporary presence resulting from different qualifications or licensing requirements.

From a human development perspective, Mode 3 and 4 restrictions do not have, and should not be given, equal weights. With their vast resources, support from national governments and co-financing by development banks, multi-national firms can meet the conditions for commercial presence (section below). It is much more difficult for an individual consultant or a small firm to comply with professional certification requirements. Although commitments under Mode 3 for commercial presence are important, the commitments in Mode 4 have by far greater significance for a developing country with a pool of professional expertise, such as India. Environmental consulting services have been the most robust segment for India.

The cross-border mode of supply (Mode 1) can also be used for those environmental support services that can be delivered as IT-enabled services (box 4 for a novel initiative). The scope, however, is limited, since the significant segments of sewage treatment, waste management and sanitation services require the physical presence of service providers.

Box 4 - Transactions of environmental services in Mode 1 are increasingly feasible

The Eco Market of the APEC Virtual Centre (APEC-VC) for Environmental Technology Exchange is a particularly noteworthy and relevant innovation. The APEC – VC was approved at the APEC Osaka meeting in 1995 and established in 1997. Virtual centres have been established in Japan and ten other APEC countries. Peru and Korea plan to establish similar centres. APEC-VC Japan is a “vast, diverse environmental technology exhibition”. Eco-Market is a bulletin board to promote transactions of environmental technologies, products and services. Environmental technology cooperation with developing countries is a component at the VC. It provides information regarding environmental technologies that could be easily introduced in developing countries. Currently, it has links on Cleaner Production, Acid Deposition, Hazardous Organic Air Pollutants, Solid Waste Management, Noise and Vibration, and Environmental Protection on the Production Floor. It also has case studies on wastewater treatment for effluents from textile dyeing, electroplating and food processing. (APEC, 2001, 3)

4.2 Unilateral, Bilateral and Regional Initiatives to Open Up Trade in Environmental Services

The leading exporter countries have a number of unilateral initiatives to open up the Asian markets. For example, eleven industrializing Asian countries were the focus of the United States-Asia Environmental Partnership (US-AEP), with the mission of promoting US exports of environmentally beneficial technologies. After a decade of promotional work that has seen markets emerge and mature in Hong Kong, Malaysia, Republic of Korea, Singapore and Taiwan, the AEP has shifted its office from the US Department of Commerce to USAID. It is now fully AID funded for field presence in newer markets, such as India, Indonesia, Philippines, Sri Lanka, Thailand, and Vietnam. Co-financing frequently leverages such initiatives. US-AEP has good working relationships with the Asian Development Bank and the World Bank, and has a portfolio of projects co-financed by the Asian Development Bank (US-AEP 2003, 27).

The recent surge in the number of regional and bilateral agreements and free trade areas affecting Asian and Pacific economies, which typically include investment issues, may strengthen FDI flows and further open markets for environmental services. The noteworthy point is that US BITS model gives the US investor six basic advantages in a host country:

- Entitlement to NT or MFN, whichever is more favourable throughout the life of the investment;
- Limits on expropriation – non-discriminatory due process of law and prompt, adequate, and effective compensation;
- Transferability of all investment related funds, including profits, at market rates;

- Limits to the host government's ability to require the investor to adopt inefficient and trade distorting practices;
- Right of the investor to international arbitration;
- Top management of investor's choice.

As a direct result, there has been acceleration in the trend toward investor-to-state arbitration under the rules of the FTAs/BITs. Three recent cases relate to trade in environmental goods and services:

- Canada had to pay \$13 million to Ethyl Corporation and withdraw its ban on MBMT as a result of arbitration under Chapter 10 of NAFTA;
- The Mexican Government was forced to pay \$16 million to US firm Metalclad upon the refusal of the local community to allow the operation of the hazardous waste facility. Metalclad won under the NAFTA Investment Chapter;
- Bechtel used the Dutch-Bolivia BIT in an attempt to force Bolivia to pay \$25 million for losses related to its Dutch subsidiary's withdrawal from running the Cochahamba municipal water system.

One important consequence of the investment rules under BITs is the risk of undermining the bedrock 'Polluters Pay Principle'. The accepted norm worldwide is the obligation of the polluter to pay environmental costs. The investment rules reverse the principle by requiring governments to compensate investors for the economic costs of complying with environmental regulations (CIEL, 2002, 7).

4.3 Entry Barriers for Developing Country Service Providers

In sharp contrast, effective entry barriers persist for developing country environmental service providers, both in OECD and in other developing countries. There is little potential for exports to the OECD markets. The main barriers are in the form of investment restrictions, restrictions on cross border mobility of labour, and government procurement and approval related policies. The main barriers in developing countries, experiencing rapid growth in the environmental services sector, include domestic regulations on business operations by foreign companies, or employment of nationals. Since a large part of the environmental service sector is still in the realm of the public sector, public procurement policies affect market access for environmental services in these countries.⁹

⁹ In this regard, the GATS multilateral negotiations on government procurement in services will have an impact on market access of environmental services. First there is the plurilateral Agreement on Government Procurement, GPA, (involving 26 WTO Members) that includes commitments by government departments, public entities and state-owned enterprises in each Party to the GPA to procure goods and services in accordance with the disciplines established in the GPA. Second, a mandate of the Working Group on Transparency in Government Procurement established at the 1996 Ministerial Conference (involving all WTO Members) to study the transparency in government procurement practices taking into account national policies, and to develop elements for inclusion in an eventual agreement. Third, Article XIII of the GATS provides for multilateral negotiations on government procurement in services (conducted within the Working Party on GATS Rules). The purpose of these negotiations is to explore the possibility of applying multilateral disciplines to government procurement covering all sectors of services. (WTO 1998)

Nevertheless, there are several promising markets for environmental services providers from developing Asia, particularly in consulting and support services. These markets are mostly in South Asia, the Asia Pacific region, Middle East, and Africa.

4.4 Growth of Trade in Environmental Services

Worldwide trade in environmental equipment and services is estimated at between US\$130 billion to US\$ 135 billion in 2003. Leading exporters are the US with 15 - 20 percent of global environmental exports, followed by Germany and Japan, while French companies have recently won large contracts. All these countries enjoy a large trade surplus in this sector.

Developing Asia has some of the markets that have experienced rapid growth for environmental goods and services. Among the 44 top environmental market countries in the world, China ranked 12th in size, experienced the fastest growth in the world at a rate of 10.6% per annum during 2000-01. It was followed by Ireland, Romania and India, growing at between 8 and 9 percent (EBI, 2004, 8; appendix 8).

The forecasts are for continued rapid growth in the region (Ferrier, 2003, 9). The biggest markets among the developing countries of Asia in terms of volume are China and South Korea. They are already the 12th and 13th largest markets in the world for environmental goods and services. Malaysia (ranked 38th) and the Philippines (44th) are forecast to grow the fastest, along with emerging Asian country markets. In contrast, the Taiwan market (ranked 20th in the world) is assessed as matured and is expected to experience slow growth (appendix 9).

In particular, China has experienced unexpected growth in investment recently, in the potable water and wastewater treatment segments (box 5). Several other Asian countries, like Republic of Korea, Taiwan and Vietnam also have increased their investments in drinking water, water and wastewater treatment. Market revenues in this segment have grown from US\$32 billion in 2003 to US\$42 billion in 2004. The market is forecast to increase to US\$62 billion by 2008 and US\$117 billion by 2015 (Helmut Kaiser Consultancy, 2004, 13).

Box 5 - Contracts for Veolia Water in China

The French Veolia Water Company is increasingly winning contracts in China. Veolia Environnement SA has won contracts worth US\$ 990 million to provide drinking water to nearly 3 million people in China. Beijing opened its first joint venture sewage processing plant with the French and a Malaysian company in October 2004. With a daily capacity of 100,000 tons, it will improve water quality of the Liangshui River, a major river in the south of the city. Veolia Water already supplies drinking water to the nearby town of Baoji and provincial capital Xian. Since 2002, the French group has won contracts worth about US\$ 25 billion in projected revenue for water treatment and supply in central and eastern China, and waste management.

Source: Forbes [http://www.forbes.com/business/services/feeds/ap/2004/10/05/ap1576494.html], 5 Oct 2004

Other environmental segments significant for Asian country imports are solid and hazardous waste, and recycling systems and remediation. The smallest volumes are in monitoring and analysis equipment, but the segment is important for local capacity building.

The main human development concern is with the sweeping multigenerational commitments. For example, China has entered into 50-year contracts with multinational companies for the above mentioned investments. Even when projects may be badly needed and make economic sense, a part of the general public's ex ante hostility to such schemes emanates from their desire to have these processes subjected to broad civic scrutiny prior to making long-term commitments. Transparency and accountability are the key instruments for empowering people and communities with respect to such international commitments.

5 – Privatization of Environmental Services and Human Development

Privatization has great significance for international trade opportunities. Local government bodies have typically provided environmental services like water and sanitation, sewage and refuse disposal, cleaning of roads, parks, and lakes. However, private participation in the provision of these basic services has been increasing globally, driven by the need for cost reduction and private sector capital.

The trend in privatization of public utilities has included most significantly that of water supply and wastewater management. This is because, among the public infrastructure services, water purification and wastewater treatment systems require the largest investment, and more than a third of the public sector capital expenditure in developed and developing countries is spent on the latter (WTO 1998, 31). Wastewater treatment is completely privatized in United Kingdom and in France more than two-thirds of the market is in the private sector (WTO, 1998, 32). Privatization has also been extensive in the US, though not uniform across all environmental service sub-sectors.

Governments of developing countries have also encouraged private participation in environmental service provision, including water, sewage, and sanitation services. Among the Asian developing countries, Indonesia, Malaysia, Philippines and Thailand have encouraged private participation in environmental infrastructure services.

Private participation in environmental infrastructure services has taken various forms across the world (Lovei and Gentry, 2002, 17). The major types of contracts are described in box 6.

Full privatization has been tried in England and Wales, France and the United States. In 1989, England and Wales privatized the water and sewage sector through the new Water Act. Ten regional water and sewage companies and 26 water supply firms were allowed to run geographic monopolies. While privatization is said to have improved drinking water supply and wastewater treatment, but concerns remain about the increases in user fees and the companies' use of the revenues.

Technically, privatization and liberalization are separate processes. The GATS agreement does not require privatization or deregulation of any service. Equally, the invitations to bid for government assets being privatized may be restricted to national firms provided the country has no made commitments for market access or national treatment under bilateral, regional or multilateral agreements. Yet, in the practical context of developing countries, privatization is only theoretically distinct from liberalization given the disparities between the capacities of national firms and those of the multinationals in the sector. Asia-Pacific governments do sometimes see the pressures for reform of utilities by the Bretton Woods Institutions and for opening up the sector to international trade under GATS, regional free trade agreements and investment treaties as an anvil and hammer situation.

Box 6 - Types of Private Participation in Environmental Services

Management service contracts

Under management service contracts, the government remains the primary provider of the service and private operators are hired to carry out designated tasks (e.g. operation of water/ wastewater treatment plant, or distribution, or meter reading/ billing/ collection, or maintenance operations) for a certain period of time, typically 5 to 7 years. This is a low risk option of service contracts, but does not optimize the efficiency of the entire service system. Such contracts are appropriate when only operation efficiency is required without significant new investment

Build operate transfer (BOT) and build operate own (BOO)

Under BOT, private investment is invited in construction and operation of new facilities for a certain period of time, typically 10 to 20 years to allow for the private company to recover cost and earn profit. Government retains ownership of the infrastructure facility, and takes the role of both a customer and a regulator. A BOO (or BOOT) is a long-term concession contract, usually for a period more than 25 years, the government gives the full responsibility of the delivery of services in an area to the private party, including construction, operation, maintenance, collection and management activities. The infrastructure assets entrusted to the private party remain government property, and the government remains the regulator.

Joint ventures

Under joint ventures, the private and public sectors together assume co-ownership of assets and co-responsibility for the delivery of services, by forming a new company or share ownership of an existing company. Joint ventures involve the creation of a new entity for implementing environmental services, under a contract, BOT or otherwise.

Full Privatization

Under full privatization, the government grants the responsibility of providing the service and ownership of the underlying infrastructure assets to the private party. The government only functions as the regulator of quality and prices of the environmental services provided by the firm.

The World Bank has recently changed its stance however, on the re-consideration of the experiences in privatization in developing countries, where the compulsions of the political economy have not been favourable to reform. A recent Bank study blames the low credibility of privatization and failed reform on weak regulatory bodies. Compared to other infrastructure services, the Bank sees the privatization of water as “problematic”. The study

calls for building up of regulatory capacity, especially for clarity of roles among the various levels of government and the regulatory agency. Concessions and leases are more effective than privatization to achieve efficiencies of competition while retaining strong public oversight. Consumer involvement in water regulation is seen as an invaluable way to provide information to the regulator (especially on the needs of poor consumers) and creating oversight of regulatory and operator behaviour (Kessides, 2004, 15).

From the human development perspective, the sequence adopted for the institutional reform process is important. Privatization without putting in place an autonomous regulator and a platform for citizen voice may only lead to social resistance and rejection. Stage-wise commercialization of ES through management service contracts is useful for experiential learning in governments and society. With experience and clarity in the roles of various policy-making and regulatory agencies and with citizen oversight, privatization could result in increased productivity and extension of services to new customers. Strategically regulated privatized operations can also be more transparent and accountable, considering government agencies can be bureaucratic and corrupt in addition to being inefficient and strapped for finances.

Even so, there would remain the concerns on grounds of equity and sustainability. The profit-seeking behaviour of private firms, especially under conditions of monopoly, is likely to result in sharp price hikes, and disconnection of services to and exclusion of the poor unable to pay the increased rates. Environmental sustainability is a concern as well, for example, a private firm may indulge in unsustainable withdrawal of underground water. In fact, all forms of negative externalities need to be more rigorously addressed. More efficient waste collection by a private company may be accompanied by more dumping of trash on sensitive wetlands, as has happened in Chennai, India (Sawhney and Chanda, 2003, 23).

To summarize, privatization of environmental services has been successful in the context of mature institutional and regulatory structures. Developing countries need to build up such capacities by incremental experiences with management service contracts, concessions, and joint ventures. The other option is non-profit cooperative ventures that are addressed in the next section.

6 – Human Development and Community-Led Environmental Management

The human development aspirations for empowerment, sustainability, as well as equity in access are often best served by low-cost community-led initiatives. Asia-Pacific has rich traditions for community initiatives that include the provision of local environmental services. However, their replication is limited by their context specificity in many cases, and their inability to harness local government and mass media support in other situations.

6.1 Asia-Pacific is Rich in Local Environmental Initiatives

Discussions on foreign investment often overshadow "alternative" success models of low-cost service delivery to the poor. There are many such community-led initiatives in Asia-Pacific. Pakistan's Orangi Pilot Project (OPP), for instance, has been working since 1980 to support people's efforts in upgrading Orangi Township, a low-income informal settlement with over 1 million residents in Karachi (a city whose Water and Sewerage Board does not reach the informal settlements that contain 60% of the city's population). The OPP model of sanitation comprises of internal development such as latrines, lane sewers and collector sewers at the neighbourhood levels. It has demonstrated that communities can finance, manage and maintain internal development, contributing \$1.5 million, constructing 1.5 million running feet of sewerage lines and sanitary pour-flush latrines in 90,000 houses. The OPP model has been replicated in 42 settlements in Karachi and in seven cities across Pakistan with varying degrees of success. The critical factor is the degree to which local government accepts the responsibility for external sanitation comprising trunk sewers and sewerage treatment (Hasan, 1997, 11).

6.2 Some Initiatives Have Been Scaled Up To National Level

There are examples in Asia-Pacific of scaled-up social innovations. Sulabh is one of India's leading NGOs that has been active in sanitation and social reform for over three decades, constructing and maintaining public toilets and twin-pit latrines for households. Sulabh has constructed over 6000 public latrines in 1075 towns spread all over India and converted over 1.2 million bucket latrines into sanitary ones. It is estimated that over 10 million people use Sulabh's facilities everyday (Sulabh 2004, 25). It has scaled up using a variety of approaches including partnerships, for example by making the exterior walls of its toilet complexes available for advertisements.

However, cases where the organization of the proponent grows in size with the spread of its ideas and approach are rather rare. It is more common for the practices of the civic entrepreneur to be replicated at other places by other organizations with similar missions.

6.3 Social Innovators Often Fail to Engage Local Governments and Mainstream Media

Potable water in taps is the standard set by engineers and accepted by politicians across the world. It cannot be matched for convenience, but entails large and expensive water treatment plants and distribution networks, substantial line losses, excessive consumption,

and operational deficits for the utility and in the end, often unsafe water for the consumer. The failure of municipalities and utilities to achieve and maintain standards has dominated the recent debates in policy-making forums. It has opened up a window for private enterprise to supply potable water through tankers and bottles. In fact, as described above, the current thinking in many Asia-Pacific capitals is to somehow adopt one of the European models and privatize utilities. In all these debates, a safe way to dis-infect water at the household level at virtually no cost is being ignored (box 7).

It is arguable that many civil society organizations in Asia-Pacific have locked themselves into a service-delivery mode, which supplants rather than supplement grass roots capacities, and those of local governments. The more difficult (but more rewarding) work of creating the demand for environmental services is being neglected. In many countries of the region, the efforts at policy advocacy for community-led environmental services are piecemeal and sporadic, and have not succeeded in fully engaging local governments and the mainstream media (WSSCC 2001, 28).

Box 7 - Solar Water Disinfection - A Free of Cost Approach to Safe Drinking Water

SODIS or solar water disinfection is a simple method to improve the microbiological quality of drinking water at the household level, free of cost. It comprises essentially of filling a 1-2 litre plastic (PET) bottle with water from the available source and exposing it to full sunlight for 6-8 hours. This destroys faecal coliforms and other pathogens in the water. A household may treat as many bottles as it needs by laying them flat in courtyards or on roofs to absorb maximum heat and rays. The Swiss Federal Institute of Environmental Science and Technology (EAWAG) has demonstrated the reliability of the method for producing pathogen free pure drinking water. The World Health Organization (WHO) has certified the results.

Water quality is a serious problem across the developing world. The limited capacities of water utilities to treat water, the risks of contamination by effluents, and poor household hygiene are three related aspects of the issue. Where the groundwater has been polluted, water from hand pumps is also unsafe. As a result, at any given time one-fifth or more of the children in a number of Asia-Pacific countries are ill or have just recovered from an episode of diarrhoea, says UNICEF.

Water bottling and retailing companies are taking full advantage of the situation by promoting their products and services as essential for life. In fact, the sector is increasingly dominated by multinationals with the resources for marketing. However, a one-litre bottle of “mineral water” retails at around ten percent of the daily labour wage rate in some Asia-Pacific countries, and a person needs four litres of drinking water each day. So only the rich and middle classes can afford “mineral water”.

Some NGOs are promoting the free-of-cost SODIS approach. They lack access to the mass media and resources for advertising. SODIS promotion remains a fringe activity.

Sources: www.sodis.ch, www.childinfo.org

6.4 The Most Successful Approaches are Replicated by Local Governments

Models of successful, co-operative non-profit water and sanitation delivery systems that have been replicated exist in rural China, for instance. In early 1980s only 50% of the rural population in China had access to safe water. In 1985, the Government initiated a rural water project with World Bank support, which was later scaled up by the Ministry of Health. Over a span of 15 years, 22 million people in 20 provinces have benefited from this programme. Key features include: targeting poor counties; using a community-based, participatory approach (through water-user associations); and very high cost recovery through user contributions which is unique for rural water and sanitation programs.

By the end of 2002, the cumulative rural residents that benefited from improved rural water supply reached 868 million, accounting for 92% of the total rural population in China. Among them, the rural residents with access to pipe water supply system account for 57% of the total rural population, a 43% increase from 1985 levels. Rural households with sanitary latrines account for 49% of the total rural households, a 41% increase from 1993 figures. The process has greatly improved the conditions of rural water supply and sanitation, the quality of life and health of rural residents, and helped promote rural economic and social development (World Bank 2004, 29).

Four principal lessons may be learned from the scaling up rural water supply and sanitation for the poor in China. They are: (a) importance of organizational and institutional capacity building, (b) community willingness to participate in financial contributions and sustainability, (c) necessity of sharing knowledge and understanding with the users, and (d) integration of sanitation and health education with rural water supply (ibid)¹⁰.

More broadly, the recognition of the importance of civic engagement and participation in debates on reforming utilities is growing, especially when deemed sensitive to consumer interests. In this vein, Thailand's new constitution, in its Articles 45 and 46, requires stakeholder consultations prior to project undertakings that might affect livelihoods or the environment.

The opening up of the environmental services under GATS and other forces of globalization will pose quite a few challenges as well as provide opportunities for community-led initiatives and civic entrepreneurship in Asia-Pacific. The next section deals with the specific proposals on the negotiating table over the coming years.

¹⁰ <http://www.worldbank.org/wbi/reducingpoverty/case-China-RuralWaterandSanitation.html>

7 – Liberalization of Environmental Services and Human Development

The reduction or elimination of tariff and non-tariff barriers to environmental goods and services was singled out for priority in the Doha Ministerial Declaration. Some developed countries, using the framework of GATS negotiations, have submitted requests for commitments from Asian countries to eliminate barriers to trade and investment in environmental services. It should be noted that such markets are already largely open, although not many Asian countries have made specific commitments in their country-based GATS schedules.

Unlike many service sectors, the supply of the basic environmental services involves large investments, which become profitable over long periods of time, thus making effective control a major factor in investment. As a result, suppliers view Mode 3 restrictions as the most important, and exporting countries have an interest in pressing for privatization of such services in developing countries. Such privatizations have also been included in the loan conditions often put forth to countries by the Bretton Woods institutions. (As noted in Section 5, there has been some recent re-thinking in this regard).

In addition, many developing countries wish to develop their own national capacity in environmental services, so as to be able to ensure the protection of their specific environment and to gain a share of domestic and export markets. Asia-Pacific countries are thus faced with the need to develop an appropriate response to request for liberalization commitments in this sector. While, in principle, liberalization should be beneficial to a large number of people to the extent that it improves the conditions in which they live and work, there is clearly a need for governments to retain and improve a set of policy measures to ensure that poorer and more vulnerable people are not penalised by certain aspects of liberalization and that adequate opportunity is provided for the development of national capacities, including the acquisition of environmentally sound technologies. Some developing countries have already been successful in this latter regard.

To the extent that liberalization commitments in environmental services can promote efficiency, and effectively halt or reverse environmental degradation in developing countries, and ensure that more people can access clean water, the human development benefits would be immense. However, in practice this does not seem to have always been the case. The higher cost of water associated with such liberalization has given rise to serious political disturbances in several developing countries. In other cases, cleaner water has been provided to the higher income groups with the capacity to pay. From a human development perspective, along with the economic rationale of cost reduction and extended coverage, the twin goals of equity in access to services and respect for human rights, are also paramount.

In many countries water is a public good and as recognised during the WSSD in 2002 in South Africa, access to clean water is a human right which ought to be viewed in conjunction with similar rights to basic food and adequate housing. This matter has been discussed in forums outside the WTO such as the UN High Commission for Human Rights where it has been stated that assessments should be conducted to understand the impact of

trade policies on human rights. The key point is that States have, over the years, undertaken many international human rights treaty obligations that need to be respected by WTO members during their negotiations on classification of services and implementation of rules on trade liberalization.

7.1 GATS Classification and Coverage of Environmental Services

Environmental services are one of the 12 classified service sectors under the GATS framework. Classification and definitional issues are important in this area given the overlapping nature of environmental activities. The scope and coverage of environmental services in the original GATS classification (contained in WTO 1991) was limited and a broader definition of the sector is proposed by the OECD and the EU.

The GATS W/120 classification of environmental services followed the provisional UN Central Product Classification system (UNCPC). Environmental services under the GATS are defined to include: (a) sewage services (CPC 9401); (b) refuse disposal services (CPC 9402); (c) sanitation and similar services (CPC 9403); and (d) other environmental services. The *other environmental services* category has been expanded to include the remaining elements of the CPC environmental services category, namely, cleaning services of exhaust gases (CPC 9404), noise abatement services (CPC 9405), nature and landscape protection services (CPC 9406), and other environmental protection services (CPC 9409). Some CPC activities are, however, excluded from these sub-sectors under the GATS. Table 3 provides the definitions and scope of these four sub-sectors under the GATS.

There is partial correspondence between the GATS classification and the OECD/Eurostat classification. The latter includes services water for human use (under water management services), recycling services (under solid and hazardous waste management services) and protection of biodiversity, as opposed to the GATS classification. Table 4 highlights the environmental services segments under the OECD/Eurostat classification that overlap with the GATS definition and those that are excluded under GATS, and the corresponding UNCPC version 1 classification.

Table 3 - The GATS Classification List of Environmental Services

Environmental Services	Provisional CPC	CPC version 1
<p>1. Sewage services</p> <p><i>Excludes:</i> collection, purification and distribution services of water (CPC 18000) and construction repair and alteration of sewers (CPC 51330)</p>	9401	9411, 9412
<p>2. Refuse disposal services</p> <p><i>Excludes:</i> dealing and wholesale in waste and scrap (CPC 62118 & 62278) ; R&D services on environmental issues (CPC 85)</p>	9402	9421, 9422
<p>3. Sanitation and similar services</p> <p><i>Excludes:</i> disinfecting/ exterminating services for buildings (CPC 87401), pest control for agriculture (CPC 88110)</p>	9403	9431, 9439
<p>4. Other services</p> <ul style="list-style-type: none"> • Cleaning of exhaust gases • Noise abatement services • Nature and landscape protection services <i>Excludes forest and damage assessment and abatement services (CPC 881, GATS 1F(f))</i> • Others not included elsewhere 	<p>9404</p> <p>9405</p> <p>9406</p> <p>9409</p>	94900

Compiled from WTO documents Services Sectoral Classification List MTN.GNS/W/120, 10 July 1991 and Table 1 in Environmental Services S/C/W/46, July 1998.

Table 4 - OECD, CPC ver. 1 & GATS Classification of Environmental Services

OECD/Eurostat	CPC version 1.0	GATS
A. Water and waste water management sector with sub-sectors: <ul style="list-style-type: none"> • Sewage services • <i>Water for human use</i> 	941 Sewage services 94110 Sewage treatment services 94120 Tank emptying and cleaning services	1. Sewage services <i>Excludes collection, purification & distribution services of water, and construction repair and alteration of sewers.</i>
B. Solid and hazardous waste management sector with sub-sectors: <ul style="list-style-type: none"> • Refuse disposal and treatment services • Sanitation services • <i>Recycling services</i> 	942 Refuse disposal services 94211 Non-hazardous waste collection services 94212 Non-hazardous waste treatment and disposal services 94221 Hazardous waste collection services 94222 Hazardous waste treatment and disposal services 943 Sanitation and similar services 94310 Sweeping and snow removal services 94390 Other sanitation service	1. Refuse disposal services <i>Excludes dealing and wholesale in waste and scrap, and R&D services on environmental issues.</i> 3. Sanitation and similar services
C. Protection of ambient air and climate	94900 Other environmental services	4. Other services
D. Noise and vibration abatement	94900 Other environmental services	4. Other services
E. Remediation and clean-up of soil, surface water and groundwater.	94900 Other environmental services	4. Other services
F. Protection of biodiversity and landscape services	94900 Other environmental protection services	4. Other services <i>Excludes forest and damage assessment and abatement services</i>
G. Other environmental/ ancillary services: <ul style="list-style-type: none"> • Design consulting and engineering. • Preparation of sites, construction, installation, assembly, repair and maintenance • Environmental research & development • Analytical services, data collection, testing, analysis, assessment • Environmental education, training and information 	94900 Other environmental protection services	4. Other services

Classification based on Table 4 of OECD 2000, 20, GATS 2000 EC Submission S/CSS/W/38 and Table 1 of WTO (1998)

At the time of the initial GATS commitment negotiations, Environmental Services were not a focus of attention, compared to other segments like Financial Services that had elaborate classification of the industry segments. The scope and coverage of environmental services under the GATS and its relationship with the OECD/Eurostat classification system, as outlined in Table 3 and 4 above, warrants some discussion.

Firstly, the GATS classification has a focus on traditional end-of-pipe approaches and not on prevention, thereby failing to reflect the emerging trend in this sector. The OECD/Eurostat classification includes services relating to pollution management (including construction and installation of facilities), services relating to cleaner technologies and products, and products reducing environmental risk and minimizing pollution, and services for improving resource use. In contrast, the GATS W/120 classification mainly focuses on pollution control and waste management activities. The last category of “*other services*”, however, allows for an expansion in the definition to some extent. For example it can encompass services to protect the ambient air and climate, and nature protection under the OECD definition.

Secondly, the GATS environmental services classification is somewhat narrow. Under environmental services, the segments cover services that are uniquely environmental and do not include services such as design, construction, architecture, engineering, investigation and survey, research and development, technical testing and analysis, consulting, and distribution, which could have an environmental component or application but which have dual uses. As noted earlier, environmental services encompass components of several other sectors. These related services are present in other parts of the W/120 list so as to keep the self-contained and mutually exclusive nature of sectoral classification under the GATS.

A third shortcoming of the GATS classification is in terms of its organization. Although it covers all environmental media, including air, water, soil, and so on, it does not organize the activities by the provision of services for specific environmental media.

In contrast, the OECD classification not only gives the overall boundaries of this sector but also the boundaries relating to specific environmental media. The GATS classification also does not differentiate between services for resource management as distinct from pollution management services. Thus, the existing WTO classification system for environmental services does not reflect the evolving and integrated nature of environmental services and the wide scope of this sector.

It may be noted here that the two segments excluded under the GATS environmental services (WTO 1998, 32) also happen to be services that are sensitive in nature entailing social equity issues and environmental risk. The GATS classification of environmental services categorically excludes the provision of water for human use, while this segment is included in the OECD classification.

Similarly, recycling services of solid wastes are excluded under GATS but are included under the OECD definition (under solid and hazardous waste management). The

international trade in hazardous waste is currently regulated under the Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal (adopted in 1989, entered into force in 1992). The guiding principle of the Basel Convention is to minimize the threat to human health and environment by encouraging the treatment and disposal of hazardous wastes close to where they are produced. The Basel Convention aims to control the trans-boundary movement of hazardous wastes, monitor and prevent illegal traffic, provide assistance for the environmentally sound management of hazardous wastes, promote cooperation between Parties in this field, and develop Technical Guidelines for the management of hazardous wastes. There is an export ban from OECD to non-OECD countries of hazardous wastes intended for final disposal, effective 1994. An amendment to the Basel Convention in 1997 also prohibits export of hazardous wastes intended for recovery and recycling from Annex VII countries (including EU, OECD, Liechtenstein) to non-Annex VII countries (all other parties to the Convention).¹¹ Notably the US, the largest generator of hazardous wastes and one of the largest exporters of scraps, has not yet ratified the 1989 Basel Convention nor the amendment to the Basel Convention on the ban of hazardous wastes for recycling services.

For developing countries, where the focus so far has been on the end-of-pipe pollution management, it would be beneficial to embrace a wider definition of environmental services if only to emphasize the importance of efficient and optimal resource utilization.

7.2 Requests at the WTO on Environmental Services

The United States proposal suggests setting up a core list of environmental services, such as in the current classification, and a list of environmentally-related services that are necessary to the provision of environmental services, such as business services, architectural services, fee-based recycling services, construction, engineering, and consulting services. Both core and related services should be liberalized. USA requests that members take full commitments for market access and national treatment in Modes 1, 2, and 3 for the above sub-sectors.¹²

The proposal of the European Community foresees the creation of seven ‘purely’ environmental sub-sectors, namely, water for human use and wastewater management; solid/hazardous waste management; protection of ambient air and climate; remediation and cleanup of soil and water; noise and vibration abatement; protection of biodiversity and landscape; other environmental and ancillary services. Dual use services, such as business, R&D, consulting, contracting, engineering, construction, distribution, and transport services with environmental components, should remain classified elsewhere. The EC proposes that these services could be included in a checklist that could be used as an aide-memoir during negotiations. The proposal encourages liberalization without restrictions on modes 1, 2 and 3. It seeks further discussions on how to facilitate the temporary movement of natural persons for the provision of specific environmental services.

¹¹ The Amendment to the Basel Convention has not yet entered into force since it needs ratification by two-thirds of the parties to become effective.

¹² USA Requests – confidential releasable to recipient WTO Member only, (November 15, 2002)

The Canadian proposal encourages liberalisation in all modes of delivery and in all sub-sectors in the present list (core services) and other related services (non-core or dual use services). The Swiss proposal suggests a classification in six sub-sectors very similar to those proposed by the EC. The Australian proposal supports the re-classification suggested by the EC. It stresses the importance of liberalising Mode 3 and calls for increased transparency in national regulations of the sector

The Cuban proposal is based on the assumption that opening up of the markets will contribute to the development of the environmental services in developing countries if appropriate conditions are established for health, safety and environmental protection, and domestic capacities are strengthened. Domestic capacity building must be one of the guaranteed results of negotiations on environmental services. For this to happen, transfer of technology and associated know-how, the creation of national technical capabilities and the conditions favourable to the export of services from developing countries should be ensured.

Columbia notes that if international trade in services is to become more balanced, the developed countries will need to make commitments on market access concerning reduction in the restrictions on the movement of individuals so as to allow the procurement of environmental services at the international level.

7.3 State of Play in Request/Offer Process

The formal state of play in the request/offer process cannot yet be determined, as no information has been released. Leaked documents relating to the European Commission's requests to various countries are available.¹³

The EC has requested that offers be presented in accordance with the EC's proposal for the classification of environmental services. The formal requests to Asian countries with some individual country variations are illustrated at box 8.

Furthermore, in terms of horizontal commitments, in Mode 3, the EC has requested elimination of restrictions. For example, from Pakistan it has requested for elimination of restriction on the form of the establishment and on maximum foreign equity participation. It has also sought elimination of the requirement for case-by-case authorization for the acquisition of real estate. It has asked for a clarification of the restriction on the funding of representative offices.

In Mode 4, the EC has asked for the elimination of quantitative restrictions (if any) on the number of foreign executives and specialists in any undertaking. It has asked for clarification on the degree of affiliation between companies that is required for a transfer to be covered under the provisions for intra-corporate transferees. The EC has requested WTO member countries to undertake commitments relating to business visitors and contract services suppliers.

¹³ <http://www.gatswatch.org>

Box 8 - EU Requests to Asian countries

“A. Water for Human Use and Waste Management

Water collection, purification and distribution services through mains, except steam and hot water

This sub-sector only concerns the distribution of water through mains’ (i.e. urban sewage systems). This excludes any cross-border transportation either by pipeline or by any other means of transport nor does it imply access to water resources.

Mode 3: Take full commitments under MA and NT

Mode 4: Commit as referred in the section “Horizontal commitments”

Waste water services (CPC 9401)

Mode 3: take full commitments, i.e. schedule “none” under MA and NT

Mode 4: Commit as referred in the section “Horizontal commitments”

B. Solid/Hazardous Waste Management

Refuse disposal services (CPC94020)

Sanitation and similar services (CPC 94030)

C. Protection of Ambient Air and Climate

Services to reduce exhaust gases and other emissions and improve air quality (CPC 94040)

D. Remediation and Cleanup of Soil & Water

Treatment, remediation of contaminated/polluted soil and water (part of CPC 94060)

E. Noise & Vibration Abatement

Noise abatement services (CPC 94050)

F. Protection of Biodiversity and Landscape

Nature and landscape protection services (part of CPC 94060)

G. Other Environmental & Ancillary Services

Other environmental protection services not classified elsewhere (CPC 94090)

For each of the above sub-sectors:

Modes 1 (where technically feasible), 2 and 3: Undertake full commitments for market access and national treatment.

Mode 4: Commit as referred to in the section “Horizontal commitments”

Limited information is available about USA requests. The United States in its initial offer on GATS, while accepting the broader classification of environmental services, has excluded “water from human use” in the sector specific commitments. The “recycling services” have also not been explicitly tabled under solid/ hazardous waste management. (TN/S/O/USA dated April 9, 2003)

Among the Asian WTO member countries, just six have made commitments on environmental services, namely, Cambodia, China, Japan, Nepal, Republic of Korea, and Thailand. Four countries have made full market access commitments on all sub-sectors.

Republic of Korea has made no commitment on sanitation and similar services (CPC 9403), while Nepal has made no commitment on other services. Some have put limitations on market access in Mode 3. Republic of Korea has limited individual foreign investor ownership of individual companies to 6 percent, while aggregate foreign investment cannot exceed 23 percent of two public enterprises. In Thailand, foreign equity participation must not exceed 49 percent of the registered capital, and the number of foreign shareholders must be less than half the total number of shareholders of the company.

7.4 Opportunities for HD by Widening Scope of ES and Trade

There are several opportunities for enlarging human choices by widening the scope of environmental services. The current focus is on tangible environmental services and the resulting debate and trade negotiation process are narrowly utilitarian. They reflect a particular concept of environmental management with a focus on engineering interventions. Nature itself provides some of the most valuable environmental services, such as smoothing out variations in the flows of streams, and filtering and purifying water. Environmentalists have long known this, but economists have recently started measuring the numbers and looking at their ramifications (box 9). Over the coming decade, markets and trade in off-site environmental services could contribute to the achievement of the MDGs.

Box 9 – Nature conservation provides some of the most effective Environmental Services

In the US Pacific Northwest, US\$1 invested in watershed protection can save between an estimated US\$ 7.50 and US\$ 200 in costs for filtration and water treatment facilities. Forest Trends, a US-based non-profit organization, reckons that similar differentials across the world should enable the creation of a useful market in which downstream water users pay upstream inhabitants for land conservation and management. Payments would be based on water quality improvements, including salinity, pollutants and nutrient reductions, and wetland or stream protection and restoration. The Group plans to have its Internet-based trading service up and running by the end of 2004. If effective, the idea and service could cross borders.

Source: Asia Pulse

[<http://www6.lexisnexis.com/publisher/EndUser?Action=UserDisplayFullDocument&orgId=1925&topicId=100002042&docId=1:233712469&start=2>],

12 Oct 2004

8 – Analysis of Stakeholders and Human Development Implications

This section provides an ex ante analysis of the probable expectations and concerns of the primary stakeholders. Second, it consolidates the human development implications that have been drawn in earlier sections. Third, it provides a set of tools that decision-makers in Asia-Pacific countries may use in their analysis of the human development implications of specific proposals for ES liberalization under GATS.

8.1 Analysis of Stakeholders

An ex ante analysis of the probable main expectations and concerns of stakeholders drawn from a study of their statements, (and from general literature review) is presented as an illustrative device (table 5). In addition to their primary motivations, individuals have hidden or secondary values, some of which may be altruistic. Communities, organizations, and certainly countries consolidate a variety of diverse values and opinions, and this certainly complicates the real world. Nevertheless, the illustrative device can be useful if applied with caution and an understanding of its limitations

The human development perspective requires putting people at the centre of things, and poor people at the very core. This is the virtue and justification for making an analysis of stakeholders at a world scale. It puts people living at the grassroots, including vulnerable sections such as the poor and women, on the table of the planners and the decision-makers.

Table 5 - Stakeholders; Probable Expectations & Concerns with Liberalization of ES under GATS

Stakeholders	Expectations	Concerns
People		
Poor	Basic and fair access to an expanding network of services	Exclusion: pricing; denial of existing access and use rights
Women	Dignity through basic provisions such as private sanitary latrines; family health with safe water	Remote decision-making that intrudes in their daily lives
Non-poor households	Better quality of services	Choices may be restricted
Governments		
OECD Governments	MA and NT in Mode 3	Influx of semi-skilled persons under Mode 4
Asia-Pacific Governments	Effective approach to attaining MDGs	Natural monopolies not under sovereign control; political instability, civil unrest
Local Governments in the Asia-Pacific region	Efficient delivery of environmental services	Quality, coverage and pricing of services; loss of public sector jobs

Private Sector		
Multinational corporations	Emerging markets	Stability in regulatory framework to enable implementation of long gestation projects
National corporations	Technology transfer; models of public-private institutional arrangements for an emerging market	International competition: loss of market share in existing ES; risk of acquisition
Small/medium enterprises	Vending opportunities and state-of-art technology	Standards and procedures difficult to comply with
Civil Society		
NGOs	Participation in transparent development of regulatory framework and over-sight of liberalized utilities	'Public' goods and services continue to be undervalued and under provided

8.2 Verifiable Indicators of Human Development Relevant to Environmental Services

Recalling the implications for human development drawn in the earlier sections of this chapter, certain themes emerge. The following indicators for empowerment, productivity, equity and sustainability appear most relevant to the environment services industry, its international trade, and prospects of privatization, community-led “alternative” approaches, and the forthcoming GATS negotiations:

Empowerment:

- Employment Generation (EG):
- Transparency and Accountability (TA):

Productivity:

- Economic Efficiency (EE):
- Technology Transfer (TT):

Equity:

- Basic Access (BA):
- Fair Access (FA):

Sustainability:

- Technological Sustainability (TS):
- Environmental Quality (EQ):

Whereas the main components of human development are powerful and emotive, the advantage of working with the above indicators is that they are objectively measurable and verifiable. Some, like employment generation or displacement, are quantitatively measurable in a specific situation. Indices and country scores have been evolved for others in recent years, for transparency and accountability, for example.

In order to confirm the accuracy of selection, it is useful to recall how each indicator is relevant to the interface between human development and environmental services. Examples of such relevance are provided (table 6).

Table 6 - Re-confirming the relevance of the selected indicators

Selected Indicators	Relevance to Environmental Services and trade
Employment Generation	Crucial for example with reference to solid waste management services, the largest segment in ES, characterised by high labour-intensity and traditionally a source of livelihoods for the poor.
Transparency/Accountability	Relevant to the operations of public utilities, especially government procurement; relevant to all types of privatization.
Economic Efficiency	Pertinent to achieving economies of scale necessary for some ES operations.
Technology Transfer	Given the asymmetries in ES capacities between industrialized and developing countries, large multinationals and small/medium enterprises, and expert groups and the general public, technology transfer is relevant to human empowerment.
Basic Access	Crucial with reference to the fact the some ES are essential services.
Fair Access	Relevant owing risk of exclusion of the poor and price increases associated with commercialization and privatization of ES that adversely affect the poor.
Technological Sustainability	Choice of technology is important in the rapidly evolving state-of-art sub-sectors of ES, and to help developing countries tunnel through the environmental Kuznets curve.
Environmental Quality	The purpose of ES is to maintain environmental quality by reducing environmental risk, minimizing pollution, and enabling efficient use of resources.

The eight indicators obviously do not represent the human development concept in its full complexity and richness. The purpose is to help achieve an objective assessment of those aspects of the HD components that are accessible to measurement.

To what degree and how fairly do the selected indicators represent the measurable aspects of human development? Certain observations are made below:

- Employment, and more generally, livelihoods are basic to empowering individuals and households. Accountability plays a key role in empowering organizations and institutions. In addition, transparency encourages confidence building by empowering the general public vis-à-vis those who hold responsible positions within such organisations as the insiders. It is argued that employment generation, transparency and accountability reflect important aspects of empowerment in the context of environmental services.

- Productivity in the conventional sense is quite measurable by itself, but less so in the context of enhancing the human potential for a wider choice of more productive activities. Gains in economic efficiency and acquisition of technology are two valid elements of this rich idea. Economic efficiency and technology transfer are also indicators that are portable across the region. They are also relevant to measuring the value-addition from the trade in environmental services.
- Equity in the truest sense must be demonstrated in processes as well as outcomes. Basic and fair accesses are both outcome indicators of equity that measure equity at different levels of access. As such, they complement each other in the description of outcome equity. Transparency and accountability are instruments for process equity, and both have already been included in the analytical framework.
- There has been much debate about an operational definition of sustainability in recent years. It may suffice to argue that environmental quality and the technology acquired by a society contribute significantly to the ability of the next generation to maintain, if not improve, its own welfare. Conversely, it is reasonably certain that a badly polluted environment and poor choice of technology are not conducive to sustainability. As such, environmental quality and technological sustainability are valid indicators of sustainability, particularly in the context of environmental services.

National and local governance, institutional autonomy, social responsibility of the private sector, and the quality of civil society institutions and societal respect for human rights, specifically the rights to water, are relevant to the process of enlarging human choices. Are there additional, alternate, or more appropriate indicators for the validation of SEEP in the ES sector? Certainly additional indicators could be considered, for example, the indicators for democracy, rule of law and government effectiveness, and corruption (Human Development Report, 2002). Foreign investors and service suppliers give prime consideration to these factors, but they largely lie beyond the sphere of influence of policy advisors, trade officials, and local government departments and agencies, who are the main audiences for this analysis. To a degree also, governance and justice issues are reflected in 'transparency and accountability', in 'basic access' and 'fair access'. For such pragmatic reasons, this analysis is restricted to the eight selected verifiable indicators listed above.

It is stressed that the selected indicators have been derived empirically, and are contingent on the current features of the trade in environmental services. Other indicators may be more appropriate for other services sectors, and even for the environmental services sector, as it evolves over time.

The preceding sections have drawn implications for human development of the various features of trade in environmental services. Equipped with a set of relevant and valid indicators, it is possible to consolidate these assessments in one diagram (figure 9). It displays the direction and magnitude of the possible impacts on human development of the various elements of the environment industry, its trade and prospective privatization, alternative approaches to services delivery, and negotiations under GATS.

The map that emerges from figure 9 suggests broadly the following:

- The domination of the sector by large multinational corporations based in OCED countries may contribute to technology transfer, but has negative implications for basic and fair access in developing countries;
- Mode 4 barriers adversely affect human opportunities while Mode 3 restrictions may limit productivity;
- The experience of opening up the ES sector under unilateral, bilateral, and regional agreements has been generally negative for human development in the host country;
- Privatization, whether in the form of concessions, joint ventures or full privatization, with multi-generational commitments has negative impacts for transparency and accountability if undertaken prior to reforms;
- With reforms that clarify the roles of various levels of government, establish an independent regulator, encourage fair competition, and require citizen oversight over the regulator and the operator, public-private partnerships in ES can make a positive contribution to human development;
- Community-led initiatives in environmental services, especially those that are replicated by local governments and enabled by national policy, have resulted in human development gains across-the-board;
- The inclusion of water for human use in the sub-sectors to be liberalized under the proposed OECD/EU re-classification could have negative implications for equity;
- The combining of solid waste with hazardous waste in one ES category, especially while the US is still to ratify the Basel Convention, reduces the choices available to developing countries under the GATS positive listing approach, and could have negative implication for employment and environmental quality in developing countries.

In order to emerge with policy relevant guidelines, it is necessary to go one step further in analysis. With reference to the specific requests by OECD/EU to liberalize the trade in environmental services, two questions are pertinent to scoping the response.

- Which sub-sectors offer the best opportunities for enhancing human development through liberalization?
- At the other extreme, where are the worst risks for human development?

Solid waste management, water treatment, and sewage treatment are the predominant sub-sectors of ES in terms of revenue generation. Other factors being equal, the most significant impacts of trade liberalization must be anticipated with reference to these sub-sectors. The best opportunities and worst risks are described below:

- All environmental services are offered with the prospect of improving environmental quality (figure 10). Services provided directly to industry offer a win-win opportunity for stakeholders and society at large. In particular, effluent treatment plants can achieve economies of scale in an industrial estate setting. The clients being industrial establishments, there is no risk of marginalizing any poor

stakeholder. Society benefits because negative externalities are assigned to point sources of pollution and regulation ensures that the polluter is charged appropriately. A level playing field encourages compliance among users that are producing competitive products. Management contracts or concessions for industrial wastewater treatment reduce administrative costs and support economic efficiency. Worldwide experience confirms that feasible levels of pollution charges can meet the capital and operating costs of the services provided. Any surplus revenues can be assigned to improving the quality of the general public welfare;

- Employment displacement in the solid waste management sub-sector is one of greatest risks associated with trade liberalization. Excessive mechanisation targets the livelihoods of some of the poorest people. Employment-displacement in the water treatment sub-sector is a more concentrated risk for the staff of public utilities. The exclusion of low-income communities from privatized and liberalized water supply and solid waste management services are also high profile risks. In addition, there is considerable risk that biodiversity conservation projects managed by international consortiums will fence-off parks and protected areas, and deprive the poor of their traditional access rights (figure 11).

Two further steps are required for a comprehensive analysis. Thought-experiments may be conducted to assess the impacts on the components of human development or one of their indicators, one at a time. Similarly, each ES sub-sector may be studied, one at a time, for the effect of the proposed liberalization. Boxes 8 and 9 illustrate by way of examples the results of thought-experiments for the indicator of 'basic access' and for sub-sector of wastewater treatment, respectively.

8.3 Summing Up the Analysis

It is likely that the decision-makers in the Asia-Pacific region will emerge with different results reflecting the diversity of their country situations. In fact, it would be amazing if similar results were obtained across the region. The aim of this analytical section has been to provide an approach to studying HD implications of ES liberalisation, not on probable particular results.

However, some possible outcomes stand out as strategic responses with possible common applicability across the Asia-Pacific region:

- In particular, there is a win-win opportunity to liberalize the trade in services for combined industrial effluent treatment plants (CETPs) operating at the level of industrial estates. A liberalized private sector regime for CETPs will bring more FDI, break local institutional gridlocks, and provide respectability to Asia-Pacific processors in the world markets. The clientele would be industry and there is no risk of excluding the poor.
- One longer-term strategic opportunity for developing countries of Asia-Pacific is to export labour and skill intensive environmental services. Other opportunities

include securing recognition for watershed management in upland areas and traditional biodiversity management as environmental services, traded across borders or consumed abroad.

With coalition building around such experiential learning, developing countries of the Asia-Pacific region through their various Groups at the WTO could respond strategically to the requests under GATS for opening up environmental services.

Figure 9 - Assessment of impact of features of ES on HD components and indicators

HD/ES	Empowerment		Productivity		Equity		Sustainability	
	EG	TA	EE	TT	BA	FA	TS	EQ
OVI								
Definition of ES	▽	▽	△	△	▽	▽	△	△
Characteristics of ES					△	△		
Structure of ES	▽			▲	▼	▼		
Segments of ES				▽			▽	
Trends in ES			△			▼		△
Barriers to trade								
• Mode 3			▽	▽				
• Mode 4					▼	▼		
ES under bilateral, regional trade, investment agreements		▼			▼	▼		
Privatization:		△	△	△	△			
• Mgmt Contract								
Concession, JV, Privatization:		▼	△	△	▼	▼		
• Prior to reform								
Concession, JV, Privatization:		▲	△	△	△	△		
• Post reform								
Community-led initiatives								
• Local	△	△	△	△	△	△		
• Scaled – out	△	△	△	△	△	△	△	△
• Replicated	▲	△	△	▲	▲	▲	△	▲
• Enabled by policy	▲	▲	▲	▲	▲	▲	▲	▲
OECD/EU re-classification		△	△	△			△	△
• Including water for human use					▼	▼		
• Combining SW/HW	▼							▼

- ▼ = major negative impact
- ▽ = significant negative impact
- ▲ = major positive impact
- △ = significant positive impact

Figure 10 - Scoping Best Opportunities in ES Liberalization for Enhancing Human Development

HD/ES	Empowerment		Productivity		Equity		Sustainability	
	EG	TA	EE	TT	BA	FA	TS	EQ
WS								
SAN								▲
IND	▲	▲	▲	▲				▲
SW								▲
HW								▲
AIR								▲
NA								▲
BL								▲

Figure 11 - Scoping Worst Possible Impacts of ES Liberalization on Human Development

HD/ES	Empowerment		Productivity		Equity		Sustainability	
	EG	TA	EE	TT	BA	FA	TS	EQ
WS	▼				▼	▼		
SAN								
IND								
SW	▼				▼	▼		
HW								
AIR								
NA								
BL					▼			

WS = Water Supply/ Utilities

SAN = Municipal Wastewater Discharge and Treatment Services

IND = Industrial Wastewater Treatment Services

SW = Solid Waste Management

HW = Hazardous Waste Management

AIR = Air Pollution Control Services

NA = Noise and Vibration Abatement Services

BL = Biodiversity and Landscape Conservation Services

Box 10 - Thought-experiments on Basic Access

- **Water Supply:** Privatization and liberalisation of water supply services could impede the access of the poor to potable water, particularly in large urban areas. Hence a large negative impact risk in a most sensitive area.
- **Sanitation:** At present, a minority in urban Asia has access to sewage treatment services. Privatization and liberalisation of urban sewage systems may extend the coverage to some un-served poor populations with considerable significance for their health;
- **Solid Waste Management:** Liberalisation of solid waste management services could impede the basic access of the poor to the service, but the poor are not served by existing solid waste collection system either;
- **Air Pollution:** It would be impossible to impede the basic access of the poor to the benefits of any abatement programme; however, the significance of the improvement in outdoor air could be marginal. It is in-door air pollution that is the more common and greater health hazard for the poor;
- **Remediation and clean up of soil and water** would have generalised benefits, that could be quite significant for the poor living on marginal lands;
- **Noise and Vibration:** It would not be possible to restrict the benefits from noise and vibration abatement, but the extent of the benefit may be small;
- **Biodiversity Protection:** It would be possible to restrict the access of the poor to projects that are fenced off, and this could be quite significant for the livelihoods of the poor in some areas.

Box 11 - Thought-experiments on Liberalising Waste Water Management

- **Employment Generation:** With both retrenchment and expansion as and where needed, the net employment impact of the privatization and liberalization of municipal wastewater treatment is uncertain, perhaps it would be slightly positive and of some importance;
- **Transparency and Accountability:** Substantial improvements in financial accountability and transparency in wastewater treatment is likely to be realised after institutional reforms, and these could be of some importance to HD.
- **Economic Efficiency:** Substantial gains in economic efficiency would drive the process of liberalizing wastewater treatment services, hence the high positive impact, but the international services will continue only if the gains in economic efficiency materialise and profits can be made and repatriated, hence the medium importance to HD;
- **Technology Transfer:** There could be significant technology transfer with wastewater treatment plants that generate a profitable by-product, such as fertilisers and fodder for livestock. Most sewage treatment plants currently installed are not being properly operated in the public sector. Hence a potential positive impact with huge significance, constrained only by problems that are more institutional than technical.
- **Basic Access:** A minority has assured minimum access to wastewater management at present; liberalization could extend the benefit to some un-served poor, with considerable significance for their health;
- **Fair Access:** The small minority that has access to wastewater treatment will pay more for a privatized and liberalized wastewater treatment service. Whether equity is enhanced or retarded will depend on how the profits are used. A small positive impact is assumed and that could be of considerable significance.
- **Technical Sustainability:** Expectations of substantial gains in technical sustainability in wastewater treatment will be a driving force for the privatization and liberalization, and the outcome will be of some significance.
- **Environmental Quality:** The expectations of substantial gains in environmental quality and integrity from wastewater treatment will be the driving force for privatization and liberalization, and the result could be hugely significant.

9 – Conclusions and Recommendations

The strategic responses to the particular requests for binding commitments for MA and NT for particular environmental services should emerge from broad-based and structured consultations. The consultations should be held with national and local representatives and with common people. The consultations should be focused. The salient issues may be framed by sector experts jointly with human development practitioners in each Asia-Pacific country.

The following recommendations are made for consideration at the international level for Asia-Pacific countries through their Groups at WTO:

- Removal of restrictions on the provision of environmental services through Mode 4 as equal, if not higher priority, than the removal of barriers on Mode 3;
- Inclusion of national and local capacity building, and technology transfer as principles for trade in ES; backed up by detailed operational rules for attainment;
- The principles of transparent operations, user community oversight of regulator and operator, and the non-exclusion of the poor in all liberalized provision of environmental services;
- Asia-Pacific countries should adopt the broad classification of environmental services with seven sub-sectors (contained in WTO 1998 Secretariat Note, as opposed to the 1991 GATS classification in W/120); with the proviso for
- Inclusion of traditional conservation services, such as watershed and biodiversity management that enhance use and existence values, as categories of ES supplied across borders (Mode 1) or consumed abroad (Mode 2); and
- Separation of solid waste and hazardous waste management into two distinct categories of environmental services under GATS, with distinct comparative advantages.

Policy recommendations at the national level have to recognise the wide diversity of Asia-Pacific countries and the dynamism in parts of the region. The recommendations below should be tailored to address the needs of at least three categories of Asia-Pacific countries, as identified in Section 1:

- Large emerging markets with poor environmental systems, heavy stresses on the environmental media, but with capacities to cope and specifically with a dynamic private sector, such as in China and India;
- Marginal markets with highly vulnerable populations, such as Pakistan;
- Small isolated markets, such as the Pacific Island Countries that are unlikely to attract multinational suppliers of environmental services under commercial market size criteria.

The recommendations are addressed to:

- Ministries of Commerce
- Other concerned Ministries, departments and agencies

The common national level policy recommendations are:

- Adopt the human development approach for the governance of environmental services;
- Incorporate human development principles in national and local laws, regulatory frameworks, programmes, and practices for the regulation, procurement, provision and management of environmental services;
- Strengthen oversight and management of environmental services by clarifying roles and responsibilities of stakeholders; and
- Develop of national capacities in environmental services, including measures for the acquisition of environmentally sound technologies;
- Ensure adequate investment in public goods, specifically environmental services;
- If and where private provision of ES is deemed appropriate, ensure transparent competition among privatized entities, by measures such as tight demarcation of natural monopolies and yardstick competition among service providers.

In addition, Ministries of Commerce in Asia-Pacific countries should:

- Be cautious about making commitments for water utilities, owing to negative experiences with the privatization and liberalization of this segment, until they have built up human and institutional capacity to regulate large private utilities;
- On the contrary, they should seek to privatize and liberalize wastewater treatment, in particular, offer MA and NT for industrial wastewater treatment services;
- Be cautious about liberalizing solid waste management, particularly because of negative employment impacts and the significance of this sub-sector for the poor;
- Proceed with the liberalization of air clean up programmes and associated services to the extent feasible;
- Similarly, seek opportunities for liberalizing the soil and water remediation sub-sector;
- Open up noise and vibration abatement services;
- Positively review the opening up of biodiversity and landscape protection services. Liberalization should be subject to prior revision of National Parks and Protected Areas laws to ensure community participation in management plans and to protect the use rights of the poor;

For the more vulnerable and institutionally less developed countries it is emphasised that:

- Enforcement of environmental standards may be undertaken in a phased, practically feasible, manner. A logical starting point is the requirement for cleaner production for export-oriented industry located in industrial estates;
- Sensitive segments of water for human use and recycling services should be excluded or not liberalized until there is widespread understanding in the country of the implications and a national consensus achieved on opening up the trade in these sub-sectors.

Postscript:

There is secrecy in GATS negotiations, coupled with an overwhelming lack of understanding of WTO provisions among state and local government officials who are the decision-takers on environmental infrastructure, as well as among the users of environmental services. The official-level discussions on the assessment of proposals and implications are not transparent enough, limited as they are to a narrow group of specialised civil servants and negotiators, and excluding the stakeholders. In turn, these specialized negotiators are not sensitized enough to the importance of the variety of environmental services needed and potentially available for improving people's health and livelihoods. All efforts toward bridging any of these gaps thus make a contribution to human development at local, national, regional and global scales.

Statistical Appendix

Appendix 1 - Environmental Sustainability Index – Asia-Pacific Countries, 2002

Rank among 142	Countries	Environmental Systems	Reducing Environmental Stress	Reducing Human Vulnerability	Social and Institutional Capacity	Global Stewardship	Composite ESI
ESI > 50							
30	Bhutan	49.4	62.0	31.4	58.4	70.9	56.3
32	Laos	57.6	56.4	35.3	57.3	65.6	56.2
42	Mongolia	70.5	58.3	32.8	42.5	52.7	54.2
51	Papua New Guinea	66.9	56.7	18.0	39.6	63.3	51.8
54	Thailand	50.0	63.7	58.9	45.0	39.6	51.6
55	Sri Lanka	37.8	58.4	56.3	48.3	63.7	51.3
ESI between 40 and 49.9							
68	Malaysia	58.9	43.2	73.0	44.2	37.0	49.5
86	Bangladesh	40.9	65.4	40.3	29.8	59.7	46.9
90	Myanmar (Burma)	44.7	67.6	32.6	27.5	55.1	46.2
94	Viet Nam	42.7	51.2	50.5	33.2	60.0	45.7
97	Cambodia	47.0	60.9	8.2	41.6	58.3	45.6
99	Nepal	37.8	48.9	31.5	41.8	66.5	45.2
100	Indonesia	32.6	60.8	57.5	37.3	45.4	45.1
104	Iran	41.0	58.2	70.7	26.9	41.4	44.5
112	Pakistan	37.6	47.7	41.5	31.8	59.2	42.1
116	India	27.4	55.3	43.8	40.8	44.3	41.6
117	Philippines	19.6	56.1	56.4	42.1	49.3	41.6
ESI < 39.9							
129	China	31.5	55.9	61.9	33.7	18.4	38.5
135	South Korea	21.7	15.6	81.7	58.6	35.1	35.9
140	North Korea	19.4	50.6	57.9	28.1	20.6	32.3

Components and Indicators: Environmental Systems: Air quality, water quality, water quantity, biodiversity, land. Reducing Environmental Stress: Reducing air pollution, reducing water stress, reducing ecosystem stress, reducing waste and consumption pressures, reducing population growth
 Reducing Human vulnerability: Basic human sustenance, environmental health. Social and institutional capacity: Science and technology, capacity for debate, environmental governance, private sector responsiveness, eco-efficiency. Global stewardship: Participation in international cooperative efforts, reducing greenhouse gas emissions, reducing trans-boundary environmental pressures, marine catch per capita; source: <http://www.ciesin.org/indicators/ESI/> accessed on 19 October 2004

Appendix 2 - Targets for MDG 7: Ensuring Environmental Sustainability

Country	Land under forest		Protected area		Energy use		CO2 emissions		Access to safe water		Improved sanitation	
	%	%	%	%	PPP\$/kg oil equivalent		Per capita, metric tons		% Population		% Urban population	
	1990	2000	1985	2002	1990	2000	1990	1999	1990	2000	1990	2000
China	15.6	17.5	0.2	7.8	1.8	4.1	2.1	2.3	71	75	57	69
Hong Kong				43.0	8.9	10.9	4.6	6.2		100		99
Korea, Rep	63.8	63.3	4.8	6.9	4.1	3.6	5.6	8.4		92	67	76
Mongolia	7.2	6.8	3.0	11.5			4.7	3.2		60	47	46
Taiwan	51.6	58.1	5.8	20.3								
Cambodia	56.1	52.9	0.1	18.5			0.0	0.1		30	56	56
Indonesia	65.2	58.0	7.6	19.7	3.7	4.2	1.0	1.2	71	78	66	69
Lao PDR	56.7	54.4	0.0	13.1			0.1	0.1		37	67	67
Malaysia	65.9	58.7	4.7	5.3	3.8	4.3	3.0	5.4		95		100
Myanmar	60.2	52.3	0.0	0.9			0.1	0.2		72	67	84
Philippines	22.4	19.4	1.3	5.7	7.2	6.8	0.7	1.0	87	86	85	93
Singapore	3.3	3.3	4.3	4.9	2.9	3.9	13.8	13.7	100	100	100	100
Thailand	31.1	28.9	5.3	13.9	4.9	5.1	1.7	3.3	80	84	95	96
Viet Nam	28.6	30.2	0.5	3.5	2.8	4.2	0.3	0.6	55	77	52	82
Afghanistan	2.1	2.1	0.0	0.3			0.1	0.0		13	13	25
Bangladesh	9.0	10.2	0.2	0.8	8.5	10.8	0.1	0.2	94	97	81	71
Bhutan	64.2	64.2	20.2	21.2			0.2	0.5		62	80	65
India	21.4	21.6	3.7	5.2	3.3	5.5	0.8	1.1	68	84	44	61
Maldives	3.3	3.3					0.7	1.3		100	98	100
Nepal	32.7	27.3	7.1	8.9	2.6	3.7	0.0	0.1	67	88	69	73
Pakistan	3.6	3.1	8.4	4.9	3.5	4.0	0.6	0.7	83	90	77	95
Sri Lanka	35.4	30.0	9.9	13.5	6.3	7.8	0.2	0.5	68	77	94	97
Cook Islands	95.7	95.7		1.0						100	100	100
Fiji	45.5	44.6	0.3	1.1			1.1	0.9		47	91	75
Kiribati	38.4	38.4		36.6			0.3	0.3		4891	91	54
Marshall Islands	0.0	0.0								88		92
Micronesia, Fed	34.8	21.7								41		45
Papua NG	70.1	67.6		2.3			0.6	0.5	40	42	92	92
Samoa	46.1	37.2		3.6			0.8	0.8		99	100	95
Solomon Islands	90.3	88.8					0.5	0.4		71	73	98
Tonga	5.5	5.5		6.0			0.8	1.2		100	88	94
Tuvalu	-	-								100	79	100
Vanuatu	36.7	36.7					0.4	0.3		88	82	100

Appendix 3 – Water, Sanitation & Hygiene in Asia-Pacific Countries

Country	Total population (millions)	GNI per capita (US\$)	% of excrement not disposed off safely	Amount of excrement not disposed off safely per year (millions of metric tonnes)	% of population without access to improved water supply	% of population without access to improved sanitation	Number of people without access to improved water supply (millions)	Number of people without access to improved sanitation (millions)	Estimated number of children dying from poor hygiene	Diarrhoeal disease rate (% of children suffering diarrhoea in the two weeks prior to survey)	% of children not growing normally	Under-five mortality rate (per 1000 live births)
Korea, Rep.	45.0	-	1	<0.1	0	1	<0.1	0.5	-	-	0	5
Malaysia	25.1	3640	2	> 0.1	6	2	1.5	0.5	100	2	18	8
Sri Lanka	19.3	830	6	0.1	23	6	4.4	1.2	400	5	33	19
Thailand	63.1	1970	4	0.2	16	4	10.1	2.5	2600	8.4	18	28
Philippines	82	1040	17	1.3	14	17	11.5	13.9	6500	7.4	29	38
Vietnam	80.8	410	53	4.1	23	53	18.6	42.8	7900	11.3	33	38
China	1288.7	890	60	73.4	25	60	322.2	773.2	No data	No data	10	39
Iran	66.6	1750	17	1.1	8	17	5.3	11.3	7900	11.3	11	42
Indonesia	220.5	680	45	9.4	22	45	48.5	99.2	24200	10.4	26	45
Korea, DPR	22.0	No data	37	0.8	8	37	1.8	8.1	No data	No data	60	55
Mongolia	2.5	400	70	0.2	40	70	1.0	1.8	500	8.0	13	76
Bangladesh	146.7	370	52	7.2	3	52	4.4	76.3	21000	6.1	48	77
Nepal	25.2	250	72	1.7	12	72	3	18.1	19500	27.5	47	91
India	1068.6	460	72	73	16	72	171	769.4	519500	19.2	47	93
Papua NG	5.5	580	18	< 0.1	58	18	3.2	1.0	2600	16.5	6	94
Bhutan	0.9	640	30	< 0.1	38	30	0.3	0.3	No data	No data	19	95
Myanmar	49.5	220	36	1.7	28	36	13.9	17.8	No data	No data	36	109
Pakistan	149.1	420	38	5.4	10	38	14.9	56.7	135000	26	38	109
Cambodia	12.6	270	83	1	70	83	8.8	10.5	10700	18.9	46	138
Afghanistan	28.7	250	88	2.4	87	88	25	25.3	48000	20	48	257

Source: WSSCC 2004, 28

Appendix 4 - Inequalities between the Poor and the Non-Poor in Health

Country	Under-5 mortality rate (deaths of children under 5 per 1,000 live births)		
	Poorest quintile	Richest quintile	Ratio
East Asia, Pacific			
Cambodia, 2000	155	64	2.4
Indonesia, 1997	109	29	3.8
Philippines, 1998	80	29	2.8
Vietnam, 2000	53	16	3.3
South Asia			
Bangladesh, 1999-2000	140	72	1.9
India, 1998-1999	141	46	3.1
Nepal, 2001	130	68	1.9
Pakistan, 1990-1991	125	74	1.7

Source: Carr, D. (2004) Improving the Health of the World's Poorest People, Health Bulletin, No.1, (Washington, DC: Population Reference Bureau)

Appendix 5 – Growth in ISO Certification in Asia-Pacific 2000 - 2003

Country	ISO 9001, 9002, 9003 By 2000	ISO 9000:2000 By 2003	ISO 14000 By 2000	ISO 14001 By 2003
Iran & South Asia				
Afghanistan	3	0	4	0
Bangladesh	25	49	0	4
India	6682	8367	257	879
Iran	433	470	12	88
Nepal	1	6	0	1
Pakistan	611	464	4	26
Sri Lanka	82	90	2	11
Total Iran & South Asia	7837	9446	279	1012
Far East				
Brunei	192	36	2	3
Cambodia	1	5	0	1
China	25657	96715	510	5064
China, Hong Kong SAR	2570	2683	105	262
China, Taipei	4319	2991	421	1337
Fiji	8	2	0	1
Indonesia	1860	1318	77	297
Japan	21329	38751	5556	13416
Korea, DPR	495	63	26	0
Korea, Republic	15424	12846	544	1495
Malaysia	2355	3076	174	370
Mongolia	1	4	0	0
Myanmar	4	3	0	0
Papua New Guinea	7	0	0	1
Philippines	1027	456	46	174
Samoa	1	0		0
Singapore	3900	3341	100	523
Thailand	2553	1675	310	736
Vietnam	184	1237	9	56
Total Far East	81887	165202	7880	23736
Total Asia-Pacific	89724	174648	8159	24748

World wide	408631	500125	22897	66070
% Asia - Pacific/World	22.0	34.9	35.6	37.5
% Asia - Pacific less Japan/World	16.7	27.2	11.4	17.2

Source: www.iso.org

Appendix 6 - The Global Environmental Market by Region, 2000

	USA	W Europe	Japan	Asia	Latin Am	Canada	Aus/NZ	E Europe	MidEast	Africa	Total\$
Equipment											
Water Equipment & Chemicals	16.7	11.4	5.2	3.2	1.0	1.2	0.8	1.0	0.5	0.5	41.6
Air Pollution Control	16.1	8.0	3.0	3.0	0.4	0.6	0.3	0.5	0.4	0.1	32.5
Instruments & Information Systems	2.5	1.7	0.9	0.6	0.2	0.1	0.1	0.1	0.1	0.0	6.4
Waste Mgmt Equipment	9.5	9.9	7.9	1.1	0.8	0.9	0.5	0.5	0.2	0.2	31.6
Process & Prevention Technology	1.3	0.6	0.5	0.3	0.1	0.1	0.1	0.0	0.0	0.0	2.9
Services											
Solid Waste Management	39.8	33.4	30.2	3.7	1.6	2.3	1.5	1.5	1.0	0.4	115.5
Hazardous Waste Mgmt	5.2	5.9	3.9	0.6	0.2	0.4	0.3	0.4	0.3	0.0	17.3
Consulting & Engineering	15.9	9.1	1.1	0.9	0.4	1.0	0.6	0.4	0.3	0.2	29.9
Remediation/Industrial Services	11.1	7.9	4.0	0.4	1.0	1.0	0.8	0.7	1.7	0.2	28.7
Analytical Services	1.2	1.2	0.5	0.3	0.1	0.1	0.1	0.1	0.1	0.0	3.7
Water Treatment Works	30.2	24.7	9.8	3.6	2.2	2.1	1.3	0.8	0.4	0.3	75.5
Resources											
Water Utilities	32.2	22.4	12.4	5.2	2.5	2.1	1.5	3.0	1.5	1.1	83.9
Resource Recovery	12.7	15.5	9.7	0.2	0.5	0.7	0.4	0.5	0.2	0.2	40.5
Clean Energy Systems & Power	9.3	6.0	4.4	0.8	0.4	0.3	0.3	0.2	0.1	0.2	22.1
Total\$	203.8	157.8	93.7	24.0	11.36	13.1	8.4	9.6	6.8	3.4	532
Total%	38.3%	29.7%	17.6%	4.5%	2.1%	2.5%	1.6%	1.8%	1.3%	0.6%	1

Appendix 7 - EBJ's Top 70 Environmental Companies in the World, 2001

Company	Country	Segment	Env'l Revs \$mil 01
1 Vivendi Environnement SA	France	Water/SW/HW/WE&C	17,230
2 Suez (Ondeo, Sita)	France	Water/WE&C/SW	13,970
3 Waste Management	U.S.A.	Solid Waste/WME	11,320
4 Allied Waste	U.S.A.	Solid Waste	5,470
5 RWE Entsorgung AG	Germany	Solid Waste/C&E	4,790
6 Bechtel Group Inc.	U.S.A.	EC/Remed	2,640
7 Severn Trent	U.K.	Water/WW/C&E	2,380
8 Ebara Corp	Japan	W/WW/APC/SW/RIS	2,300
9 Republic Services	U.S.A.	Solid Waste	2,260
10 Mitsubishi Heavy Industries	Japan	Incin/APC/Water Equip.	2,160
11 Kubota (Ind'l Eq div.)	Japan	Equip	1,830
12 Betz Laboratories Inc. (now GE Betz)	U.S.A.	Water Treatment	1,820
13 Hochtief AG	Germany	EC	1,760
14 AWG plc (Anglian Water)	U.K.	Water	1,740
15 Shaw Group (IT Corp, S&W)	U.S.A.	C&E/Remed	1,610
16 Safety Kleen Corp.	U.S.A.	Haz Waste/Recycling	1,510
17 Earth Tech	U.S.A.	C&E	1,460
18 United Utilities	U.K.	Water/WW/Equip	1,440
19 CH2M Hill Cos.	U.S.A.	C&E	1,420
20 Vestas	Denmark	Wind Power Systems	1,280
21 Kurita Water Industries	Japan	Equipment	1,260
22 Noell Gmbh	Germany	APC/EC/SW/RR	1,100
23 Washington Group International (Morrison-Knudsen)	U.S.A.	C&E/EC	1,040
24 Fomento de Construcciones y Contratas	Spain	EC/Solid Waste	1,040
25 Hitachi Zosen	Japan	WME	970
26 Takuma (Envl Eq & M/M divs)	Japan	WME/Biogas/WEC	920
27 Kelda Group (Yorkshire)	U.K.	WU/WTW/AS/MedWaste	910
28 Philip Services	Canada	RR/Ind'l Svcs/AS	810
29 Bilfinger + Berger	Germany	EC	810
30 NEG Micon	Denmark	Wind Power Systems	790
31 Babcock Borsig (Deutsche Babcock)	Germany	WME/APC	790
32 Black & Veatch	U.S.A.	C&E/EC	730
33 Foster Wheeler Corp. (now part of Tetra Tech)	U.S.A.	EC	730
34 Linde	Germany	Equip/C&E	720
35 Fluor Daniel Inc.	U.S.A.	EC	720
36 Rethmann Entsorgungs	Germany	Solid Waste	710
37 URS Corp	U.S.A.	C&E	700
38 Organo	Japan	Water Eq	700
39 Parsons Engineering Science	USA	C&E/CE	680
40 Philipp Holzmann	Germany	EC	600
41 Tsukishima Kikai	Japan	Water/Sludge/Incin Eq	590
42 MWH Global (Montgomery-Watson)	U.S.A.	C&E	570

43 Alstom	France	APC Eqpt	560	
44 Tetra Tech Inc.	USA	C&E	550	
45 Rhodia Eco Services	France	Haz Waste	510	
46 Casella Waste Systems Inc. (Rutland, VT)	USA	Solid Waste	480	
47 Battelle Memorial Institute	USA	C&E	450	
48 Camp Dresser & McKee Inc.	U.S.A.	C&E	440	
49 Jacobs Engineering	U.S.A.	C&E	410	
50 Stericycle	USA	Medical Waste	390	
51 Waste Connections Inc. (Folsom, CA)	USA	Solid Waste	380	
52 Buderus	Germany	Construction/WEC	380	
53 CalEnergy (MidAmerican Holdings)	U.S.A.	Geothermal Power	370	
54 AECOM Technology Corp	USA	C&E	370	
55 Mactec Inc.	USA	C&E	370	
56 Ionics	U.S.A.	Water/WW Equipment	350	
57 Norcal Waste Systems Inc. (San Francisco)	USA	Solid Waste	320	
58 The ERM Group	U.S.A.	C&E	300	
59 Rumpke Consolidated Companies Inc. (Cincinnati)	USA	Solid Waste	290	
60 Gundle Environmental	USA	Waste Eq.	260	
61 Waste Holdings Inc. (Waste Industries, Raleigh, NC)	USA	Solid Waste	260	
62 Pall Corp	USA	Water Eq.	260	
63 Thermo Electron Corp.	U.S.A.	Instruments	240	
64 Arcadis	Holland	C&E	230	
65 Clean Harbors Inc. (Braintree, Mass.)	USA	Hazardous Waste	220	
66 Donaldson Company Inc.	USA	APC Eqpt	220	
67 Heritage Environmental Services	USA	Haz Waste	200	
68 IESI Corp. (Haltom City, TX)	USA	Solid Waste	190	
69 Perkin-Elmer	USA	Inst.	180	
70 BHA Group Inc.	USA	APC Eqpt	170	
71 Deffenbaugh Industries Inc. (Shawnee, Kan)	USA	Solid Waste	170	
Top 71 Total			107,800	19.9%
Rest of Companies			435,200	
Total			543,000	

Appendix 8 - Top Environmental Market Countries, 2000-2001

Country	2000	2001	% change	\$change
1 USA	203.08	208.45	2.6%	5.37
2 Japan	93.75	93.35	-0.4%	-0.40
3 Germany	44.63	44.88	0.6%	0.25
4 United Kingdom	25.42	25.98	2.2%	0.56
5 France	24.21	24.70	2.0%	0.49
6 Italy	15.65	16.25	3.8%	0.59
7 Canada	13.05	13.25	1.5%	0.19
8 Spain	8.60	9.01	4.8%	0.41
9 Netherlands	8.81	8.90	1.1%	0.09
10 Australia	7.10	7.27	2.4%	0.17
11 Middle East	6.84	7.01	2.4%	0.16
12 China	7.37	8.15	10.6%	0.78
13 South Korea	5.58	5.81	4.1%	0.23
14 Switzerland	5.33	5.40	1.3%	0.07
15 Poland	4.64	4.83	4.2%	0.19
16 Brazil	4.58	4.72	3.1%	0.14
17 Sweden	4.41	4.46	1.2%	0.05
18 Austria	4.22	4.26	1.1%	0.04
19 Africa	3.35	3.62	8.0%	0.27
20 Taiwan	3.44	3.54	3.0%	0.10
21 Belgium	3.29	3.32	1.0%	0.03
22 Mexico	2.75	2.78	1.1%	0.03
23 Norway	2.73	2.77	1.4%	0.04
24 Denmark	2.65	2.67	0.9%	0.02
25 India	2.44	2.64	8.1%	0.20
26 Finland	2.60	2.62	0.7%	0.02
27 Ireland	1.68	1.83	8.7%	0.15
28 Hong Kong	1.67	1.71	2.0%	0.03
29 Portugal	1.61	1.67	3.9%	0.06
30 Greece	1.50	1.59	6.1%	0.09
31 Argentina	1.60	1.56	-2.5%	-0.04
32 New Zealand	1.31	1.33	1.8%	0.02
33 Singapore	1.17	1.26	7.0%	0.08
34 Thailand	1.21	1.25	3.2%	0.04
35 Hungary	1.14	1.21	6.8%	0.08
36 Czech Republic	1.01	1.08	6.5%	0.07
37 Indonesia	0.89	0.94	6.0%	0.05
38 Malaysia	0.80	0.80	0.7%	0.01
39 Chile	0.75	0.78	4.0%	0.03
40 Romania	0.68	0.73	8.3%	0.06
41 Venezuela	0.60	0.63	5.0%	0.03
42 Colombia	0.50	0.52	4.0%	0.02
43 Slovakia	0.43	0.46	6.3%	0.03
44 Philippines	0.43	0.46	6.1%	0.03

*SOURCE: Environmental Business International, Inc.,
San Diego, Calif. units in \$bil.*

Appendix 9 - Trends and Forecasts for Top Environmental Market Countries in Asia

World Rank	Country	1995	1996	1997	1998	1999	2000	2001	2002	02-05 annual growth forecast
2	Japan	90.80	91.50	93.70	91.80	91.60	93.75	93.35	92.40	1-2%
12	China	3.30	3.90	4.40	4.70	4.98	7.37	8.15	7.15	4-8%
13	South Korea	4.40	4.80	4.99	4.61	5.06	5.58	5.81	5.93	6-8%
20	Taiwan	2.90	3.20	3.28	3.18	3.25	3.44	3.54	3.65	0-4%
25	India	1.80	1.90	2.05	2.15	2.28	2.44	2.64	2.85	3-5%
28	Hong Kong	1.40	1.50	1.57	1.47	1.50	1.67	1.71	1.77	2-6%
33	Thailand	1.10	1.30	1.22	1.08	1.12	1.21	1.25	1.35	6-8%
34	Singapore	0.90	0.90	1.02	1.01	1.06	1.17	1.26	1.29	6-8%
37	Indonesia	0.90	0.90	0.95	0.82	0.81	0.89	0.94	0.98	2-6%
38	Malaysia	0.60	0.70	0.72	0.66	0.69	0.80	0.80	0.84	8-12%
44	Philippines	0.40	0.40	0.40	0.39	0.40	0.43	0.46	0.50	8-12%
	Rest of Asia	0.50	0.50	0.55	0.57	0.60	0.67	0.72	0.77	10-12%
	Total	109.00	111.50	114.85	112.44	113.35	119.43	120.63	119.48	5-6%

SOURCE: Environmental Business International, Inc., San Diego, Calif. units in US \$ billion

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