Water for the 21st Century: Vision to Action for Southeast Asia

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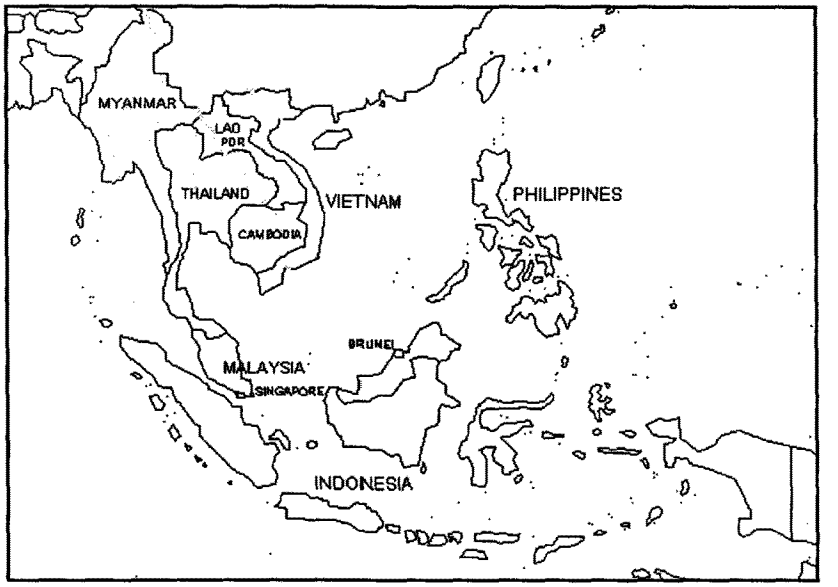
1.0 INTRODUCTION

The last half of the 20th century has been characterized by unprecedented changes and irreversible trends in the natural, technological, social, economic and political factors which have defined and affected human life and well-being in less traditional and more radical ways compared to previous eras. The combined human factors of present population growth, urbanization, industrialization and economic development continue to exert greater pressure and to make higher demands on the natural resources, foremost of which are water resources.

Increasing conflicts among competing uses for water such as drinking water supply, irrigation, hydropower, etc. have arisen from the pressing needs for social and economic welfare and development. At the same time, the more extensive and intensive uses of water resources have caused their degradation and increased the hazards associated with the resulting undesirable levels of water quantity and qual-

ity. These problems will be carried by civilization into the next millennium and unless society is able to develop and apply needed solutions to various aspects of the problems, then human life, health and well-being are in severe peril and society may become too impaired as to adequately meet the yet unforeseen challenges of the next millenium.



Map of the Southeast Asian region.

Southeast Asia is an extensive humid tropical region in the eastern hemisphere. It is made up of mainland countries located east of the Indian subcontinent and south of the Chinese mainland - namely, Myanmar, Thailand, Lao PDR, Cambodia and Vietnam which share common borders as well as a major river basin (the Mekong); a peninsular and multi-insular country which is Malaysia, neighbor to two extensive archipelagos which are Indonesia and the Philippines; and the two compact city-states, namely Brunei Darussalam and Singapore, strategically located amidst the larger countries. Divided by the equator along Indonesia, the region also lies in the path of the monsoons which blow from the Indian Ocean from the west, and of the typhoons which develop and move from the western Pacific Ocean. To the southeast lies an immediate neighbor, Papua New Guinea and farther, Australia and New Zealand.

Being a region most blessed with abundant rains brought by the monsoons, rice agriculture has developed for centuries, supporting the population centers which have developed in various countries where trade, culture and central authorities have flourished. The mainland countries directly benefit from the Mekong River which receives both rains and snowmelt. Local thunderstorms associated with the oscillation of the Inter-tropical Convergence Zone (ITCZ) bring in short-duration but intense rainfall episodes. The watery domains have also fostered river commerce as well as coastal and inter-island navigation. Its people, exposed to the watery elements, have built up a certain level of endurance to the calamities of floods, typhoons and the occasional tsunami due to earthquakes and volcanic activities. Droughts also occur, not only according to the more predictable seasonal patterns, but also due to the less understood geophysical trends and climatic changes such as the effects of El Niño on the western Pacific area.

The region experienced one of the fastest rates of economic growth in the world beginning in the mid-1980s which continued into the late 1990s. The pace of urbanization and industrialization increased, and the consequent demand for domestic and industrial water supply has also risen. Competition for water between the rural agricultural population and the urban commercial/industrial populations has therefore intensified. Population growth and shifting migration and settlement patterns also necessitated the provision of better and more adequate infrastructure for protection from floods and other calamities as well as for sanitation in conjunction with the safe drinking water supply.

The countries of the region differ in many aspects of geography, population size, colonial experience, culture, levels of economic development, degree of urbanization and forms of government. Nevertheless, they share two basic things: the common heritage which is the abundant natural water resources and a common humanity, which is one of not only sharing to some extent the material aspect of water resources itself, but also sharing the non-material, namely, the knowledge that was developed and the lessons that were learned in the course of their recent and collective histories to control and utilize their respective water resources.

At the close of the 20th century, Southeast Asia has achieved an impressive level of human progress and economic development, comparable if not yet at par

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with the developed countries of Asia, Europe and America. This juncture has been reached after half a century of post-colonial endeavor to provide for its citizens the basic necessities and quality of life, to which water as a resource has much to account for. The levels of development reached by the different countries vary a great deal. Singapore, Brunei Darussalam and Malaysia are recognized as leading in economic development and income levels, having displayed their inner strength by recovering quickly from the currency crisis of the late 1990s. They are followed by Thailand, the Philippines and Indonesia which have started recovering from the effects of the crisis. The countries of Lao PDR, Cambodia and Vietnam are properly on track for economic development, having shaken off most of the trauma and healed the deepest wounds of past internal wars. Myanmar, the westernmost member country, has finally rejoined this community of nations to share its common thrust and direction.

There is therefore a need to develop a long-term vision for the region that will clearly depict the desirable water world in the year 2025, including a strategy and framework for action that is not only focused, applicable and appropriate for Southeast Asia, but at the same time containing aspects and qualities potentially relevant and useful to the other regions in the world. The regional Vision and Framework for Action exercise in Southeast Asia is coordinated by the Southeast Asia Technical Advisory Committee (SEATAC) of the Global Water Partnership (GWP) (see inset box). Two regional consultations were previously held at the Asian Development Bank in Manila, Philippines and country consultations were held in Malaysia, Thailand and the Philippines. Consultations in the rest of the SEA countries are being organized. This regional report contains the results of these activities and has served as input to the global reports of GWP and World Water Council (WWC) presented during the Second World Water Forum in March 2000 in the Hague, Netherlands.

The countries of Southeast Asia are Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

The Global Water Partnership (GWP) and the World Water Council (WWC)

The global challenge of increasing water resources awareness and expanding the future options for water has been concretized in a formal agenda by the Global Water Partnership (GWP) through a project called Water Sector Mapping and Vision which is being undertaken in collaboration with the World Water Council (WWC). The project aims to map strategic assistance needs in the water sector against available human and information resources and to formulate a vision for the sector and the corresponding action to attain the vision. Regional meetings have been convened in Southeast Asia, South Asia, the People's Republic of China and in Africa, South America and Eastern Europe to address the various issues on water resources management.

ASEAN Network of Water Resources Agencies (ANWRA)

Parallel to the activities of SEATAC, the Consultative Working Group Meeting on ASEAN Cooperation on Water Conservation recommended last February 1999 in Manila the establishment of the ASEAN Network of Water Resources Agencies (ANWRA) which shall be composed of the water resources agencies designated as national focal points by the ASEAN member countries. The general objective of ANWRA is to promote cooperation among the members in ensuring the conservation and sustainability of water resources and the systematic transfer of knowledge and technology.

The Meeting decided that the ANWRA shall report to the ASEAN Senior Officials on the Environment (ASOEN). The Meeting further agreed on the final draft of the ANWRA Charter to be submitted to ASOEN for its endorsement and eventual approval by the ASEAN Standing Committee (ASC).

1.1 Objectives

The regional vision aims to spur all water stakeholders in the region to form and build a consensus on the state of water resources in the region in the year 2025. The framework for action serves as the blueprint for the attainment of the formulated vision.

1.2 Water Resources and Uses

- *Land and Water Resources Availability*

The total land area of the Southeast Asia region exceeds 435 million hectares or 4,350,000 square kilometers. The geographic size and shape of the countries range from small compact states such as Singapore and Brunei, to the archipelagos such as Indonesia and the Philippines, to the partly peninsular and partly insular nation like Malaysia, and to the mainland nations with shared inland borders and/or coastal boundaries such as Cambodia, Lao PDR, Myanmar, Thailand and Vietnam. The climate is generally humid tropical, with average annual rainfall varying from 1600 mm. to 3400 mm. The maximum average rainfalls occur in the countries lying closest to the equator.

	Land Area (million ha.)	**Average Annual Rainfall (mm.)**
Brunei D	0.5765	3389
Cambodia	18.1	na
Indonesia	181.1	2190
Lao PDR	23.7	1750
Malaysia	33.0	3000
Myanmar	65.8	2000
Philippines	29.8	2400
Singapore	0.065	2844
Thailand	51.1	1600
Vietnam.	33.0	1976
Total	436.2	

Water resources are generally abundant in view of the humid tropical regimes, its average total for the entire region exceeding 5590 cubic kilometers per year. The total water availability in a country is jointly proportional in qualitative terms to both its total land area and average annual rainfall. For international rivers shared by neighboring countries, water availability may be defined as a total basin value which transcends national boundaries, or else as adopted in this report, a local basin contribution which is always less than the total basin value.

Water resources are broken down into surface water and groundwater components. The larger amounts of surface water indicate the larger amounts of overland and channel flow components (which often reach rainstorm flood levels) as compared to the lower groundwater components which receive only from limited soil water infiltration and deeper aquifer recharge, despite a generally humid environment above ground.

	Water Resource Availability (cu.km./year)	**Surface-Water Availability (cu.km./year)**	**Groundwater Availability (cu.km./year)**
Brunei D	5.871	5.857	0.014
Cambodia	88	na	na
Indonesia	2986	1847	na
Lao PDR	na	270	na
Malaysia	630	566	64
Myanmar	1323	828	495
Philippines	358	326	32
Singapore	na	na	na
Thailand	229	226	3
Vietnam.	371	313	58
Total	5591		

- *Population Factors and Water Uses and Services*

The total population of the region is more than 500 million at the end of the 20th century and is expected to increase by around 50% or by an additional 250 million by year 2025. This also translates to around 50% rise in population

density in each country. The average population density of the region will rise from (508 millions)/(436 million has.)=1.2 person per hectare to 1.8 persons per hectare after 25 years. Per capita natural water availability will drop from (5590 cu.km./year)/(508 millions)=11 thousand cubic meters/year to 7.3 thousand cubic meters/year after 25 years. In daily per capita values, natural water availability will decrease from (11000/365)=30 to (7300/365)=20 cubic meters per person per day.

	Population (1997) (millions.)	**Projected Population (2025)** (millions)
Brunei D	.3	na
Cambodia	11.2	na
Indonesia	209.8	280
Lao PDR	4.6	8.5
Malaysia	20.5	34
Myanmar	46.5 (1995)	na
Philippines	76.1	111
Singapore	3.4	na
Thailand	59.5	na
Vietnam.	76.3	100
TOTAL	508.0	

(Note: "na" means "not available.")

In 1995, the total amount of water resources used was 270 cu.km./year or 4.8 per cent of the total water resource availability of 5590 cu.km./year. However, the percentage of water-use varies a great deal from country to country, from below 1 per cent for the mainland countries of Cambodia, Lao PDR and Myanmar, to 1-2 percent for Indonesia and Malaysia, and up to highs of 14-29% for the Philippines, Thailand and Vietnam.

	Water Resource Availability (cu.km./year)	**Water Resources Use** (1995) (cu.km./year)	(% of availability)
Brunei D	6	na	na
Cambodia	88	1	1%
Indonesia	2986	49	2
Lao PDR	270	1	<1
Malaysia	630	12	2
Myanmar	1323	4	<1
Philippines	358	105	29
Singapore	na	0.434	na
Thailand	229	33	14
Vietnam.	371	65	17
Total	5591	270	4.8% (ave.)

More than 70% of water use in the region is devoted to agricultural purposes or irrigation of staple crops which is mainly rice. The relative success of the Green Revolution in preventing major famines has been ascribed to the large investments made in previous decades in costly water resources projects for irrigation. The irrigated areas have reached between 30% and 50% of irrigable areas in the region. Expanding populations and increasing living standards will further increase the demand for food in the region, which has to be met by a food self-sufficiency program in locally irrigated agriculture, coupled with a food-security program based partly on imported foodstuff financed by export earnings.

	Distribution of Water Use (%)		
	Agricultural	Industrial	Domestic/municipal
Brunei D	5	18	77
Cambodia	na	na	na
Indonesia	75	11.5	13.5
Lao PDR	82	10	8
Malaysia	78	6.3	13.7
Myanmar	na	na	na
Philippines	79	10.0	11.0
Singapore	na	na	na
Thailand	70.9	1.9	4.6
Vietnam.	51.6	30.0	18.4

	Water for Irrigation	
	Irrigable Area (million ha.)	Irrigated Area (million ha.)
Brunei D	0.0208	0.0010
Cambodia	na	na
Indonesia	24.95	7.1
Lao PDR	0.8	0.2
Malaysia	0.564	0.322
Myanmar	na	1.76
Philippines	3.16	1.36
Singapore	na	na
Thailand	6.59	3.83
Vietnam	3.0	1.64

Domestic and municipal water use is in the range of 10-20% of total water use, while industrial water use is about 10% or less of total use. While population growth and increasing urbanization will exert higher food demand, the same factors will put pressure on present irrigation water to be reallocated in the next decades for domestic, municipal and industrial uses in an expanding and urbanizing population.

The extent of population with access to safe water is spread over a wide range of 30 to 100% for rural populations but is significantly in the high range of 50-100% for urban populations. Malaysia, Brunei Darussalam, and Singapore lead in the region in terms of percentage of both urban and rural population with access to safe water supply. The close dependence of sanitation on safe water supply explains the similar or even lower percentages of access to sanitation facilities in both rural and urban populations in the region. Urbanization trends will make more demands on better access to improved water supply and sanitation facilities.

Water for Health and Sanitation:

	Population Access to Safe Water		Sanitation	
	Rural	Urban (%)	Rural	Urban (%)
Brunei D	99	99.8	na	na
Cambodia	33	65	18	81
Indonesia	43	68	36	64
Lao PDR	57	56	18	na
Malaysia	82	98	35	65
Myanmar	43	57	na	39
Philippines	79	85	62	79
Singapore	100	100	na	na
Thailand	72	87	72	80
Vietnam	30	50	10	30

Water for Hydroelectricity:

	Potential Capacity (MW)	Installed Capacity (MW)	Average Annual Total (Production GWh)	Share of Electrical Production (%)
Brunei D	na	na	na	na
Cambodia	na	na	na	na
Indonesia	na	2200	na	na
Lao PDR	18000	620	2373	98
Malaysia	29000	1819	4934	7.5
Myanmar	4000	288	na	7
Philippines	12308	2304	4302	9.0
Singapore	na	na	na	na
Thailand	27500	2873	5551	6.4
Vietnam	17400	2864	11000	52

Energy demands of local industries as well as incentives of revenue from exportable hydroelectricity will encourage the expansion of hydropower facilities from the present total installed capacity which is typically less than 5% of potential capacity. The hydropower sector, although non-water consumptive, will require

close planning and operational coordination with the irrigation and water supply purposes, in terms of optimal water release schedules and capital cost sharing in multipurpose facilities.

Water Hazards and Flood Control:

	Total Flood Prone Area (million ha.)	Total Area Protected (million ha.)
Brunei D	na	0.02
Cambodia	na	na
Indonesia	na	1.96
Lao PDR	na	na
Malaysia	2.9	na
Myanmar	na	1.3
Philippines	1.32	0.45
Singapore	na	na
Thailand	na	na
Vietnam	2.2	1.5

Geographically associated with both irrigated farmlands and urbanized population centers are the risks associated with floods brought about by monsoons and typhoons. The extent of lowland areas provided with flood control protection measures remains much less than the total flood-prone area (less than 50%). It is also clear that increasing economic development and urbanization in the flood-prone areas will raise the cost of expected flood damages, thereby exerting pressure for more investments in flood-control projects.

2.0 CHALLENGES

2.1 Population Growth and Migration

Like the rest of the world, the SEA region is faced with a growing population that is expected to increase by a further 50% in 2025. As one of the fastest growing regions, Southeast Asia at present has a total population of 508 million, almost 100 million more than in 1993. As such, water resources will have to be managed more efficiently if these are to support the requirements of an ever-increasing population for domestic and industrial uses as well as food production.

Rural to urban migration is also evident with a relatively large number of the population concentrated in urban cities where high economic activities exist. Rural poverty has led to migration into urban centers. Urbanization averages at rates between 3 to 5% per annum. Already three megacities have been developed in Southeast Asia: Bangkok, Jakarta and Manila, each with a population of close to 10 million. With the rapid growth in population, increasing economic development and improvements in the standards of living come an increased demand for water supply, thereby putting tremendous pressures on an already threatened environment and natural resource base as well as basic infrastructure and services. Problems such as traffic congestion, pollution, flooding, solid waste, among others, are common to these large urban centers. Evidently, infrastructure and resource development cannot keep up with the rapid pace of migration.

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Rapid migration into urban areas is also a primary contributor to the pollution of water sources. A large majority of the urban poor are settling in waterways with no access to water and sanitation services. Shanties and slums fill up the riverbanks and drainage areas, often impeding access to these waterways. This, coupled with uncollected garbage which finds its way to water bodies, further aggravates the flooding problem.

Although water supply coverage in most urban centers is high, only about 6-15 percent is covered by sewerage systems. As a result, water bodies are often the recipients of raw sewage from domestic and industrial sources. In most megacities and urban areas, pollution of river systems has become quite serious, rendering many unfit for human consumption or industrial purposes. In Bangkok for instance, the Chao Phraya River, a principal river system that runs across the city and is the main source of water for Bangkok, is threatened by wastes coming from domestic and industrial sources. In Metro Manila, the government is undertaking a massive rehabilitation program of the Pasig River, the counterpart of the Chao Phraya, which was declared biologically dead a few years ago. Clearly, the lack of wastewater

disposal, sanitation and proper solid waste management has resulted in further reducing available freshwater supply.

Given all the deleterious effects of rapid urbanization, the challenge today is to stimulate development in the countryside to relieve the migration to and infrastructure pressures in the urban centers.

2.2. Natural Resource Degradation

In the last two decades, natural resources degradation has escalated to unprecedented proportions as a result of an increased demand from a rapidly growing population. Deforestation in the region occured at the rate of 2.5 million hectares from the period 1980-1990. Forest cover in the region decreased from 182 million hectares in 1980 to 156 million hectares in 1990. The pattern of forest destruction will only worsen over time if not properly addressed today.

Over time, forest depletion has triggered a chain of effects resulting in a decrease in available freshwater supply, soil erosion, sedimentation and siltation of river systems and flooding. Large portions of surface water sources are severely degraded as a result primarily of diminishing forest cover within watersheds. In the same manner, groundwater resources have not escaped the results of environmental degradation as evidenced by the increasing incidence of groundwater contamination caused by improper waste disposal and the infiltration of contaminated surface water into the underground aquifers. Salt water intrusion and land subsidence resulting from over-abstraction likewise pose real dangers.

In addition, unregulated land use practices have also taken a toll on water sources. The use of agricultural fertilizers and pesticides somehow find their way either in surface water or groundwater sources. A poor grasp and understanding of the intricate land-water ecosystems processes has exacerbated environmental degradation, in general, and water resources degradation, in particular. The fact that environmental programs which are supposed to ensure environmental protection and management are poorly planned and uncoordinated in most instances only worsen the situation.

There is therefore a need to address the varied issues on environmental degradation to prevent further destruction. This could be properly addressed by the adoption of appropriate institutional infrastructures that will ensure a coordinated development and management of water, land and related resources to optimize economic and social welfare without compromising the sustainability of environmental systems.

2.3 Inadequate Institutional and Regulatory Framework

The absence of a well-defined institutional and regulatory framework within the water sector as well as the apparent fragmentation and overlap of functions among water-related agencies has resulted in the emergence of additional challenges with far reaching consequences. The need for strong sector leadership and political will to implement reforms are key ingredients in the formulation and effective implementation of sound water policies and programs. Admittedly, the ideal tandem of a powerful leader to assume the role of a champion to initiate water sector reforms backed by a strong political will is often found deficient in the regional setting. However, countries in the region are in various stages of success with respect to water governance. Singapore, for instance, has been quite successful in addressing the country's water and sanitation requirements, having appropriate institutional arrangements in place for effective implementation. Given the diversity in country conditions in terms of administrative structure, economic development and political maturity, solutions would vary from country to country. The challenge for each country therefore, is to determine the appropriate formula or model for efficient water management given their respective situations and to aggressively implement the same.

2.3.1 Fragmentation in Water Sector Management

The system of sectoral regulation (i.e. irrigation, water supply, health and sanitation and water resources) common in most countries in the region, has resulted in a very fragmented approach to water management. Several government agencies and departments, in some cases as many as 30, are entrusted with a sectoral re-

sponsibility with little or no coordination among them. Fortunately, countries in the region are beginning to recognize the need for a more holistic approach to water management, considering the complex nature of water which cuts across sectors: irrigation, domestic and industrial supply, flood control and health. Several countries such as Malaysia, the Philippines, Indonesia, Thailand have in fact moved or are moving towards this direction. Most recently, Lao PDR began the process of establishing the National Water Resources Development Council to serve as the apex body to address issues on water resources.

But having the proper regulatory framework is just the beginning. In the Philippines for instance, although a national agency intended to be such an apex body exists, the National Water Resources Board is facing great difficulty performing its mandate because of a variety of problems such as the lack of independence, budget, technical personnel and the lack of coordination with other agencies that may impact on its work.

From a water sector perspective, governance is concerned with the basic relationships existing among national, regional and local governments in the management and development of water resources. In the absence of an integrated approach to water management, conflicts also arise with respect to jurisdiction and ownership of the resource. Although generally, water is owned by the State represented by the national (federal) government, local (state) governments have likewise laid claim to water resources within their areas of jurisdiction. A similar conflict exists among countries that share river systems. Since water literally and figuratively cuts across administrative jurisdictions, it cannot be managed efficiently using administrative boundaries. A system of management respecting hydrological boundaries must be implemented not only among in-country basins but also in international river basins. The challenge therefore, is to forge cooperation and alliances among those that share water sources, especially in the international scenario. Implementation of an integrated water resources management system is the key to management efficiency.

On the Mekong River Commission

Background and Structure

The signing of the *Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin* on 5 April 1995 by the four Lower Mekong Basin countries: Cambodia, Lao PDR, Thailand and Vietnam, established the Mekong River Commission (MRC). MRC enjoys the status of an international body, including entering into agreements and obligations with the donor or international community. The MRC consists of three permanent bodies: Council, Joint Committee and Secretariat. The Commission holds a dialogue with the two upper states of the Mekong River Basin, China and Myanmar. The budget of MRC consists of contributions from its members and the donor community.

Areas of Cooperation

The countries cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin (MRB), including but not limited to irrigation, hydropower, navigation, flood control, fisheries, timber floating, recreation and tourism.

Visions and Mission

The Council of the MRC approved in 1998 the following visions and mission:

- MRB Vision: An economically prosperous, socially just and environmentally sound Mekong River Basin.
- MRC Vision: A world-class, financially secure, international river basin organization serving the Mekong countries to achieve the basin vision.
- MRC Mission: To promote and coordinate sustainable management and development of water and related resources for the countries' mutual benefit and the people's well-being by implementing strategic programmes and activities and providing scientific information and policy advice.

2.3.2 Inappropriate Regulatory Framework

Inappropriate legal and regulatory arrangements have also led to inefficient water resources management. Water laws are abundant but have become obsolete in most countries. In Indonesia for instance, there is no well-defined system for water allocation and use. In cases where such systems exist however, the same may not be appropriate, as in the cases of Thailand and the Philippines. In Thailand, the system of riparian ownership is enforced which is based upon a perpetual right to use water on land adjacent to a natural body of water. Since there is no control on the quantity abstracted and the number of users, there is uncertainty concerning the amount of available water supply throughout the year. Moreover, the principle of "first in time, priority in right" currently enforced in the Philippines also poses a problem since it prevents government from reallocating water rights earlier issued in favor of a more equitable allocation given the increasing scarcity of water i.e. golf courses vs domestic water supply. Pricing mechanisms in the allocation of water should also be studied, given the growing competition among users.

2.3.3 Balancing Full Cost Recovery and Capacity to Pay

Given the growing scarcity of water, there is an urgent need to recognize that water is an economic good that has an economic value in all its competing uses. In a region where water is still generally regarded as a social good however, the concept of full cost recovery is relatively new. Government subsidies are common and tariff is artificially maintained at a very low level. In many developing countries in the region, full cost recovery is not observed because of sociopolitical considerations. Today, it is recognized that such a practice has detrimental effects resulting in the failure to maintain and operate existing systems, whether for irrigation or water supply. In most cases, irrigation canals and distribution networks have largely deteriorated, resulting in huge water losses from seepage and leaks. Balancing existing socioeconomic conditions with the need for the introduction and implementation of cost recovery principles poses a considerable challenge.

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Water Supply

The absence of established economic regulation only complicates the problem. Oftentimes, increasing tariff to cost recovery levels is met with political resistance. In the absence of a mechanism for such increases, the status quo is maintained. The result is a water utility that is not able to comply with its service obligations. More often than not, these utilities do not have enough revenues to cover operations and maintenance costs, much less improve on the service and expand the coverage area.

Over the past years however, governments are recognizing the need to enforce tariffs that actually reflect full cost recovery as a way towards efficient service and to attract private investments. Given the highly capital-intensive nature of the sector, governments are looking more and more towards private investments to remove the fiscal burden from it. At present, the provision of water supply and sewerage for the most part remains largely a government responsibility. Recently however, the megacities of Metro Manila in the Philippines and Jakarta in Indonesia privatized their water supply and sewerage (only in Metro Manila) services. The move is being closely monitored by other neighboring countries as a model for other privatization efforts to follow.

The MWSS Privatization

Prior to its privatization in 1997, the Metropolitan Waterworks and Sewerage System (MWSS), one of Southeast Asia's largest water utilities, had a service area of 1,274 square kilometers, covering six cities and two neighboring provinces, Rizal and (parts of) Cavite. Its total service area population was 11 million, only 67% of which it actually supplied with water through its 825,000 connections. Half the population received a 24-hour water service and the rest, a maximum of 12 hours. With the Angat River (97%) and ground water (3%) as sources, MWSS produced a total of 3,000 MLD, but it also posted a high percentage of non-revenue water (55-58%) due mainly to leaks and pilferage.

To improve these conditions and to relieve government of fiscal burden as regards water, a series of government initiatives were instituted. This included the Department of Finance's National Water Sector Reform Study of 1994 which

examined the possibilities of privatization and the Water Crisis Act of 1995 enacted to address the nationwide water crisis. It also resulted in the reassessment of all water utilities in the country. Prior legislation also affirmed the process of privatization; these were Republic Act 7718 (the Build-Operate-Transfer Law) enacted in 1993 and the Omnibus Investments Code of 1987, both of which created a favorable environment for private investment.

In 1995, the MWSS Board commenced a two-phase plan toward the fruition of its privatization objectives: to improve the water supply and sewerage utility's service standards and to expand the coverage of its service area; to increase the efficiency of its water supply system; and to eliminate fiscal burden on government. Phase One of the two-fold plan involved an eight-month study of guidelines for a satisfactory privatization scheme; it also involved the preparation of pertinent documents for the tender of the project. Phase Two saw the implementation of the scheme from pre-marketing to bidding and evaluation and finally, to awarding of the contracts.

The MWSS privatization structure was drawn as follows:

- geographical separation of the total service area into East and West Zones;
- 25-year concession for both water supply and sewerage;
- ownership of fixed assets shall remain with MWSS but operational and investment ownership shall transfer to private sector;
- no abdication of MWSS responsibility to provide water under its franchise;
- concessionaires shall have rights to water from Angat River;
- concession should be 60% Filipino-owned;
- concessionaires shall improve service and expand coverage according to certain standards, targets and timetables;
- total labor transition package shall be negotiated between MWSS and labor representatives and incorporated in the Concession Agreement;

- MWSS shall establish a Regulatory Office, independent of its other residual activities, to administer the privatization contract including tariff adjustments.

  Following a successful bid process – due mainly to the strong political will of those involved, special powers for direct contract negotiations granted to the President by the Water Crisis Act of 1995, and international competitive bidding – two concessionaires now operate the water supply and sewerage utility: the Manila Water Company, a consortium of the Ayala Corporation, Bechtel and International Water Ltd. for the East Zone, and the Maynilad Water Services Incorporated, a consortium of Benpres and Lyonnaise des Eaux for the West Zone. Both Ayala and Benpres Corporations are two of the country's largest local companies involved in a variety of sectors such as land, power, telecommunications and infrastructure development.

Irrigation

Agriculture accounts for almost 70% of water demand in the region, pointing to the very significant potential for water "savings" and improved water productivity. Although a system for a raw water fee is charged for irrigation water, the same is nominal and by no means accounts for cost recovery owing to the farmer's inability to pay. To a large extent, this does not encourage water conservation techniques. Countries are reviewing this system of irrigation fees and have established several activities towards improving irrigation efficiency. Malaysia for instance, has a program for lining canals, recycling water, rainfall collection and harvesting as well as diversification to less water-intensive crops. The Philippines and Indonesia have similar programs.

2.4 Food Security

With the increase in population comes an increased demand for food which in turn increases water demand for irrigation. However, as industrialization and ur-

banization take place, the agricultural land base decreases. In a region that is predominantly agricultural, the challenge is to introduce more efficient farming techniques and appropriate technologies to improve productivity.

2.5 Lack of Resources

Most of the countries in the region suffer from a lack of resources to meet the challenge of an adequate potable supply to support their development. The huge capital requirements for water infrastructure development such as flood control, water distribution and sanitation pose a real challenge especially for developing countries where other needs appear to be more pressing i.e. poverty, education, food security. However, governments must realize that all these are in fact inextricably linked to the issues of water management since the solutions of such problems to a certain extent lie in the solution of water issues. After all, economic development, environmental protection and food security can only be achieved if good quality water is available for use.

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3.0 SOUTHEAST ASIA'S VISION FOR WATER IN THE 21st CENTURY

The vision of Southeast Asia for water in the new century is the attainment of sustainability of water resources to ensure sufficient water quantity of acceptable quality to meet the needs of the people of Southeast Asia in terms of health, food security, economy and environment. This vision means:

- Access to safe, adequate and affordable water supply, hygiene and sanitation.
- Provision of sufficient water that will ensure food security for the region.
- Provision of sufficient water to spur and sustain the economies of the region.
- Protection of the water environment to preserve flow regimes, biodiversity and cultural heritage as well as the mitigation of water related hazards.

4.0 SOUTHEAST ASIA'S FRAMEWORK FOR ACTION

Southeast Asia's framework for action for a better water future is formulated to meet the foremost challenges facing the region which are:

Managing our water resources efficiently and effectively;
Moving towards integrated river basin management;
Translating awareness to political will and capacities;
Moving towards adequate and affordable water services.

The framework presented below includes the challenges, the implementation strategies and the actions required for the achievement of the vision.

4.1 Managing our water resources efficiently and effectively

The degradation of land and water resources points to the need for efficient and effective management of our water resources. To achieve this, the following have to be undertaken:

- *Review of Policy and Legislation*

Fragmentation of responsibilities for water resources management within governments is common, resulting in overlapping of functions and fragmented as well as conflicting policies. Too many government agencies are involved in the different aspects of water management: irrigation, domestic and industrial supply, flood control, infrastructure development, among others. Clearly, the traditional approach of developing water resources by sectors is no longer appropriate. The inter-relationship between land and water should be included in the planning process. The adoption of integrated water resources management (IWRM) is therefore a must.

Furthermore, the common perception that since water is a basic human need, it should be provided "free" has resulted in very low tariffs which cannot support maintenance and expansion requirements. Competition among users is also common. The introduction of cost recovery policies, economic valuation of water and

the "polluter pays" principle is necessary to ensure the availability of good quality water for all.

- *Institute demand and supply management techniques*

Water Supply

Supply-side management is prevalent with governments in the region focused on the development of new water sources to address the countries' requirements. However, more and more, governments are shifting to demand management techniques to manage water use. The introduction of market-based instruments such as a system of fees, fines and penalties to influence water use and to promote efficiency is slowly gaining ground. Thailand for instance has begun to implement such demand management approaches.

The use of existing demand management technologies should also be encouraged, especially in new structures and development. A number of water-saving technologies exist in the market today, i.e. slow-flow showers, two-piped systems, half-flush toilets, among others. Incentives for their use through lower taxes or tax holidays to reduce costs as well as incentives for retrofitting should also be provided.

Furthermore, revenues from raw water fees, effluent and sewerage charges may be earmarked for use for water resource management activities. Oftentimes, programs are not sustained or implemented because of the absence of a guaranteed source of funds. The experience with the Global Environment Fund provides a model for the establishment of such a system.

Irrigation

Given that SEA is primarily a rice-producing region, the agricultural sector has the highest demand for water resources (almost 80%). There is then a potential for significant water "savings" by employing water-conservation technologies such as farm level water management (i.e. drip/gravity irrigation), soil moisture conservation measures and cropping management techniques. Although cutting-edge techniques may have a high investment cost at the onset, the benefits reaped in the

long-term far outweigh these initial costs. Drip irrigation for instance can reduce water use by 25-90 percent while increasing crop yields by 50-100 percent. Improving canal linings and installing more flow monitors can likewise be made. Water "saved" translates to more water for domestic and industrial use.

- *Undertake research and development programs*

Research and development activities on water conservation, water quality management, pollution control, water recovery, re-use and recycling, watershed, flood-plain and coastal management, and water-data network design and implementation must be undertaken towards a more effective management of our water resources system.

4.2 Moving towards integrated river basin management

Cognizant of the fact that the river basin is a geographical unit with well-defined boundaries that encompass the totality of the hydrological process transcending political and administrative limits, it is therefore the ideal management unit to address water-related problems. An integrated approach to water resources management takes into account all the natural aspects of water resources, sectoral interests and stakeholders, the spatial variations of resources and needs, the existing policy frameworks and the institutional arrangements that may pose limitations and constraints.

Integrated river basin management can only be achieved under the framework of an Integrated Water Resources Management (IWRM). Locally available expertise is adequate to meet some of the identified strategic level issues on IWRM. However, much of the expertise remains untapped. One reason is the lack of public awareness, especially at the political or decision maker's level, about the imperatives of IWRM in sustaining the social and economic development of countries in the region.

Clearly, reform initiatives are needed to provide the adequate enabling environment for the effective and efficient implementation of IWRM, as presented below.

- *Establish river basin management organizations*

An integrated river basin management organization under the framework of IWRM should be established in selected local and international basins. Under the framework of IWRM, reform initiatives are needed: (a) on the institutional framework for the integrated planning and regulation of water resources, the water rights systems and the environmental issues; (b) on the strictest implementation and enforcement of laws and policies as well as on the streamlining of the bureaucracy; and (c) IWRM awareness raising campaigns at all levels – political, technical and general public, to gain active support at all levels;

These are the guiding principles of IWRM; however, its implementation in specific basins will vary according to the conditions existing in the particular river basin. What is essential is that governments first accept the principles of IWRM as the framework for effective water management. A pilot program can be implemented in a priority basin to test the framework. One such pilot is the Laguna Lake Development Authority (LLDA) in the Philippines. Although others were created in the past, all were project-based such that the institutional frameworks were also project oriented. The result was the failure of the so-called basin authorities to continue activities beyond the end of the project itself. The LLDA remains the only basin authority in the country truly functioning as such and which employs a holistic approach to the management of Asia's second largest lake. There is no question that the introduction of basin management authorities in priority river basins within countries and more importantly, the establishment of regional cooperation in shared river basins is a step closer to our goal of sustainable water management.

- *Develop decision support systems*

The collection, management and dissemination of basin-wide data on land and water resources, their allocation and multiple uses, are important basic functions of the integrated river basin management. In addition to providing vital public information on natural resources, the data shall serve as quantitative inputs to decision support systems that management utilizes for decision-making on planning,

design, implementation and operations of water-resources and other basin-development programs and projects.

The importance of good quality data on water resources cannot be over-emphasized. Information is needed to support policy decisions and programs development. As such, a system for a sustained data collection and management must be developed and implemented.

Under the framework of IWRM, the needed initiatives are: (a) reforms on data and information, including a review and rehabilitation of the data collection network for surface water, groundwater and water quality; (b) enhanced transfer of knowledge and information based on experiences and best practices on all aspects of IWRM; and (c) research and development to develop and disseminate knowledge methods and tools to facilitate the understanding of the complex water system, to forecast its long term dynamics and to compare impacts of various policies, management strategies and institutional frameworks.

- *Promote equitable sharing among water users and environment*

The river basin is the ideal venue to promote equitable sharing among conflicting water users and the environment, since the various users (water supply, irrigation, flood control, hydropower, environment), utilize and must share water within the same river basin. Requirements of countries in shared river basins are likewise addressed. The creation of the Mekong River Commission in 1995 provided the venue for such equitable sharing of water by the riparian states of Thailand, Lao PDR, Cambodia and Vietnam.

Under the framework of IWRM, the actions needed are: (a) formulation of strategies related to population growth and land-use development; (b) promotion of water conservation/reuse and demand management; (c) development of water resource/water supply management and conservation plan; (d) formulation of master plan for the water resources and land-use sectors; and (e) protection of the environment and conservation of natural resources.

- *Mitigate water-related hazards and maintain ecological balance*

In addition to water utilization, the river basin management organization should lead in the mitigation of water-related hazards such as floods, droughts and erosion, and maintain ecological balance.

Basin authorities should therefore establish a system for disaster management and prevention. Public education and instruction to enhance awareness and preparedness with respect to flood control and water use help control and manage the damage brought by such disasters. Regional cooperation in terms of available data and the sharing of experiences and best practices are likewise important.

4.3 Translating awareness to political will and capacities

The Southeast Asian region is blessed with one of the highest renewable freshwater resources. Thus, the water problem besetting the region involves issues of delivery to particular areas rather than resource availability. To a large extent, the problem is exacerbated by inefficient governance. Fragmentation and sectoral approaches to water management have only led to uncoordinated efforts that often result in duplication of work and in some cases, to conflicts in policies. Without a doubt, strong leadership, political will and commitment are necessary ingredients for the achievement of our goal for sustainable water management. But these must be complemented by a thorough understanding of the issues involved. It is therefore important to instill awareness of the economic, social and environmental value of water among politicians, decision-makers and other stakeholders in the water sector.

...strong leadership, political will and commitment are necessary for sustainable water management.

Moreover, it has now been recognized that the role and participation of stakeholders are of vital importance if we are to realize an efficient and effective water resources management. Following the establishment of appropriate institutional frameworks, capacity building and human resources development are the key elements to the achievement of efficient water management which must be vigorously

pursued. Training of technical staff, planners and managers on the areas of integrated water resources management, water resources policy formulation, economic valuation and regulation, water data collection and management, water-saving technologies, among others, is essential to the attainment of a sustainable water regime within the region.

Finally, a well-informed constituency with a high level of awareness and appreciation for the nature of water is still in its early stages. Programs that introduce water concerns in the education curricula, coupled with an intensive and gender sensitive information campaign, are likewise essential to mobilize awareness that will lead to advocacy and action.

- *Improved Governance*

Government should take the lead in ensuring sustainable water management with the active participation of all stakeholders. To be sure, individual governments play a crucial role in achieving the goals of sustainable water resources development and management. Governments must effect the necessary reforms in the water sector through their own efforts and must provide the stimulus to motivate all stakeholders to contribute to the task at hand. The implementation of a holistic approach to water management is only the beginning. The promotion of broader stakeholder participation and consultation will ensure that different and perhaps conflicting water-related concerns and interests are properly addressed. Good governance requires a committed leadership; equally important is an empowered constituency.

- *Encourage multiple stakeholder participation in water resources development and management*

The development of a well-informed and motivated citizenry equipped with the understanding and appreciation of the complex nature of water resources management is an important element towards the achievement of efficient and effective water management. Accordingly, the core issue at present evolves around people's participation. Clearly, education and information campaigns are indispens-

able tools to foster understanding and acceptance of necessary policy impositions such as the implementation of cost recovery measures in water tariff which, in all probability, will result in higher tariff. But through the acceptance of the principle that water is indeed an economic good, people may begin to practice conservation measures and thereby promote the most beneficial use of this scarce resource. Information and education programs can undoubtedly influence changes in people's values and attitudes and eventually, their behavior.

In addition, special focus should be accorded the poor, women and children, who are most affected by the problems of water shortage, pollution and flooding.

- *Develop, enhance and strengthen institutions in a decentralized and participatory manner*

The management and development of water resources within the Southeast Asian region is basically conducted in a highly centralized setting. Since policies emanate from the central government, there is a tendency to overlook local situations to the detriment of the local stakeholders. While a lot of countries in Southeast Asia have been advocating a basin approach to water resources management, only a few have been successful. From a political perspective, the local government units are political instruments that, if properly harnessed through capacitation, could be transformed into agents of change for the water sector.

The integrated water resources management paradigm necessitates the development and/or strengthening of water-related institutions in a decentralized setting with support from well-informed stakeholders. Sustainable water management from a decentralized local perspective is expected to result in improved water access and delivery of services for all concerned. Such decentralization requires capacitating local institutions as well as individual stakeholders in the field of integrated water resources development and management, planning and regulatory controls.

- *Build individual capacities*

Empowerment and capability building are essential elements in pursuing effective water sector governance. The empowerment of water sector stakeholders

requires the building of individual capacities through the conduct of broad-based training. Human resources development efforts must be undertaken to create a pool of sufficiently trained and skilled men and women. To be successful in this endeavor however, such an effort must be sustained over the long-term. Considering the limitations in government budgets, maintaining a motivated trained staff is indeed a challenge. Linkages with other institutions such as research and development agencies and academic institutions can be explored and utilized. Moreover, much can be learned from the experiences of the different countries in the region in the field of water management. Best practices can be shared through documentation of experiences and technical visits and exchanges. The formation of the ANWRA is a step in the right direction and has the potential to be a significant vehicle to facilitate and develop regional cooperation.

Capacity building in integrated water resources management, data management, strategic planning, water policy formulation, community participation, among others, are indeed necessary for the achievement of effective water management. Mapping exercises in the Philippines, Thailand and Malaysia all reveal that the building of institutional and individual capacity is very much a priority for these Southeast Asian countries.

4.4 Moving towards adequate and affordable water services

Inadequate infrastructure, the absence of clear policies for public-private partnerships and the practice of government subsidies have impacted negatively on the water sector in a number of countries in the region. In general, existing water distribution systems for domestic use and irrigation are largely inefficient and fast deteriorating as a result of low tariffs. With rapid population growth and industrialization in the region, pressures for infrastructure development to meet these growth requirements are mounting. Given the capital requirements for expansion and maintenance of these systems, governments are finding it more and more difficult to meet the water requirements of a growing population for domestic/industrial use and food security. Public-private partnerships are therefore encouraged to address this gap.

- *Enhance public-private partnerships*

There is growing recognition in the region that the private sector can contribute greatly in the provision of water supply and sewerage requirements. In a region where water utilities are predominantly government operated, experience thus far shows the need for better management, the imposition of appropriate tariffs and the introduction of new technologies for a more efficient delivery of the service. Although there are clear exceptions, most of the public-run systems are poorly managed and suffer from very high losses due to leaks and pilferage (between 50-60%) as well as low coverage (60-70%). The insistence on extremely low tariff that do not support operations and maintenance requirements further contributes to the deterioration of the system.

Moreover, existing regulations are either lacking, inadequate or inappropriate. Economic regulation is virtually non-existent. In a sector where capital requirements are high and assets are sunk up-front, the private sector is faced with significant risks. As such, a fair, transparent and stable regulatory framework must be in place to minimize these risks. Such conditions obviously do not present a favorable environment for private sector participation.

To attract legitimate private investments in the sector therefore, a fair and transparent process must first be conducted. Second, a clear regulatory framework enforced by a strong regulator must be established.

At present, two privatization efforts in the megacities of Jakarta and Metro Manila have successfully been tendered. There is a need for clear and consistent policies to encourage private sector participation in the water sector. Often, changing rules erode investor confidence.

There is also a limited understanding of public-private partnerships. The options are varied and the choice would depend on the needs and circumstances present in each case. Knowing what the available options are is a first step.

- *Recognize that water is an economic good*

In most parts of the region, water is still regarded as "free", with governments subsidizing the delivery of the service. This has resulted in the deterioration of the

system and in the eventual breakdown in the delivery of the service. In such cases, the poor actually pay more for water than the rich since the former have no choice but to buy water from water vendors. The imposition of tariffs that reflect cost recovery principles and the recognition that water is an economic good will in the long-run result in a more efficient system that promotes the conservation of water as well as optimize its benefits. Such a system likewise can be used in compensating farmers who need to give up their water allocations in cases of drought. This was a serious consideration in the region during the worst El Nino episode in 1997-1998.

However, social realities must be considered in developing pricing mechanisms reflecting full cost recovery.

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