



Asia-Pacific
Water Forum

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5th World Water Forum Secretariat
Libadiye Caddesi No:54
Küçükçamlıca-Üsküdar
34696 İstanbul/TURKEY
www.worldwaterforum5.org

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PAB Mimari Tasarım

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Despite ceaseless efforts by people across the world, we are still faced with serious global water issues. In particular, in Asia and the Pacific region, where we live, 500 million people, or one out of seven of the population in this region have no access to safe drinking water, and 1.8 billion people, that is half the population, have no access to basic sanitation.

Compared with the survey conducted two years ago, the situation regarding drinking water has improved a little. Improvement of sanitation, however, is rather behind schedule. Therefore, we need to take innovative measures in order to achieve the Millennium Development Goals.

Moreover, we have suffered tremendous losses caused by water-related disasters. About eighty percent of worldwide deaths resulting from water-related disasters have occurred in this region. We are faced with a critical situation. According to the IPCC report, it is predicted that climate change will in the future increase the risk of floods and droughts, worsening the situation.

In Asia and the Pacific region, which is home to sixty percent of the world's population, we must not forget food problems either. Almost eighty percent of our fresh water is used for food production; therefore water problems are directly linked to food problems. Recently, frequent droughts in Australia have caused a decrease of wheat production, having a serious impact worldwide.

To improve today's critical situation, the Asia-Pacific Water Forum is developing diverse initiatives by creating close networks between stakeholders not only in Asia and the Pacific region, but also around the world. One of these initiatives was the 1st Asia-Pacific Water Summit held in Oita in December, 2007. This was the world's first summit dedicated to water issues.

His Imperial Highness the Crown Prince of Japan, honorary president of the United Nations Secretary-General's Advisory Board on Water and Sanitation, and His Royal Highness Prince Willem Alexander of the Netherlands, president of the United Nations Secretary-General's Advisory Board on Water and Sanitation, were both present. The summit was also attended by ten heads of state and government from Asia and the Pacific region, and Prime Minister of Japan Yasuo Fukuda.

At the 1st Asia-Pacific Water Summit, the Policy Brief 2007, which detailed the policy recommendations on water for this region, was published. After two days of energetic discussions, the determination of the summit participants was embodied in the document Message from Beppu.

Based on the recognition that access to safe drinking water and basic sanitation is a basic human right and important for basic human security, the document set new goals to be accomplished by 2025. These goals were one step ahead of the Millennium Development Goals of 2015, and were unprecedented anywhere in the world. Message from Beppu, which set these ultimate goals, has received worldwide attention and has been highly esteemed.

However, true success depends on what specific actions we take towards the resolution of water issues. Taking advantage of the 1st summit, Asia and the Pacific region has taken a giant step forward in the area of water security.

Water is essential for sustainable development. Without the resolution of water problems, we cannot achieve sustainable development. I am proud that the world's first summit on water was held in Asia and the Pacific region, which is facing the harshest conditions regarding water and sanitation. I am sure that we will be able to play a leading role in the resolution of global water issues. I believe that the 5th World Water Forum will be a good opportunity to showcase the diverse water programs of Asia and the Pacific region and to share our accumulated experiences with the rest of the world.

I would like to conclude my message with the commitment to make every effort towards overcoming critical water problems and to hand over this beautiful earth intact to future generations.



Yoshiro Mori
President of the Asia-Pacific Water Forum





REGIONAL DOCUMENT ASIA-PACIFIC



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1

BACKGROUND OF THE REGIONAL DOCUMENT

1. Background of the Regional Document

This document highlights the progress that the region is making, the examples it is setting, and the opportunities to do more and better through partnerships, while making the case for the need to deploy more resources and energies in the face of yet considerable unmet needs in water and sanitation, water-related disaster management and ecosystem protection and conservation in the region. This document is produced in collaboration with the 5th World Water Forum Secretariat.

The APWF's creation, having been called for by the region's ministers at the 4th World Water Forum, was launched in Manila in September 2006 and has since been active in providing countries and organizations in the region with a common platform and voice to accelerate the process of effective integration of water resource management into the socio-economic development process of the Asia-Pacific region. This Asia-Pacific Regional Document presents the fruit of over two years of the APWF's sustained efforts in bringing water issues to a higher priority level, based on concerted, concrete actions. Several key events have provided occasion to rally key stakeholders from across the region, as presented in the Preliminary Roadmap to the 5th World Water Forum, namely, the 1st Asia-Pacific Water Summit (1st APWS), which was held in Japan, in 2007. Two seminal documents were issued at the 1st APWS, the Message from Beppu and Policy Brief 2007, which provide a comprehensive set of policy prescriptions for the region's water issues and reaches beyond the 2015 Millennium Development Goals by fixing a goal of achieving safe drinking water and basic sanitation for all by 2025. The series of 19 concrete initiatives presented in Chapter 4, including the Initiative on Ministers for Water in the Asia-Pacific, are a roadmap, a work in progress, which the APWF family launched from the 1st APWS onwards to implement the recommendations and goals set forth in the Policy Brief 2007 and the Message from Beppu. Chapter 4 also presents the five subregional reports (Central Asia, South Asia, Northeast Asia, Southeast Asia, Oceania and the Pacific), as drafted by the APWF subregional coordinators.

This regional perspective document was drafted according to a transparent, collaborative and open process, whereby all APWF stakeholders were invited to submit their input—through either their subregional consultation process or directly to the APWF Secretariat, a process which culminated in the Asia-Pacific Regional Synthesis Meeting for the 5th World Water Forum held in Tokyo, 15-16 December 2008 and attended by a majority of APWF members (figure 1). The Tokyo meeting once again demonstrated the region's eagerness to tackle the issues together

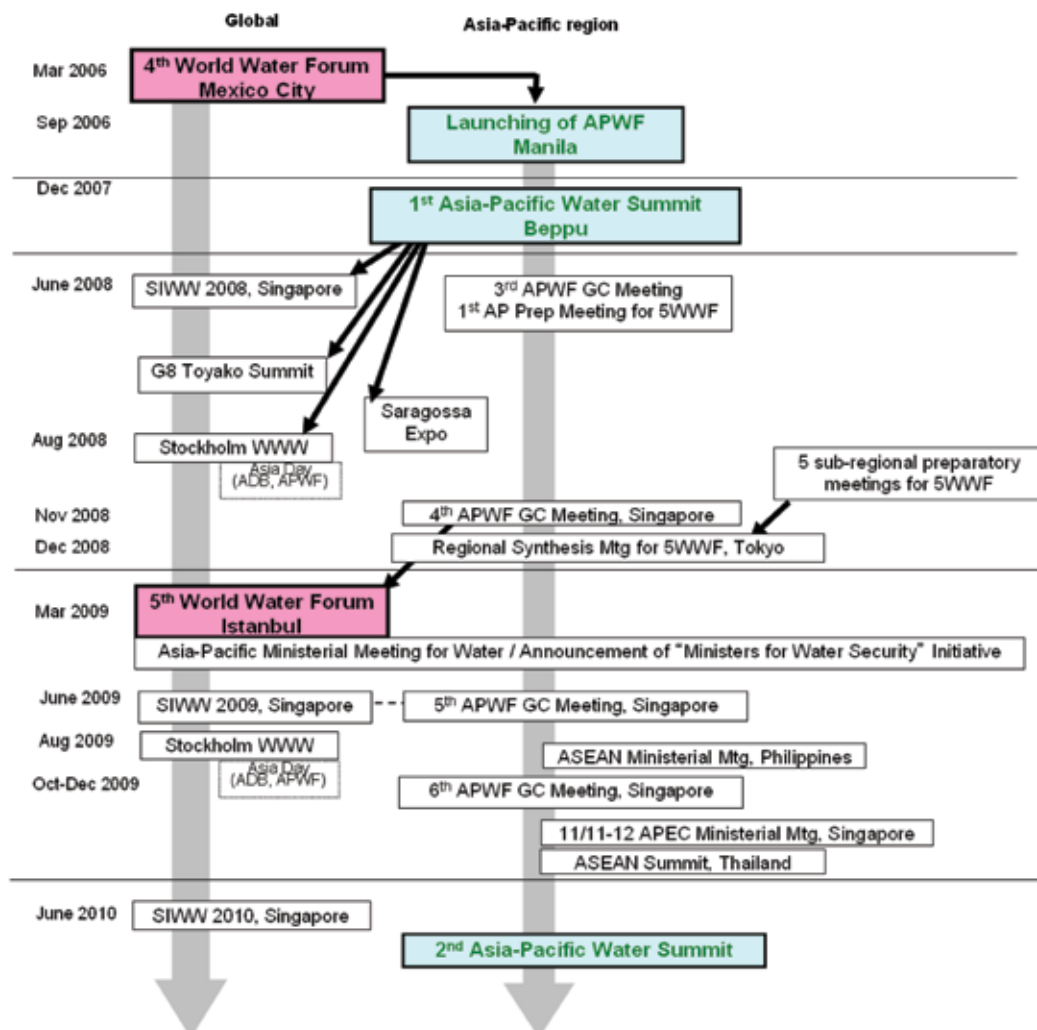


through the power of joint collaboration. Hence, this document represents not only a collection of inputs from all corners of the region, but is the fruit of a consensus-building exercise within the APWF family.

The Secretariat of the APWF would like to thank the subregional coordinators who provided input to this regional process, namely: Executive Committee of the International Fund for Saving Aral Sea (EC IFAS), Global Water Partnership of Caucasus and Central Asia (GWP CACENA), Korea Water Forum (KWF), Bangladesh Water Partnership (BWP), Global Water Partnership Southeast Asia (GWP SEA) and Pacific Islands Applied Geoscience Commission (SOPAC); and in consultation with the following institutions: Asian Development Bank (ADB), The International Center for Water Hazard and Risk Management (ICHRM), The World Conservation Union (IUCN), Food and Agriculture Organization of the United Nations (FAO), PUB Singapore, United Nations Educational, Scientific and Cultural Organization

(UNESCO), Streams of Knowledge (STREAMS), United Nations Human Settlements Programme (UN-HABITAT), United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Asia-Pacific Broadcasting Union (ABU), Asia Society, International Center for Water Hazard and Risk Management (ICIMOD), International Water Management Institute (IWMI), Interstate Commission for Water Coordination of Central Asia (ICWC), Interstate Commission for Sustainable Development (ICSD), Japan International Cooperation Agency (JICA), National Science Museum of Thailand, United Nations Department of Economic and Social Affairs (UNDESA), United Nations Global Compact, United Nations Children's Fund (UNICEF), Water Web Alliance, World Health Organizations (WHO) and Japan Water Forum (JWF). Special gratitude is extended to Mr. Yoshiro Mori, President of APWF, Professor Tommy Koh, Chair of the Governing Council of APWF, Mdm. Erna Witoelar and Mr. Ravi Narayanan, Vice-Chairs of the Governing Council of APWF, and members of the APWF Secretariat for their contributions.

Figure 1: Preliminary Road map to the 5th World Water Forum & 2nd Asia-Pacific Water Summit



2

REGIONAL OVERVIEW



2. Regional Overview

2.1 The Boundaries

The Asia-Pacific region, known as the largest continent in the world, extends in latitude from 48° north with Kazakhstan to latitude 45° south with New Zealand. This explains the great diversity of the region, in terms of climate, natural resources, culture and economy. The region encompasses 5 sub-regions, namely Central Asia, Northeast Asia, South Asia, Southeast Asia, Oceania and the Pacific, with 50 countries (figure 2 and table 1).

Figure 2: Map of the Asia-Pacific Subregions



Table 1: Subregions and countries

Central Asia	Afghanistan, Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan
Northeast Asia	China, Democratic People's Republic of Korea, Japan, Mongolia and Republic of Korea
South Asia	Bangladesh, Bhutan, India, Nepal, Pakistan, Maldives and Sri Lanka
Southeast Asia	Brunei, Cambodia, Indonesia, Laos PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, East Timor, Vietnam
Oceania & Pacific	Australia, Cook Islands, Fiji, Kiribati, Marshall Islands, Federated States of Micronesia, Nauru, Niue, New Zealand, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu
Others	Iran, Israel

2.2 The Climate

Being so vast, the Asia-Pacific region displays climates ranging from equatorial to cool temperate. Those countries along the equator experience a hot wet and steamy climate and are covered with tropical rainforests (for instance, Indonesia and Papua New Guinea). In sharp contrast, the high mountains of the Himalayas are permanently covered with snow and ice. There are also extremes in climate related to the distance from the sea. The islands of the Pacific experience the maritime effect, which moderates temperatures and provides ample moisture in rain-bearing winds, under normal conditions. Deep within the Asian mainland lie the deserts, desiccated by the continental effect, and prone to extremes of temperature.

Two of the most important climatic influences on countries in and around the Pacific Ocean are tropical storms and the El Niño and La Niña phenomena. The natural pattern of El Niño and La Niña episodes has a significant impact on the region especially in Pacific island countries as well as Indonesia, Papua New Guinea and Australia causing climatic extremes through the impacts of extensive droughts as well as increased risk of flooding severely impacting health, water supply and agriculture.

Seasonal changes in the position of the sun and the resultant reversal of wind direction, "monsoon", impact on much of southern Asia and northern Australia.

2.3 The Indicators

The following series of graphs provide a snapshot of the region's current water circumstances. The data presented in this section yields from a variety of sources and aims to provide the recent and noteworthy information. The tables compiling the region's comprehensive national data sets are provided in Annex I. The data collection process performed for this chapter underscored the fact that water-related data access is a significant challenge throughout the region, a challenge which the APWF has committed to tackle itself to through its monitoring initiative.

Water is intricately linked to the region's critical challenges, namely, climate change, food security, health and economic growth and while the Asian continent is home to 60% of the world's population it benefits from only 36% of the world's water resources.

¹ UNESCO (2006) World Water Day and Culture, p.5

Asia-Pacific Water Facts at a Glance

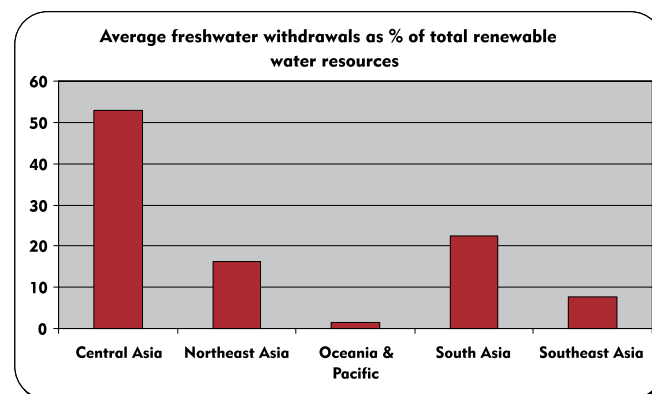
- 500 million people are still without safe drinking water and 1.8 billion without access to basic sanitation in our region.²
- From 1980 to 2006, the recorded fatalities due to water-related disasters were approximately 1.36 million, of which, Asia accounted for 46 %, and the number of affected people was approximately 4.7 billion, of which, Asia accounted for 90%.³
- 542 million, or two-thirds, of the world's hungry people live in Asia⁴. Agriculture consumes an average 79% of the region's renewable water resources and faces the challenge of increasing food production, degraded ecosystems and competition for land.⁵
- Investing in water is to invest in poverty reduction: \$1 spent on improving water supplies and sanitation buys the poor at least \$6 in time and health savings.⁶
- In some of the major breadbaskets of Asia, such as the Punjab in India and the North China Plain, water tables are falling 2 to 3 meters a year⁷, with serious consequences for agriculture and food security. Other critical systems, the tropical deltas, face degradation, sea level rise and water shortage. Water productivity of food production is low overall.
- Glaciers in the Himalayas are receding faster than in any other part of the world.⁸
- Asia's rivers average 20 times more lead than the rivers in the industrialized world, and average 50 times more bacteria from human feces than WHO guidelines allow.⁹

2.3.1 Freshwater Pressures

Water resources are unevenly distributed (figure 3), and water availability is complicated by physical, economic and environmental water scarcity. Moreover, the region's freshwater resources are imperilled by pollution, inadequate management, and climate change.

The region as a whole is facing moderate to very high vulnerability related to climate change impacts¹⁰, as manifested through: a) rising sea levels, storm surges, higher frequency of cyclones, saline intrusion in rivers and groundwater of the region's deltas—namely, the Ganges Brahmaputra, Yellow River, Red River, Mekong River; b) substantial reductions in surface water and groundwater recharge, changed seasonality of runoff and peak flows, more rainfall in place of snow, increased peak flows and flooding, among other impacts for the snow melt systems such as the Indus system, the Ganges Brahmaputra, North Western China, Red and Mekong Rivers; c) shifting monsoon patterns and increased drought and flooding for the Indian subcontinent, etc. These impacts pose unprecedented risks to populations, infrastructure, food production and economic activities throughout the region.

Figure 3: Water Resource Availability

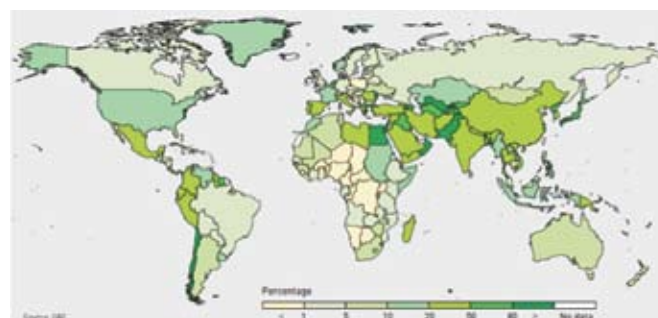


Source: Calculated from FAO Aquastat 2008

2.3.2 Irrigation

Agriculture is by far the major user of water in Asia (figure 4). Water withdrawals for agriculture account for an average 79% of total withdrawals in 2002, where high-income economies withdrew only 62.4 per cent of total water for agriculture, middle-income economies withdrew 77.3 per cent and low-income economies withdrew a total of 90.9 per cent.¹¹

Figure 4: Percentage of total arable and permanent cropland irrigated



Source: FAO, 2008

In 2007, mainly because of soaring food prices, the number of hungry rose by 75 million, instead of declining by 43 million – the number needed to achieve the 1996 World Food Summit commitment. In 2008, a further 40 million people went hungry. There are currently 963 million undernourished people in the world, 65% of whom are concentrated in seven countries, five of which are in the Asia-Pacific region, namely in India, Pakistan, China, Bangladesh and Indonesia.

² WHO & UNICEF (2008) Progress on Drinking-water and Sanitation

³ EM-DAT: The OFDA/CRED International Disaster Database – www.em-dat.net

⁴ FAO (2008) The State of Food Insecurity in the World 2008.

⁵ ESCAP (to be published) Statistical Yearbook for Asia and The Pacific 2008.

⁶ ADB (2006) Asia Water Watch 2015, ch. 5, p. 27

⁷ WHO & UNICEF (2006) The United Nations World Water Development Report 2, ch. 6, p. 233.

⁸ Intergovernmental Panel on Climate Change, <http://www.realcities.com/mld/krwashington/17212911.htm>

⁹ Kristof, N.D. (1997) "Across Asia, a Pollution Disaster Hovers" in New York Times 28 November 1997

¹⁰ FAO (2008) Climate Change, Water and Food Security. Rome: Technical Background Document from the Expert Consultation Held on 26 to 28 February 2008.

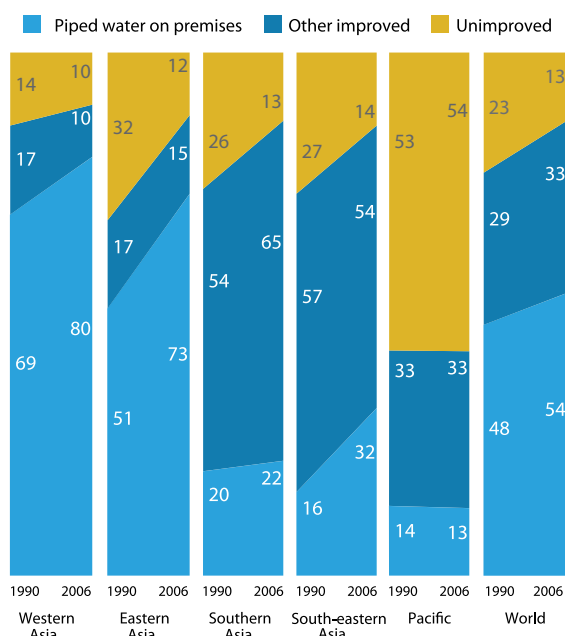
¹¹ ESCAP (2008) op.cit

2.3.3 Access to Improved Drinking Water and Sanitation

Overall, the proportion of population having access to improved drinking water sources has increased in the Asia-Pacific region, from 74 per cent in 1990 to 88 per cent in 2006. This means that 1.2 billion more people in the region have access to good water. While access to sanitation has improved significantly in almost all Asian and Pacific subregions, the regional average (55 per cent) is still lower than the global (60 per cent) or Latin American and Caribbean (78 per cent) averages but higher than in Africa (38 per cent).

The Pacific subregion is still facing severe water supply challenges with an unimproved drinking water coverage at 54% in 2006 (figure 5). Open defecation is still most widely practised in Southern Asia by 48% of the population, whereas Eastern Asia and the Pacific subregion still grapple with a significant share of unimproved sanitation facilities, with 25% and 34% respectively (figure 6).

Figure 5: Drinking Water Supply Coverage: Trends in the proportion of the population using a piped water connection, other improved drinking water sources or an unimproved source, by MDG region in 1990 and 2006



Source: Adapted from UNICEF & WHO, 2008¹⁵

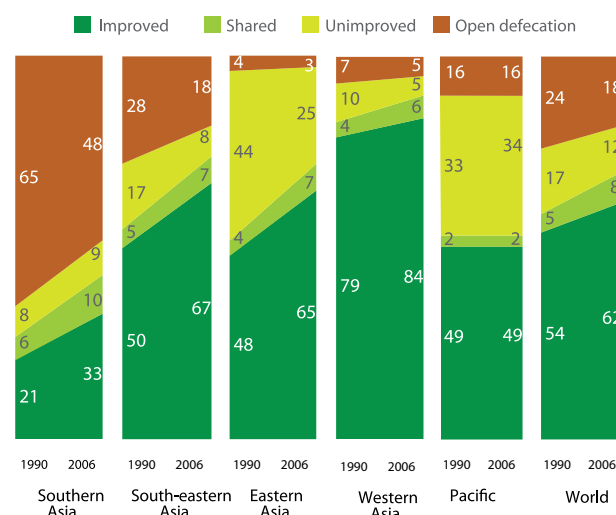
¹² FAO (2008) The State of Food Insecurity in the World, p.39.

¹³ FAO (2008) at <http://www.fao.org/news/story/en/item/8836/>

¹⁴ ESCAP (2008) op.cit.

¹⁵ UNICEF & WHO (2008) op.cit

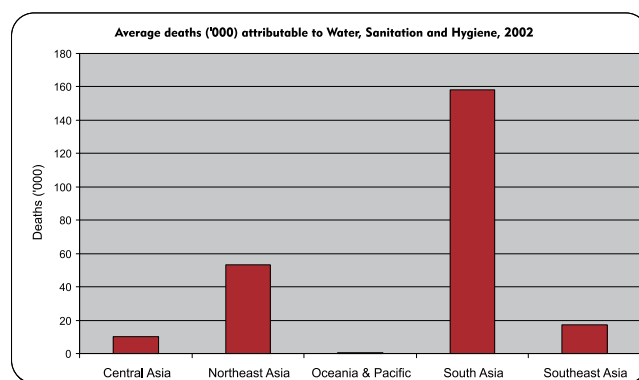
Figure 6: Sanitation Coverage: Trends in the proportion of the population using an improved, shared or unimproved sanitation facility or practicing open defecation, by MDG regions in 1990 and 2006



Source: Adapted from UNICEF& WHO, 2008¹⁶

Cost of Inadequate Water and Sanitation: 239,495 deaths are attributable to water, sanitation and hygiene in the region, with South Asia bearing the greatest burden, with 158,450 deaths (figure 7).

Figure 7: Deaths attributable to Water, Sanitation and Hygiene



Source: Calculated from WHO, 2008¹⁷

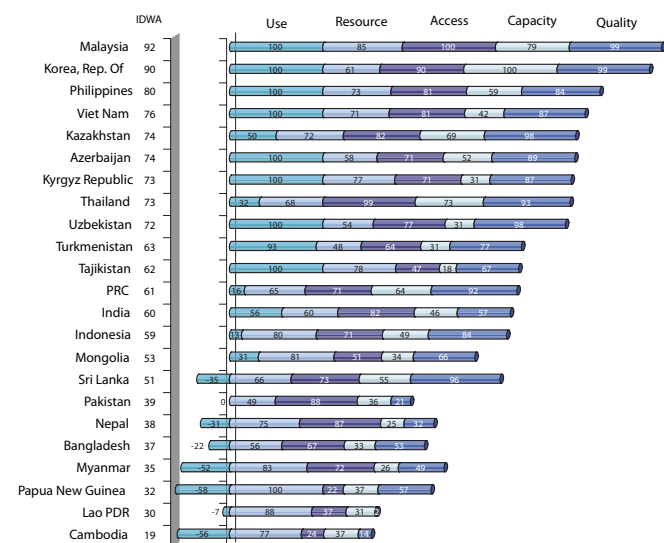
¹⁶ Ibid

¹⁷ WHO (2008) Safer Water, Better Health

In terms of the costs of inadequate sanitation, a recent World Bank study concluded that Cambodia, Indonesia, Vietnam and the Philippines lose an estimated US\$9 billion a year due to poor sanitation (based on 2005 prices), which accounts for approximately 2% of their combined Gross Domestic Product (GDP)¹⁸. The study goes on to estimate that universal sanitation would lead to an annual gain of US\$6.3 billion in those four countries.

In an effort to spotlight attention on the water issue and assess progress, the Asian Development Bank and the APWF devised the 2007 Index of Drinking Water Adequacy (IDWA). The IDWA averages and ranks (figure 8) a selection of the ADB's developing member countries, according to 5 variables: use, resource, access, capacity and quality.

Figure 8: Ranking based on IDWA



Source: ADB, 2007

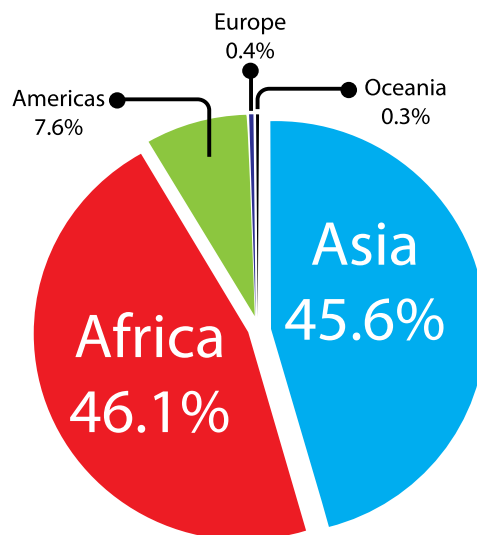
2.3.4 Water-related Disasters

The Asia-Pacific region is the most vulnerable to water-related disasters in the world. According to the EM-DAT data base, from 1980 to 2006 the recorded fatalities due to water-related disasters were approximately 1.36 million, of which, Asia accounted for 46 %. For the same period, the number of affected people was approximately 4.7 billion, of which, Asia accounted for 90%. Further, US\$ 8 billion worth of economic damages were recorded for the same period in the Asia-Pacific region.²⁰ Floods, storms, tsunamis, hit an ill-prepared and densely populated region hard, hence the recorded significant loss of life. It is anticipated

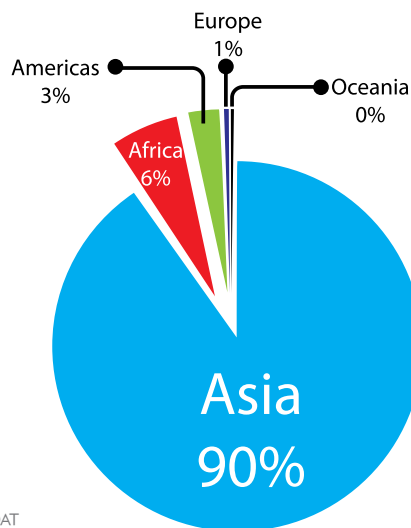
that climate change patterns may put extra burdens to already vulnerable Asia-Pacific countries, which might hinder sustainable development, poverty reduction and other important goals/targets in the region.

Figure 8: Ranking based on IDWA

Ratio of water-related disasters fatalities in different continent since 1980-2006



Ratio of affected people by water-related disasters in different continent since 1980-2006



Source: EM-DAT

Both men and women are productive agents in the farm, have multiple and visible roles at home as domestic water collectors, and as educators and managers of household health and hygiene. The poor and women bear the burdens of low quality and inadequate (or excessive) waters. Moreover, women are more affected from water-related disaster events by virtue of their household responsibilities and the fact that men migrate following a disaster, women have poor physical mobility, and face more post-disaster safety & security issues.

¹⁸ World Bank (2007) Economic Impacts of Sanitation in Southeast Asia

¹⁹ ADB (2007) Asian Water Development Outlook

²⁰ PWRI Technical Note 4088 "The global trend of water-related disasters"



3

CRITICAL ISSUES BRIDGING AND DIVIDING THE REGION



3. Critical Issues Bridging and Dividing the Region

3.1 Water Financing and Capacity Development

Progress and Challenges

The Asia - Pacific region generally has performed well in improving access to and management of water. However, rapid population growth, urbanization, and the underperformance of existing water assets mean there is still a significant shortfall in meeting the region's needs.

In 2002, according to Asia Water Watch 2015 – Are Countries in Asia on Track to meet Target 10 of the Millennium Development Goals?“ (AWW 2015), a study commissioned by the Asian Development Bank (ADB) and conducted in partnership with the World Health Organization (WHO), United Nations Development Programme (UNDP), and United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), despite the substantial improvement in access to improved drinking water supplies in the Asia - Pacific Region (around 3.16 billion people - 82% of the population - in the Asia - Pacific region had access to improved water supplies, up from 74% in 1990), formidable challenges remain. Approximately 669 million people in the region were still without access to safe drinking water. Aggregate figures also mask dramatic disparities between the subregions, between nations within subregions, and even between different parts of individual countries.

With the availability of 2004 data, ADB made another assessment, but this time limited to ADB's Developing Member Countries (DMCs). Good progress has been made in many countries in the Asia - Pacific but much still remains to be done if the MDG target is to be met. From 2002 to 2004, an additional 117 million people were served with drinking water supply, increasing the coverage from 80.9% in 2002 to 81.1% in 2004. However, alarming challenges remain in DMCs. In 2004, approximately 635 million people in the region were still without access to safe drinking water; 545 million of these live in the rural area.

Sanitation

The story for sanitation is less satisfactory. Based on AWW 2015, coverage for improved sanitation in the region lags behind the rate needed to attain the MDG target. As of 2002, less than half of the population of the region had access to improved sanitation facilities. Of the 2.6 billion people in the world without access to

improved sanitation facilities, 2 billion are in the Asia - Pacific region.

ADB also made assessment on DMCs' progress in sanitation with 2004 data. Good progress has been made in many DMCs but much still remains to be done if the MDG target is to be met. From 2002 to 2004, an additional 117 million people were served with sanitation services/facilities, increasing the coverage from 42.8% in 2002 to 44.7% in 2004. However, alarming challenges still remain in DMCs. In 2004, approximately 1,862 million people in the region remain unserved; 1,498 million of these live in the rural area.

Water Resources and Services

Moreover, the region's freshwater resources – our river basins, watersheds, wetlands and ecosystems – are suffering from pollution, inadequate management and climate change. It is anticipated that climate change will make water shortages more serious. Adaptation to the effects of climate change should be considered in order to secure limited water resources. In short, Asia's needs for further investments in the water sector remain high.

Rapid population growth in the Asia-Pacific region over the past decade has led to ever-increasing demands for water and sanitation services, which require greater investments in water projects. Investments to provide people with improved access to safe drinking water and decent sanitation facilities, allocate and preserve water resources, manage wastewater properly, and construct flood control and irrigation facilities, have fallen seriously behind demands.

Achieving Target 10 of MDG 7

Improvements in the MDG indicators for income levels, hunger, communicable diseases, maternal and child mortality rates, and environmental sustainability rest on many factors. But all have one factor in common: water. Water is essential to sustain life, provide food, and create the conditions for higher levels of health, education and income. Investing in the water sector embodies the intent of "Human Security," which is to create systems that give people the building blocks for survival, dignity and livelihood.

AWW 2015 estimated that an annual investment of at least \$8 billion will be needed in the Asia and Pacific Region over the next decade if countries are to meet the MDG targets for safe drinking water and sanitation (Target 10). The greatest proportion of these financial needs is in the South and the Southwest Area subregion, followed by the East and the Northeast Asia. In terms of numbers

of unserved people, the largest numbers are found in India and the People's Republic of China. Because Asia is home to the majority of the world's poor, achieving Target 10 in this region would make a significant contribution toward attaining the global target. The achievability and affordability of meeting Target 10 in the Asia-Pacific region raises an interesting possibility: Political leaders can afford to confidently set more ambitious targets than the MDGs and advance their countries toward greater levels of social and economic development. It is not a matter of possibility, but a matter of willingness.²¹

Broad-based Impacts

An investment in the water sector is an investment in all of the MDGs, not just Target 10. The impact of water sector investments directly targeted at poor consumers is anything but subtle. Safe water supplies immediately improve people's health and save them time, which they can use to study, or improve their livelihoods, so they can earn more, eat more nutritiously, and enjoy healthier lives. On the other hand, improved sanitation protects the poor from socially and physically degrading surroundings, health risks and exposure to dangerous environmental conditions.

Significant investments are also needed in irrigation services, river basin management, flood management and mitigation, and wastewater management. Investments in water are crucial to meet the broader MDG targets of reducing poverty, hunger, child and maternal mortality and the incidence of major diseases, and to improve environmental sustainability. Clearly, this is a major challenge, and one that is complicated by a wide range of governance, institutional, social, environmental and political issues.

Disaster Risk Management

There is also a need to drastically reduce the vulnerability of populations to water-related disasters. The Asia - Pacific region accounted for 91% of the world's total deaths due to natural disasters and 49% of the world's total damage due to natural disasters in the last century.²² With regard to climate change, the numbers of typhoons and cyclones as well as drought-affected areas have been increasing. Disaster risk management and expansion of irrigation facilities with participation of communities need to be promoted.

²¹ ADB (2006) Asia Water Watch 2015

²² ADB. Technical Assistance Report: Supporting the Asia-Pacific Water Forum

In general, it is clearly understood that the principal challenge is not in the technological aspects (hardware component) of water supplies and sanitation and other water sector developments and resources management, but more in the soft components, especially: (1) leadership and commitment; (2) the need for an appropriate policy environment, legal and regulatory framework; (3) capacity development of service providers; and (4) innovative financing mechanisms attractive to potential investors, especially the private sector, to boost investment in the water sector with active participation of stakeholders – not only from the water sector but also in the health, education and other sectors concerned.

Pro-Poor Financing

Reaching out to the poor and marginalized men and women in the region will require implementation of some innovative financing solutions. Properly targeted incentive mechanisms should encourage more pro-poor investments even among the small entrepreneurs, community based organizations and households themselves. A differentiated approach is needed to facilitate access to financing to suit both the needs of small service providers as well as large scale utilities.

Development financing must also seek to improve efficient, effective and sustainable service provision. Financing for income generating activities by women, for example, would not only empower them but would also enable them to pay for water supply and sanitation services that meet their needs.

Capacity Development

Sustainable water service delivery and integrated water resources management require further capacity development at local, regional and national levels. These should be based on proper diagnostic assessments that put the organizations concerned in charge of their own capacity development strategy and its implementation. Knowledge, skills and attitudes need further improvement at individual, organizational and institutional levels.

While most Asian countries have decentralized responsibilities to local governments, large gaps still exist between existing and required capacities. Local governments and other local stakeholders need to be empowered financially, technically and institutionally. Regulatory functions have to be strengthened to increase service performance. Further reforms are needed to optimize the roles and contributions by the public and private sectors and by civil society organizations, through effective government-corporate-society (GCS) partnerships.

Furthermore, the need to involve vulnerable groups including

poor and disadvantaged men and women requires time and appropriate financial arrangements, awareness building, and empowerment to allow them to become active partners. The region has a wealth of knowledge and experience that can be tapped to step up capacity development work, taking into account local requirements and sensitivity to gender issues and cultural contexts. Making use of both formal and informal education, programs can be supported by universities, resource centers, NGOs, academe and specialized organizations.

Additionally, the need for achieving new standards of excellence in the development and dissemination of knowledge in selected topics of importance to the water sector has been identified as a significant need throughout the region. APWF's KnowledgeHubs initiative launched in 2008 seeks to improve collaborative networking to serve the knowledge and capacity development needs of project clients in the region. To date, 13 regional knowledge hubs have been recognized to address priority water management topics.

Networking among practitioners in key water sector organizations in the region is steadily increasing among water utilities, river basin organizations, and national water apex bodies, and is increasingly supported by performance benchmarking and peer review services that show where and how performance can be improved.

3.2 Water-related Disaster Management

The IPCC reports that expected climatic changes over the region will stimulate an increase in extreme weather events that include higher maximum temperatures, increased number of hot days, more intense rainfall over some areas and an increased frequency and severity of tropical cyclones. Climate variability and change cause death and disease through natural disasters, such as variable rainfall, cyclones, accelerating storm water runoff, floods, droughts, and heat waves, which bring about a reduction in the availability of freshwater and a gradual decrease in water quality.

The UNFCCC assessment states that climate variability, development and social changes and the rapid population growth are already placing pressure on sensitive environmental and human systems and these impacts would be exacerbated if the anticipated changes in climate and sea level (including extreme events) did materialize. Poverty and population density versus the toll of human casualties is also evident, revealing how management of such social factors to adapt to the changing risks is also important to reduce vulnerability to water-related disasters. Health issues, especially the spread of water epidemics

and water-borne diseases when a disaster occurs are still a big challenge for many communities particularly for those in the slums. These health issues are intricately interrelated to the status and efficiency of supplying adequate clean water and providing sanitation facilities during emergency response.

In many small island countries factors such as climate variability, increasingly variable rainfall, accelerating storm water runoff and increasing demand for water are so significant that they threaten their economic development and the health of their people. This is exacerbated in the Pacific island countries due to the fragility and vulnerability of the water lenses in the countries' islands. The impact of Climate Change magnifies the current rising trend of the sea level, which is enhancing the vulnerability of already vulnerable low-lying small island countries in the Pacific and deltas in the region.

Glacial Lake Outburst Floods (GLOFs)

Temperature increase is widespread over the globe, with some areas, including the world's highlands, showing remarkably higher trends. The climate change is having a profound impact on Himalayan valley glaciers, which are receding faster today than the world average. If the present trend continues, it is estimated that most valley glacier trunks and small glaciers will disappear by 2050. As valley glaciers retreat, glacial lakes can form and many are observed at elevations of around 4500m. With increasing amounts of water in these lakes, glacial lake outburst floods (GLOFs) are inevitable. There have been at least 35 GLOF events in Bhutan, China and Nepal in the past. In the Hindu Kush-Himalaya region 204 glacial lakes have been identified as potentially dangerous lakes, which can burst any time.

The glacial lake outburst flood is an inherent part of glaciers and the lakes, which are associated with the glaciers. The glaciers are nature's valuable source of freshwater in the form of frozen reservoirs from which large amounts of melt ice release to many of the major rivers of the Hindu Kush-Himalaya (HKH). In some instance, the glacier snout area and down valley is favorable in the formation of lakes. The continuous and enhanced retreat of glaciers due to global climate change is resulting the formation of many glacial lakes at the toe of glaciers dammed by the loose moraine. The rapid accumulation of water in these glacial lakes can lead to a sudden breach of their unstable moraine dams, however. The resultant discharges of huge amounts of water and debris – a glacial lake outburst flood – often have catastrophic effects downstream. A number of glacial lake outburst floods (GLOFs) have been reported in the region in the last few decades, particularly from the eastern sector of the region. GLOFs have resulted in many deaths for downstream populations as well as destruction of property and infrastructure.

Source: S.R.Bajracharya, P.K. Mool and B.R. Shrestha (2007) Impact of Climate Change on Himalayan Glaciers and Glacial Lakes: Case studies on GLOF and Associated Hazards in Nepal and Bhutan. Kathmandu, Nepal: ICIMOD and UNEP.

Countries in the Asia-Pacific region must establish adaptation strategies to cope with changing situations, in which adaptation to climate change will be the key. For this purpose downscaling of climate and hydro-meteorological models, assessment of impacts of climate change to local scale and tools for decision-making are required to be developed.

To fill the current gap in water-related disaster management at regional and national levels, a unified action involving all key stakeholders must be undertaken. The national governments should bear major responsibility to establish national disaster management strategies/plans as well as execution of major disaster management actions in proper collaboration with local governments, communities and other stakeholders. The real challenge, however, lies in striking and sustaining an optimal balance between the development needs of many Asian developing economies (especially influenced by population growth, food and energy security issues) and the risks associated with the use of flood-prone land, within given institutional structures and under given uncertainties concerning the future state of the water regime. As such disaster risk reduction cannot be an isolated undertaking, but must be mainstreamed into development planning of various sectors, such as urban, river, land-use and agricultural planning.

The best-mix of both structural and non-structural measures need to be sought as measures for disaster management and climate change adaptation in the Asia-Pacific region, with the aim of optimizing use of limited available resources. Structural measures such as levees and water/sediment regulation facilities need to be steadily implemented for they would cover the physical protection level from disasters. At the same time potential significant environmental impact of any measures would need to be factored into the decision-making processes together with the socio-economic factors, under the awareness that final decisions on such developments are matters of societal choice. The level of investments in water-related risk management is currently very low in most developing countries, which needs to be increased to also cope with increasing risks from climate change.²³

On the other hand, non-structural measures such as warning systems, hazard maps, basin management plans and empowerment of flood defence community groups, have been recognized as being efficient especially for extreme events which cannot be prognosticated and anticipated. Investment on both

²³ Experiences in Japan showed the desirable investment level to be 1% of GDP. Experiences in Malaysia and the Republic of Korea illustrated a consistent increase from 0.01% to 0.04 in past decades.

structural and non-structural measures for water-related disaster management needs to be duly considered as stated during the concluding statement in Asia-Pacific Regional Document of the 4th World Water Forum as follows: "Developing and improving appropriate structural measures to reduce damage from water-related disasters is a lengthy and expensive process. However, over the long term, a precautionary approach whereby funds are allocated pre-emptively would significantly offset the funds currently required for recovery activities..... the key to reducing vulnerability lies in increasing preparedness through pre-emptive activities: early warning systems, raising awareness and evacuation planning. Coordinated efforts to adopt these measures would go a very long way towards dramatically decreasing the number of deaths caused by water-related disasters – a key priority for the region."

From a global perspective, the Millennium Development Goals (MDGs), the Hyogo Framework for Action 2005-2015 (HFA), and the Hashimoto Action Plan together provide a set of strategic goals and global actions to substantially reduce the effects of disasters on life and livelihood over the next decades. Thus it is also vital that national and local development plans are formulated to mainstream water-related disaster management including climate change and climate variability into national water and land management policies and practices.

Integrated Transboundary River Basin Management and joint efforts on early warning and forecasting of disasters are equally important to solve disasters and climate change impacts on water resources in the Asia Pacific.

3.3 Water for Development and Ecosystems

Agriculture dominates the water sector in the Asia-Pacific region, accounting for 79% of total freshwater withdrawals. It is characterized by poor efficiency, low productivity, poor service provision, and non-existing or ineffective demand management. Many irrigation agencies are still driven by supply, and demand management mechanisms are either non-existent or ineffective. Furthermore, the intensification of agriculture, combined with industrial development and urbanization, has severely affected water quality.

Irrigated agriculture is usually the first sector affected by water shortage and increased scarcity, resulting in a decreased capacity to maintain per capita food production while meeting water needs for domestic, industrial and environmental purposes. Growing scarcity and competition for water stand as major threats to future advances in food security and poverty alleviation in the region. Essential ecosystem services provided by aquatic ecosystems, upstream watersheds, and agricultural landscapes are being

significantly degraded, especially in areas of high resource dependency. The aquatic biodiversity's high economic and social value is threatened by overexploitation and alterations in hydrological regimes.

Ecosystems and livelihoods are often affected when inadequate consideration is given to the potential impacts of water-related development and management strategies. An environmental flow is a water regime within a river, wetland, or coastal zone for maintaining ecosystems and their benefits where there are competing water uses. E-flow approaches assist in assessing the distribution of costs and benefits across sectors and stakeholders and can help ensure that water is allocated to the environment in development planning, especially involving large infrastructure, and should be seen as integral to sustainable water management. Governments of the region must establish legislative, regulatory, and institutional policies and capacities to enable effective quantification, implementation, and enforcement of environmental flow, recognizing the ecosystem services of agricultural systems. Integrated transboundary river basin management is also an important approach to overcome the conflicts and for cooperative development of potential water resources in the region, based on ecosystem precepts.

While economic growth is rapid across much of the region, the distribution of benefits across societies is more uneven. The rural poor are often being asked to maintain supplies of critical ecosystem goods and services such as watershed functions. Payment for environmental services schemes have been tested in the region in upstream watersheds, but should be taken to the next step of refinement and considered also for agricultural water management. Incentives such as tax breaks, tenure, and other financial and non-financial instruments must also be considered.

To meet the future food security needs and rural socio-economic aspirations of the region, pressure to develop new supply sources or increase water allocation to agriculture will continue. At the same time, pressure on agriculture to perform more effectively and efficiently and reduce its environmental impact will intensify. Water management must first focus on making better use of the water being accessed, and restore a strategic balance between rain-fed and irrigated production. Given the overwhelming dominance of irrigation and its role in securing food security, it is necessary to improve the benefits of irrigation water. Irrigation is often characterized by poor water productive efficiency, and poor services to farmers, limiting their social benefits and hampering their capacity to adapt to and benefit from changes in agricultural markets and water allocation. Policy-makers can avoid conflict between agriculture and competing sectors by providing direction and incentives for the reform of irrigation management and

the upgrading of infrastructure, while delivering direct benefits for a rapidly growing population and to farming communities. Proposed approaches include:

The potential to increase food production by boosting the productivity of rain-fed production has been neglected and must be fully realized by providing incentives for the adoption of improved soil and water management practices, and supplementary irrigation and water harvesting, resulting in more equitable investment patterns.

In addition to food, irrigation systems in the region also provide water for farmhouses, habitats for fish and other aquatic resources, rural enterprise water supplies, domestic water, hydroelectric power, and navigation. It also supports important cultural values that are essential for local wellbeing and livelihoods. Ecological benefits include flood control, groundwater recharge, water purification, biodiversity conservation, and climate adjustment. Policies that recognize and promote the multi-functionality of irrigation water can improve food security, health and sanitation of local communities, and benefits to society as a whole.

Irrigation sector reform should be reoriented to focus on the professionalization of management and service provision and the accountability of service providers to users, satisfying the needs for representation and empowerment along with performance objectives and market-based instruments. This poses many questions regarding the capacity and willingness of the institutions to deliver services on the basis of demand rather than supply. In many developing countries with large irrigated sub-sectors, there is a continued reliance upon supply management approaches with little attention to the management of existing assets. This trend needs to be reversed if agriculture is to continue to account for its water withdrawals. Reforms will require improving both physical structures and management institutions. Investments should be based upon an understanding of the changing demand in irrigation services for farmers, multifunctionality, and the need to improve the environmental performance of the systems in a river basin management context.

Bringing about this shift in irrigation management will require considerable investment in capacity building at all levels, including engineering and operations. Countries also need to adopt benchmarking systems to monitor the effects of policy changes and improve sectoral performance and quality of investment.

In order to counter the environmental impacts that have resulted from the intensification of agricultural production and exploitation of natural resources, policies must be revised to promote conservation agriculture, integrated pest management,

integrated plant nutrition, sustainable forest management, efficient processing and marketing processes, and environmentally friendly livestock production.

China is maintaining food security without increasing water allocation to agriculture

China has adopted a series of strategic, policy, institutional and technical innovations during the past two decades to facilitate nationwide Water Saving Irrigation (WSI) development, with significant achievements. From 1980 to 2004, while national total water diversion increased by 25%; irrigation water use remained at 340-360 billion m³ and the proportion of irrigation water use in total water use declined from 81% to 65%. Meanwhile, national irrigation area increased by 5.4 million ha, food production capacity increased by 20 million tons and 200 million people gained food security. During the past decade, China's average unit irrigation water use was reduced from 7,935 to 6,450 m³/ha and nationwide irrigation water use efficiency has improved by around 10%.





Irrigation water use in China

By 2020, China needs to increase national food production by 200 million tons to maintain national food security, which requires an increase in irrigation area by 6.67 million ha. It is projected that newly developed water resources in the next two decades will be mainly allocated to domestic and industrial users; the agriculture sector will have to maintain food security for a larger population with the current amount of water allocation. For that purpose, different WSI development scenarios have been developed for the next decades.

Scenarios of irrigation water use improvement in China by 2020

Indicators	Scenario 1		Scenario 2		Scenario 3	
	2010	2020	2010	2020	2010	2020
Total irrigation water at location (100 million m ³)	3600	3600	3600	3600	3600	3600
Increased WSI areas (100 million mu)	2.0	3.0	1.5	2.5	1.0	2.0
Irrigation water use efficiency (%)	50-51	54-55	48-50	53-54	46-47	48-49
Unit irrigation water allocation (m ³ /mu)	400	380	410	390	418	400
Equipped WSI areas (100 million mu)	3.0	full	2.2	3.0	1.8	2.6
Reduction of water consumption per 10,000 Yuan of agriculture production (%)	12	20	10	15	8	12
Reduction of irrigation water allocation in water scarce areas (%)	10	15	8	12	6	10

Irrigation Aggregate Water Use in China (billion m³)

Year	1949	1957	1965	1980	1988	1993	1997	1998	2000	2002	2003
Total Water Use	1031	2048	2744	4437	4967	5198	5566	5435	5599	5565	5322
Irr. Water Use	956	1853	2350	3574	3874	3440	3599	3495	3600	3484	3433
Ratio(irri./total)	92.73	90.48	85.64	80.55	77.99	66.18	64.66	64.3	64.3	62.6	64.5

FAO is assisting China to achieve this goal with capacity building on irrigation modernization, the development of provincial irrigation investment plans in certain provinces, and of an improved irrigation performance appraisal tool for policy evaluation. China will be an important partner of the FAO-IWMI initiative, which will support the dissemination of key experience and knowledge generated in China.

Source: Li Yuanhua, Ministry of Water Resources, 2006

Water and Energy

As the region's economies and populations continue to grow, there is no question that demands for energy will increase, the growth rates of which are likely to remain at similar levels or even accelerate further in coming decades²⁴. Current forecasts place the region's electricity consumption at an annual increase of 5-8%²⁵, a trend which will have significant implications for water resources across the region's ecosystems since energy generation requires water. As domestic and international markets for biofuels expand, biofuel crop cultivation is also gaining momentum in the region, bringing concomitant water quantity and quality implications, which have yet to be analyzed and managed by nations around the region.

Not only is water required for energy generation, but water and wastewater treatment plants are in turn significant consumers of energy. Asian countries already face significant energy requirements for pumping, and as treatment plants increase exponentially across the region in coming years, so will the energy needs for this sector. The water – energy nexus in the region is yet to be adequately studied and will require closer intersectoral integration between the water and energy sectors' policies and plans.

3.4 Monitoring of Investments and Results

Monitoring of investments and results was conceived as one of the key result areas (KRAs) of regional cooperation to prepare for the 1st APWS. This KRA 4 aims to promote a new culture in water resources management and development to enhance effective policy and decision making at all levels: regional, national and local so as to ensure regional efforts to contribute to achieving all water-related MDGs, especially those related to poverty reduction and access to safe drinking water and basic sanitation, and also all internationally agreed development goals.

The Economic and Social Survey of Asia and the Pacific pointed

²⁴ ADB (2007) op.cit.

²⁵ Ibid.

out that the Asia-Pacific region has made major strides in economic and social progress during the past half-century and per capita income growth has been much faster than elsewhere in the world. However, the overall impressive economic achievements together with the rapid growth in population have put increasing pressure on the limited availability of freshwater resources in the region. Furthermore, the developing countries in the region with economic policy liberalization is resulting in significant changes in economic structure in many countries, including substantial changes in farming systems, and also resulting in rapidly mounting pressure on freshwater resources. Overall water available for development across the region is on steep decline. Defined as the amount of internal renewable water remaining in a country after all water withdrawals – whether for agricultural, household or industrial use – trends over time in a calculated index capture the nature of this crisis. Asian-Pacific countries experienced as much as a 50% reduction in water available for development relative to 1980 benchmark levels (Figure 10). Some countries, including Pakistan and Uzbekistan, long overexploiting their water resources, hold starting points at -100 on the index. What this water stress highlights is precisely how human ‘mis-use’ and ‘over-use’ undermines prospects for harnessing water for development opportunities. On the other hand, the apparent strong relationship between life expectancy at birth and access to safe drinking water in the region in Figure 11 demonstrates the importance in achievements by the progress made in the region by the advancement of MDGs in water.

It must be pointed out that the above preliminary overall pictures of the region were based on the limited amount of data collected by key institutions, including FAO and the Joint Monitoring Programme of the United Nations and initial attempts of UNESCAP to fill some of the gaps to enable a regional picture could be made. Additional efforts are required to encourage countries to invest in data collection, especially those essential for policy and decision making on MDGs. At the regional level, efforts are being made to improve the data at regional level in terms of filling the gaps and making them available to all countries and stakeholders for consistency in analysis.

The initial pictures mentioned earlier and the increasing complexity of water resources management in the region has called for further improvement in investment and water resources management policy reform. Effective monitoring of investment and results of policy reforms is increasingly recognized as a prerequisite for effective and efficient management of water resources for sustainable economic growth and sustainable development.

Figure 10

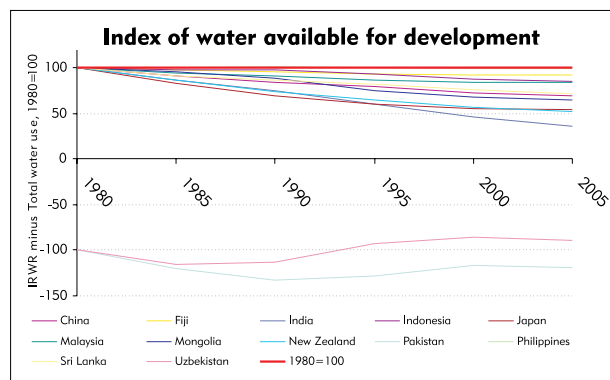
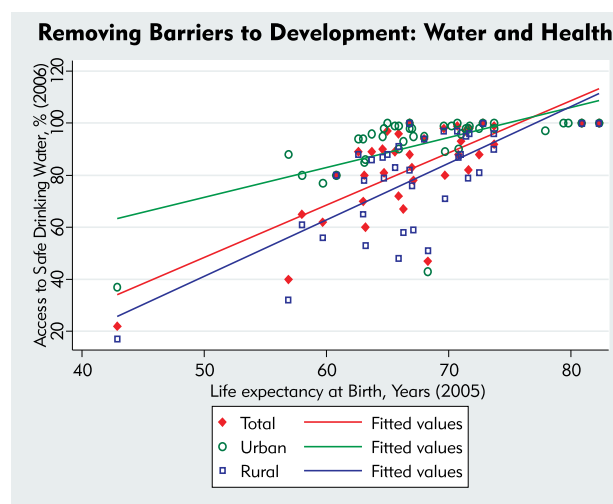


Figure 11



Source: ESCAP, 2008²⁶

²⁶ ESCAP (2008) op.cit.

4

OVERALL REGIONAL STRATEGY, SUBREGIONAL REPORTS AND CONCRETE INITIATIVES



4. Overall Regional Strategy, Subregional Reports And Concrete Initiatives

The Boundaries

At its most dire, the region's water circumstances set the scene for tragedies and unfathomable suffering on a daily basis. But the Asia-Pacific region is also home to extraordinary resilience, energy and dedication to tackling our water woes. Throughout the region, committed groups and individuals are marching forth with innovative impetus at regional, sub-regional national, and local levels.

4.1 Overall Regional Strategy: The Asia-Pacific Water Forum (APWF)

In the face of the region's pressing water problems, APWF was created in 2006, under the impetus of late Prime Minister of Japan Ryutaro Hashimoto, and currently presided by former Prime Minister of Japan, Mr. Yoshiro Mori, to provide countries and organizations in the region with a common platform and voice to accelerate the process of effective integration of water resource management into the socio-economic development process of the Asia-Pacific region. A number of key institutions from the region have committed themselves to supporting the APWF as "lead organizations" responsible for identifying strategies and initiating actions to achieve progress under three Priority Themes and five Key Result Areas.

Priority Themes	Targets	Lead Organizations
1. Water Financing and Capacity Development	To increase targeted investments for water and sanitation infrastructure and for human resources development	ADB
2. Water-related Disaster Management	To drastically reduce the vulnerability of human populations to water-related disasters	ICHARM
3. Water for Development and Ecosystems	To conserve and restore land-water interfaces for the improvement of water productivity	IUCN, FAO

Key Result Areas	Main Activities	Lead Organization
1. Developing knowledge and lessons	<ul style="list-style-type: none"> Building a network of water knowledge hubs Coordinating capacity development programs Providing guidance on water policies 	Singapore PUB, UNESCO
2. Increasing local capacity	<ul style="list-style-type: none"> Supporting peer learning (including cities/mayors) Empowering civil society, gender and youth Fostering (sub)regional cooperation 	Streams of Knowledge, UNHABITAT
3. Increasing public outreach	<ul style="list-style-type: none"> Developing regional water advocacy Supporting in-country water awareness programs Presenting regional awards for excellence 	ADB
4. Monitoring investments and results	<ul style="list-style-type: none"> Monitoring public and private investments Monitoring reforms and trends Monitoring MDG achievement 	UNESCAP
5. Supporting Forum and Summit	<ul style="list-style-type: none"> Maintaining an interactive website Supporting the APWF Governing Council Organizing/supporting the Asia-Pacific Water Summits 	JWF

One of the APWF's primary activities is to organize the Asia-Pacific Water Summits, the first one having been held in Beppu City in Japan, 3-4th December 2007. The 1st APWS, under the theme Water Security: Leadership and Commitment, attracted 10 Heads of State and Government, 32 Ministers, and representatives from over 36 Asia-Pacific countries and regions. In preparation for the 1st APWS, the APWF's lead organizations issued a series of recommendations, contained in the APWF Policy Brief 2007, launched at the Summit.

The Summit was the occasion for the region to focus its attention and energy on the pressing water challenges, to exchange ideas

and good practices and to commit to taking action. While a series of concrete initiatives were launched²⁸, the participants also unanimously issued the Message from Beppu, a call to further the water agenda in the region that offers tangible suggestions to leaders and expresses intent to heighten water issues on the agenda of major political events.

Water and sanitation issues were taken up at both the 4th Tokyo International Conference on African Development (TICAD IV) held in Yokohama and at the G8 Hokkaido Toyako Summit, both held in 2008 in Japan. At TICAD IV, the Japanese Government committed to "organizing a new technical assistance corps of

water specialists to be known as ‘W-SAT,’ or the ‘Water Security Action Team,’ which will be dispatched to work on the ground in African nations”²⁹ to provide access to water. The Yokohama Declaration and the Yokohama Action Plan, which comprise the more substantive principles for advancing African Development among TICAD stakeholders, contain numerous references to water and sanitation.

In the Leaders’ Declaration of the G8 Hokkaido Toyako Summit chaired by Japan, leaders of G8 countries called “upon national governments, in this International Year of Sanitation, to prioritize access to sanitation, building on the initiatives agreed at conferences on sanitation in Asia-Pacific and Africa” and committed to reviewing the Evian Water Action Plan on the basis of a progress report prepared by G8 water experts, by the next Summit. A first G8 Experts Group Meeting on Water and Sanitation was held in December 2008 in Japan in a sequence of efforts leading up to the next G8 Summit. Moreover, the G8 confirmed that “good water cycle management is crucial in order to address the issue of water, which has a cross-sectoral nature.”

The 2nd Asia-Pacific Water Summit, aims to continue to serve as the political sentinel for the region’s major commitments to water issues.

4.2 Subregional Reports

In the face of the region’s formidable size and diversity, the APWF works with coordinators representing five subregions, who have coordinated the drafting of the following subregional reports: Global Water Partnership of Caucasus and Central Asia (GWP CACENA) - Central Asia, Bangladesh Water Partnership (BWP) - South Asia, Korea Water Forum (KWF) - Northeast Asia, Global Water Partnership Southeast Asia (GWP SEA) - Southeast Asia, Pacific Islands Applied Geoscience Commission (SOPAC) - Pacific.

²⁸ APWF (2007) Policy Brief 2007

²⁹ Excerpt from the opening speech of former Prime Minister of Japan, Mr. Yasuo Fukuda, at TICAD IV, 2008.

³⁰ G8 Hokkaido Toyako Summit Leaders Declaration, Hokkaido Toyako, 8 July 2008



Central Asia & Southern Caucasus

Introduction

The CACENA region can geographically be subdivided into two sub-regions: The Southern Caucasus (three countries – Azerbaijan, Armenia and Georgia), and Central Asia (six countries – Afghanistan, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Uzbekistan). There is a big differentiation in renewable water resources availability among the countries within each sub-region. The biggest part of the territory is located in the arid and semi-arid climate, and irrigated agriculture accounts for about 85-90 % of total water use. The most common challenging issues for the Caucasian sub-region are the low access to proper drinking water supply and sanitation, water ecosystems degradation, floods and, in some zones, water scarcity. For Central Asia they are increasing water deficit and water ecosystems degradation. Transboundary issues (conflicting interests for water among upper and down-stream countries) are common for the whole CACENA region.

The principal efforts undertaken by national water authorities mostly addressing the implementation of the integrated water resources management (IWRM) principles towards sustainable development and MDGs achievement in all nine countries. These include public participation in decision making, promoting political will to cooperation among sectors and countries, initiating dialogues among all stakeholders and support to practical actions at local levels. Due to the active role of the Regional Water Partnership (RWP) CACENA in close cooperation with the Executive Committee of International Fund for Saving the Aral Sea (EC IFAS) and ICWC, many joint activities have been implemented, as a result of which good relationship has been established in between the water-related professionals from all countries. During the regional meetings within the framework of RWP CACENA, exchange of information and management experience takes place between the principal stakeholders. The RWP CACENA provides favorable conditions for integrating not only into the GWP network activities, but together with the IFAS and other regional processes also for involving local partners into activities supported by other international organizations and donors.

Main Challenges and Actions

Water issues and actions to address them

There are a number of challenges for sustainable water resources management in Central Asia and Southern Caucasus, which are predetermined by the following destabilizing factors:

1. *Population growth*, although its rates have reduced in

comparing with the last quarter of 20th century, makes up not less than 1.5% per year resulting in additional demands for water resources;

2. *Urban population growth* and expanding urbanized areas causes the additional need in water resources;
3. *Changes in crop pattern* due to restructuring of farming agriculture and tendency to produce more high-value crops;
4. *Climate changes* that are exhibiting increasing water requirements for agriculture and more often recurrence of extreme flood and drought events;
5. *Progressing instability* in world prices on agricultural production against increase in costs of agricultural inputs makes the irrigated farming less cost-effective, but there are no alternatives to irrigation due to its high social significance for the region (about 60% of rural population rely on it).
6. *Strengthening the competition for water resources between upstream and downstream countries* mainly due to shifting the water flow regime in transboundary rivers towards the interests of maximum hydropower production, especially in winter – created proper frictions in regional cooperation and disputes concerning future hydro constructions in upper reaches.
7. *Possible increase in water withdrawals from the Amudarya River by Afghanistan* after the stabilization of political and economic situation in this country – it will stress the water balance even more.

There are also a number of internal challenges, which characterize water consumption factors, but can be controllable, first of all, due to the introduction of IWRM in the region. These internal challenges should be added to the points listed above:

- *Lowering accuracy of water resources accounting/ registration and forecasting*, resulting in unproductive water losses along river channels;
- *Obsolescence and degradation of water infrastructure* at all levels of water management hierarchy resulting in increases of unproductive water losses and deteriorating controllability;
- *Low level of capital investments for rehabilitating and upgrading water infrastructure*;
- *Increase in the amount of water users*;
- *Insufficient financing O&M organizations resulting in loss of skilled personnel*.

With the aim of finding proper ways to overcome most of the above-mentioned destabilizing factors, the Central Asian and Southern Caucasus countries organized the Regional Preparatory Meeting of the 5th World Water Forum, which took place in Bishkek on 28-29 May 2008. The meeting was hosted by the Ministry of Agriculture, Water Management and Processing Industry of Kyrgyz Republic, the Ministry of Environment and Forestry of Turkey, the Interstate Commission for Water Coordination in Central Asia and the Global Water Partnership Central Asia and Caucasus. Ministers from Kyrgyz Republic, Turkey, Tajikistan and Turkmenistan attended to the meeting. Presentations were made by Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan and Turkey, as well as by the representatives of the ICWC, EC IFAS, and regional offices of SDC, IWMI and ADB. Fruitful roundtable meetings followed, with about 200 experts from the 13 countries sharing similar problems, and provided guidance for managing and protection of water resources to meet human and environmental needs. Finally, the four major topics were formulated as main outcomes of the Bishkek meeting, for which follow-up activities towards 5th World Water Forum were agreed to, as follows:

Topic 1: Climate change impact on water resources in Central Asia and Southern Caucasus

Climate change, population growth, industrialization, urbanization and deforestation create huge stress on the water resources of the region. Understanding the effects of the climate change is central for developing regional and national adaptation strategies. Water storage and integrated water management are important elements in that respect. CO₂ emissions should be decreased by using renewable energies, hydro-energy in particular. Re-use of the wastewater and utilization of the modern irrigation techniques are essential for water-saving. Furthermore, public awareness should be created on the adaptation strategies. Hydro-meteorological data and information should be collected regularly. Observation, measurement and monitoring networks should be improved. The scale of tasks and problems on mitigation of influence of the climate change is rather great and covers almost all spheres of the human life. This problem in aggregate with the drying Aral Sea should be given the priority attention in the region. Mitigation and overcoming of these crises require mobilization of the efforts of all stakeholders and more harmonious cooperation of the regional countries.

Topic 2: Basin management and transboundary cooperation

The region is relatively rich in water resources, but there are many

transboundary rivers. Transboundary dialogue and cooperation in the region for the last 15 years has permitted to avoid any serious conflict for water delivery to different states and zones, even in previous water scarce and flooding years. Nevertheless, the existing cooperation among the countries of the region is not sufficient and must be improved. Although political will generally exists, the lack of understanding and confidence at the sectoral, and partly at the technical levels, is the main barrier to enhancing cooperation. Regional programs of consensus building dialogues at different levels could be developed so as to merge different views and positions. Exchange of reliable data and information is crucial. Furthermore, international mechanisms should work coherently to strengthen and advance transboundary cooperation. Cross-sectoral interests of hydropower, irrigation and environment require strengthening of legal and institutional frameworks of cooperation, same as use of financial tools that would account in sharing benefits, expenses and compensation of damage. This calls for comprehensive basin development plans, which need to be developed with stronger participation of all riparian countries and should be based on IWRM principles. Promotion of regional and sector dialogues oriented specifically towards long-term development of the region as a whole and stronger adherence to agreements by member countries is a must in order to merge different sectoral and country priorities on water use with the interest of society and nature. The Chu-Talas experience can be taken into account particularly in small transboundary rivers. Inter-national Commissions should be established by the riparian states in order to manage trans-boundary water resources in an equitable and sustainable manner. Integrated water management plans could be developed at the basin level. However, good management of water resources at the national level is central at first. All stakeholders should be included in this process and a bottom-up approach needs to follow. Taking into account the fact that the three Southern Caucasian countries (Azerbaijan, Georgia, Armenia) share the Kura-Araks river basin, there is not still any interstate document, which would regulate transboundary water resources use and management; it is necessary to develop a Concept for formulating such a document, in which the GWP CACENA can play a big role from the perspective of both consulting and financing. Lessons and tools, reflecting mistakes of ICWC activities, should be taken into account for building such sub-regional capacity in the Caucasian countries.

Topic 3: Water resources governance (organizational aspects of efficient water management)

Water resources management and governance should be reformed in the region. Content and phases of the reform, from

the decentralization point of view in particular, is as follows:

- a) Transboundary level (agreements, strengthening of organizations on regional/basin level, ecosystem demands, economic tools – cost and benefits sharing, information exchange, water demand and limitation)
- b) Same at National level
- c) Same at Basin level
- d) Same at System level
- e) Same at Water users association level

Decentralization of water resources management in line with the economic reforms, mostly in agriculture sector, requires the tools and instruments for all inclusive (states, sectors and stakeholders) and good governance such as:

1. Institutions
2. Legal and regulatory framework (development and harmonization)
3. Economic tools (what is state shared and what are the boundaries of responsibility, financial mechanisms – tariffs, subsidies, privilege loans, incentives for water saving and resources protection)
4. Technical and technological aspects (hydrometrics, automation, water allocation tools)
5. Environmental needs (pollution control, ecological releases, water protection zones)
6. Capacity building (equipment, training, including study tours).

Integrated water resources management is an important concept for bridging water users (sectors, states, downstream-upstream), water providers (states, decision makers, sectors) and stakeholders.

Topic 4: Capacity building and education

Training of the trainers is crucial in the region. Furthermore, education of the technical people as well as the women and children is central. Integrated training programs could be developed at the regional level. Joint and reliable hydraulic and hydrological data bases should be established. Information exchange on the standards ought to be ensured. Technological innovations should be followed regularly. Partnerships can be developed for capacity building. New models and techniques should be applied in order to utilize water resources in an equitable way. Strengthening regional cooperation, particularly in the Aral Sea Basin or in the Kura-Araks Basin, could include the following:

1. Institutional and legal aspects
2. Training activities
3. Information systems and data base
4. Integrated water resources management
5. Introduction of the automation systems
6. Modelling tools for decision support systems.

Furthermore, public awareness and concern on water issues should be created. NGOs involvement and media attraction are essential to this end.

Major changes after the 4th World Water Forum

In the CACENA countries we can observe definite delay of institutional reforms – until now results are limited to amalgamation of ministries, reshuffling of authorities from one department to another or permanent rotation of curators from government. It is a result of sector egotism in order to keep uncontrolled regulation of limited financial funds within the continued economic crisis of transition period.

Only clear political will and support for real reforms can solve these problems. At present time, just to create such political will and commitment for real reforms is a priority sphere for the GWP CACENA activity. There are still enough numbers of highly qualified specialists in each country, who can suggest the most rational variant of institutional reforms to the government from the variety of options, which was developed by the world community (for instance, see IWRM ToolBox). The GWP CACENA supports strongly these specialists, involving them in a range of activities along with NGO representatives. The latter ones play an important role of buffer between professional and civil society at large. The GWP CACENA program for 2006-2008 aimed at sitting negotiators at round-tables to find consensus, to accelerate progressive reforms of the legislative base, to build human capacity and develop cooperation, to draw attention to rational ecosystems management, etc.

Colleagues-partners from Central Asia and Southern Caucasus have discussed many issues common to all when meeting at GWP regional working meetings and conferences. Many issues relate to how to improve water legislation. For instance, Uzbekistan started reforms of organizational structures for water management, but the legal base lags behind. Here the Law on "Limited water use" of 1993 has force but does not include a definition for «integrated water resources management». It is absent also in the water law of Georgia and Azerbaijan. On the other hand, Armenia, Kazakhstan, Kyrgyzstan, Tajikistan approved new Water Codes, where integrated management principles are

taken into account. The principal IWRM postulates are not stated in the new legislation of Turkmenistan. One of the largest-scale water systems in the world “Karakumdyra” already operates in accordance with the basin (hydrographic) principle.

Understanding of our own problems and lessons, obtaining knowledge about overseas best experiences based on cooperation within the GWP network allows specialists from the CACENA region to attract the attention of international organizations and donors to the problems and issues in the region. In the future, GWP CACENA will pay more attention to the priority challenges:

- Conflicts around water resources
- Non-coordinated planning
- Unsustainable development – to minimize destabilizing factors
- Unsustainable water resources management
- Lack of ecosystem approach and IWRM application
- Overexploitation and pollution of water ecosystems
- IWRM Adaptation to possible climate changes

Progress on political commitments

During the past few months 2008 there were a number of politically significant events in the CACENA region addressing cooperation in general and water issues in particular.

On 10 October 2008 in Bishkek Heads of Central Asian countries used the opportunity to meet within the framework of the Commonwealth of Independent States and had a discussion addressing regional cooperation on water-energy issues. The willingness for regional cooperation in this sphere was once again confirmed. On 16-17 October Vice-Prime Ministers of five states signed an agreement about joint measures to overcome water problems within the Aral Sea Basin during Winter – Spring season of 2008-2009.

On 2 November in Moscow, Presidents of Armenia and Azerbaijan met for the first time in many years to start a negotiation process on Nagorny Karabakh – improvement of the political environment will open more room for decisions on water-related issues within the Southern Caucasus sub-region.

Inauguration of the new EC IFAS during regional conference held on 17-18 November 2008 in Almaty gives a new positive impulse to regional water cooperation.

The key principles needed for progress on political commitments could be grouped into three categories:

Regional approach needed: Ownership and sustainability

- Ensure the stability and the security of the countries of the region;
- Promote closer regional cooperation within sub-regions: Central Asia and Southern Caucasus;
- Build upon achievements already made in the countries;
- Make donor assistance conditional upon regional cooperation;
- Encourage regional political and financial commitment;
- Allow strong leadership of regional institutions by locals, not donors.

Negotiation strategy: Creative approaches

- Apply issue-linkage strategies, e.g. water for energy, water for environment, etc.;
- Offer incentives to constituencies who may lose from cooperation;
- Carry out basic dispute resolution functions: information flow, fair treatment, and sustainable processes;
- Allow local solutions to transboundary activities.

Programme management: Network and authority

- Commit to coordination and knowledge sharing;
- Make conflict prevention measures integral to programmes and projects;
- Support existing institutions in cross-sectoral activities, and;
- Encourage cooperation with global knowledge networks.

Way Forward

The GWP CACENA, as one of the recognized regional driving forces on the way forward to the 5th World Water Forum, is trying to conduct sub-regional preparations in line with policy and activities of the EC IFAS – leading regional body responsible for regional cooperation in Central Asia. Using outcomes of the Bishkek Conference (May 2008) as a basis – GWP CACENA supported preparation of the National position papers for 5th World Water Forum, which were drafted by members of ICWC and National Authorities of Caucasian countries. On agreement with ICWC the GWP CACENA submitted proposal for Central Asian and Southern Caucasus side event to the Virtual space of the 5th World Water Forum. The GWP CACENA achieved agreement with Ministry of Foreign Affairs of Finland about proper financial support in 2009, which will be allocated via GWP CACENA Secretariat to cover part of costs for CACENA delegation to World Water Forum in Istanbul in March 2009 and to support follow-up activities after the forum during 2009.

The main side event output will be: Sub-Regional Position Paper

“Climate change, water resources management, governance and capacity building issues in Central Asia and Southern Caucasus”.

Follow up activities: Some ideas on follow-up activities after 5th World Water Forum preliminary include the following:

- Meeting of ICWC in April 2009 – to discuss outcomes of the 5th World Water Forum.
- A number of working regional meetings under umbrella of “Transboundary Dialogue” to discuss progress on interstate agreements, which are under preparation with support from ADB and conducted by EC IFAS. Afghanistan should be invited.
- Launching new program jointly with WWC and IUCN “Water Governance” – summer 2009.
- Special session during Regional Asian Conference of ICID in December 2009 – to discuss further collaboration with CACENA countries.

Northeast Asia

Introduction

In this report Northeast Asia (NEA) is defined as the geographical sphere encompassing five countries: China, Democratic People’s Republic of Korea, Japan, Mongolia and Republic of Korea. In NEA, interaction between the rapidly mixing atmosphere and the slowly changing oceans are largely responsible for the monsoon, which affects China, Japan, Mongolia and the Korean Peninsula.

The characteristics of the appropriate countries are as follows. In the past 100 years in China, there was no obvious trend of change in annual precipitation, but there exists considerable variation among regions. The annual precipitation decreased gradually since 1950s with an average rate of 2.9 mm/10a, although it increased slightly during the period of 1991-2000. The regional distribution of precipitation shows that the decrease in annual precipitation was significant in most of northern China, eastern part of the northwest, and northeastern China, averaging 20-40 mm/10a, with decrease in northern China being most severe; while precipitation significantly increased in southern China and southwestern China, averaging 20-60 mm/10a.

Japan’s national water demand remains unchanged and is even slightly decreasing. Japan’s water resource development facilities have improved so that Japan’s water supply now largely meets demand. According to the report by Ministry of Health, Labour and Welfare of Japan, household access served by 97.3% of population and total improved access served by 100% and there

is only 7% leakage rate.

Mongolia, located in the transition zone of the Siberia taiga and the Central Asian desert, possesses a rich biodiversity and unique ecosystems. However, protection and conservation of the natural system is under threat from causes related to climate change, changes in the nomadic lifestyle and husbandry, mining activities and other human impacts. The registered water use and consumption in Mongolia is only about 0.5-0.7km³ per year. In 2005, 60% of the population still lacked access to safe drinking water and sanitation causing health risks and unequal opportunities for an acceptable quality of life.

Annual average volume of water resources of Republic of Korea is 72.3 billion m³, which constitutes 58% of the annual average precipitation of 124 billion m³ and per capita available water resources is 1,512 m³. Per capita annual average precipitation is about 2,591m³. The rainy season over Korea, the so-called jangma, continues for a month from late June to late July. A short period of rainfall comes in early September when the monsoon front retreats back to the north. This rain occurs over a period of 30-40 days in June through July at all points of the Republic of Korea, and accounts for more than 50 percent of annual precipitation in most regions. Per capita, the annual amount of water resources use in Korea is about 540m³, which is relatively less than the average usage of OECD countries. While the total volume of water resources is limited, the amount of water use has increased by 6.6 times since 1965 due to the rapid growth of the population and to the economic situation.

Main Challenges and Actions

Main Challenges and Water Issues

The main challenges and water issues common to the region include climate change impact and water-related disasters, MDG issues such as water supply and sanitation, and water disputes.

1. Climate Change Impact and Water-related Disasters

Human-induced climate change is a serious environment, development and security issue affecting all NEA countries. The frequency and intensity of extreme climate/weather events throughout China have experienced obvious changes during the last 50 years. Drought in northern and northeastern China, and flood in the middle and lower reaches of the Yangtze River and southeastern China have become more severe. The annual precipitation in most years since 1990 has been larger than normal, with the precipitation pattern being a dipole,

corresponding to frequent disasters in the North and flood in the South. The rate of sea level rise along China's coasts during the past 50 years was 2.5 mm/a, slightly higher than the global average. The mountain glaciers in China have retreated, and the trend is accelerating.

In Japan, there has been a smaller rainfall amount in recent years and the range of variation has been lower than in the late 1940s through the late 1960s when dams and other facilities were constructed. As a result, stable water supply using dams has been decreasing. With global warming, (i) earlier snow melt and (ii) reduction of snowfall induce changes in river flow rate, and (iii) earlier surface soil puddling in paddy fields is expected to cause the annual water demand pattern to change and to have serious impacts on water use. In the case of sea level rise, below-sea-level areas with flood risks due to high tides will increase. The area below-sea-level in three large bay areas would increase about 1.5 times. Moreover, the number of days of heavy rains is expected to increase in years to come due to global warming, with concomitant increases in the frequency and scale of floods to be expected.

In the Republic of Korea, in the last 30 years (1997-2006), annual average number of deaths is not large about 196 persons, and average of property loss is almost 1,029 Million USD due to natural disasters. Heavy losses in 2002 and 2003 are caused by extreme typhoons Rusa and Maemi. Recently, climate anomalies have caused more torrential rainfall and typhoons. In case of Jeju Island in Republic of Korea, sea-level increased as much as 22cm over the last 40 years. It also accounts for increased incidence of extreme weather events such as hot days, floods and droughts.

Mongolia has had, since 2005, 84 floods and heavy rainfalls and USD1436.5 thousand in property loss.

The challenge for NEA is to limit the magnitude and rate of human-induced climate change, by transitioning to a low-carbon economy and reduce the vulnerability of socio-economic sectors, ecological systems and human health to current climate variability and projected changes in climate by integrating climate concerns into sectoral and national economic planning. Adaptation to climate change is an issue to be dealt with by all NEA countries. However, development of adaptation measures is urgently required in sub-regions with demonstrated need. Japan is currently looking into how the country should implement adaptation measures to climate change especially in the field of water-related disasters such as floods, sediment-related disasters, storm surges and droughts. The Republic of Korea comes to establish that all government ministries work together to develop a national plan for both mitigation and adaptation, as well as ensuring strong public support through outreach and

communications and close collaboration with the private sector. In implementing adaptation measures, scientific knowledge is essential to prevent mal-adaptation.

All NEA countries should develop indicators for research and monitoring to understand the impacts of climate change, as the basis for undertaking a national risk assessment. Such analyses will allow the development and implementation of adaptation policies and practices that decrease the vulnerability of NEA countries to current climate variability as well as projected changes in climate. It is crucial to increase human resources management and financial support for adaptation measures. In this regard, it is important to initiate a Climate Change Committee and Adaptation Fund to NEA countries similar to the Japanese initiative for climate change adaptation, called "Cool Earth Partnership", as soon as possible.

2. Drinking Water and Sanitation

In 2005, 60% of the population in Mongolia still lacked access to safe drinking water and sanitation causing health risks and unequal opportunities for an acceptable quality of life. In order to diminish the above mentioned unequal situation of water supply among different dwellers, the national government has committed itself to reduce the number of people lacking access to safe drinking water by 50% by 2015 (MDG number 7) with reference to the situation in the year 2000. A strategy was developed by the Government of Mongolia, assisted by UNDP, which describes the action plan to improve the water supply service level, i.e. establish a shift in the ratio of the population served by springs (protected/unprotected), wells, water kiosk/unit or house connections. Together, targets were set for sewage and sanitation provisions.

Japan continues to contribute significantly to the improvement of the water and sanitation situation of developing countries worldwide. Japan has been the top donor in the water and sanitation sector since 1990, and Japanese assistance in this sector represents approximately 37% of total bilateral assistance, from 2001 to 2005. Following up on the Hashimoto Action Plan's recommendation to focus on water operators, JICA has developed technical cooperation programs to comprehensively strengthen the capacity of individuals (engineers) and organizations (water operators). JBIC's response to the Financing Objective 2 of the Hashimoto Action Plan, has centered on incorporating capacity development of water operators (especially governance improvement) into most of the JBIC-financed water projects, as well as; collaborating with USAID under the US-Japan Clean Water Initiative to channel private sector funds for water and sanitation projects through Japanese ODA loans and USAID Guarantee. JBIC's contribution to the MDG target on Water (2003-2007) has funded 25 projects enabling 15 million people to be newly connected to the public water supply service. And JBIC's contributions to the MDG target on sanitation have funded

40 projects (2003-2007), serving 22.5 million people with new connections to the public sewerage service.

3. Water Disputes

Considering various references on water issues such as the access to water, safe drinking water, water use rights and facilities construction, it was researched that the number of disputes at the each level steadily. It happens at the international level basically steady, but at the same time the disputes and conflicts over water are getting a serious issue at national level. In NEA region, according to the Ministry of Water Resources of China, the number of disputes during the period from 1990 to 2002 reached an average number of some 8,000 per year and has reached some 12,000 in 2006.³¹

In fact, disputes on water are more significant and severe in counties which are sharing and managing trans-boundary basins, but in case of NEA region each county has their own challenges on water conflicts. In NEA, specific reasons and causes, especially Mongolia, in water disputes can be described as below.

- a) Disputes relevant to construction of water infrastructures (China & Mongolia)
Dam construction projects often became victims of environmental opposition in the new paradigm. The cases were basically struggles between water development coalitions and environmental protection coalitions on regional water disputes.
- b) Disputes on establishing the river basin council (Mongolia)
According to the law on water, river basin council of the river which runs through the 3 provinces, shall be established with discussion of citizens representatives meeting of the provinces. And it is articulated that the council shall consist of 15 persons such as the director, secretary, members. In this case, there are a number of debates – arguing between the citizen representatives of the other provinces on the establishment of the council, interest in being the council member from their own province, electing the director and secretary from their own province, are rising.
- c) Disputes with land ownership and gravel extraction on the water source protection area (Mongolia)
It is articulated in the constitution of Mongolia that any industrial, service complexes can not be constructed on the drinking water sources. But Korean invested company “Tuul River Countryside” was given the land permission to construct the golf field in the “Khaduur bulan” site where concern for the drinking water source of the Ulaanbaatar city or Gachuurt territory of Bayanzurkh district, has been encountered with

resistance from the national movement “protecting the Tuul river” and local citizens. However, there were three court sessions to dispute and the argument has not yet been resolved.

Also, over 100 tourist companies were given the land permission to carry out the tourist activities around the Mongolian biggest lake Khuvsgul, which is also encountering resistance from local residents. For the last years, construction industries have been increasing moderately due to the government programme “Apartment of 40,000 families”. In connection with this, usage of the construction material industries and gravel, sediment, is increasing too. Most construction companies in Ulaanbaatar city are taking their needs from Tuul River channel and this process is influencing negatively. Although the joint working group from Water Authority, State Professional Inspection Agency, NGOs and Civil Movement carried out the inspections regularly, the working group activities are unsuccessful.

4. Water for Food (Food Security)

Presently, many countries in the world are facing food shortages. Food security is closely linked with the national economic development and social stability of NEA countries.

In China, with the urbanization and industrialization, growing population and raising living standards, food demands are also increasing. The food production is increasingly limited by the declining farming lands, water resources shortage and climate change. In July 2008 in China, the State Council approved the Medium and Long-Term Planning Outlines on National Food Security in which it is stated that the rate of food self-sufficiency will be 95% and the food production will be 500 billion kg by 2010 and 540 billion kg by 2020. By 2010, the irrigation water use coefficient in China will be raised to 0.5 to ensure that the objective of sustainable development of the society and economy is guaranteed by the sustainable utilization of water resources while securing the agricultural water demand. There will be an additional irrigated area of 2 million hectares, bringing the total area to 58.6 million hectares, 50% of which meeting the requirement of the water-saving irrigation with high efficient water uses.

³¹ It is extracted from the background note for NEA sub-regional consultation for the 5th World Water Forum by UNESCAP for the NEA sub-regional meeting on 27th September 2008 in Beijing

For a long time, the main industry in the Republic of Korea has depended on agriculture, so the largest volume of water resources in Korea is used for the agriculture and food production. In fact, still 47 % (app. 16 billion tons) of the total volume of water resources is used for agriculture. Actually, the challenge of food security has not been a main issue for water in Korea. However, today food security is raising as one of the concerns. Exporting countries have stressed that Korean farm policy imposes high food costs on consumers and increases the cost of labor for its manufacturing sector. By artificially maintaining resources in agriculture, Korean agricultural policy allegedly slows the growth rate of the entire domestic economy. Other World Trade Organization (WTO) member countries complain that Korea, while benefiting from global manufacturing export opportunities, imposes considerable obstacles to other countries' exports of food products. Today, Korea is focusing on raising the rate of food self-sufficiency and at the same time considering the concept of "Virtual Water (VW)" which is newly adopted as the alternative to dealing with food security in regard to water. The theory of VW is still developing, based on various case studies. Basically a range of the conceptual idea of VW is not limited as only the agriculture, but most of the case studies are based on food products such as crops, fruit and meat. It combines production and water use, and shows statistical figures on how much water volume is used through trade.

Due to the limitation of lands and water resources in Japan, the country is importing food significantly. Therefore Japan, also, is interested in figuring out how much water is used for producing food by Japan itself and how effective it is for Japan to import food from other countries.

Fortunately, countries in NEA are not struggling severely due to food security at this moment. However, we are recognizing the importance of food security and prepare how to deal with this issue and how to use water effectively for food self-sufficiency in the future.

Major Changes after the 4th World Water Forum

a) China

First, the principles and purposes of the integrated water resources management were set up. With the purpose of remaining the harmony between human and nature, the Central Government coordinated the relationship among water imploration, water use, water governance, water distribution, water saving and protection of the water resources. There was a comprehensive arrangement for water development in river basins, river basin districts, urban and rural areas so that the eco-social development could be

in tune with carrying capacity of water resources and water environment. As a consequence, water would fill the satisfaction of contemporary generation but still service the development of offspring.

Second, the systems of the water resources management have been built up. In accordance with China's Water Law, there has been initiated a set of water- related regulations and laws in order to combine the river basins management with the districts management under the guidance of the integrated water resources management system. Other significant systems pertinent to the water-drawing permit, the control of total quantity and the water function zoning have been taken into place. The flood control plan of seven river basins and the State master plan of water resources management have been developed and consequentially revised for the advance of water right systems.

Third, the building of water saving society has been vigorously promoted. The Chinese Government mobilized the strategy of building water saving society as the prime measure against water scarcity problem. As the result of water saving measure, the water efficiency of irrigation system increased up to 0.45 and the water consumption of an industrial added value of RMB 10,000 dropped down to 169 m³, which would expect up to 0.5 and down to 115 m³ below respectively by 2010.

Fourth, the water resources protection and water environment governance have been strengthened. The system of water function zoning could appraise the pollution treatment capacity of river basins and tributary areas; enhance the protection of urban probable water resources and the governance of areas with groundwater over exploited; and conduct the protection and restoration of river ecosystem. The Central Government, at the moment of revising the comprehensive river planning, has formulated the river control indicators for the health of river and ecosystem.

b) Japan

Since the 4th World Water Forum, Japan has continued to exert significant leadership in tackling water resource issues, both domestically as well as in the international arena. In a string of momentous events, Japan's political leadership has repeatedly reiterated its commitment to water. The year 2008 alone saw Japan put water and sanitation on the agenda of the TICAD IV held in Yokohama, and of the G8 Hokkaido Toyako Summit. Japan also hosted the 1st APWS under the leadership of former Prime Minister, Mr. Yoshiro Mori, and the 10th United Nations Secretary General's Advisory Board on Water and Sanitation (UNSGAB) meeting, with the participation of His Imperial Highness The Crown Prince of Japan in his capacity as Honorary President of UNSGAB. The 1st APWS, attended by 10 heads of state and

government and 32 minister level participants, highlighted the significance of the political commitment in solving regional water issues focusing on its theme “Water Security: Leadership and Commitment”. Following the 1st APWS, Japan sent teams to Tuvalu to look into their water problems, particularly in terms of adaptation to climate change projects.

c) Mongolia

The necessity for elaborating management for rational use of water resources and the protection of the resources became one of the biggest concerns for the Government since 2006. It has resulted in the Law of Water and other formal legislative acts. Their implementation became a vital goal of the water sector. Integrated water resources management can contribute to remedying Mongolia’s growing water problems. As Mongolia is located in the most desiccated part of the Asian and Pacific region, it is an important strategic objective to use the water resources responsibly, protect them and safeguard the ecological balance.

The government has planned to conduct both a pre-feasibility assessment of the technical and economic justification for establishing a water reservoir in the Tuul River to enhance the water supply in Ulaanbaatar and groundwater exploratory research for the domestic and drinking water supply in Kharkhorin city (the central city of Khangai region). Both studies will be financed by the state budget in 2007-2008.

New provisions are mentioned in the law of water, which was adopted in 2004. They include the establishment of large river basin councils in order to enhance the participation of local herders in the water management of the area, the development of a management plan to procure adequate use of water resources and their protection, and the restoration of the environment.

The steppe and Gobi regions, which together represent about 70 percent of the country’s total territory, lack a surface water resources and the demand for water in those areas is mostly supplied from ground water. In addition, as these regions are part of continental saline zones, a high percentage of minerals and hard content in the water makes it less suitable for consumption. The South and Southern Gobi regions are also focus of serious interest in the development of mining prospects that could provide much needed economic boost for the region and the country if they are developed correctly. These projects will need large amount of water. In this case there are 2 big projects on Water transmission pipeline on long distance and its application for Gobi and Steppe regions of Mongolia: “Herlen-Govi” and “Orkhon-Govi” project.

The objective of these projects is to divert water from the Herlen and Orkhon Rivers and supply it to the Southern Gobi regions by means of a pipeline network. The project will provide water of high quality for potable use, not only to major population centers, but also to small users along the pipeline route. Water will be made available for agricultural users including livestock and farming. There will be sufficient quantity of water to support mining developments that will provide employment and needed revenue for Mongolia.

d) Republic of Korea

The sustainable development and management of water resources in Korea are still given on the securing plentiful and clean water resources to meet the future demand. 12 medium and small-scale multipurpose dams are in the process to construct for meeting the water deficit issues and frequent flood issues. More emphasis is given on the construction of environment friendly dams and promoting the welfare and incomes of residents in the surrounding areas of dams. The law for supporting the areas surrounding dams was enacted in 2001 and changed priorities of considerations on dam designing and construction. Integrated agriculture and rural water development and management measures should be strengthened for efficient irrigation water use.

Additionally, since the 4th World Water Forum, Korea recognized again how important it is to cooperate closely and continuously with other countries in water sectors. Especially, the Ministry of Land, Transport and Maritime Affairs(MLTM) as a governmental agency and Korea Water Forum as a non-profit organization and the sub-regional coordinator of NEA are working together to build structural/ non-structural network and contribute to global water communities to solve water-related challenges and problems.

Progress on Political Commitments

a) China

In the year of 2000, there were 0.379 billion rural population having no access to safe drinking water. From 2001 to 2007, the total investment of 46.7 billion RMB were made of which the Central Government put 24 billion and the local governments financed and provided supports totaling 22.7 billion. Thus, the problem of drinking water supply and water insecurity for 128 million people had been tackled and the history of serious drinking water shortage in China’s rural areas comes to an end.

In July, 2008, the State Council approved the Medium and Long-Term Planning Outlines on national Food Security in which it is stated that the rate of food self-sufficiency will be 95% and the

food production being 500 billion kg by 2010 and 540 billion kg by 2020.

The development of Chinese water infrastructure achieved a tremendous headway since 1998 and the water-related reform and management also met their effective outcomes. The national investment on water infrastructure totaled 700 billion RMB among which on central water projects occupied around 315 billion RMB. The investment accomplished the rehabilitation of dykes on middle and downstream of the Yangtze River; approximately all 19 major projects of Huai River; the first stage of the middle and eastern route of South-to-North Water Diversion Project (SNWDP). With these efforts, the key water control projects could give their full play, such as Three Gorges project; the measures on rural safe drinking and the reconstruction of damaged dams were implemented; the governance and protection projects for ecosystem of Tarim River, Black River, Shiyang River and water resources in Beijing harvested golden fruits; and capacity buildings for hydrologic and water monitoring, supervision of water policies, water informatization were strengthened; the working condition of water sectors at the basic level saw obvious improvement.

b) Japan

The Water Security Council of Japan (WSCJ) was established on January 30, 2009. Thirty eight leaders from politics, business and academia got together as members of the governing council in response to the call by Mr. Yoshiro Mori, former Prime Minister; Mr. Fujio Mitarai, Chairman of the Federation of Economic Organizations (Keidanren); and Mr. Norihito Tambo, emeritus professor at Hokkaido University. WSCJ is an organization established under the banners of government leadership, public participation, and full cooperation between public and private sectors. It intends to assist the activities of "Team Water Japan", through which private companies, academic experts, ministries, local governments will collaborate beyond sectoral boundaries for the resolution of global water issues. The Japan Water Forum will enhance the functions of the secretariat of the WSCJ.

c) Mongolia

According to the Law on Water which was adopted in 2004, a governmental organization has been established which is responsible for water affairs, named the Water Authority, under the scope of work of the member of Government who is in charge of Environmental issues (i.e. minister of Nature and Environment). Integrated water resources management should be a cornerstone of the government's national policy to safeguard the ecological balance and to manage water resources adequately with respect to scarcity. Because of this, the Mongolian government has started to pay attention to strengthening legislation and the

organizational structure of the water sector. In accordance with its responsibility, laws on water and on use of mineral spring resources were amended and approved by the parliament.

Legal acts were developed and carried out including rules for River Basin Councils, for water information databases and for elaborating the national water cadastre and water censuses. This became the beginning of the implementation of water resources management to support sustainable socio-economic development in the country.

The objectives for water resources management are reflected in the government action program. The implementation includes increasing investments in the water sector, strengthening water policy renewal, increasing surface water use, establishing large reservoirs and encouraging groundwater exploratory research.

d) Republic of Korea

Since 4th World Water Forum in Mexico, Republic of Korea itself has developed in water sectors politically. Most of all, today Korean governmental agencies are concentrating on preventing and reducing water-related disasters such as floods, especially caused by climate change. Currently, Korean government amends National Water Resources Plan to adapt to climate change and strengthens national water security and firstly it will be covered by 2011. In addition, considering climate change impacts, Master Plan against Climate Change was established by major ministries and agencies dealing with water in Korea. And also, Environmental Impact Assessment has been constructed by Maritime affairs and a scenario is developed when the sea-level rises, sea temperature rises, acidification, extreme typhoon happens. Then it will be shown by 2010. Moreover, it is implemented to strengthen Disaster Impact Assessment and Preparation against water-related disasters.

Korea had established "Comprehensive River Basin Basis Plan" with regard to 12 major rivers by 2008 and it already was completed, so major rivers in Korea were re-born newly considering irrigation, eco-friendly environment, floods and water-related disasters prevention. Also, stable water supply system has established and its main purpose is to overcome extreme droughts or emergencies. It is still developing and will be completed by 2011. Dams has been developed and improved to extend their operation capability from the standard at current 1,000 years' frequent flood to the standard by Probable Maximum precipitation by 2015.

Way Forward

Using outcomes and discussions of the Northeast Asian Sub-regional Preparatory Meeting for the 5th World Water Forum on 27th September 2008, in Beijing, China, and on the occasion of the 39th WMO/UNESCAP Typhoon Committee, NEA countries could share various information on water challenges which we are facing as well as common issues which can be dealt with together through close cooperation.

Water management to adapt to climate change should be a cornerstone of the NEA countries' national policy and through consolidated efforts towards effective implementation of the climate change adaptation program nationally, regionally and internationally through the creation of an appropriate enabling environment, institutional arrangements and management instruments. It is important to develop respective national water policy implementation frameworks for climate change, through a systematic review of the existing water management institutional structures and processes so as to incorporate explicitly the participation of all stakeholders. Priority areas and mechanisms of sub-regional and regional cooperation for more wise and reasonable adaptation in water issues can be classified as follows:

Priority areas of sub-regional and regional cooperation

a) Technical Cooperation:

(i) the establishment of systematic observation on climate, (ii) the efficient water conservation methods, such as sprinkler irrigation and drip irrigation; the saving and recycling methods of industrial water (iii) the treatment of industrial wastewater and domestic sewage; the domestic water conservation technologies (iv) flood control methods, and (v) the observatory and warning technologies for flood, drought, sea level rise, agricultural disaster and so forth.

b) Human Resources Development:

(i) the strengthening of the capacity building by means of staff training, international exchanges, discipline development and special skills training around the fundamental study on climate change (ii) the analysis of water policies; the warning systems, information system and clean and green technologies

c) The Improvement of Public Awareness:

(i) the formulation of midterm and long-term plans and

policies for raising the public awareness of climate change (ii) the establishment of professional educational networks and institutions in line with international practices, (iii) the disseminative campaigns towards stakeholders in different backgrounds at all levels, (iv) the publicity and popularization of water knowledge; the guidance for the public in changing their consumption pattern towards the water resources protection

d) Information system :

(i) the setting up of a platform for sharing the information on climate change and water resources based upon the IT application, (ii) developing the systems of public welfare information services and that of industrialization information services as well as the cooperation and exchanges of international information.

Mechanism to enhance effectiveness of regional cooperation

a) Technical cooperation mechanism:

It is necessary to set up the effective technical cooperation mechanisms to advance the research, application and transfer of the climate change technologies; to remove all barriers existed in policies, systems, procedure, funds and protection of intellectual property rights as the encouraging measures for the success of technical cooperation and transfer in practices; and set up funding systems for regional technical cooperation so that all countries can afford and access leading-edge and environmentally-friendly technologies

b) Personnel exchange mechanism:

As the cornerstone of cooperation, it is important to build up long-term and institutional personnel exchange mechanisms at different levels in various circles.

c) Information circular mechanism: the mechanism of regular information circulation within all partner countries of the region must be set up so as to jointly formulate the indicators, range, context and frequency of information circulation.

To discuss how to establish collaborative platform, including the cooperation between governments and between non-governmental organizations, to identify the areas and scope of cooperation, to start discussions on the draft of the cooperation mechanisms, priority actions to be carried out in connection with the 5th World Water Forum and the 2nd APWS.

South Asia

Introduction

South Asia is highly populous, poverty stricken and handicapped by natural disasters. It is home to nearly 1.5 billion people. It has the highest population density but the lowest urbanisation rate in the world. The economy of South Asia is highly dependent on agriculture. More than 80 per cent of water withdrawn is used for agriculture. The region presents a range of contrasts in topography and terrain, climate and weather, land and water availability, population densities, demographic trends and in resource availability and use. The countries of South Asia, except for Sri Lanka and Maldives, lie within the large river systems of the world – the Ganges, the Brahmaputra, the Meghna, the Indus and the Irrawaddy which are transboundary in nature. These river systems support the agriculture-based livelihoods of about 650 million people. Every year, the South Asia region faces recurrent floods, droughts, flash floods associated with landslides, river erosion and glacial Lake Outburst Floods (GLOF). The region being located in the coastal belt (surrounded by the Indian Ocean, the Bay of Bengal and the Arabian Sea) is handicapped by cyclones, storms and tidal surges, tornadoes, typhoons and is vulnerable to climate change. Again being located in a seismic belt, the region faces disasters like earthquakes and earthquake induced floods and experiences changes of river courses.

Over 40% world's poor live in South Asia. About 35% of the population (over 515 million) lives in absolute poverty well below the \$1 a day level and about 75% below \$2 a day, due to underdeveloped agriculture, unplanned urbanisation and inadequately regulated industrialization. It leads to drastic economic and social consequences and imperceptible long-term environmental degradation. The population of the region is increasing steadily and unless the current development trends are changed, poverty will become even more pervasive. Despite the poor socioeconomic status, the region is endowed with considerable natural resources that could be used to foster sustainable economic development in the region and water could be successfully used as the engine to promote this economic development.

The available water in the three major rivers (Ganges, Brahmaputra and Meghna) during the rainy season is approximately 200000 m³/sec whereas the flow during dry season is only about 6000 m³/sec. These river systems are not only rich in land and water resources but also rich in ancient civilizations on fertile agricultural flood plains. About 10% of the world's population (over half a billion) lives in the river of the Ganges and the Brahmaputra basins. Sustainable and integrated water

resources management is a challenge for the region with 'too much water' in rainy season and 'too little water' in dry season. The world's largest mangrove forest 'The Sundarban' (Heritage) with rich aquatic and terrestrial biodiversity is situated in the southern extremity of the Ganges river which provides a good support of lives and livelihoods of many people in the region. The Greater Himalayas known as the 'Water Tower of Asia' (17% of global mountain area) lies in Nepal in South Asia. Unfortunately the optimum development and management of these vast natural resources for national and regional benefits has been obscured by political boundaries, perceptual differences and a legacy of mistrust. The countries had little experience of basin wide water resources management for regional cooperation on flood and drought management, hydropower generation and navigation.

Major Challenges: and Actions

Major Challenges:

Water-related Disasters and Risk Management: The first and foremost challenge in South Asia is the vulnerability to water-related disasters. This causes huge loss of life and property estimated loss ranges from 2-20%, and revenue loss between 12-66%, and it hinders sustainable development for poverty reduction by eroding hard earned gains of development. Bangladesh situated furthest downstream of three mighty river (Ganges, Brahmaputra and Meghna) systems in the region bears the brunt of the floods. About 60% of the country is flood prone while 20% of the land area is inundated during the monsoon season even in a normal year. Cooperative flood management and improved early forecasting and warning for disasters is one of the core challenges in South Asia, specially in eastern India and Bangladesh in the Ganges, Brahmaputra and Meghna river basins. The Catastrophic floods in Bangladesh in 1988 and 1998 inundated more than 60% of the country's land area and caused damages to the people and economy worth about US\$ 10 billion. In a ten year period, from 1991 to 2000, a total of 2,16,150 people died in 181 water-induced disasters in Bangladesh and 1,24,069 people died in India in 345 disasters (World Disaster Report-2001). Disasters caused an annual economic loss of around US\$ 2 billion in India between 1985-1995. In between 1983-2002, 6466 lives were lost in Nepal due to floods and landslides.

Glacial Lake Outburst Floods (GLOF) are very common in Nepal and Bhutan. The past record shows that at least one GLOF event happens at an interval of 3 to 10 years in the Himalayan Hindukush region. The GLOF creates catastrophic effects and pose a severe hazard to mountain communities. In the wake of global warming/ climate change phenomena the glacial lakes

formed at the glacier tongue are growing and many new glacial lakes had formed in consequence of the glacier retreat in the Himalayas. The growing glacial lakes which are dammed by the loose moraine ultimately have to breach out with the catastrophic effect to the downstream valley. GLOF of 11 July 1981 from the Zhangzangbo Glacial Lake in China had damaging effects down to 50 km, which destroyed three concrete bridges (one inside China, one inside Nepal and one at the Nepal-China boarder) and a long section of Nepal-China Highway, which cost US\$ 3 million to rebuild. The GLOF events from Lunana area of north western Bhutan have damaged the Punakha Dzong in 1957, 1969 and 1994. The GLOF of October 1994 event in Bhutan was triggered by a partial breaching of Luggye Tsho Glacial Lake. GLOF event of 4 August 1985 from Dig Tsho (Langmoche) Glacial Lake destroyed the nearly completed Namche Small Hydropower Plant of estimated cost of US\$1.5 million, 14 bridges, cultivated lands, etc. There are five GLOF events recorded in Nepal from 1977 to 1998 and some other evidences of the past events from the study of satellite images. Six GLOF events were (1935 - 1981) reported in China and damages occurred inside Nepal as well. The global warming and climate variability will increase the frequency of such GLOF in coming years.

Cyclones are most deadly when crossing the coastal areas of Andhra Pradesh, Orissa, West Bengal of India and Bangladesh mainly because of serious storm surge problems in the area. 1991 cyclone in Bangladesh caused 138,000 human deaths and property losses worth US \$ 1.78 billion and 1970 cyclone caused 500,000 deaths. India and SriLanka were seriously affected in Asia by the 2004 Tsunami. SriLanka's Government has estimated reconstruction cost at nearly US\$ 3 billion. It was the deadliest natural disaster in the history of Sri Lanka and India.

Migration is another problem which is often triggered by water-related disasters like floods, droughts, river bank erosion, cyclones and slides as well as human activities like dam construction and mining. The indigenous and vulnerable people, especially women, become most affected. They have to loose or leave their hearth and homes and end up in refugee camps and other places such as urban slums without proper access to water.

Climate Variability and Change : The region is most vulnerable to climate change according to the 4th IPCC report and it will hit the water resources most. The report predicts that in South Asia, monsoon rainfall will be higher, resulting in increased flows in the rivers (the Ganges, the Brahmaputra and the Meghna river basins) which flow into Bangladesh from India, Nepal, Bhutan and China. These flows are likely to further increase in the medium term due to the melting of the Himalayan glaciers. It also forecasts that global warming will result in sea level rises

of between 0.18 and 0.79 metres, which could increase coastal flooding and saline water intrusion into aquifers and rivers across a wide belt of the seas, although parts of the area are already protected by polders. More recent scientific research indicates that sea level rise could be over 1.50 metres by the end of the century. Rainfall is predicted to become both higher and more erratic, and the frequency and intensity of droughts are likely to increase. Bangladesh is widely recognised to be one of the most climate vulnerable countries in the world. As a result of these changes, climate change could hamper the achievement of many of the Millennium Development Goals (MDGs), including those on poverty eradication, child mortality, malaria, and other diseases, and environmental sustainability. The 2008 Global Monitoring Report stresses the link between environment and development and calls for urgent action on climate change. It argues that environmental sustainability underpins progress on other MDGs. If forests are lost, soils degraded, and water and air polluted, and greenhouse gas emissions not combated, achievements in poverty reduction and human development will not be sustainable.

Sharing and management of transboundary river waters: Though there is abundant water in the region during rainy season (from Jul to Oct), the region faces serious scarcity of water during dry season from Nov to May due to low flow in the rivers and non-occurrence of rainfall. Having no reservoir facilities to store water during rainy season, a flat country situated at the extreme downstream of the three rivers near the sea pose serious scarcity of water during dry season. Cooperative management and sharing of the common water resources of the three river basins among the riparian countries is essential to overcome the crisis of water during dry season, monsoon flood problems and improve navigation in the region. Again there is huge potential of hydropower development in the region from water conservation under such regional cooperation. Despite all these potentials only bilateral cooperation exists between i) Nepal and India, ii) Nepal and Bangladesh and iii) between India and Bangladesh for transmission of flood related data, which needs to be strengthened further. More reliable forecasts with additional lead time would be possible if real time and daily forecast level transmissions from additional upstream points of the three rivers could be achieved.

Access to water and sanitation: About 235 million people out of 1.5 billion in South Asia are without access to safe drinking water and 938 million without access to basic sanitation. Over 778 million people still practise open defecation. The population in South Asia is projected to grow upto 1.8 billion by 2015 and 2.12 billion by 2025. If business remains as usual, the achievements of MDGs would be in jeopardy. Some 27% of people in South Asia live without food while 50% of the children under 5 years are malnourished. Reliable water supply not only for sustenance

but also for subsistence agriculture, fisheries environment is needed for the millions of poor. Access to basic water supply and sanitation is a key factor in reducing gender disparities in primary and secondary education that have multiple spin-off for girls and women. Both urban and rural areas received much less attention in terms of coverage of sanitation compared to provision of drinking water supplies. Poor sanitation leads to degraded environment, poor health and quality of life, increased malnutrition, debility, death and poverty. The women and children particularly in urban slums are more susceptible to unhygienic conditions resulting from poor sanitation.

Water Pollution: Control of water pollution in water bodies is a big challenge due to increasing urbanisation, industrialization and lack of environmental flow into the river bodies. Problems of mega cities - water supply, sanitation, sewage treatment, urban drainage, solid waste management and urban slums - are expected to become more severe. Restoring and sustaining the health of the environment, ecology and biodiversity has become another challenge. There has been so much degradation and progressive deterioration that the process needs to be stopped first and then reversed.

Ground water depletion and arsenic contamination: Ground water (GW) depletion is another major problem in South Asia. The region has been very much dependant on ground water. More than 80% water for agriculture and over 85% for water supply is withdrawn from ground water in countries like Bangladesh. Again the demand for water is increasing with time, due to increase in population and industrialization and the rate of GW recharge is decreasing with increase in pavement area due to rapid urbanization. The prediction for the future shows that the GW level in the central part of Dhaka city in Bangladesh will decrease to (-) 90 m from the reference level, in the year 2020. At present, the water table is falling at a rate of about 2-3 m/yr and hence, the ground water aquifer is vulnerable to drying of the wells, contamination of water and possible land subsidence. Among others, the depletion of ground water table is threatening agricultural development that is the main source of GDP in the region. The ground water in the South Asia particularly Bangladesh is contaminated by arsenic and this is posing as a major public health disaster in Bangladesh. Bangladesh is seriously affected by arsenic in ground water. 61 out of 64 districts of Bangladesh are affected by arsenic and it has reduced countries water supply from 99% to 74%. Over 40 million people are at risk in the region to arsenicosis. Estimated cancer fatalities over 50 years in Bangladesh are 136000. Unless combated urgently, arsenic poisoning of ground water in Bangladesh would become a weapon of mass destruction.

Demand-Driven Approaches to Groundwater Depletion

A UN FAO and NGO BIRDS partnership is implementing the Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) Project based on the key premise that behavioral change can lead to voluntary self regulation. In seven drought prone districts of Andhra Pradesh, India, thousands of farmers residing in 638 habitations spread over several hundred kilometres have voluntarily taken a number of steps to reduce groundwater pumping. Implemented in 2003, the project has been empowering users through knowledge and by demystifying science, monitoring, organizing users into pressure groups, building a coalition of civil society and NGOs to support user communities, providing the technical tools, and gender mainstreaming.

Among the numerous results yielded, the project is showing that the demystification of the approach to groundwater resource management is an empowering tool for users and that community decision making tools and gender mainstreaming contribute to the sustainability of the intervention. This project demonstrates an alternative model to the supply side approach of groundwater management for creating new structures.

Source: FAO

Farmer Facilitators: facilitators are better trained and build-up fast the pool of farmer facilitators.

Water Governance: The region is plagued with a plethora of institutions and legislations with overlapping and conflicting mandates relating to water resources management. This has resulted in confusion and conflicts among water users and managers leading to inefficiency and inertia. Present water resources management systems that are largely sector-based, centralized and state driven fail largely to meet the needs and rising aspirations of the public for whom water use should be a decentralized and integrated function. Achieving IWRM is a challenge for the region. Creating awareness and capacity building in the water sector is essential for good governance and sustainable water management.

Water Financing: The last challenge is Water Financing. Only to achieve MDGs for Water Supply and Sanitation regardless of other sector MDGs, the region need to show progress 2.2% / yr for water supply and 4.5% /yr for Sanitation. The investment required would be US\$ 6.6 billion/yr. The current investment is only US\$ 1.54 billion/yr. So investment should be increased in the sector of water supply, sanitation and integrated water resources management.

Actions and progress on political commitments:

The Countries have adopted their own Strategies for Disaster Risk Reduction but the cooperation among South Asian countries for disaster risk reduction, has been very slow. Bilaterally countries have been cooperating with each other but regional cooperation has advanced at a very slow pace. There is lack of more comprehensive regional policy for disaster management in South Asia. After 4th World Water Forum, regional platform on disaster risk reduction and establishment of SAARC Disaster Management Center in New Delhi is notable. SAARC Comprehensive Framework on Disaster Management was formulated in 2007. ICIMOD, Nepal is trying to promote regional cooperation for timely sharing of hydro-meteorological data and information for flood management. The Dhaka Declaration of Fourth South Asia Water Forum (SAWAF) and many dialogues and conferences on transboundary water management give direction on institutional requirements (formation of separate river basin organisations on major transboundary rivers like that of Mekong River Commission) in the region and Kathmandu Declaration during First SAWAF in 2002 provides direction for hydropower development and its pricing for regional development of sustainable water resources management. The Second SAWAF held in Islamabad focused on ground water regulation and combined use of surface and ground water. It is widely accepted and understood that basin wide river management can solve water problems and conflicts and it should be a long term development strategy in the region. The judicial and integrated management of water resources in the transboundary river basins in South Asia with regional cooperation is of utmost importance for social and economic development in the region and water can be the engine for such development including generation of hydropower which can meet huge energy demand of the region and provide navigation. It also can save the World Heritage site 'The Sundarbans' in the region which, is under threat due to salinity intrusion and scarcity of freshwater from climate change impacts. Such cooperation can save millions of poor people numbering over 650 million who suffer the most from the consequences of both unsustainable development activities and natural disasters. GWP South Asia has been engaged in sensitizing people across the borders in the region to find a peaceful solution for regional cooperation on transboundary water management especially on the rivers of the Ganges and the Brahmaputra. The access to reliable and adequate data on water disasters and hydro-meteorological parameters has been discussed for long and currently some regional institutions like ICIMOD, SAARC Disaster Management Center and Abu Dhabi Knowledge Forum initiated by the World Bank have taken initiatives to develop web-based data so that everybody could have access to those.

Many countries in South Asia have adopted an National Adaptation Plan of Action (NAPA) to adapt to climate change impacts and also developed country strategies and action plans. The national governments are also in process of incorporating climate change impacts into their national development and integrated water resources management plans. The institutional reforms in water sector also have taken place. GWP-South Asia has been implementing a regional programme on Regional Co-operation for Flood Disaster Management in the Ganges and the Brahmaputra River Basins involving India, Nepal and Bangladesh. The programme is to assess institutional capabilities and required support for cooperative early warning and flood forecasting in the two major river basins and approach the donors to fulfill the institutional gaps. It also has undertaken a programme on Coping with Climate Variability and change through partnership and capacity building involving India, Nepal, Bangladesh, Pakistan, Bhutan, Sri Lanka.

A political commitment among the countries of South Asia now exists to accelerate the progress of sanitation and hygiene practices in the region in fulfilment of the MDGs (declaration of the World Summit on Sustainable Development and the 3rd World Water Forum). The SACOSAN (South Asia Conference on Sanitation) in this respect as initiated by the Government of Bangladesh was held in Dhaka in 2003 and it has now been a biannual regional event. The Second was held in Pakistan in 2006 and the third in New Delhi, India in 2008. An official declaration was given in the third SACOSAN conference in India by the Indian Prime Minister Manmohan Singh that "Good sanitation should be the birthright of every citizen in South Asia". The Water Utility Network –South Asia (SAWUN) has been established with the initiative of Asian Development Bank and Global Water Partnership in South Asia to improve delivery of water services and promote knowledge exchange and performance efficiencies in water supply sector. The World Bank also has been engaged in improvement of performances of water utilities at national level. There are many actors responsible for and committed to achieving the MDG targets and poverty reduction goals in South Asia. The national governments, political systems and development agencies play a major role; increasingly local government bodies are asserting a new role with strong links to communities and civil societies to achieve MDGs. Public-Private Partnerships even though they are not formalised or in process of formalisation are also increasing. The countries have prepared their own Poverty Reduction Strategy Papers (PRSPs) and IWRM policies.

The Countries in South Asia have provided their efforts for improved water supply and they have given attention for conjunctive use of surface and ground water. The Government of Bangladesh has formulated a Policy for Arsenic Mitigation in Bangladesh and its implementation plan recently.

GWP-South Asia over the past ten years has positioned itself at country and local or basin level to collaborate with all stakeholders to establish platforms and forums for dialogues and actions to implement IWRM and promote water efficiency. The NARBO (Network for Asian River Basin Organisations) which was set up after 3rd World Water Forum has played an important role to enhance capacity for IWRM, ensure sustainable use of water among all stakeholders, capacitate policy makers, professionals and practitioners on IWRM and share knowledge and information for effective implementation of IWRM and conflict resolution. Besides GWP-South Asia through its CWP platforms, CapNet and GWA have been engaged in building the capacity of water professionals, including women, for implementation of IWRM in South Asia.

The formation of Water Integrity Network (WIN) in 2006 is another initiative to stimulate appropriate activities in the water sector in the region. It has taken an initiative in South Asia to assess the corruptions in water sector in South Asia and support the water sector organisations and civil societies to maintain the integrity in the sector. A South Asia Workshop on Water and Integrity held in Dhaka in November 2007 issued the Dhaka declaration for joint efforts to combat corruption in the water sector in South Asia. The SAARC Agricultural Conference on Science-based Agricultural transformation towards alleviating hunger and poverty held in New Delhi in 2008 and South Asia Forum for Farmers are political commitments of the governments of South Asia to work towards sustainable agriculture with increased productivity in the agriculture sector. GWP-South Asia has initiated a programme to increase water productivity in the agriculture sector in Pakistan, Bhutan, India and Sri Lanka.

Major Changes:

Many countries have developed comprehensive disaster management strategies and frameworks for disasters risk reduction. The countries' initiative in managing disasters has reduced the death toll and donor's initiative in supporting the disasters (specially recent Tsunami, Sidr and earthquake) affected countries have helped the countries to adjust the sudden shocks in the economy sector.

Most of the countries in South Asia have now approved the IWRM and Water Efficiency Plan and many countries in South Asia, like Bangladesh, Sri Lanka, Pakistan, Nepal, are now undergoing the process of formulating national water codes to protect water bodies and implement IWRM. The sanitation situation has improved in many countries of South Asia after joint efforts and commitment in 2003. Some countries like Bangladesh, India, Sri Lanka have also given attention to promoting ecological sanitation. SAWUN

has contributed to improving the performance efficiency of water utilities in South Asia. The increased investment in the water sector (both public and private) and pro-growth policies of the governments have contributed to alleviating poverty in the region.

The World Bank's recent report shows that in South Asia, the percentage of those living below the \$1.25 poverty rate has decreased from 60 to 40 percent over 1981-2005, but the absolute number of desperately poor people did not decline; there are some 600 million in that category. In India, extremely uneven economic development reduced the poverty rate as a share of the total population from 60 percent in 1981 to 42 percent in 2005, but the number of the destitute increased from 420 million in 1981 to 455 million in 2005.

Literacy in women in South Asia is still low compared with that in men. South Asia lags behind other Asian sub-regions in terms of the share of women in non-agricultural paid employment. And even though South Asia has made progress in women's equal representation in parliament, it is far from parity. Similarly, in terms of progress against hunger, South Asia is not expected to meet targets because more than 300 million people are still racked by chronic hunger. Most of South Asia is self sufficient in grain production, but because of inefficient distribution and lack of access to resources the number of hungry people is increasing.

Way Forward

- Creating enabling environments with proper political will and both structural and non-structural measures are needed to solve regional water issues multilaterally and harness equal and common benefits among all riparian countries from available resources in the region.
- There is an opportunity for South Asian countries now to work together to solve Climate Change and develop a long-term regional strategy for effective management of climate.
- A greater regional voice and activism in global fora is needed to influence international action on climate change, including equitable cost sharing arrangements, and seeking better international funding for the climate change agenda in South Asia, and stronger participation in carbon trading and other related global facilities.
- Though South Asia has attracted global attention due to rapid GDP growth over the past 27 years, averaging nearly 6 percent per annum, it faces many challenges.

- South Asia will need greater international assistance and mobilization of regional and domestic resources to attain the MDG goals.

Southeast Asia

Introduction

Southeast Asia consists of the countries that are geographically south of China, east of India, and north of Australia. The region consists of two geographic zones: the Asian mainland, and island arcs and archipelagoes to the east and southeast. The mainland section consists of Cambodia, Lao PDR, Myanmar, Thailand, and Vietnam. The maritime section consists of Brunei, East Timor, Indonesia, Malaysia, the Philippines, and Singapore. Ten of the eleven countries, excluding East Timor, are united under the Association of Southeast Asian Nations (ASEAN), a regional alliance that promotes stability and economic growth in the region.

Basic water resources management issues in the region have been indicated jointly as the region had organized three Water Forums : in 2003 in Chiang Mai, Thailand, in 2005 in Bali, Indonesia and in 2007 in Kuala Lumpur, Malaysia. The next Water Forum will

be held in Cebu, Philippine in September 2009. Declarations and technical documents had been produced during the forums.

An overall assessment of water resources management situation had been reported by ASEAN in October 2005 : 'State of Water Resources Management in ASEAN'. This report was prepared based on rich data analyzed from questionnaires completed by member countries and from many other reports published by various development agencies operating in the region.

The initial data used in present report are mainly taken or derived from the above mentioned documents.

Main Challenges and Action

Statistics of average conditions in the region as presented in the following table show the relations between area, population and water resources are still good, however there are water issues the region is facing at national and local management level, especially those related to urbanization and industrialization.

Area, Population, and Annual Water of ASEAN countries

	Country	Area (Ha)	Population (x 1000 persons)	Internal renewable water (mcm/yr)	Total available internal water resources (mcm/yr)	DEMAND 2004		DEMAND 2025	
						mcm/yr	%	mcm/yr	%
1	Brunei DS	576,500	0.374	8,500	3,425	83	2.42	151	4.41
2	Cambodia	18,106,000	14.131	121,000	133,600	621	0.46	1,742	1.30
3	Indonesia	190,457,000	245.540	2,838,000	1,852,576	86,156	4.65	118,400	6.39
4	Lao PDR	23,680,000	5.758	190,000	308,000	5,700	1.85	na	-
5	Malaysia	32,975,000	25.671	580,000	630,000	11,622	1.84	14,504	2.30
6	Myanmar	67,658,000	54.745	881,000	901,000	28,233	3.13	785	0.09
7	Philippines	30,000,000	82.664	479,000	226,430	29,955	13.23	85,221	37.64
8	Singapore	66,700	4.588	600	890	447	74.50	664	110.67
9	Thailand	51,312,000	64.470	210,000	216,123	52,671	24.37	na	-
10	Viet Nam	33,169,000	82.222	367,000	335,000	66,316	19.80	100,257	29.93
	Total	447,995,500	579.773	5,675,100	4,606,754	281,804	6.12		

Source: ASEAN 2005, FAO, WRI, World Bank, GWP, Encarta 2007, PUB Singapore

Water issues the sub-region is facing and actions to address them

Demand-supply policy.

Whilst most of SEA countries do not have a physical scarcity of water, local seasonal scarcity does occur. This needs to be examined in more detail and the results be used as a basis for the planning of water supply strategies in the future.

Countries in the region are experiencing an internationally familiar urban scenario of localized water stress, coupled with an increasing inability of traditional water sharing systems to cope with growing demand, with the new users, and with competition between sectors and between individual users. The general solution is the introduction of government- managed water sharing system where water rights are formalized and better specified. This will raise a significant challenge for comprehensive regulations and good field management for water allocation operation which will be able to provide equity, sustainability and economic efficiency.

This effort has been started in some SEA countries and there is a real challenge on the development of principles and in the sharing of knowledge in this area.

Water Quality.

Most SEA countries are facing increasing evidence of surface as well as groundwater pollution. There is a strong challenge for strengthening of policy and institutional framework, improving compliance and enforcement capabilities, and developing public participation.

Several countries have developed water quality monitoring and classification systems. However it has been observed that statistically sound monitoring designs, sound long term data storage facilities and standardized reporting systems are lacking or do not exist. One main reason identified is because the water quality related activities are fragmented within institutional framework in most countries. This poses a significant challenge for a SEA cooperation for water quality management.

Water Data Issues.

Statistics on Southeast Asia water data reported by several agencies such as FAO, WRI, World Bank and ASEAN are differing to each other to some extent. The situation is quite common in the world and can usually be explained by different authors reporting different sources and years, but for SEA there is considerable work required to be able to present a consistent and complete picture of its water resources management.

The existence of good data is an absolute requirement for reasonable water resources management. Clearly SEA requires a component of water resources management strategy to develop a useful, consistent and credible datasets to support regional water policy and water management.

Water for Food.

In five GWP-SEA countries, Cambodia, Indonesia, Laos, Myanmar and Thailand, water use for irrigation amounts to more than 90% of its total use. The percentage for the other three countries Malaysia, Philippines and Vietnam, is still above 60%.

Given the demands on water resources coming from other sectors and the environment and the growing population, it is important to limit withdrawals yet to grow more foods. Thus there is a general opinion that the target should be for a zero percentage increase in irrigation water demand, for an increase in water productivity. This is posing a clear challenge for the region.

Drinking Water and Sanitation.

Millennium Development Goals Progress reported by WHO (World Health Organization) in August 2004 indicates differences across SEA countries in respect to both access to safe drinking water and improved sanitation. Thailand, Malaysia, Singapore and perhaps Brunei (although some data was not reported) have very good performance while the other countries still need to do much effort to achieve the rate of progress required as part of the Millennium Development Goals. When significant progress had been made between 1990 and 2006 as given in UNDP publication, there is a fair way to go towards the targets.

Urban Water Management

Singapore and Phnom Penh are tackling their water management challenges head on. As a densely populated city state, Singapore is one of the world's most water-stressed countries in terms of natural renewable water resources. Water shortages, flooding, and pollution in its rivers were just some of the problems the city state faced 40 years ago. Today, however, the situation is vastly different. To meet the demands of a rapidly growing city, PUB has adopted a holistic approach to water management. As Singapore's national water agency, PUB manages all aspects of the water cycle in an integrated manner, from sourcing, collection, purification and supply of drinking water, to the treatment of used water and its reclamation into NEWater, as well as the drainage of stormwater.

By investing heavily in water technologies and R&D, Singapore was able to close the water loop and put in place a long-term water supply strategy known as the Four National Taps. The Four National Taps comprise of four different sources of water: water from local catchments, imported water from Malaysia, reclaimed water (branded NEWater in Singapore) and

desalinated water. Integrating the system and maximising the efficiency of each of the four water sources have ensured a robust and sustainable water supply for Singapore. Beyond supply-side solutions, Singapore's total concept in managing the water loop also extends to managing demand. PUB actively engages the community to play their part to use water wisely, keep the catchments and waterways clean, and build a relationship with water so that they can enjoy the water resources.

When Ek Sonn Chan joined as director of the Phnom Penh Water Supply Authority (PPWSA) in 1993, only 40 percent of the city area, merely 20 percent of the total population, was supplied with water. At best, water supply was intermittent and only available for 10 hours a day. The PPWSA has now achieved efficiency, greater water productivity and is increasing its consumer base by radically transforming a decrepit and war-torn water supply system with missing water and missing customers into a model public sector water utility that provides 24-hour safe drinking water to Phnom Penh. Not only is the PPWSA providing safe drinking water to a majority of the city's poor, untypical for a public utility, it is even making a modest profit.

Source: PUB Singapore and Kea, Puy (2007) Assassination Threats Couldn't Stop Cambodian Official in Providing Safe Drinking Water To The Poor. Viewed at <http://www.maximsnews.com/107mnunovember12asiapacificwaterconference.htm>.

Water-related Disaster and Climate Change.

Many lands in SEA, especially in Cambodia, Indonesia, Philippine, Thailand and Vietnam are vulnerable to floods, causing damages to agricultural production, urban, infrastructure and tourist industry. Coupled with growing number of population and economic development, the potential damage values are increasing. It has been indicated as well that climate change has made the situation worse in many areas.

Concerned governments are applying structural and non structural measures to cope with their problems. It is now also considered important to develop capacity building in integrated management and climate change adaptation.

Water Governance.

Today SEA countries that are developing at a rapid pace are faced not only with irrigation matters as before, but with a multitude of water-related problems such as urban flash floods, landslides and erosion, water scarcity, polluted water ways and contaminated ground water.

There has been a growing recognition in Southeast Asia that Integrated Water Resources Management (IWRM) is crucial, especially in the last 10 years. This has paved a path in Southeast Asia for positive steps in implementing strategies for IWRM. This can be seen through ongoing institutional reforms, policy changes and water governance that is sweeping through the region. International cooperation has been developed for trans-boundary rivers in mainland zone countries, especially in Lower Mekong River Basin which has been established by Vietnam, Cambodia, Lao PDR and Thailand.

Development of a National Framework for IWRM in Malaysia

Due to its rapid development since the 1970s Malaysia faces a number of challenges in water-related areas such as water supply, water quality, other environmental challenges such as floods, erosion, landslides, pollution, peat fire, impact of climate changes as well as in governance and management instruments. Challenges in water supply include increasing and competing needs for domestic and industrial, agriculture, environment, hydropower, transportation, recreation and others. There have been incremental national responses to date that included over-arching policies accepting the IWRM and IRBM concepts as well as restructuring and setting up of new water-related agencies. These are sporadic responses, such that in 2006 recommendations emerged from workshops supported by UNEP, held with the public and private sectors as well as NGOs, the proposal for a National Framework on Water Resources Management (NFWRM).

This NFWRM is aimed to fully integrate Water Resources Management through out the country from the head waters to the coastal areas such that there is equity in allocation of water among the sectors; water supply for industry, housing and agriculture, integrated and well coordinated; clean and vibrant rivers and water bodies; Malaysia's biodiversity and gene bank, recognized, protected, thriving and contributing to the country's economy; floods, erosion, land slides and other land & water-related challenges, well managed and under control.

The NFWRM was presented and fully endorsed by the NWRC (National Water Resources Council), chaired by HE the Prime Minister, in 2007. The NFWRM will incorporate land and water, together with other related resources, weaved in a matrix that complements one another. The NFWRM will be developed incrementally, supported, monitored, assisted and enforced by all stakeholders to ensure sustainable economic growth and pristine environment so as to support, nurture and develop related water services turning them into successful businesses. The generic format of the NFWRM was based on the review of status of IWRM plans agreed in JPOI of WSSD and adopted on the basis to promote regional co-operation and dialogue within South-East Asia. Efforts are being made to mobilize resources to implement the NFWRM in Malaysia as well as similar frameworks in other countries in South-East Asia.

Source: Salmah Zakaria, Director General, NAHRIM, NRE, 2007.

Major changes after the 4th World Water Forum

Institution, legislation

Cambodia :

After the Approval of the National Water Resources Strategy in 2004, the Law on Water Resources Management was ratified by the National Assembly and signed by the King in June 2007, four sub-decrees are planned, three of them are already drafted (Basin Management, Water

allocation and licensing, Farmers water user communities) and one still to be prepared (Water quality management).

Indonesia :

Stipulation of Government Regulation on Water Supply System Development in 2006;

Revision of Government Regulation on Irrigation in 2006 for reform in irrigation management;

Establishment of National Water Resources Council in 2008, to replace the provisional National Water Resources Management Coordination Team which did not cover all stakeholders, but government organizations only;

Revision of Government Regulation on Water Resources Management in 2008;

Stipulation of Government Regulation on Groundwater in 2008.

Lao PDR :

The Science Technology and Environment Agency changed into new "Water Resources and Environment Administration", also at provincial and some districts level in May 2007

Water law, water decree, water strategy are being proposed to be revised

Malaysia :

Enactment of Water Services Industry Act in 2006, and establishment of the National Water Services Commission in 2007 for long-term sustainability in Water Supply and Sewerage Services.

Myanmar:

Enacting the conservation of water resources and rivers law in 2006 which is intended to conserve and protect the water resources and river system for beneficial utilization by the public and to protect environmental impact.

Recently, NCEA (National Commission for Environmental Affairs) and NGOs prepare effluent standard for proper disposal of waste water from factories.

Philippine:

- Amendment to the Memorandum of Agreement Between the National Water Resources Board (NWRB) and the Cooperative Development Authority (CDA) on Light-handed Regulation among Small Scale Water Service Providers in 2008

Vietnam :

Water sector reform with clearer separation of water resources management from water use management (2006-08).

In March 2007, the Government decided to transfer responsibility on river basin management from Ministry of Agriculture and

Rural Development (MARD) to Ministry of Natural Resources and Environment (MONRE). This makes the management of water resources more integrated in one Ministry.

Improvement of targeted numbers

Percentage of population using an improved drinking water source

	1990			2006		
	Total	Urban	Rural	Total	Urban	Rural
South-East Asia	73	92	64	86	92	81
World	77	95	63	87	96	78
Developing region	71	93	59	84	94	76

Percentage of population using an improved sanitation facility

	1990			2006		
	Total	Urban	Rural	Total	Urban	Rural
South-East Asia	50	74	40	67	78	58
World	54	78	36	62	79	45
Developing region	41	66	28	53	71	39

Progress on political commitments (e.g. policy changes, reforms, etc)

Cambodia :

As a part of The National Strategic Development Plan which main priority is to achieve poverty reduction and economic growth, The Strategy for Agriculture and Water was jointly developed by Ministry of Water Resources and Meteorology and Ministry of Agriculture, Forestry and Fisheries in March 2007.

Lao PDR :

Institution is being reformed such as in water resources sectors, environmental sectors

Legislations/policies related to environment and water resources will be considered to be revised and developed.

Capacity building related water resources and environment will be continued.

Policy study into establishment of River Basin organizations is being proposed

Malaysia :

The Ministry of Natural Resources and Environment and the related NGOs plan to hold continuing dialogues with all relevant ministries to ensure that IWRM principles and practices are fully incorporated. These efforts and initiatives will also be extended to the various States in the form of "Road Shows".

Myanmar:

More careful consideration of Environmental Impact Assessment in newly proposed water-related infrastructure development projects.

Capacity building-related water resources development concerning with environment.

Related Government Agencies and NGOs initiate the establishment of Community Forest in catchment area for conservation of water resources.

Enforcement of changing the cultivation policy in hilly regions that is slash and burn cultivation practice to terrace farming so as to avoid soil erosion problems.

Philippines:

Legislation establishing the Water Resources Commission to act as an economic regulatory body in the water sector is being proposed.

Vietnam :

Adoption of the National Water resources Strategy (2006)

Review of the Water sector : a comprehensive assessment (2007-08)

New managerial and financial policies in urban water supply and sewerage with IWRM approach (2007);

New policy on exemption of irrigation charges (all M&O expenses to be covered from now by government budget) 2007.



Training of community people on using measurement

Community-based flood forecasting and warning system (CBFFWS) in the Philippines -a good model of collaboration among central government, local government and communities

The CBFFWS is a locally based operational flood forecasting and warning activities of a community that aids them in mitigating the effects of flooding in their area. It is simple in design and operation, relatively cheap, easy to sustain and most of all the social and moral responsibilities of the community and its leaders, the Local Government Unit (LGU), are enhanced through their direct and active participation. It empowers the people of the community to protect, prepare themselves and make them resilient against the disastrous effects of floods.

The CBFFWS is based on agreement of central government, LGU and local communities. The system is basically composed of a set of monitoring instruments, staff gages along the river channel and rain gages installed at strategic locations within the target areas. Flood markers are also installed for flood extent mapping and for other related studies. Community personnel or volunteers are equipped with radio communication sets or cellular phones for data and info exchange and for transmitting warnings to the disaster groups who will serve as hydrological observers. The weather forecast from the national meteorological office will be the initial information for the system's operation possibly aided by localized weather systems. A local flood warning or signal will then be issued by the communities' operation centers to its field personnel and disaster information groups based on pre-determined river stage assessment levels and or when the set of rainfall threshold values have been attained.

For now, the CBFFWS is one way of addressing the pressing need for an early warning system in small communities that are not covered by the conventional flood forecasting & warning system. Due to the significance of the CBFFWS, it has been supported by several international schemes such as UNDP, JICA and WMO/ESCAP Typhoon Committee and now being exercised in more than 20 rivers in The Philippines.

Source: MO technical document No. 1472 "General Guidelines for Setting-up a Community-based Flood Forecasting and Warning System (CBFFWS)"

Way Forward

From the regional water forums, there has been a common understanding that there is a need for a paradigm shift in the traditional sectoral management approach to water resources, which focus only on sectoral objectives, towards IWRM, a more integrated manner of management of water resources.

The IWRM paradigm requires concerted efforts to adopt, where appropriate, a policy that stakeholder participation shall be an integral part of all water management activities. It requires, where appropriate, to review the existing water resources legislation especially in the area where it is lacking, also to review the existing sectoral water management institutional structures and processes to incorporate explicitly the participation of all stakeholders, and to strengthen capacity building associated to water resources management.

In recognition of the above mentioned understanding, the Ministers responsible for water resources from Southeast Asian countries, have affirmed their commitment to consolidate actions towards effective implementation of IWRM in respective countries by (1) adoption of the IWRM Guidelines that was declared at the 1st Ministerial Meeting at Chiang Mai, Thailand in 2003, (2) implementing commitment to develop a concrete set of policies and programs to support respective countries' IWRM agenda as declared at the 2nd Ministerial Meeting at Bali, Indonesia in 2005, (3) consolidating efforts towards effective implementation of the IWRM nationally, regionally and internationally through the creation of an appropriate enabling environment, institutional arrangements and management instruments, (4) developing respective national IWRM implementation framework, through a systematic review of the existing water management institutional structures and processes so as to incorporate explicitly the participation of all stakeholder, (5) strengthening the legislative and administrative systems to enable water resources to be managed effectively, (6) promoting and strengthening the process of capacity building and human resources development to implement IWRM, (7) encouraging the involvement of all stakeholders in the decision-making process with emphasis on gender roles, and good management of water, (8) organizing regional water fora to create awareness and to exchange information among all stakeholders at national, regional and international levels and providing support and developing ways and means to promote more robust, systematic and cohesive collaboration among water-related networks in the Southeast Asian region, (9) expand the current framework of sub-regional Ministerial Conference on Water in Southeast Asia to link to similar initiatives in other sub-regions of Asia-Pacific.

Pacific and Oceania

Introduction

The Pacific region is in a period of unprecedented growth in support for the water and sanitation sector, guided largely by three regional strategies developed in the last 7 years through a series of coordinated consultations:

The Pacific Wastewater Policy Statement and associated Pacific Wastewater Framework for Action (2001);

The more holistic Pacific Regional Action Plan on Sustainable Water Management (2002); and

The Drinking Water Quality and Health Framework for Action (2005).

The region's geographic, demographic and developmental diversity is as great as the area it covers. But with few exceptions, the people are located in the coastal areas and their lives are influenced by their immediate coastal environment. The ability of this environment at the land and marine interface to sustain the lives of people is extremely fragile and highly vulnerable to both natural hazards and human activities. Urbanisation and tourism, and activities contributing to climate change threaten to overwhelm the supportive capacity of the natural environment and the health of the people.

A recent WHO/SOPAC report on sanitation, hygiene and drinking water in Pacific Island countries revealed that the annual incidence of diarrhoeal diseases in the Pacific nearly matches the numbers of its inhabitants, with 6.7 million cases of acute diarrhoea each year, causing the death of 2,800 people.

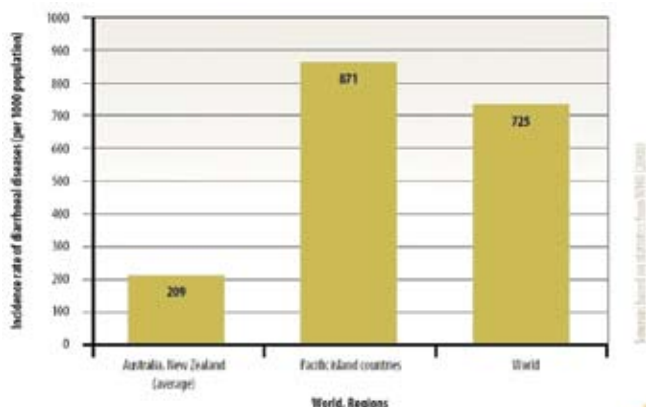
The number of deaths due to diarrhoeal diseases in the Pacific Island countries in 2002, most of them children under five, is equivalent to the crash and death of the passengers of nine jumbo jets a year.

Country statistics on access to improved sanitation and improved drinking-water indicate that on average, approximately only half of the total population of the Pacific Island countries are served with any form of improved sanitation or drinking-water. Furthermore, drinking-water and sanitation coverage in rural areas of the Pacific Island countries is only about half that of urban coverage .

³² The Pacific island countries addressed in this report include 14 independent and self-governing countries: Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Nauru, Niue, Palau, Papua New Guinea, Republic of Marshall Islands, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

³³ Extracted from a WHO/SOPAC report Sanitation, hygiene and drinking water in Pacific island countries, Converting commitment into action (WHO, 2008).

Figure 1: Incidence rate of diarrhoeal diseases per 1000 population in the developed Pacific countries, the developing Pacific Island countries, and World, 2002



It is clear then that increased efforts are required to achieve the MDG targets of halving the proportion of people without access to safe drinking water and basic sanitation by 2015. The WHO/SOPAC stated that in the remaining years of the Water for Life Decade, efforts will need to quintuple in the Pacific region as compared with the period since 1990, if these MDG targets are to be met.

Main Challenges and Action

Various regional forums have identified the main challenges and constraints that have hampered drinking-water and sanitation development in the Pacific islands:

Pacific Island countries have uniquely fragile water resources due to their small size, lack of natural storage, competing land use, and vulnerability to natural hazards (including climate change) and human activities. This requires detailed water resources monitoring and management and improving collaboration with meteorological forecasting services;

Water service providers face challenging constraints to sustaining water and wastewater provision due to the lack of both human and financial resource bases, which restrict the availability of experienced staff and investment, and effectiveness of cost-recovery. Future action is required in human resources development and retention, water demand management and improving cost-recovery; and

Water governance is highly complex due to the specific socio-political and cultural structures relating to traditional community, tribal and inter-island practices, rights and interests. These are all interwoven with past colonial and 'modern' practices and instruments. These require programmes to develop awareness, advocacy, and political will at all levels to create a framework for sustainable integrated water resources and wastewater management (IWRM).

The above key regional strategies, along with the Pacific Partnership Initiative on Sustainable Water Management, ensure a more coordinated and strategic approach to water and sanitation activities in the region. The Partnership enables countries and development agencies to: identify successful previous activities and therefore improve the sustainability of subsequent interventions; reduce and prevent duplication of activities; link country requirements to development programmes (and vice versa); and augment existing and proposed activities nationally and regionally.³⁴

Water Resources: Sustainable Integrated Water Resources and Wastewater Management

Responding to the need to better understand the capacity and vulnerability of relatively small and finite water resources, there is an on-going process across Pacific island countries to improve national capacity in monitoring and assessment of water resources to enable sound decisions for management and planning of water resources.

Whilst many countries have made great progress to realising sustainable development and achieving the MDGs and targets, such endeavours have been generally made through sectoral approaches. In doing so the competitive demands of different sectors have become difficult to manage, with increasing stress placed upon water resources as pollution increases and populations continue to grow increasing demand on already fragile water resources.

Niue Leads the Way in Mobilising and Adopting Integrated Water Resources Management

As one of the smallest nations in the world sat on top of a large reserve of pure freshwater you may question why integrating water resource management is so important? Niue's unique hydrogeology means that, although they have a large reserve of freshwater and use very little of it, the porous nature of the 'Rock of Polynesia' poses a threat to the groundwater from pollution, such as human and animal waste and fuel spills. Pollution of the fragile groundwater resource would have serious consequences on the health and well-being of this island nation, with no surface water resources to rely on. Niue Water Works Department and other government agencies have progressed in a wide range of water interventions including hydrology, IWRM, WQM, WDM and WSP, as well as the development of water resources legislation.

³⁴ See <http://www.pacificwater.org>

Niue will implement two programmes under the Pacific Alliance for Sustainability, the IWRM Demonstration project and the Pacific Adaptation to Climate Change project, as well

as the current Sustainable Land Management Project. The IWRM project will focus on integrating land use, water supply and wastewater management around Alofi town to protect the groundwater from pollution sources, and look to minimise polluting surface run-off entering coastal waters.

The temporary National Water Working Committee established for drinking water safety planning will be supported by the EU Water Facility IWRM Planning Programme to formalise the Committee into a broader National Water and Climate Committee, avoiding overlap and duplication between sectors and raising awareness about the cross-cutting issue of climate change

The Pacific Integrated Water Resources Management (IWRM) Programme is making strides to achieving the MDG's through an intelligent cross-sectoral, multi level approach by focussing on water resources management which also provides an entry point to addressing other inter-related sectors as well such as health, land and coastal management. There are 13 country demonstration projects which will focus on the capture and presentation of on-the-ground IWRM interventions in the areas of Watershed Management, Wastewater Management & Sanitation, Water Resources Assessment & Protection, and Water Use Efficiency & Water Safety. A regional component focuses on national policy reform and improved institutional capacity and change.

The IWRM framework is considered as best approach to adapt to climate change in the water sector and strong linkages between water and climate adaptation is being demonstrated by several Pacific island countries.

Water Services: Drinking-water Quality Management and Sanitation

In 2006, over a half of the Pacific Islands population did not have access to any type of improved sanitation facility (Figure 2). For every eight people in the Pacific island countries only one had access to piped water into their dwelling, plot or yard in 2006 and only 46% had access to any type of improved drinking-water facility (Figure 3) .

Figure 2: Proportion of people using different types of sanitation practices in the Pacific islands, 2006

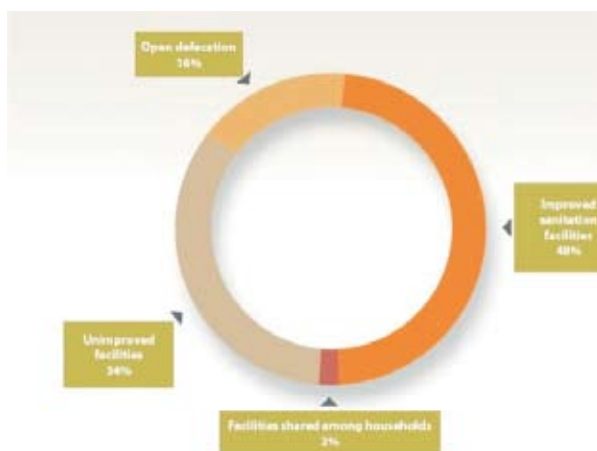
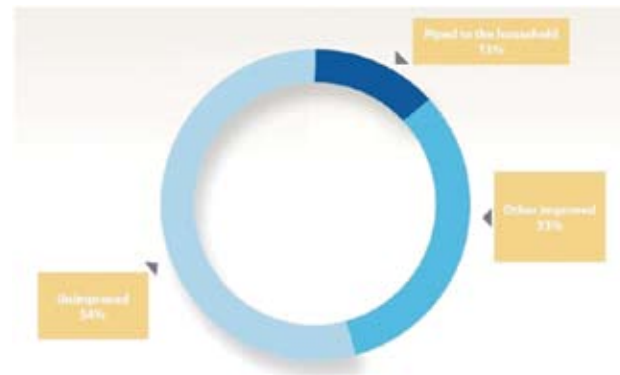


Figure 3: Proportion of people using different types of drinking-water sources in the Pacific island countries, 2006



Implementation of the WQM Capacity Building Programme: The Republic of the Marshall Islands

The US Freely Associated States Voluntary Water Quality Laboratory Certification Program recently granted certification to RMI's Majuro EPA water quality testing laboratory for bacterial contamination in both drinking and marine waters. Certification provides assurance that the laboratory provides scientifically valid and legally defensible data, an important aspect of making decisions that affect the health of people and that commit considerable public money. The WQM Capacity Building programme provided assistance with preparations.

Quite a number of Pacific island countries have made, or are making, significant drinking-water, sanitation or stormwater infrastructure investment. Samoa's sanitation and drainage projects target improvements in Apia's drainage, sewerage,

³⁴ Extracted from a WHO/SOPAC report Sanitation, hygiene and drinking water in Pacific island countries, Converting commitment into action (WHO, 2008).

sanitation and wastewater treatment, and also sanitation facilities for 200 schools and 15 district hospitals. In Tonga, improvements include rehabilitating existing drains in the central business areas in Nuku'alofa, constructing of flood relief drains, and developing a stormwater drainage maintenance program. Improvements are also underway for the Nuku'alofa drinking-water supply bore field. The Cook Islands is upgrading power, water, and sanitation services and infrastructure on the two main islands. Climate proofing is a key feature and aims to reduce climate-related risks in a cost-effective manner. Tuvalu, the Marshall Islands and Nauru are making efforts to maximise their rainwater harvesting potential in order to be more resilient to droughts. The Federated States of Micronesia are addressing both water and sanitation under an infrastructure omnibus programme in response to the need to increase the provision of basic services in the four States of Yap, Chuuk, Kosrae and Pohnpei. Papua New Guinea is working on increasing the access to water and sanitation for especially the rural population. Fiji is currently upgrading their urban water supply and wastewater infrastructure in combination with a reform of the water sector whereas both Palau and Vanuatu are focusing on securing the safety of their main water supplies in Koror-Airai and Luganville, respectively. Last but not least, Kiribati is addressing water and sanitation issues through a climate adaptation programme whilst taking measures to protect their vulnerable water reserve on the main atoll island of Tarawa.

Many urban areas in the Pacific have problems with drinking-water supply because more water is lost through leakage and wastage than they actually deliver. With more pressure on limited resources, many Pacific islands have realised that the key towards sustainability lies not in costly infrastructure extension but in sound management of existing water supplies.

Water Governance, Awareness and Education

Sustainable water and sanitation management necessarily spans a range of institutions. Without clearly defined responsibilities and accountabilities for all stakeholder organisations involved, fragmented and uncoordinated plans and actions stifle progress. Good water governance includes the design of public policies and institutional frameworks that are socially acceptable and have strong societal support. Good governance fosters linkages between institutions, sectors and society through raising awareness, sharing data and expertise and leveraging finances. A number of countries are developing water policies - Kiribati has prepared a draft National Freshwater Resources Policy; Solomon Islands have prepared a draft National Water Policy and reviewed Water Resources Legislation; Fiji has drafted a national Water Resources Policy, the Environmental Management Act was recently enacted, and a National Liquid Waste Management

Strategy and Action Plan has been prepared. The Cook Islands is implementing a Sewage Treatment System Upgrade Program Strategic Plan and have developed Public Health (Sewage) Regulations to improve sewage treatment standards; Tonga has drafted a Water Resources Bill and Solid Waste Strategy and started to prepare a National Programme of Action for the Protection of marine Environment from Land-based Activities; a National Water Resources Policy for Samoa has been endorsed by Cabinet and is being reviewed, a complementary National Water Services Policy for water services is underway, and a National Water Resources Management Strategy is under-going consultation.

Community involvement is essential in addressing water and sanitation issues, especially where communities are not connected to reticulated systems. There is a huge disparity in sanitation and drinking-water coverage for urban and rural areas in the Pacific island countries, coverage in rural areas hardly reaching a half of the urban coverage.³⁶ Since less than 10 % of the total population in the Pacific region is connected to a centralised sewerage system, the focus of many wastewater interventions are on introducing appropriate on-site sanitation technologies.

Practical training in eco-sanitation has taken place in Tonga, Vanuatu, Fiji, Tuvalu and Kiribati, providing community members with sufficient information and practical skills to choose, construct and maintain the most appropriate treatment systems for their needs.

The "Keeping Your Drinking Water Safe Community" toolkit for effective management of drinking-water supplies in Pacific island countries, has been used by Community Trainers, Health Officers, Community Workers, and Facilitators, to raise awareness about the need to keep water clean and promote responsible attitudes, behaviour and actions to ensure safe and lasting drinking water supplies. The toolkit contains an Introductory Guide containing background information and annexes, and tools on Conducting a Water Audit, Conducting Sanitary Surveys, Snapshots to Monitoring Water Sources, Water Quality Monitoring Using The Hydrogen-Sulphide (H₂S) Paper-Strip Test, Water Awareness and Education, Water Management Actions, and a Comic and Paper-strip test Instruction Flipchart.

Co-ordinating and refocusing of donor programmes

With the regional support and capacity building programmes being relatively well established and funded, there is now an increased need to focus on implementation at the national and

³⁶ Extracted from a WHO/SOPAC report Sanitation, hygiene and drinking water in Pacific island countries, Converting commitment into action (WHO, 2008).

local levels. Harmonisation of donor agency programmes, as well as prioritization of water and sanitation in the national political agendas, is in this respect key to maximize the impact of actions to date.

To assist Pacific island countries address (among other things) water and sanitation, infrastructure requirements, NZAID, AusAID, the World Bank Group and the Asia Development Bank have partnered to develop the Pacific Region Infrastructure Facility (PRIF). The PRIF will respond to requests for support based on Pacific island country plans and priorities, considering both new investments and maintenance needs. The facility aims to strengthen the local private sector to undertake new works and ongoing maintenance of infrastructure to help grow the domestic private sector and create long term employment opportunities.

Under the **Water Sector Support Programme the Government of Samoa** has been working to improve the quality of public health through improved water services and sustainable water resource management. Implemented through four agencies in Samoa, and running from 2005 to 2012 the €20m programme has already made significant progress.

At the 1st Annual Joint Sector Review meeting stakeholders from Government, community organisations, donors and regional agencies were invited to review progress against the six objectives of the Water Sector Support Programme facilitated by a Water Sector Management Unit. The joint review meeting provided an opportunity to evaluate current and future projects including the ADB funded Samoa Sanitation and Drainage Project, and the Pacific HYCOS and IWRM projects, designed to improve the collection, storage and analysis of hydro(geo)logical data to improve water management as small islands face increasing climate variability.

Participants were able to provide recommendations on the water sector performance indicators in order to keep monitoring to a realistic, achievable, and cost-effective level. Significant progress has been made in Samoa regarding development of water management, with the launch earlier this year of the Water for Life document to guide the medium term development of the water sector in Samoa. The challenge now is to put the plan into action and reap the benefits of improved water management for all Samoans.

Way Forward

The Pacific region has made good progress since the 4th World Water Forum in 2006, and has numerous regional and country-specific examples of actions to share and learn from. The sustainable IWRM approach adopted by many countries recognizes the challenges and constraints of the Pacific region with the objective of improving water resources management and water use efficiency through improved collaboration and is seen as best approach to adapt to climate change in the water sector. Significant progress has been made in forming intergovernmental

department committees to oversee and coordinate the development of national policies and frameworks. There is now an increased need to focus even more on implementation at the national and local levels, and in urban and rural settings.

Implementation requires agencies to work together, adequate national technical and managerial capacity, financial assistance, and buy-in by all peoples to the importance and practices of sustainable integrated water management.

Implementation needs to be supported by a framework for monitoring and evaluation of investments and outcomes. This information is invaluable for national sustainable development planning and sectoral strategic planning and to determine best practices which need to be replicated.

The establishment of national sanitation, hygiene and drinking-water assessments should be promoted taking into account the need to conduct such assessments within the perspective of sustainable integrated water resources management.

A sound sanitation and drinking-water monitoring and evaluation system should be developed for the Pacific island countries, capable of collecting, analyzing and disseminating population based information on access to sanitation and drinking-water in close collaboration and consultation with the WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP).

If the MDG targets on water and sanitation are to be achieved additional resources have to be made available to the water sector in the Pacific even requiring a five-fold increase over the remaining years of the Water for Life Decade.

The challenges at the regional and international level include: Co-ordination and refocusing of donor programmes and project design to assist Pacific Island countries to develop water resources management capacity and to implement projects to improve the environmental sustainability of water supply and wastewater services, consistent with both regional priorities and individual country challenges;

Co-operation between existing regional agencies in the development of water sector related programmes and technologies; and

Regional level support for national capacity building, advocacy and awareness.

In 2006 Pacific Leaders agreed that the water, sanitation and hygiene challenges facing the region should be critical priorities

of the Pacific Plan and addressed through implementation of the Pacific Regional Action Plan on Sustainable Water Management (RAP). In December 2007, Pacific Leaders attending the Asia Pacific Water Summit in Japan reiterated their commitment to the provision of adequate sanitation and safe drinking-water for their people.

New Zealand

Present and future management

Pollution of freshwater from point-source discharges is largely under control and managed under the Resource Management Act 1991, attention has therefore turned to the reduction of non-point-source pollution from intensive land use. As a result there is greater emphasis than in the past on managing intensive land use through stream-bank (riparian) planting, nutrient management, and excluding stock from waterways using bridging and fencing. Water allocation and pollution caused by intensive rural and urban land use will continue to be the focus of freshwater management in New Zealand. Balancing the competing values and needs of water users – Maori (indigenous people), recreational users, town water suppliers, hydro-electricity generators, tourist operators, and farmers is becoming increasingly challenging.

Examples of actions

Working with indigenous people - Maori are inextricably linked to, and involved with, the use and management of natural resources. A joint programme of work has been established at the national level to ensure policy work on water reflects Maori interests and needs in water resource planning and use. Practices based on an understanding of the environment have supported Maori efforts to maintain and sustain their families and communities for many centuries. A Cultural Health Index for Streams and Waterways has been developed to provide an opportunity for local Maori to assess and report on the cultural health of a catchment or stream and provides a basis to prioritise management or restoration of specific sites.

Working with industry

– the Dairying and Clean Streams Accord is a voluntary agreement between Fonterra Co-operative Group (the largest dairy company in New Zealand) and regional and central government. The Accord sets out practical targets for farmers (eg. 90% of regular stream crossing are bridged by 2012).

Working with local government

– The Taranaki Regional Council is one of many councils working

with farmers to develop sustainable land management and riparian planting plans. Up to June 2007, 12,400 kilometres of stream bank and 60% of all dairy farms in the region were covered by riparian plans. By the same date, more than 1 million plants had been provided to farmers by the Council at cost.

Central government

– Government has developed a number regulatory and non-regulatory policy statements, standards and guidelines. These include:

Draft National Policy Statement for Freshwater Management (Ministry for the Environment 2008)

National standards in development:

Measurement of water takes

Ecological Flows and Water Levels

National Environmental Standards for Drinking Water Sources (Ministry for the Environment 2006)

Drinking Water Standards for New Zealand (Ministry of Health 2005)

Microbiological Water Quality Guidelines for Fresh and Marine and Freshwater Recreational Areas (Ministry for the Environment and Ministry of Health 2003)

Australia and New Zealand Guidelines for Fresh and Marine Water Quality (Australia and New Zealand Environment Committee 2000)

Others

Israel

The Israeli water sector suffers from consecutive years of drought (including this year). The situation has developed into a severe crisis in agriculture and urban use. Water supply did not meet requirements in spite of the fact that there were more than 50% administrative cuts in agricultural allocation and the urban demand per capita is less than developed countries in semi arid areas.

The main reasons for the crisis are:

- Decrease in natural replenishment: In the last 16 years we have a 20 percent reduction in natural replenishment.
- Increased demand by population growth and the rising standard of living.
- Abundance of human activities on the top of the natural resources increased quality problems (Nitrates, Chlorides, VOC)

Current activities of the water sector are based on a new water sector policy that incorporates sustainable development actions based upon these components:

1. Establishing one central water authority that is

responsible for all management functions including setting water tariffs.

2. Incorporating demand management measures: changing water tariffs for gardening in domestic use and campaign for water saving.
3. Ensuring water supply by reclamation and desalination.
4. Raising the readiness for climate change by increasing the standards of reliability.

The policy for addressing both drought issues and sustainable development are mainly:

- Demand management measures were implemented by adopting a new model of water pricing for urban use and in addition setting extractions levies. Full cost recovery pricing for water should be implemented in conjunction with meeting social requirements.
- Appropriate legislation must lead people to incorporate water saving activities. Education and explanation will ensure long term results. Water saving devices and advanced technologies for irrigation should be used. Water conservation must become a way of life in our region.
- Increasing development of sea water desalination plants.

On the basis of this policy, the Water Authority consolidated a national master plan and the government of Israel is already implementing some of these recommendations:

1. Desalinating 750 MCM/Year till 2020 of sea water and in addition 50 MCM/Year of brackish water.
2. The amount of total reclaimed treated sewage for agriculture will be increased from recent 340 up to 500 by 2015 MCM.
3. Treating polluted parts of the aquifer.

The estimated cost of the plan is 5 billion US\$. Hopefully all projects will be completed by 2015.

Completion of these projects will help to stabilize the Israeli Water Sector.

4.3 Concrete Initiatives

The following series of 19 concrete initiatives are a roadmap, a work in progress, which the APWF family launched from the 1st APWS onwards to implement the recommendations and goals set forth in the *Policy Brief 2007* and the *Message from Beppu*.

Water Financing and Capacity Development

ADB and JICA

The Asian Development Bank and the Japan International Cooperation Agency are co-leaders to promote initiatives under Priority Theme A. Their work is a part of broader collaboration between Japan and ADB to boost and support water investments in the Asia-Pacific region. That collaboration focuses on three inter-linked levels: (i) investment projects, (ii) knowledge and capacity development services and networking, and (iii) leadership for policies and investment decisions in the region.

Water for All Policy. The Asian Development Bank (ADB) adopted its Water for All policy in January 2001. The policy promotes a national focus on water sector reform, fostering the integrated management of water resources, and improving and expanding the delivery of water services. To meet the burgeoning water needs in the region, ADB formulated the Water Financing Program (WFP), which seeks to make water a core investment area for ADB.

Water Financing Program. Through the Water Financing Program 2006-2010 (WFP), ADB envisages to catalyze some \$20 billion in new water investments from various development partners that would improve the quality of life and water security for more than 300 million people in the Asia-Pacific region. The three areas of investment under the WFP are for rural water services, urban water services, and basin water management, with their supporting reforms, capacity development, knowledge management, and regional cooperation. Sanitation is a priority across the three areas.

Secure Investment Area for ADB. By the end of 2007, water sector projects had secured a 20% share of ADB's ongoing project portfolio, and that is expected to grow to 25% by the end of the WFP in 2010.

Boosting Investments: The first-two years 2006-2007, posted nearly \$2.3 billion in new investments and led to the programming of nearly \$8.5 billion in water sector investments through 2010. To top that off, ADB expects to catalyze \$8 billion more in co-financing by the end of the program. As it stays the course, the WFP will also cover more ground in areas increasingly important to ADB as a whole, including rural development, climate change, and disaster management. (Note: 2008 figures to be confirmed in early January 2008)

Water Financing Partnership Facility: The Facility provides a strategic, long-term platform for pooling grants, loans, guarantees, and knowledge from various development partners. To date, the Facility has received \$65 million in commitments from the governments of Austria, Australia, Austria, the Netherlands, Norway, and Spain. The initial target is to mobilize \$100 million.

Increased Cofinancing: For every dollar ADB approved for a new water sector project in 2007, ADB catalyzed an additional dollar from either a government, private sector or other cofinancing source.

Outcomes that People Experience. The WFP aims to accelerate the achievement of the Millennium Development Goals (MDGs) in the region as well as other targeted outcomes. Table 1 illustrates the progress to date.

Target	Units	Target	Progress*
Sustainable access to safe drinking water and to improve sanitation	million people	200	65
More productive and efficient irrigation and drainage services affecting the livelihoods of people	million people	40	7
Reduced Risk of flooding affecting people and reducing recurring damage to vital infrastructure	million people	100	35
Introduction of IWRM in river basins	river basins	25	24

* Expected from projects approved since 2006.

By the 2nd APWS in 2010, ADB is preparing for a future beyond the WFP—a future that will continue to need the kind of financing the WFP has helped to catalyze for the sector from all development partners to increase water security for the people of the region.

Water-related Disaster Management

ICHARM

1. Description

International Center for Water Hazard and Risk Management (ICHARM) committed to “establish a Regional Knowledge Hub (RKH) on Water-related Disaster Risk Reduction (WRDRR)” at the 1st APWS in December 2007. Since then ICHARM has been trying hard to become an excellent RKH on WRDRR, through its three key activities, namely (1) Research, (2) Training, and (3) Information networking. There are still serious divides in WRDRR such as divides in the access to reliable information and technologies, divides in human capacity development. ICHARM believes that its key activities will directly or indirectly contribute to bridge such divides in the AP region.

ICHARM also believes that even though there is no clear disaster-related target under the MDG framework, WRDRR will contribute a lot in achieving many MDGs such as MDG1 (poverty and hunger-related), MDG4 (child mortality-related) and MDG6 (disease-related). ICHARM’s activities would also contribute to

achieve other disaster-related international framework such as Hyogo Framework for Action (HFA). ICHARM is also acting as an international center under the auspice of UNESCO, we believe ICHARM’s key activities are definitely useful/applicable to other regions of the globe.

On 27 June 2008, ICHARM was officially acknowledged by APWF as RKH on DRR and flood management.

2. Update on progress

The following are some of ICHARM’s recent developments:

- 1) Capacity development
 - One-year master course programme on WRDRR (since October 2007, in collaboration with GRIPS and JICA)
 - Comprehensive Tsunami Disaster Management Training Course (in 2008, in collaboration with UN/ISDR)
 - Flood Hazard Mapping Training Course (since 2004, in collaboration with JICA)
- 2) Research
 - Development of IFAS (Integrated Flood Analysis System) – an automated flood forecasting system utilizing satellite-based data.
 - Factor analysis of Water-related Disasters series; e.g. Bangladesh, Sri Lanka and the Philippines.
 - Local-scale factor analysis of flood risks series; Hatiya island (Bangladesh), Infanta city (the Philippines)
 - Research on global trend on water-related disasters
 - Community-based flood disaster management in Banke District, Nepal
- 3) Information Networking
 - Acting as secretariat of the International Flood Initiative (IFI) - a joint initiative of UNESCO, WMO, UN/ISDR and UNU.
 - Contribution in the WWAP (World Water Assessment Programme)
 - Jointly with JWF, acting as topic coordinator on “Managing Disasters” topic of the 5th World Water Forum
 - Extension of technical assistance to selected Asian countries in collaboration with ADB (under planning).

Many of the above-mentioned activities are for the benefit of enhancing social, economic, environmental and institutional aspects in AP regions. ICHARM also made available such information on web-base at <http://www.icharm.pwri.go.jp/>. ICHARM is willing to continue its utmost efforts to fulfill the responsibility as the RKH on WRDRR.

Climate Change, Glaciers, and Water Resources in the Himalayan Region

ICIMOD

Scientific information and applicable knowledge are necessary to develop policies for adaptation to climate change in the Himalayan region. To this end, the objectives of the ICIMOD initiative are as follows:

1. Development of monitoring and assessment schemes for cryosphere and water resources in a regional scale and strengthening national capacities for the monitoring and assessment of cryosphere and water resources on both national and field-based scales
2. Capacity development among ICIMOD's regional member country (RMC) partners to deal with multi-hazard risk assessment, including vulnerability assessment at community levels and the development and application of early warning systems and other preparedness measures.
3. Development of regional information sharing mechanisms, including the establishment of a regional water database and the development of basin-wide scenarios on climate change and its consequences for water availability and flood hazards.

ICIMOD has prepared an action plan for 2008-2012 and an annual work plan for 2009. Some of the highlights of the activities conducted by ICIMOD in 2008 are as follows:

International: ICIMOD organized a session at the 2008 World Water Week in Stockholm in August to create awareness of the international community about the problems related to climate change and water resources in the Himalayan region. It also organized an international workshop in Kathmandu on cryosphere and hazards for the Hindu Kush-Himalaya and the Tibetan Plateau in March-April and an international symposium on high mountain remote sensing cartography in September. Finally, in October it organized a two-week global e-conference on culture and natural hazards risk. (For the 5th World Water Forum, ICIMOD has prepared a perspective document for Topic 1.1 and is one of the main partners for a number of sessions, including 1.1.2 and 1.1.3.)

Regional: ICIMOD developed a regional GLOF (Glacier Lakes Outburst Flood) risk assessment plan for the Hindu Kush-Himalaya region together with national partners from the HKH region. ICIMOD also organized an inception workshop for the regional research programme on the feasibility study for a Himalayan climate change impact and adaptation assessment (HICIA) with

Center for International Climate and Environmental Research – Oslo (CICERO) and UNEP-Grid Arendal. And it launched five research teams to document current local adaptation strategies to climate-induced floods and droughts in China, India, Nepal and Pakistan.

National: ICIMOD initiated preparatory activities to carry out field investigations in selected potential GLOF sites in Nepal with financial support from the World Bank. ICIMOD also delivered training packages on Disaster Risk Reduction in Pakistan to 850 people, including students and practitioners.

In addition, through its role as an APWF Regional Knowledge Hub, ICIMOD plans to document the reproducibility of its initiative for mountainous areas in other parts of the Asia-Pacific region.

Pacific IWRM Resource Centre Background

SOPAC

The Pacific IWRM Resource Centre has been established as one of the priority actions under the Pacific Regional Action Plan on Sustainable Water Management (Pacific RAP), and is initially funded through the EU Water Facility under the Pacific IWRM Planning Programme. The Pacific IWRM Resource Centre shares the vision of the Pacific Partnership Initiative on Sustainable Water Management, which is a voluntary partnership of water and wastewater stakeholders in the Pacific region.

The regional resource centre is supporting IWRM national and catchment partnership and policy development to Pacific island countries which are also developing National IWRM demonstrations under a programme funded by the Global Environment Facility.

The centre assists in identifying and documenting small island IWRM practices at different scales and promotes multi-stakeholder and multi-sectoral, government-civil society partnerships. Using short-term political and public priorities the relevance of IWRM is being highlighted especially with relevance to the water and sanitation related MDG targets. Extreme catchment events (droughts, floods and related landslides) are used to demonstrate the economic, social and environmental benefits of IWRM. Support is being provided to countries to develop long term integrated water policies as best approach to climate change adaptation in the water sector, as well as shorter term priority catchment issue resolutions (e.g. flood / drought mitigation or improving access to safe drinking water).

The centre is acting as a regional clearing house, developing and promoting best practice and training to build national and local capacity in IWRM. Existing regional networks are being

used including the South-South partnership with other Small Island Developing States (SIDS) regions such as the Caribbean and Indian & Atlantic Ocean established at the 3rd World Water Forum to promote IWRM initiatives in the countries as well as SIDS IWRM issues on the global agenda.

Re-Inventing Irrigation and Agricultural Water Governance in the Asia Pacific to Meet the Millennium Development Goals

FAO and IWMI

1. Description:

FAO and IWMI's initiative is "Re-inventing irrigation and agricultural water governance in the Asia Pacific to meet the Millennium Development Goals - a regional programme to support action at all levels through knowledge sharing, capacity building and implementation".

The key objective is to support feasible pathways to re-invent irrigation and re-think agricultural water governance to ensure the social, economic and environmental outcomes to sustain food security and poverty alleviation in the river basins of the region.

Its initial focus is irrigated agriculture. The sector is the major water consumer and backbone of food security in the region: development and environmental targets will not be met if this sector does not adopt forward-looking strategies. This requires the adoption of effective policies and strategies; investment and modernization of all types of irrigation systems; and improved agricultural water governance.

The initiative aims at triggering effective change by bringing the focus on the neglected agricultural water management sector to respond to global changes: climate change, agricultural trading, changing consumption patterns, decentralization. It is especially a timely response to soaring food prices: investment flows and reform must deliver the results and should not further destroy our ecosystems.

The initiative is designed to enable actors at all levels to take effective action, achieving consistency of objectives and interventions at all management and implementation levels, supporting effective implementation and filling critical knowledge gaps, requiring substantial capacity building at all levels and instruments to monitor and evaluate the results of change.

The initiative includes five inter-related components: communities of practice at all levels; a Knowledge Hub on irrigation service

reforms; a number of representative basin centers of excellence and reference, consisting of the array of central agencies, basin organization and leader functional level centers such as local governments, irrigation system and groundwater managers, and farmers associations; a framework for monitoring of investments and results and a harmonized regional irrigation benchmarking initiative; and the mobilization of the professional community in the region.

Although focused primarily on Themes 2 and 3 of the Forum and MDGs 1 and 7, the initiative cuts across and attempts to bridge the gaps between all Themes with a focus on agricultural water management. The main bridges are to be established between irrigation and the environment, agriculture policy and knowledge, implementation and knowledge, policy and implementation, and national and river basin logics and local and decentralized actors.

2. Update on Progress:

FAO and IWMI have initiated consultations with all potential partners after the summit. A consultation process will partners at regional level to fully design the initiative's components and the creation of coalitions of local partners with local partners in four priority river basins, together with a community of practice on water allocation issues are under way. The Knowledge Hub has been launched. The overall strategy is thus the bottom-up development of river basin initiatives by local stakeholder, actors and users supported by regional components undertaken by a network of resource centres.

Community of Practice in Asia-Pacific: Environmental Flows for Water Resources Management

IUCN

Over the last five years, IUCN has been working with a number of partners including NARBO, IWMI, WWF, FAO, The Nature Conservancy, UNESCAP, and the Mekong River Commission, to promote environmental flows globally and regionally. Environmental flows means enough water is left in the rivers in order to ensure downstream environmental, economic and social benefits. In September 2007, at the River Symposium in Brisbane, Australia, IUCN and partner organizations launched a Global Environmental Flows Network. The overall goal of the network is to integrate environmental flows into standard practices for the management and use of river basins.

The e flows network connects water managers, governments,

businesses, NGOs, local communities and scientists to share knowledge or experience on environmental flows. It facilitates communication, capacity building and education to expand the recognition and adoption of eflows globally, and bridges the gap between science, policy and implementation by encouraging a broad dialogue on putting eflows into practice. The network's website provides knowledge of environmental flows to new audiences by offering readily available access to current practices and methodologies.

In the Asia-Pacific region, IUCN is working to ensure that the region's specific needs and issues related to environmental flows are promoted and looked at by integrating the concept in on-going projects that engage with key stakeholders. By doing so, IUCN is providing a platform to support action in putting environmental flows into practice, which is essential if river basins are to be restored and managed in a manner that serves environmental needs alongside livelihoods and well-being.

Specifically, IUCN has integrated the concept in the multi-stakeholder dialogue processes of the Mekong River Water Dialogues which are being implemented in Vietnam, Cambodia, Lao PDR, Thailand and China. In Pakistan the concept is being integrated into the Balochistan Sustainable Development Project. In Vietnam in the Huong River basin planning and in the forthcoming India-Bangladesh Transboundary Management project eflows will be an important component of the project. "Flows" the tool kit on eflows published by IUCN has also been translated into regional languages like Thai etc.

In all the projects being implemented and supported by IUCN the overall goal is to manage and protect water resources and their supply systems to meet human and environmental needs. Finally helping set up a better water governance framework in the region.

Developing Knowledge and Lessons - Establishment of Network Of Knowledge Hubs

PUB Singapore and UNESCO

PUB Singapore and UNESCO are the lead organisations for KRA 1 on Developing Knowledge and Lessons, which aims to improve coordination on capacity development programmes and to provide better guidance on water policy issues through sharing of experiences, building up of a network of water knowledge hubs and strengthening existing networks. KRA 1 is strongly supported by ADB and UNESCO-IHE.

The APWF Knowledgehubs, the concrete initiative of KRA 1, was launched on 26 June 2008 at PUB's WaterHub during the inaugural Singapore International Water Week (SIWW). Currently, the APWF Knowledgehubs consist of 13 knowledge hubs each covering one of the 18 priority water topics identified by ADB. The establishment of APWF Knowledgehubs is an inclusive process aiming to ensure a high standard of excellence in the development and dissemination of knowledge, whereby the knowledge hubs have agreed to help each other to peer review business plans and put in place key operating principles.

Singapore's contribution. To facilitate the sharing of knowledge and experience with other countries, PUB organised the annual Singapore International Water Week (SIWW), a global platform for water solutions, in June 2008. The inaugural show saw more than 8500 delegates from 79 countries coming together to address challenges, showcase technologies, discover opportunities and celebrate achievements in the water world. In addition, as one of the lead organizations for KRA 1 and as knowledge hub for Urban Water Management, PUB's WaterHub continues to deliver capacity building workshops to share on water resources management, water services, policies and best practices. Since the formation of the APWF in Sep 2006, about 600 participants from 45 countries have taken part in the workshops funded by Singapore. Some of the workshops are also co-funded by ADB. Moving Forward. KnowledgeHubs is progressing well and two successful regional meetings were organised with prospective hubs clients, in Zhengzhou, China on 15-17 October on hydro-informatics, and in Bangi, Malaysia on 1-5 December 2008 on water and climate change adaptation. The next key milestone will be the establishment of the APWF Knowledgehub Secretariat to support and coordinate the activities carried out by the knowledge hubs, which the PUB on its part will provide the necessary office space at Waterhub to house the Secretariat office. Another priority is the identification of knowledge hubs for the remaining water topics namely, groundwater management, transboundary water resources, sanitation, water supply for rural areas and small towns and water and energy.

List of APWF Knowledge Hubs

- Urban Water Management [PUB WaterHub – Singapore]
- Disaster Risk Reduction and Flood Management [ICHARM – Japan]
- Water and Climate Change Adaptation in Southeast Asia [NAHRIM – Malaysia]
- River Basin Organizations and Management [CRBOM – Indonesia]
- Water Quality Management in River Basins [K-water – Korea]
- Decision Support Systems for River Basin Management

(Hydro-informatics) [CHIRB – China]

- Water Governance [Institute of Water Policy (IWP), LKY School of Public Policy - Singapore]
- Irrigation Service Reform [IWMI - Sri Lanka]
- Integrated Water Resources Management in Central Asia [Central Asia IWRM Resource Center – Uzbekistan]
- Integrated Water Resources Management in the Pacific [Pacific IWRM Resource Centre - Fiji Islands]
- Erosion and Sedimentation in River Basins [IRTCS - China]
- Healthy Rivers and Aquatic Ecosystems [IWC – Australia]
- Water Resources Management in Mountainous Areas [ICIMOD – Nepal]

Website: www.apwf-knowledgehubs.net

Contact: sec@apwf-knowledgehubs.net

Asia-Pacific Water Museum

NSM of Thailand, UNESCO and JWF

The National Science Museum (NSM) Thailand, Ministry of Science and Technology, has a mission to promote the public awareness of science and technology, to develop rational thinking and a better living quality of the society. In 2007, NSM has got an approval by Thai Government on the Rama IX Museum Establishment project as one of the commemorative projects of His Majesty King Bhumibol's 80th Birthday Anniversary. The museum will introduce His Majesty's systematic problem solving approach and self-sufficiency principle which result in simple but effective solution to the major problems of the country. The museum will also cover the issues of environment and ecology, soil and water, with a gallery on water issues in Asia Pacific and the world. The gallery will serve as an Asia Pacific Water Museum (APWM, which functions to promote the public awareness of water resource conservation and to be a center for information and knowledge sharing on water resources, water management, as well as water-related issues in the Asia-Pacific region. Three major roles of the water museum will include: a) exhibition that will be themed with water-related issues, science, technology, culture, tradition, and history and Asia Pacific Region, b) education: with formal and informal education program for both school and public group to raise awareness in water and environment conservation, and c) information center: providing outcomes, research materials, database regarding the Asia Pacific water situation.

Development Plan

The plan of APWM will proceed under the framework of Rama IX Museum development through the budget of The Thai

government. The museum is now under the stage of master plan preparation which is to be completed in late 2009. The museum construction is expected to be commenced in 2009 and due to completion at the end of 2011.

Through sharing of information among our world water network, with enthusiastic encouragement given to this project from JWF, APWF, UNESCO, UN agencies and various international organizations, NSM hopes to bridge and bring about key messages regarding water resources, culture, success and failure in water management and practice from various countries so that it can be conveyed in the exhibition and activities, thus turning the effort one has made in one place into a lesson learned by others to enhance awareness water conservation in global and regional dimensions.

Increasing Local Capacities for Bridging the Divides in the Region

UN-HABITAT and STREAMS

The Asia-Pacific region is facing serious water challenges. Many of these problems can be addressed if there is strong political commitment and leadership at local, national, regional and international levels. Experience has shown that with movers and shakers changes happen. Increasing local capacity is quite essential for the leadership and supporting them in their efforts to address the different water and sanitation crisis happening all over the region.

UN-HABITAT is cooperating with the STREAMS for organizing various activities for developing local capacity. The concrete initiative aims at facilitating the proactive involvement of local government authorities for effective water management and improved delivery of sustainable water, sanitation and hygiene services. For this purpose, capacity building hubs have been identified both at regional, national and local levels that will enable policy support for increased local capacities. These hubs will be addressing the two major issues (i) providing water for sustainable development and (ii) enabling mechanisms for development that are being addressed during the 5th World Water Forum. These capacity building hubs will invariably build on the various themes and topics of the 5th World Water Forum. Thus, helping bridging the divides in the region.

UN-HABITAT and SOK have undertaken a rapid mapping of water networks and other water-related organisations with the ending view of identifying potential capacity building hubs within the region who will take lead in building the necessary capacity in the Asia-Pacific region. The key objective of the capacity development hubs at country and local levels is to facilitate the

dissemination of knowledge products and services relating to sustainable water, sanitation and hygiene service delivery for the poor communities. The capacity development hubs will facilitate the training, information dissemination and sharing of knowledge about the local actions/ best practices in water and sanitation which are successfully implemented.

The identified capacity development hubs plan to collaborate with local government authorities, civil society, community based organisations and water and sanitation service providers to collect/ develop a pool of resources, materials and courses relating to global changes and risk management including climate change and water-related disasters and their management, ensuring water, sanitation and hygiene for all, managing and protecting water resources and their supply systems to meet human and environmental needs as well as sustainable financing for the water sector, its governance and good management. These hubs will organise/ facilitate multi-stakeholder learning platform and also mobilize additional resources/ support from local, national and other regional bodies. This probably is the best way of education, knowledge and capacity building in all regions of the world.

TV Documentary Co-Production on Water

ABU, ADB and JWF

1. Background

Increasing public outreach is one of the key result areas (KRA3) of the APWF, which hinders in part on developing strategic media activities.

2. Brief Description

The objectives of this initiative are to support capacity building of media and journalists, to contribute to the development of regional water advocacy, and to support in country water awareness development. In 2007, 6 member broadcasters of the Asia-Pacific Broadcasting Union (ABU) co-produced a TV documentary "Water Issues in Asia-Pacific" in support with Asian Development Bank (ADB) and Japan Water Forum (JWF). The documentary consisted of six reports regarding water problem seriousness in each country (Japan, Papua New Guinea, Malaysia, China, Nepal and Vietnam). The programme was aired by all participating broadcasters. It was also screened at the 1st APWS held last December in Beppu City, Japan.

3. How the initiative is bridging some of the divides in the region

The initiative could bridge the divides in terms of awareness on water by broadcasting a documentary on TV, one of the most

effective ways to increase public awareness. And the members of co-production are consisted of broadcasters in both developed and developing country, which could also bridge the capacity divides.

4. How do these concrete initiatives contribute to bridging divides in terms of the MDGs and other water-related goals

Increasing public awareness by using TV broadcasting could be one of major momentums to contribute to bridging divides in terms of the MDGs and other water-related goals.

5. Application to the other regions

This initiative is being implementing by a reasonable regional consortium. The consortium is consists of a regional broadcasting union (ABU) as producer and a regional development bank (ADB) as financial sponsor under a framework of a regional network (APWF). The concept of the consortium could be applied to the other regions.

6. Update on Progress

The ABU expects 10 members to join the co-production. Each participating organisation will make a 10-minute video report which will depict how local people are tackling their water problems. Once completed, it will be distributed to other participating broadcasters. The production will be done on a monthly basis. This means that every month one video report on water issues will be produced and made available to all ABU members.

ADB is leading work for KRA 3 for improving public outreach in collaboration with JWF, ABU and other interested organizations. Initial activities have included television documentaries, and the publication of the 'Asian Water Development Outlook 2007' which was commissioned to inform water leaders in the region, including those attending the 1st APWS. Preparations for the 'Asian Water Development Outlook 2010' have started. ADB's Water for All website (www.adb.org/water) and online water knowledge center (www.adb.org/water/knowledge-center) continue to offer updated news as well as knowledge products and stories from around the region.

MINISTERS FOR WATER SECURITY INITIATIVE IN THE ASIA-PACIFIC

JWF, UNESCAP, ADB, and NARBO

The development of an initiative on Ministers for Water in the Asia-Pacific to keep water issues high on the agenda of leaders and support the regular Asia-Pacific Water Summits was part of the regional efforts of KRA 4 on "Monitoring of Investment and

Results". Following the 1st APWS, work under KRA 4 continued with emphasis on identifying key issues to be addressed by such an initiative, including both achievements and emerging challenges in the water sector.

APWS has underlined the need for leadership and commitment to achieve water security. Low access to water and sanitation in the region is still a serious barrier to human health and dignity, and to economic development, highlighting the fact that water insecurity is still widespread. By adopting sound policies and promoting more investment in water services and water resource management, leaders can make a profound impact on poverty reduction and sustainable economic development.

The 1st Asian Water Development Outlook provided clear messages to leaders at the APWS that knowledge and solutions are available to address the region's water challenges, provided that water governance is improved.

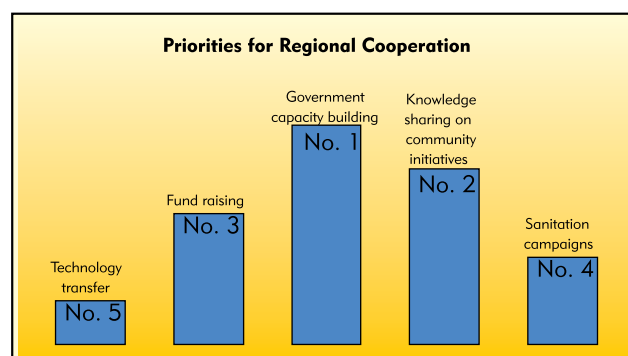
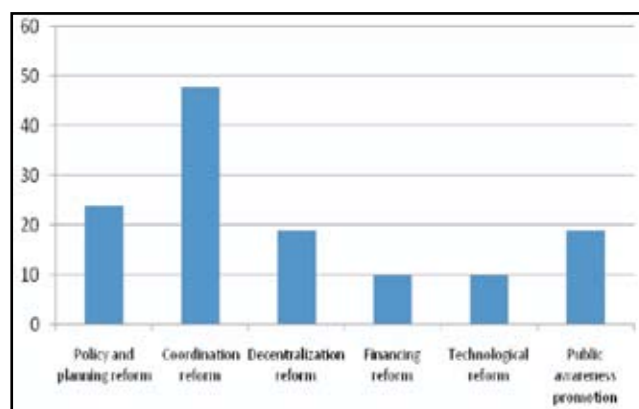
The APWS has significantly increased public awareness and spurred many follow-up actions to continue promoting leadership and commitments. The three partners that led the formation of the APWF with the Asia-Pacific Ministerial Meeting at the 4th World Water Forum in Mexico City in March 2006, namely Japan Water Forum (also functions as the Secretariat for APWF), ADB and UNESCAP, have recognized the need to further strengthen national and regional activities on Monitoring of Investment and Results with a view to increasing water security and preparing for the 2nd APWS.

One of the envisaged follow-up activities is the establishment of an initiative that promotes and disseminates the work of ministers and other leaders in the region to take concrete steps for increasing water security. The three partners will collaborate to develop an initiative on Ministers for Water in the Asia-Pacific and to explore support for its implementation through in-country and regional activities, with the involvement of members and stakeholders of the APWF and leaders participating in the APWS.

Implementation of the International Year of Sanitation-2008 and follow-up

UNESCAP, JICA, WHO, UNICEF and ADB

Following the Regional Launching of the International Year of Sanitation at the 1st APWS in December 2007 in Beppu, Japan, ESCAP continued its efforts in collaboration with various regional and international partners to promote the implementation of IYS-2008. As part of its efforts, ESCAP conducted a survey in the Asian and Pacific region and organized a "Regional Workshop on Institutional Changes Required to meet the MDG on Sanitation" in November 2008 in Macao, China, to consolidate achievements of IYS in the region and to identify emerging and persisting challenges in meeting the MDG on sanitation. As part of the survey, a questionnaire was sent at the beginning of September



2008 to members countries through the regional offices of the WHO and UNICEF. As of 28 October 2008, 15 completed questionnaires were returned to ESCAP, either directly or via the country WHO or UNICEF offices. The key findings of the survey and the regional workshop are summarized below.

Nearly 50 per cent of the countries have recently introduced coordination reform with the establishment of coordination mechanisms for sanitation issues (e.g. National Committee on

Sanitation, Steering Committee on Sanitation etc.) and policy changes with the integration of sanitation in existing national plans. These changes aimed to involve key stakeholders, such as representatives from all the Ministries that influence sanitation decisions or are mandated to help in meeting the MDG on sanitation.

Information received from the responses was rich with respect to presenting key recommendations in promoting sustainable sanitation infrastructure at the local level. Financial sustainability was a key concern and a unanimous recommendation was the establishment of household contributions. Adequate support for the extreme poor was also identified as key condition. Although hygiene and sanitation campaigns were effective tools for promoting sanitation goals, uplifting the current standards and sustaining the improved goals requires institutional support, and inclusive in these is the need for such improvements to be part of, and integrated within the national development plans. Support for civil society mobilization, community based initiatives and political leadership may need to be institutionalized as well, within the national development plan initiatives. The experiences in the region also showed a wide variety in the modalities and methodologies for improving sanitation. Among these, advocacies and creating awareness in the form of sanitation and hygiene campaigns, particularly in rural areas, were most common. The most important national driver for institutional changes was found to be civil society mobilization, followed closely by community-based initiatives and political leadership.

All the above activities and findings are part of the follow-up action that JICA, WHO, UNICEF, ADB and UNESCAP will continue to carry out to prepare for the 2nd APWS in order to promote for more regional efforts towards achieving the MDGs on water supply and sanitation.

Sanimap (Water Web Projects on Google Map / Earth)

JWF and Water Web Alliance

<http://www.sanimap.net>

The "Water Web Projects on Google Map / Earth" was launched at the 1st APWS, to contribute to solve water problems, by using open source web technologies, such as Google Map & Earth. The Sanimap is the first attempt of such projects that focuses on sanitation. Mr. Yoshiro Mori, President of the Japan Water Forum and former Prime Minister of Japan announced the release at the 1st APWS.

Description

The objective of the Sanimap is to bring together donors and implementing organizations of sanitation projects and training in developing countries more efficiently. Users of the Sanimap can ACCESS, POST, COMMENT on and RATE information, which is classified into 3 categories: "Projects", "Sanitation NOW" and "Organizations in the sanitation sector".

This web tool makes it possible for those without contact points to directly assist projects and training, and monitor the progress in developing countries. It also makes it possible to share lessons learned from the projects online and exchange views, which promotes good practices and business models for sustainable sanitation around the world.

Update on Progress

The Sanimap is free of charge and open to everyone. More than 70 users from across the globe have registered since August 2008 (3 months). Eight news pieces, 40 organizations and 65 projects in the sanitation sector have been posted (as of the end of November 2008). The Sanimap has gained acclaim as a useful database tool of the Sustainable Sanitation Alliance (SuSanA) in the international community.

The Sanimap is developing further. Discussions are currently being held about a work flow for the quality control of posted information. To achieve the objective of the Sanimap, the JWF and WWA will make every effort to promote organizations working in the fields of sanitation and hygiene to post project proposals, and also donors and potential ones to access and find good organizations and projects through the Sanimap, which they could assist.

Central Asian IWRM Resource Center

GWP CACENA, ICWC, ICSD and EC IFAS

To bridge existing gaps in water-related information exchange and capacity development the Asia-Pacific Network of Knowledge HUBs was created. As a response to this initiative, the GWP CACENA in cooperation with Scientific-Information Center of the Interstate Commission for Water Coordination in Central Asia (SIC ICWC) promoted the establishment of the Central Asian IWRM Resource Center, which became an integrated part of the above network.

The Center committed to serve as facilitator for the integrated water resource management projects, research activities, information exchange and capacity development for local and international actors working at different levels of the water

hierarchy within water, agriculture, energy and environment sectors in Central Asia. The Center is a non-profit association of the regional and national water-related institutions, covering five countries. The headquarter is located in Tashkent, Uzbekistan and its branches in the republics of Kazakhstan, Kyrgyzstan, Tajikistan and Turkmenistan. Actually, activities of this Center are supported to different extents by Swiss Development and Cooperation (SDC), UNECE, ADB, GWP CACENA and CapNet. In the future, the Center foresees to expand collaboration with UNDP and the European Commission and to cover countries of the Southern Caucasus (Azerbaijan, Armenia and Georgia).

As regional water knowledge hub, the Central Asian IWRM Resource Center offers to local, national and regional authorities, academic and education institutions, public and private corporations, specialized water sector institutions, international partners and others the following services:

- Knowledge exchange through unique Central Asian Water-Info web-portal (www.cawater-info.net).
- Access to retrospective hydrological data, real-time data on water allocations and use, estimates of future water consumption, actual and future water and land productivity in the region.
- Access to E-Library of SIC ICWC and GWP CACENA (publications, national and international laws, international conventions, water planning models, an inventory of best practices and more).
- GIS-based services – different thematic maps.
- Cooperation bridges with regional projects addressing to effective water resource use and conservation and the adoption of common water management policies and guidelines.
- Interactive professional training for high and mid-level specialists in water and land management, irrigation and drainage, and environmental protection.
- Regular round tables to support interstate policy dialogues on water use and management. Capacities to coordinate research activities and projects – to bridge local and overseas scientists and institutions.

The CEO Water Mandate

UN Global Compact

One of the key elements of the CEO Roundtable at the APWF was the discussion of the United Nations Global Compact CEO Water Mandate and the commitment to expand and increase the activities of the Mandate in the Region.

The CEO Water Mandate recognizes that the business sector,

through the production of goods and services, impacts water resources – both directly and through supply chains. Endorsing CEOs acknowledge that in order to operate in a more sustainable manner, and contribute to the vision of the UN Global Compact and the realization of the Millennium Development Goals, they have a responsibility to make water-resources management a priority, and to work with governments, UN agencies, non-governmental organizations, and other stakeholders to address this global water challenge. The CEO Water Mandate covers six areas: Direct Operations; Supply Chain and Watershed Management; Collective Action; Public Policy; Community Engagement; and Transparency.

Endorsers of the CEO Water Mandate recognize that through individual and collective action they can contribute to the vision of the UN Global Compact and the realization of the Millennium Development Goals. Since the 1st APWS the number of CEOs from Asia-Pacific companies engaged in United Nations Global Compact CEO Water Mandate has increased to five: Finlay International (Bangladesh), Hayleys Limited (Sri Lanka), Hindustan Construction Co. (India), Hong Kong Beijing Air Catering (China), Westpac Banking Corporation (Australia).

Importantly, there are now a total of 45 leaders from the following global corporations, most with extensive operations in the Asia Pacific Region who are active in the CEO Water Mandate.

During the year, the CEO Water Mandate has received a high level of promotion from the Global Compact Office and included in the Asia Pacific Local Network meeting held in Seoul, Korea. On 21-22 August, the UN Global Compact Office, in partnership with the Pacific Institute, convened the second working conference of The CEO Water Mandate. Held in Stockholm during World Water Week, the event focused on the topics of managing water in the supply chain, and transparency. The conference brought together approximately 70 senior representatives from the private sector, civil society, UN agencies, as well as other key stakeholders. A keynote address was delivered by Ewa Bjorling, Swedish Minister for Trade.

Along with sharing of emerging practices related to water and supply chains, including discussions on assessing, measuring, and managing water-use impacts, risks and opportunities, the conference focused on the draft Transparency Framework for The CEO Water Mandate. Developed in partnership with the Pacific Institute, the ultimate goal of the Transparency Framework is to establish transparency policies, objectives, and actions that are deemed valuable and credible by endorsers and key interests.

On the 9th of October 2008, the CEO Transparency Policy and Framework were announced. Details of the Policy and Framework are available at http://www.unglobalcompact.org/Issues/Environment/CEO_Water_Mandate/index.html

The next CEO Mandate working conference focusing on "Water and Public Policy" will take place in Istanbul on 16-18 March, 2009.

Leadership Group on Water Security in Asia

Asia Society

The Asia Society has formed a **Leadership Group on Water Security in Asia** to examine decreased access to a safe, stable supply of water as a driver of political and social instability and conflict in Asia. In addition to identifying potential destabilizing forces and likely hot spots in the region, the Leadership Group will put forward a comprehensive set of policy recommendations in support of cooperative approaches to prevent, manage and respond to water scarcity and its impacts. The first report of the Leadership Group provides a forward looking action plan outlining how governments, businesses, NGOs, and regional and international organizations can work together to address the challenges associated with water security and how good water governance, efficiency, transparency and equity advances conflict management/prevention in Asia and in the world more broadly. Moreover, the Leadership Group report will proffer regional and global institutional remedies to improve cooperation and management of shared, transboundary water basins.

The members of the Leadership Group include former senior government officials, leaders from business and civil society, scientists and experts—who together represent the best thinking on these issues. In seeking the broadest regional representation, the Asia Society's Leadership Group exemplifies the type of regional and global dialogue needed to address the looming water crisis in Asia. **Tommy Koh**, Chair of the APWF Governing Council and Singapore's Ambassador-at-Large, is chairing the Group. Other members include **Rajendra Pachauri**, Nobel Prize-winning Chairman of the UN International Panel on Climate Change (IPCC), **Richard Holbrooke**, Chairman of the Asia Society and former US Ambassador to the UN, **Gareth Evans**, President of the International Crisis Group and former Foreign Minister of Australia, **Nafis Sadik**, Special Advisor to the UN Secretary-General, **Han Sung-Joo**, Chairman of the Asan Institute for Policy Studies and former Foreign Minister of South Korea, **N.G. Wickremaratne**, CEO of Hayleys Limited (Sri Lanka), **Ajit Gulabchand**, CEO of Hindustan Construction Company (India), and **Surin Pitsuwan**, Secretary-General of the Association for Southeast Asian Nations (ASEAN), among others.

The work of the Asia Society Leadership Group is supported by

an international advisory council that includes leading specialists from environment, security, development and humanitarian sectors. To carry out the project, the Asia Society is working in partnership with the Earth Institute's Water Center at Columbia University in New York, APWF and JWF.

Guidelines for IWRM at the River Basin level (IRBM)

UN-Water (Secretariat: UNESCO)

Sustainable development depends on the management of water resources. Managed water resources are an essential component of growth, social and economic development, poverty reduction and equity. They are essential to the achievement of the 2015 Millennium Development Goals.

Because water is managed locally, IWRM at the river basin level is being recognized as a comprehensive basis for managing water resources more sustainably. In developing countries, water security has more difficulties in solving trade-offs to maintain a proper balance between infrastructures and institution, and to realize adaptable governance for natural, economical and social changes. The implementing IWRM progress in varying degrees depends on the area, capacity, political will, and understanding of IWRM concept and its implementation. Under these circumstances, the MDGs may be very difficult to achieve.

The Guidelines of IWRM at the river basin level will be disseminated as a follow-up of UNESCO's International Hydrological Programme latest report and contribution to the World Water Assessment Program culminating in the launch of the 3rd United Nations World Water Development Report at the 5th World Water Forum, with the collaboration of many individuals and organization from around the world. The Guidelines will be also planned to be applied to Asia as a leading area in cooperation with NARBO.

The Guidelines intends to provide pragmatic principles and procedures that cover a large range of complex situations and bridge the gap between resources management and function provision. It highlights key issues that extract the key challenges from existing case studies in different sectors and geographically, politically, socially, economically, unique areas under the principle that; to be practical especially at the real field in developing countries; to generalize Keys for Success from diverse cases; to be coordinated side of views; to be an evolutionary process by seeking an acceptable best set of solutions on each process.

Readers will be able to find relevant sections such as irrigation, environmental conservation, water-related disaster, navigation, hydropower etc. including overall facilitation of stakeholders, with customized practices to solve their own issues. It answers that IWRM is not a complicated process, and it benefits for each sector in a process of adaptation to changes within a sustainable national development. Thus, the product would support to bridge contributions in diverse area linked to capacity development, by guiding water managers to voluntarily know how to persuade their colleagues to do IWRM and how to start or make forward IWRM from whichever stage they are.

SWITCH – Integrated Programme for Asia (SWITCH-IPA)

SWITCH - Sustainable Water Management Improves Tomorrow's

Cities' Health

UNESCO Jakarta Office

Background

During the 4th World Water Forum in Mexico in March 2006, the EU and UNESCO-IHE launched the SWITCH* initiative, which constitutes a world-wide, innovative, urban water management project, implemented via a 33 partner consortium, addressing a range of un-sustainability issues of water in our expanding cities today. While this action research and demonstration project has a world-wide coverage, the need was felt to develop a specific programme for Asia and the Pacific Region (ASPAC), which has over 60% of the world population, the largest increase in extreme weather events, the largest number of people without access to safe water supply and sanitation (62 and 74%, resp.), and shows the most rapid destruction of water resources in terms of quality and quantity. Besides, the coverage of the ongoing SWITCH programme in Asia is very limited, with activities only in China. Therefore, a new initiative is proposed specifically for Asia and Pacific region, referred to as the "SWITCH Integrated Programme for Asia (SWITCH-IPA)".

Description

This programme aims at the development, application and demonstration of a range of tested scientific, technological and socio-economic solutions and approaches that contribute to the development of effective and sustainable urban water management

(UWM) schemes in 'Asia's City of the future' (projection 30-50 years from now). The approach will be to develop efficient and interactive urban water systems and services (city level) in the context of the city's geographical and ecological setting (river basin level), which are robust, flexible and adjustable to a range of global change pressures (global level). The programme will address a wide range of water-related issues and challenges for cities, settlements and corresponding catchments. The issues include sustainable water supply and sanitation services, pollution abatement and water quality improvement, health and hygiene promotion (water borne disease), flooding/droughts, and other water-related disasters. The programme contributes positively to Millennium Development Goals 1, 4 and 7, and is expected to have a wide global impact on the feasibility of sustainable, integrated UWM schemes.

Programme implementation

The programme will be implemented in two phases: phase I will emphasise innovation, development, demonstration and capacity building, while phase II will be mainly on replication and up-scaling of best practices. During phase I the proposed SWITCH-ASIA programme will be implemented along three inter-active components, including: a) Action research, b) Demonstration, and c) Training, capacity building and awareness raising.

This programme requires a broad consortium of partners, representing academia, municipal authorities, city planners, Provincial and local authorities (e.g. Municipal Councils), developers, SMEs, NGOs, UN agencies, banks and bilateral agencies. UNESCO and APWF will act as the lead partners in the development of the SWITCH-IPA programme.

Contact: g.arduino@unesco.org, h.gijzen@unesco.org



5

CONCLUSION AND RECOMMENDATIONS



5. Conclusion and Recommendations

Water problems of the Asia-Pacific region are manageable with strong political will, leadership, and commitment.

The Asia-Pacific region has taken on water security challenges head on. In December 2007, 10 Heads of Government and 32 ministers convened in Beppu, Japan at the 1st APWS. Under the chairmanship of former Prime Minister of Japan, Mr. Yoshiro Mori, participants of the Summit deliberated during two days on the critical water issues for the region: water financing and capacity development, water-related disaster management, water for development and ecosystems, among others and issued sweeping recommendations and messages to help steer the course for the region's water challenges.

The APWF family seizes this opportunity to again highlight some key facts facing water security in the region, and to convey the recommendations that were issued at the 1st APWS:

- Water is intricately linked to humanity's critical challenges, namely, climate change, food security, health and economic growth.
- 500 million people are still without safe drinking water and 1.8 billion without access to basic sanitation in our region.
- From 1980 to 2006, the recorded fatalities due to water-related disasters were approximately 1.36 million, of which, Asia accounted for 46 %, and the number of affected people was approximately 4.7 billion, of which, Asia accounted for 90%..
- 542 million, or two-thirds, of the world's hungry people live in Asia. Agriculture consumes an average 79% of the region's renewable water resources and faces the challenge of increasing food production, degraded ecosystems and competition for land.
- Investing in water is to invest in poverty reduction: \$1 spent on improving water supplies and sanitation buys the poor at least \$6 in time and health savings.
- In some of the major breadbaskets of Asia, such as the Punjab in India and the North China Plain, water tables are falling 2 to 3 meters a year, with serious consequences for agriculture and food security. Other critical systems, the tropical deltas, face degradation, sea level rise and water shortage. Water productivity of food production is low overall.
- Glaciers in the Himalayas are receding faster than in any other part of the world.
- Asia's rivers average 20 times more load than the rivers in

the industrialized world, and average 50 times more bacteria from human feces than WHO guidelines allow.

The APWF calls upon the region and its leaders to recognize the new regional movement and commitment generated by the 1st APWS to cope with the increasing challenges in water resources management and support efforts to integrate the following recommendations to give water security and sanitation a higher priority on the local, national, regional and international agendas :

1. Water Financing and Capacity Development

- Define policies that target the specific needs and opportunities of the poor for enhancing human security through improved water security
- Broaden the range of technology and management choices to include the development of innovative, low-cost technical choices that can be implemented in poor communities
- Establish more effective and diverse credit and financial management systems that are accessible and affordable to the poor; and develop regulatory regimes that encourage investments by the private sector, and especially by local small-scale entrepreneurs.
- Carry out reforms that include capacity building, introduction of more appropriate management systems, and more effective institutional coordination between all players

2. Water-related Disaster Management

- Integrate water-related Disaster Risk Reduction (DRR) into national development plans, recognizing adaptation to climate change as a highest priority issue
- Recognize the importance of IWRM for water-related DRR and the need to strengthen comprehensive structural and non-structural measures
- Establish national and local goals/targets for water-related DRR, taking the impacts of climate change into consideration
- Develop preparedness indices for water-related DRR
- Develop water-related disaster warning systems, human capacities and transparent data-sharing
- Promote and develop integrated transboundary river basin management
- Develop disaster communication culture

3. Water for Development and Ecosystems

- Implement good governance at all levels in catchment and islands
- Adopt practical tools to improve economic, social and environmental outcomes of water management
- Re-invent and invest in agricultural water management to raise the productivity of water and decrease the environmental footprint of agricultural production
- Protect and restore urban environments
- Prepare for climate change impacts on water availability and adopt mitigation and adaptation strategies that provide benefits now

Guiding Principles to Accelerate Progress













- Decentralization with empowerment
- Partnership approach between local authorities, civil society (NGOs and community-based groups) and different service providers (public and private)
- Capacity development and water awareness and education as an important area of investment
- Building knowledge platforms and supporting initiatives to accelerate progress
- Building a culture of openness among stakeholders of the region that is transparent, collaborative and relevant
- Integrating gender as a social and economic issue



















Key Recommendations for the Way Forward





















- Create a platform of scientific information to support decision-making
- Create a platform for knowledge coordination, knowledge sharing, and knowledge management at the regional and national levels to increase access to important information, skills, and other support services, in order to improve capacities and efficiencies among implementers of water management programs and services
- Create a platform for a set of sector-level collective monitoring systems at the regional and national levels

ANNEX 1

Relevant Data in the Asia-Pacific Region

			Proportion of the Population using an improved sanitation facility		Proportion of the Population using improved drinking water sources		Deaths ('000) Attributable to Water, Sanitation and Hygiene	
Sub-region	Country	Flag	1990	2006	1990	2006	Total WSH-related	% of total deaths
Central Asia	Afghanistan			30		22	78.5	16.2
	Armenia			91		98	0.1	0.3
	Azerbaijan			80	68	78	1.7	2.6
	Georgia		94	93	76	99	0.1	0.1
	Kazakhstan		97	97	96	96	1.6	0.9
	Kyrgyz Republic			93		89	1.4	3
	Tajikistan			92		67	2.2	4
	Turkmenistan						1.7	4
	Uzbekistan		93	96	90	88	2.2	1.3
Northeast Asia	China		48	65	67	88	200.2	2.2
	DPR Korea					100	7.1	3.5
	Japan		100	100	100	100	4.8	0.5

			Proportion of the Population using an improved sanitation facility		Proportion of the Population using improved drinking water sources		Deaths ('000) Attributable to Water, Sanitation and Hygiene	
Sub-region	Country	Flag	1990	2006	1990	2006	Total WSH - related	% of total deaths
Northeast Asia	Korea							
	Mongolia			50	64	72	1	5.2
Oceania & Pacific	Australia		100	100	100	100	0.4	0.3
	Cook Island		96	100	94	95	0	3.6
	Fiji		68	71	48	47	0.2	3.4
	Kiribati		22	33	48	65	0	6.6
	Marshall Islands		75		96		0	4.7
	Micronesia		29	25	88	94	0.1	8
	Nauru						0	2.6
	Niue		100	100	100	100	0	3.3
	New Zealand				97		0	0.2
	Palau		61	67	90	89	0	3.2
	PNG		44	45	39	40	4.9	10.4
	Samoa		98	100	91	88	0	4.2
	Solomon Islands		29	32	69	70	0.3	11.4
	Tonga		96	96	100	100	0	3.9
	Tuvalu		78	89	90	93	0	5.6
	Vanuatu				61		0.1	4.8

			Proportion of the Population using an improved sanitation facility		Proportion of the Population using improved drinking water sources		Deaths ('000) Attributable to Water, Sanitation and Hygiene	
Sub-region	Country	Flag	1990	2006	1990	2006	Total WSH - related	% of total deaths
South Asia	Bangladesh		26	36	78	80	109.9	9.9
	Bhutan			52		81	1.9	9.2
	India		14	28	71	89	782	7.5
	Nepal		9	27	72	89	24.7	10.6
	Pakistan		33	58	86	90	187.9	13.6
	Maldives			59	96	83	0.1	6
	Sri Lanka		71	86	67	82	2.7	1.9
Southeast Asia	Brunei						0	1.2
	Cambodia			28		65	21	13.1
	East Timor			41		62	0.6	9
	Indonesia		51	52	72	80	57.3	3.5
	Laos PDR			48		60	9.4	13.9
	Malaysia			94	98	99	2.2	1.9
	Myanmar		23	82	57	80	44	8.5
	Philippines		58	78	83	93	23.3	5.2
	Singapore		100*	100*	100*	100*	0	0.2
	Thailand		78	96	95	98	13.5	3.2
	Vietnam		29	65	52	92	20.8	4
Other	Iran		83		92			
	Israel				100	100		

Sources:

UNICEF & WHO (2008) Progress on Drinking Water and Sanitation.

*PUB Singapore

WHO (2008) Safer Water, Better Health

	Country	Average Precipitation (mm/yr). 2007	Water resources: total renewable per capita (actual) (m ³ /inhab/yr) . 1960-2008	Average Tariff US\$/m ³ in cities	Freshwater withdrawal as % of total renewable water resources (actual) (%)	Total Storage Capacity of Reservoir (1000m ³)	Agricultural water withdrawal (10 ⁹ m ³ /yr)
Central Asia	Afghanistan	327	2 492		35.8	3,158,000	(2000) 22.8
	Armenia	562	3 499		26.8	234,000	(2006) 1.86
	Azerbaijan	447	3 602		39.8	16,762,000	(2005) 9.33
	Georgia	1 026	14 286		2.56	1,918,000	(2005) 1.06
	Kazakhstan	250	7 157		30.5	50,430,000	(2000) 28.6
	Kyrgyz Republic	533	3 914		49.0	22,745,000	(2000) 9.45
	Tajikistan	691	2 407		74.8	10,597,000	(2000) 11.0
	Turkmenistan	161	5 045		99.6		(2000) 24.0
	Uzbekistan	206	1 868	0.01 (Tashkent)	116	2,738,400	(2000) 54.4
Northeast Asia	China	610*	2 130	0.14 (Chengdu)	21.8	593,442,125	(2000) 427
	DPR Korea	1 054	3 254		11.7	21,852,750	(2000) 4.96
	Japan	1 668	3 361	1.37 (Osaka)	20.4	21,517,131	(2000) 55.2
	Korea	1 274	1 451	0.49 (Seoul)	26.7	13,854,812	(2000) 8.92
	Mongolia	241	13 361	0.19 (Ulaanbaatar)	1.26		(2000) 0.23
Oceania & Pacific	Australia	534	23 964		4.86	93,779,313	(2000) 18.0
	Cook Island	2 100					
	Fiji	2 000-3 000	34 260		0.245	133,000	(2000) 0.05
	Kiribati	2 048					
	Marshall Islands	2 000-4 000					
	Micronesia	3 000-4 900					
	Nauru	2 090					
	Niue	2 180					
	New Zealand	1 732	78 993		0.645	17,094,886	(2000) 0.89

	Country	Average Precipitation (mm/yr). 2007	Water resources: total renewable per capita (actual) (m3/inhab/yr) . 1960-2008	Average Tariff US\$/m3 in cities	Freshwater withdrawal as % of total renewable water resources (actual) (%)	Total Storage Capacity of Reservoir (1000m³)	Agricultural water withdrawal (10 ⁹ m3/yr)
	Palau	3 700					
	PNG	1 000-8 000	129 158		0.00886	323,200	(2000) 0.001
	Samoa	3 000					
	Solomon Islands	1 500-5 000	92 351				
	Tonga	1 689-2 185					
	Tuvalu	3 569					
	Vanuatu	2 000-4 000					
South Asia	Bangladesh	2 666	7 761	0.06 (Dhaka)	6.56		(2000) 76.4
	Bhutan	2 200	146 432		0.447		(2000) 0.4
	India	1 083	1 647	0.07 (Delhi)	34.1	302,578,142	(2000) 558
	Nepal	1 500	7 605	0.09 (Katmandu)	4.84	144,550	(2000) 9.82
	Pakistan	494	1 400		75.2	23,434,931	(2000) 163
	Maldives	1 972	99.9		11.2		(1987) 0
	Sri Lanka	1 712	2 603	0.22 (Colombo)	25.2	5,817,707	(2000) 12.0
Southeast Asia	Brunei	2 722	22 254		1.08		
	Cambodia	1 904	33 537	0.24 (Phnom Penh)	0.857		(2000) 4.00
	East Timor						
	Indonesia	2 702	12 400	0.29 (Jakarta)	2.92	74,390,618	(2000) 75.6
	Laos PDR	1 834	57 914	0.04 (Vientiane)	0.899	407,000	(2000) 2.70
	Malaysia	2 875	22 211	0.30 (Kuala Lumpur)	1.55	28,959,562	(2000) 5.60
	Myanmar	2 091	21 613		3.18	969,517	(2000) 32.6
Sources		FAO Aquastat+Integrated Water Resource Management Synopsis (SOPAC) and PI- GCOS for the Pacific Islands+ Ministry of Water Resources China, 2007*	FAO Aquastat	Sources: ADB (2004) <i>Water in Asian Cities</i> + *PUB Singapore, based on exchange rate of 1US\$=1,45 S\$	FAO Aquastat	ICOLD (2003) World Register of Dams	FAO Aquastat

Sub-region	Country	Total area (1000 ha)	Population (millions)	Urban Population (% of total)	Annual Population Growth Rate %	Density (inhab/km ²)	Human Poverty Index (HPI-1) %	Human Develop- ment Index	GDP per Capita (US\$) in 2006
Central Asia	Afghanistan	65209				40.0			289.311
	Armenia	2980	3.0	64.1	0.2	101		0.775	1,881.211
	Azerbaijan	8660	8.4	51.5	1.3	97.1		0.746	2,454.756
	Georgia	6970	4.5	52.2	-0.3	63.6		0.754	1,764.863
	Kazakhstan	272490	15.2	57.3	0.2	5.62		0.794	5,260.976
	Kyrgyz Republic	19990	5.2	35.8	1.5	26.3		0.696	546.043
	Tajikistan	14255	6.6	24.7	2.1	46.6		0.673	440.575
	Turkmenistan	48810	4.8	46.2	2.2	10.0		0.713	4,191.503
	Uzbekistan	44740	26.6	36.7	2.1	60.3		0.702	642.796
Northeast Asia	China	959809	1,313.0	40.4	1.2	138	11.7	0.777	2,021.972
	DPR Korea	12054				197			
	Japan	37791	127.9	65.8	0.5	339	11.7	0.953	34,263.643
	Korea	9926	47.9	80.8	1.0	484		0.921	18,395.336
	Mongolia	156650	2.6	56.7	1.9	1.66	16.3	0.700	1,223.772
Oceania & Pacific	Australia	774122	20.3	88.2	1.3	2.65		0.962	36,420.430
	Cook Island	23.64	0.021388			56.8			
	Fiji	1827.40	0.905949	50.8	1.2	45.6	21.2	0.762	3,674.111
	Kiribati	81.0	0.105432			115			657.677
	Marshall Islands	18.10	0.060422			322			
	Micronesia	70.20	0.108004			158			
	Nauru	2.10	0.013287			507			
	Niue	26.0	0.017330			6.14			
	New Zealand	26771	4.1	86.2	0.9	15.5		0.943	25,224.554
	Palau	48.70	0.021492			44.0			
	PNG	46200.00	6.002079	13.4	2.5	13.4	40.3	0.530	943.239
	Samoa	293.00	0.183308	22.4	0.7	65.3		0.785	2,330.626
	Solomon Islands	2800.00	0.552438	17.0	3.0	16.7	22.4	0.602	658.094
	Tonga	74.70	0.114689	24.0	0.2	133		0.819	2 306.855
	Tuvalu	2.60	0.011810			350			
	Vanuatu	1219.00	0.217955	23.5	2.5	18.1	24.6	0.674	1 863.094

Sub-region	Country	Total area (1000 ha)	Population (millions)	Urban Population (% of total)	Annual Population Growth Rate %	Density (inhab/k m ²)	Human Poverty Index (HPI - 1) %	Human Development Index	GDP per Capita (US\$) in 2006
South Asia	Bangladesh	14400	153.3	25.1	2.2	1083	40.5	0.547	417.661
	Bhutan	4700	0.6	11.1	1.9	13.8	38.9	0.579	1,447.806
	India	328726	1,134.4	28.7	2.0	350	31.3	0.619	762.137
	Nepal	14718	27.1	15.8	2.3	188	38.1	0.534	333.200
	Pakistan	79610	158.1	34.9	2.8	202	36.2	0.551	817.260
	Maldives	30.0	0.3	29.6	2.6	1001	17.0	0.741	2,654.545
	Sri Lanka	6561	19.1	15.1	1.1	293	17.8	0.743	1,430.200
Southeast Asia	Brunei	577	0.4	73.5	2.8	66.2		0.894	30,342.157
	Cambodia	18104	14.0	19.7	2.3	78.4	38.6	0.598	512.867
	East Timor	1487	1.1	26.5	1.5	74.9	41.8	0.514	347.990
	Indonesia	190457	226.1	48.1	1.7	120	18.2	0.728	1,640.968
	Laos PDR	23680	5.7	20.6	2.2	24.3	34.5	0.601	580.535
	Malaysia	32974	25.7	67.3	2.5	79.2	8.3	0.811	5,943.270
	Myanmar	67658	48.0	30.6	1.6	71.5	21.5	0.583	232.248
	Philippines	30000	84.6	62.7	2.3	288	15.3	0.771	1,351.765
	Singapore	70.0	4.3	100.0	2.2	6260	5.2	0.922	31,027.888
	Thailand	51312	63.0	32.3	1.3	124	10.0	0.781	3,166.399
	Vietnam	32931	85.0	26.4	1.9	262	15.2	0.733	722.754
Other	Iran	174515	69.4	66.9	2.4	40.3	12.9	0.759	3,151.962
	Israel	2207	6.7	91.6	2.3	309		0.932	21,143.048
Sources		FAO Aquastat + SOP AC 2008 for the Pacific Islands	UNDP (2007) <i>Human Development Report 2007 - 2008</i> . + SOPAC 2008 for the Pacific Islands	UNDP (2007) <i>Human Development Report 2007-2008</i> .		FAO Aquastat	UNDP (2007) <i>Human Development Report 2007-2008</i> .		International Monetary Fund

ANNEX 2

Main Organizations and Institutions that Offer Technical and Financial Support to Water-related Issues

Asian Development Bank (ADB)	Japan International Cooperation Agency (JICA)
Australian Agency for International Development (AusAID)	Japan Water Forum (JWF)
Bureau of Meteorology (Australia)	Korea International Cooperation Agency (KOICA)
Canadian International Development Agency (CIDA)	Korea Water Forum (KWF)
Capacity Building Network for Integrated Water Resource Management (Cap-Net)	Korea Water Resources Corporation (K-Water)
Center for Hydroinformatics in River Basins (CHIRB)	Mekong River Commission (MRC)
Center for River Basin Organizations and Management (CRBOM)	National Institute of Water & Atmospheric Research (NIWA, New Zealand)
Danish International Development Agency (Danida)	National Hydraulic Research Institute of Malaysia (NAHRIM)
Department for International Development-British Government (DfID)	Network of Asian River Basin Organization (NARBO)
Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)	New Zealand Agency for International Development (NzAID)
Dutch Directorate General for International Cooperation (DGIS)	Norwegian Agency for Development Cooperation (Norad)
Food and Agriculture Organization of the United Nations (FAO)	Pacific Institute
Global Environment Facility (GEF/UNDP)	Pacific Partnership Initiative on Sustainable Water Management
Global Water Partnership (GWP)	Pacific Regional Environment Programme (SPREP)
Global Water Partnership for Caucasus and Central Asia (GWP-CACENA)	Pacific Water Association (PWA)
Global Water Partnership South Asia (GWP South Asia)	Public Utilities Board Singapore (PUB Singapore)
Global Water Partnership Southeast Asia (GWP Southeast Asia)	Scientific-Information Center of the Interstate Coordination Water Commission of the Central Asia (SIC ICWC)
Institute for Global Change Adaptation Science (ICAS)	Pacific Islands Applied Geoscience Commission (SOPAC)
Institute for Global Environmental Strategies (IGES)	Streams of Knowledge (STREAMS)
International Center for Integrated Mountain Development (ICIMOD)	Swedish International Development Agency (SIDA)
International Center for Water Hazard and Risk Management (ICHARM)	Transparency International (TI)
International Commission on Irrigation and Drainage (ICID)	UNEP-IETC (International Environmental Technology Centre)
International Fund for saving the Aral Sea	United Nations Children's Fund (UNICEF)
International Research and Training Center on Erosion and Sedimentation (IRTCES)	United Nations Development Programme (UNDP)
International Water Center (IWC)	United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP)
International Water Management Institute (IWMI)	United Nations Educational, Cultural and Scientific Organisation (UNESCO)
International Waters of the Pacific Islands	UNESCO IHE (Institute for Water Education)
Islamic Development Bank (IDB)	United Nations Environment Programme (UNEP)
The Island Climate Update	United Nations Human Settlements Programme (UN-Habitat)
	United States Agency for International Development (USAID)
	World Bank (WB)
	World Conservation Union (IUCN)

World Health Organization (WHO)
World Meteorology Organization (WMO)
World Supply and Sanitation Collaborative Council (WSSCC)
World Toilet Organization (WTO)
World Water Council (WWC)

Notes

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Lined area for notes.