PEARLS OF WISDOM
IN
ASIAN WATER SUPPLIES

Lessons Learned from
1000 Years of Collective Experience

Edited by Arthur C. McIntosh

ABOUT THE COVER

BENEVOLENT BUDDHIST DRAGON — YIN (Feminine)

The oriental dragon is a divine mythical creature and potent symbol of good luck in East Asian, Chinese, and Buddhist cultures. The Yin dragon represents the mind that seeks enlightenment. Chinese dragons obtain their power from "The Pearl of Wisdom," which multiplies anything it touches.

THE PEARL OF WISDOM — YANG

The dragon is often portrayed as chasing after a luminous pearl—thought to be a symbolic representation of the "Sacred Pearl," Qi or Yang energy. This sacred pearl is said to represent truth and life maybe even everlasting life, which is made available to those who perceive the truth and attain enlightenment. The dragon is associated with water. Many dragons lived in the sea and were fond of collecting pearls as each pearl represented the ancient knowledge of wisdom in their quest of enlightenment.

The red cover of the book is symbolic of courage.

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THE PEARLS IN CONTEXT

FOREWORD

In most parts of Asia, water supply and sanitation has a long way to go to reach developed country status. Many donors are active in the sector, but it is quite common to see water supply and sanitation projects that are not successful in terms of delivering sustainable improvements in a timely manner.

This book brings together the thoughts and stories of 42 authors who have made their mark in developing country water supplies. These include such giants of the water supply and sanitation industry as Margaret Catley-Carlson, Ravi Narayanan, Dipak Gyawali, Arjun Thapan, Tan Gee Paw, Ek Sonn Chan, Chuanpit Dhamasiri, Anton Soedjarwo, Kamal Kar, Ranjith Wirasinha and Peter Rogers.

On development, we learn from Margaret Catley-Carlson that dozens of donors directing their own resources to their own goals or modus operandi can constrain development. Anton Soedjarwo says that by keeping projects and activities small, it is possible to avoid heavy politics and bureaucracy. Vijay Jagannathan avers that development practitioners should encourage a culture of learning collaboratively with their clients. Arjun Thapan says don't ram development down a people—sip it with them slowly.

On water policy, Ravi Narayanan says the ideal solution is for every country to have a comprehensive water policy based on a system of reliable data collection and public dissemination. But most countries don't have a clear water policy and Tan Gee Paw notes this is why the Singapore Public Utilities Board founded the Institute of Water Policy.

On governance, Ek Sonn Chan says that unless urban water governance practices are improved significantly, universal access to clean drinking water will remain an unachievable dream, even if billions of dollars of investment are provided with no strings attached.

On sanitation, Kamal Kar noted that the drastic shift in approach brought about by community-led total sanitation was the change in basic assumption from *health* as a driver of change to *shame, disgust, and self-respect* as the shaker. The traditional mindset focused more on *things* rather than *people.*

The *Pearls of Wisdom in Asian Water Supplies* is a unique book that will appeal to those working in developing country water supplies, as a reference source and tool to guide practitioners in the development and operation of developing country water supplies.

Many people like myself have devoted 20–30 years of their lives to various aspects of Asian water supplies. Most of these people are in the 50–70 age range, and soon their knowledge may be lost. It is important while they are fit and well to pass on the key points of this knowledge to the younger generations.

The contributors are mostly those I knew myself and highly respected for their dedication to and passion for their work in Asian water supplies. Some 42 authors from 19 countries (including 9 developing countries) sourced from governments, utilities, consultants, donors, nongovernment organizations, media, and academia have contributed…all for free.

The subjects touched upon are many and varied. Many offer thoughts on development in general. Leadership, management, governance, policies, tariffs, capacity building, water resources, nonrevenue water, the urban poor, sanitation, private sector participation—there is something here for everyone. Maybe, the greatest lesson of all is that every person has a different perspective even on the same subject.

It is not enough to create a book of knowledge. It is important to make sure that knowledge is taken on board by the future decision makers who are the younger generation today. The first step toward that objective is to make the book very readable and user friendly. At the start of the book there is a summary by subject matter, which brings similar comments together. These are the *Pearls of Wisdom*. The full text of each author and their bio-notes (current at June 2012) are presented in the main part of the book called *The Pearls in Context*.

Arthur McIntosh

Editor

ACKNOWLEDGEMENTS

For this book, I was inspired and guided and provided with the necessary energy to see it through by a higher source. *"Somebody placed the shuttle in your hand: somebody who had already arranged the threads"* Dag Hammarskjold – Markings 1965.

That good man Ek Sonn Chan was the first to deliver his contribution and I was able to use his name and reputation to start the ball rolling. Thank you, Mr. Ek Sonn Chan.

Then as I kept going—and it was not plain sailing—there were two contributors who said they admired my tenacity. Thank you, Margaret. Thank you, Ravi. I can assure you I greatly appreciated your encouragement.

A special thank you to Salma Sadikha of Bangalore for having the courage to talk about the truth and the forces that come together to stop the urban poor getting a water connection.

To those authors who went out on a limb to say it as it really is with no sugar coating, thank you.

To all authors who answered my call and gave freely of time and thought to make this book something special, thank you.

Ma. Theresa Mercado provided the professional editing and the "pearls" picture.

K.E. Seetharam provided the introduction to Books on Demand at just the right time to make a difference. Thank you, Seetharam.

My wife Pauline provided the inspiration for the cover design, and was my sounding board day after day. My son Jeremy kept my feet on the ground. Thank you both.

To the late Quamrul Siddique from Bangladesh who taught me that it is patience and persistence that lead to success. This book would not have happened but for you.

Arthur McIntosh

Editor

ABBREVIATIONS AND ACRONYMS

ADB	–	Asian Development Bank
AFD	–	Agençe Francaişe de Developpement
AusAid	–	Australian Aid for International Development
BBMP	–	Bruhat Bangalore Mahanagara Palike
BWSSB	–	Bangalore Water Supply and Sewerage Board
CBO	–	community-based organization
CIDA	–	Canadian International Development Agency
CLTS	–	Community-Led Total Sanitation
DCWD	–	Davao City Water District
DFID	–	Department for International Development UK
DILG	–	Department of Interior and Local Government
DWASA	–	Dhaka Water Supply and Sewerage Authority
GIZ	–	Deutsche Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation)
GWOPA	–	Global Water Operators' Partnership Alliance
GWP	–	Global Water Partnership
IBRD	–	International Bank for Reconstruction and Development
IDWD	–	International Drinking Water Decade
IFDC	–	International Fertilizer Development Council
IMF	–	International Monetary Fund
IWA	–	International Water Association
IWADCO	–	Inpart Waterworks and Development Company
IWRM	–	Integrated water resources management
LGU	–	local government unit
LWUA	–	Local Water Utilities Adminstration
MDG	–	Millennium Development Goal
MEA	–	Metropolitan Electricity Authority
MWA	–	Metropolitan Waterworks Authority
NAST	–	Nepal Academy of Science and Technology
NGO	–	nongovernment organization
NRW	–	nonrevenue water
NWSDB	–	National Water Supply and Drainage Board (Sri Lanka)
ODF	–	open defecation free
PAWD	–	Philippine Association of Water Districts
PDAM	–	Water Enterprise (Indonesia)

PEA	–	Provincial Electricity Authority
PHAST	–	Participatory Hygiene and Sanitation Transformation
PUB	–	Public Utilities Board
PWA	–	Provincial Waterworks Authority
PWMC	–	Philippine Watershed Management Coalition
PWP	–	Philippine Water Partnership
PPWSA	–	Phnom Penh Water Supply Authority
RO	–	reverse osmosis
SBWRB	–	Subic Bay Water Regulatory Board
SEAWUN	–	Southeast Asia Water Utilities Network
SIDA	–	Swedish International Development Agency
SSWP	–	small-scale water provider
STBM	–	Sanitasi Total Berbasis Masyarakat (Community-Led Total Sanitation- Indonesia)
SWSP	–	small water service provider
UFW	–	unaccounted-for-water
UK	–	United Kingdom
UN	–	United Nations
UNDP	–	United Nations Development Programme
UNESCO	–	United Nations Educational Scientific and Cultural Organization
UNICEF	–	United Nations Children's Fund
USAID	–	United States Agency for International Development
VERC	–	Village Education Resource Centre
WCD	–	World Commission on Dams
WD	–	water district
WOP	–	water operators' partnership
WSS	–	water supply and sanitation
WTO	–	World Toilet Organization
WUSP	–	Water and Sanitation for the Urban Poor
YDD	–	Yayasan Dian Desa

MEASUREMENT UNITS AND SYMBOLS

Baht	Thailand Currency (June 16, 2012 US$1.00= 31.36 Baht)
cm	centimeter
km^2	square kilometer
kW	kilowatt
m^3	cubic meter
mm	millimeter
MW	megawatt
Rs	Indian Rupees (June 16, 2012 US$1.00=55.5 Rs)
Sq.ft.	square feet

THE PEARLS

(Editor Arthur McIntosh)

Introduction

My job as an editor is not to pass comment on the wisdom of many of the top practitioners of water supply and sanitation in Asia, but to assemble their thoughts into common subject matters so that they can be compared, and a better understanding of each subject attained. For someone looking for a comprehensive and structured guide to water supply and sanitation in developing countries, this is not the place. What it does do, and very powerfully, is to put a finger on those very important elements of development that make or break water supply and sanitation projects and their long-term sustainable operation.

This section gives readers a short overview of what is to be found in greater depth in the original contributions of each author contained later in this book.

Development in General

Margaret Catley-Carlson

- Real incentive to developmental change means opportunity for positive material change, productive employment, and money. Political accountability, goals, and an implementation plan are needed. A lot of energies are spent on designing technologies, but it is the human systems—much harder to get at—that are the real issue.
- Dozens of donors directing their own resources to their own goals or modus operandi can constrain development.
- Women are excellent change agents, but governments do not invest enough in them. Girls are disproportionately left out of school.

Nancy Barnes

- When developing countries have their own prioritized list of water investments, donor organizations can consider a project on that list, resulting in a better alignment of funding with priorities.
- Working relationships between the international consultant/donor and the government/utility in a developing country need to be greatly improved by recognizing they have a lot to learn from each other.

Vijay Jagannathan

- Development practitioners need to encourage a culture of learning collaboratively with their clients. Capacity building is a two-way process.

Digby Davies

- It pays to spend the time needed to understand local realities.

Christina Aristanti Tjondroputro

- People's perceptions are important. Take time to understand them.

Hervé Conan

- One important issue for the developer is to analyze the existing initiatives, small or quite big, and to assess the opportunity to support them by scaling up or legalizing informal activities.
- The main challenge of international funding institutions is to develop, with governments, the appropriate financial tools to provide long-term support for local stakeholders and initiatives.

Roshan Shrestha

- Many successful small-scale innovations in the water supply and sanitation sector have never been replicated on a large scale.

Ravi Narayanan

- The ideal solution is for every country to have a comprehensive water policy based on a system of reliable data collection and public dissemination.

Tan Gee Paw

- Water policy development must keep in step with economic, social, and educational development, neither running ahead, nor lagging behind. In fact many emerging countries do not even have a clear water policy. It is for this reason the Public Utilities Board (PUB) founded the Institute of Water Policy in the Lee Kuan Yew School of Public Policy.

Arthur McIntosh

- Development must be premised on transparent and accountable policies. We need somebody to monitor the implementation of those policies and report to the public.

Arjun Thapan

- Don't ram "development" down a people. Sip it with them slowly.
- The loan was incidental in getting Phnom Penh Water Supply Authority off the ground. What we did was stay the course with the leader and his team. We supported him as he fought lonely battles with political masters.

Caspar Lambrechtsen

- Beneficiaries of the development process should be able to take full ownership of the effort and make it sustainable for the future of their societies. External

teachers can serve to transfer knowledge, but internal teachers must carry the torch.

Mayling Simpson

- Success rests not so much on the engineering design, as the understanding, ownership, and responsibility of those systems by the people who must manage them in the decades following construction.

Ek Sonn Chan

- Constraints are mostly institutional and governance-related issues, including political interference.

Ravi Narayanan

- Coordination is needed not only between different agencies dealing with water, but especially between international agencies in the sector.

Dipak Gyawali

- Academics better translate their concerns into a language that is understood in local political terms, something they have mostly failed to do.

Ian Binch

- Most aid is really just a stop gap measure until time, good governance, and good policies help the countries emerge from a developing to a developed status.
- Each project must be approached as a new specific activity. Broad standardized approaches to communities, technologies, or management are almost bound to fail.

Bob Hood

- Silver bullet solutions such as management by objectives, good governance, corporatization, and privatization are not helpful. Better to investigate and discover what might be the underlying causes holding back performance and then carefully weigh up solution options.

Digby Davies

- Development goals and policy need equilibrium. There are no silver bullets. Social values need to be balanced by practical outcomes.

Caspar Lambrechtsen

- Even after demand has been satisfied, the project must follow up on its education program.

Anton Soedjarwo

- By keeping projects and activities small, it is possible to avoid heavy politics and bureaucracy.

Jim Woodcock

- Multidevelopment banks need bilateral assistance agencies to help them achieve sustainable benefits from loans to developing countries. The ideas or knowledge-creation side of aid is critical to helping countries reform and for helping communities effectively provide public service, such as education, health, and water supply.

Roshan Shrestha

- There is a huge gap of understanding between researchers and consultants.

Ranjith Wirasinha

- The process of formulation should lead to common ownership by all stakeholders.
- The best informed and influential change agents are inevitably children.

Urban Water Supply and Sanitation

Kamal Kar

- A drastic shift in the approach brought about by community-led total sanitation was the change in the basic assumption from *health* as a driver of change to *shame* and *disgust* and *self-respect* as the shaker. The traditional mindset focused more on “things” rather than “people.” Construction of a latrine was viewed as a solution, not behavior change.

Ek Sonn Chan

- Institutional reforms began in earnest with full autonomy status. Success was based on no political interference with utility managers and the ability to leverage an internal effort of 70% with external assistance of 30%.

Rory Villaluna

- Investing in the capacity building of small water service providers will expand and sustain water service delivery.

Jim Woodcock

- The piped water sector is the logical leading sector for building greater local accountability in all urban services, because it is the only utility that is sourced, processed, managed, and distributed entirely locally.
- In 2003, a survey of 15 municipalities in six provinces in Indonesia found that local government owners were not aware of the proportion of people in their district

who were not served by piped water, the amount of water that is lost, or the financial condition of the utility.

- The principal target of adequate access to urban water supply goes beyond health. It is now wealth.

Anton Soedjarwo

- Access to water will answer one problem of a basic human need. This may also serve as a platform for health and hygiene improvement. But availability of water will release low-income communities from their daily water-fetching burden. This becomes an important vehicle for economic improvement. Such momentum is often not used appropriately. Support for water is given by donors, but post-water support is not.

Elsa Mejia

- Out of one people's adversity (no piped water) comes an opportunity to be of service and to operate a good business as a small-scale water provider. Service is provided quickly (6 weeks) at a high level (24/7) and in an attractive package (low connection fee).
- We usually aim for a management contract with the local government, building on whatever system is already in place. We offer to operate, improve, and expand at no cost to the local government. They also get a share in the gross income of the project.
- Twenty years in the business as a small-scale water provider has generated trust. Now, private investors come to me and offer large monies for investment, because they get a high return (3% per month) and minimal risk.

Sahana Singh

- Hundreds of water projects are being announced in developing countries without including any component for managing wastewater and solid waste. Years down the line, these very water projects will further choke rivers, lakes, and seas, compounding the very problem they were meant to solve.

Suman Sharma

- Benchmarking and technical regulation of water supply systems must be promoted rigorously to inculcate accountability in operators, effectively deliver the intended services, and improve the overall sustainability of the systems.

Rural Water Supply and Sanitation

Ian Binch

- The community participation and self-reliance approach to rural water supply implementation, which has been in vogue over 25 years, is yet to be proved sustainable.
- Rural water supply and sanitation is complex and difficult to sustain because of lower capacity to pay, difficulty in establishing proper system management and maintenance, paucity of water resources with adequate capacity and quality, and cost and complexity of water treatment. These factors commonly result in rural water supplies deteriorating over time, irrespective of social mobilization and technical and financial training provided at the outset.

Anton Soedjarwo

- After the budget is finished, the nongovernment organization (NGO) or implementing organization hand over everything to the target communities and expect that after the capacity building (training and facilitation) process is done, everything will run well. In reality, too many rural water supply systems run for a few months only. The common reasons are (i) no money for operation and maintenance and equipment replacements, and (ii) sociocultural problems. The big question to be asked is why the NGO or implementing organization did not manage the system in a sustainable manner.

Mayling Simpson

- The sustainability of new water supply and sanitation systems in rural areas depends on the time spent with communities before any construction is done, helping them to understand the implications of new systems in terms of social change and responsibility.

Christina Aristanti Tjondroputro

- We use a participatory assessment approach to small-scale water supply and sanitation as part of an integrated community development. We compare the views of men and women and of high income versus low income. Sometimes we say no to a village if they are clearly not willing to help themselves. Often, there is a national program but people in the villages are not aware of it.

Margaret Catley-Carlson

- Conflicts and management issues that arise over water projects may demand too much from community management and may be overburdening communities with matters they can’t deal with.

Kurt Rippinger

- A regularly overlooked problem is the inclusion of customers/villagers along a transmission main from source to a city. If unattended, one faces the risk of social

problems, meaning to say, villagers along the route will boycott and even sabotage the transmission main, if they do not get a proper tapping point and water.

Hervé Conan

- "Water is life" and everyone is living, so the new water service has to compete with the existing ones, often traditional ones, well known to the users.

Water Resources

M. Wickramage

- Sharing of water resources for irrigation, hydropower, and water supply based on policy legislation and institutional framework failed, but an equitable informal system operated between stakeholders, based on collaborative planning and consultation, succeeded.

Tan Gee Paw

- For an emerging country, the development of water resources can be successfully undertaken only if there is parallel economic, social, and educational development, which in turn needs strong continuing political leadership.
- The clean up of the Singapore River took 10 years and was a major achievement.
- In Singapore, having a separate sewer system helped rainwater harvesting. We plan to harvest every drop of rain and reuse every drop too.
- The water agency and the consumer must realize that water is a limited resource and therefore the agency only loans the water to the consumer, who must then return it to the agency for refurbishment and reuse.

Peter Rogers

- Water security is much talked about but ill-defined. Restricting the outcomes to single-value measures, such as economic losses and a dollar value for loss of life, may help to focus the concept of water security.

Jelle van Gijn

- A functioning network of drains is the basis for all urban infrastructure development.
- Water resources training should be included in the Ministry of Education to attract academic excellence and to ensure continuity.
- "Nearly 50 years later he still toured the world explaining the continued need for large dams and representing the World Commission on Dams."

Sahana Singh

- We need ecological intelligence and we need to use pricing as an instrument of change. The most valuable liquid in the world is priced so cheap it is lost, wasted,

and polluted. If it were oil it would be different. The paradox is that the rich get water cheaply and the poor expensively.

Chuanpit Dhamasiri

- During the 1997 financial crisis, there were two major issues that affected the work and morale of state enterprises: one was the halting of investments and the other was privatization of state enterprises. In the end, MWA (Metropolitan Waterworks Authority) succumbed to neither.
- MWA pointed out that halting investments would (i) leave consumers short of basic necessities, (ii) leave the private sector with unemployment and, (iii) miss out on the opportunity to construct improvements with much lower costs, due to heavy competition.
- Water is not "goods" but a national resource. Water is not only a basic necessity for the health and the welfare of the people, which must be provided by governments, it is also strongly linked to national security.

Ravi Narayanan

- There is the issue of the impact of sinking water tables on groundwater-dependent drinking water sources and the issue of water quality and groundwater contamination.
- We need to see what can be done in the interconnected domains of policy, institutional structures, technology, and capacity.
- It will be important for the water resources ministry to be properly resourced with funds and technical capability.
- There will inevitably be competing and conflicting claims for water to be used in the pursuit of food security and creation of livelihood and employment. While these are extremely important, there should be no ambiguity about the first call on water resources for domestic consumption, as a nonnegotiable principle.

Roshan Shrestha

- Let us harvest the rain and recharge groundwater through shallow wells.

Ranjith Wirasinha

- Much greater attention to, and support for, rainwater harvesting is called for in policy formulation, awareness raising and education, and program implementation.

Vijay Jagannathan

- Progress in the sector is disappointing in terms of service coverage, protection of the poor, water quality, and water management.

Bob Hood

- Too many cooks spoil the broth. This saying is very true of the water sector. It is astounding how many organizations have a finger in the water sector pie. Such fragmentation would appear to be a major barrier to making progress—involving too much consultation and delay and little action.

Dipak Gyawali

- Southern socio-environmental activists do not uphold the slogan of the northern environmentalists of "no dams" but argue instead for "no bad dams."
- Issues of equity and justice have a habit of re-emerging from the woodworks and no amount of chorus singing in their favor will come to your rescue when a sense of being unfairly treated prevails.
- At the level of mass politics in the myriad villages of a country, it is what the politicians and political parties say that drives public opinion. And politics, unlike academia or professional thinking, is often driven by very short-term and mundane thinking.

Capacity Building

Jelle van Gijn

- Establishing a permanent infrastructure of training and capacity building to support the water sector is as good an investment as one can make. Bilateral or foundation support for 10 years is desirable.
- So 25 years later our graduates can be found throughout the water sector, throughout the country, at central, provincial, and local level, managing hydrometric networks, deciding national policy, or operating water treatment stations.

Nancy Barnes

- A good definition of capacity building might be "create an enabling environment; give people compelling reasons to act; and support them with the experience, tools, resources and knowledge they need to take action."
- We have a lot to learn from each other, if only we are willing to do that. Realize that local people in a country know a lot about their country and that people who work internationally know about a lot of countries. There is tremendous value in blending these two perspectives. Listen more and talk less.

Ek Sonn Chan

- Old inactive managers were replaced by young dynamic well-educated staff. All staff got good financial packages, so that they could have a good standard of living.

Cesar Yñiguez

- Invest in people and develop their capacities. Well-performing utilities care for equipment and people and learn to do things well. Water districts that receive technical, institutional, and financial training and advice perform much better than others.
- Learn from others through national associations and water operator partnerships.
- Why can't governments develop capacity building programs that support water utilities on a continuing basis and not just on a per project basis? It is most needed at the operations and maintenance stage.

Rodora Gamboa

- Human resource is the most important resource. Take care of the employees.
- I want to learn more so I can share more. I want to provide a venue for learning, capacity building, sharing, and empowering others.

Sam Parker

- International development conferences should be conceived, planned, and led by low-income countries, bringing people together who can make things happen and investing in their ideas.

Art Villasan

- The Local Water Utilities Administration was set up to provide loans to the water districts, but it also executed a stringent institutional development program.
- The central governments tried to tax the water districts on their profits, but the strong efforts of the Philippine Association of Water Districts eventually saw this threat away.

Bob Hood

- A huge amount of resources have been and continue to be misused in inappropriate training for developing countries. It is crucial to target the right participants at the outset.

Digby Davies

- In water operator partnerships, the key insight is that most of the required skills and knowledge lie with the operators themselves. The problem is one of unequal distribution. Partnering strong utilities with weak ones can address that problem, by sharing know-how, skills, and resources.

Tony de Vera

- Understand that the stakeholders are really the ones making the changes and your role is to motivate them and develop their capabilities.

Ranjith Wirasinha

- Technical education and upbringing need to inculcate a social culture for the good of the water supply and sanitation sector.
- Trust and collaboration between partners for a cause brings forth salutary collective wisdom—strengthening achievement and sustainability.

Leadership

Vijay Jagannathan

- Success came because of country leadership in managing the politics of water sector reforms, including support from outside the sector at the highest levels in government.

Arjun Thapan

- Recognize the champions in urban water and stay the course with them, both in friendship and professionalism, devoid of interminable process and paper.

Rodora Gamboa

- Good relationship with the local government doesn't necessarily mean agreeing to whatever they say, or following what they want you to do. It is a matter of respecting each other's opinion.

Ek Sonn Chan

- Managers should be role models for staff.

Tan Gee Paw

- Under the leadership of Lee Kuan Yew in Singapore, water was made a top priority in public policy. It dominated every other policy.

Ian Binch

- Strong, committed, and honest leadership at national, provincial, and local levels can almost guarantee a project's success. This is seen as being paramount—unfortunately these qualities are not commonly seen.

Arthur McIntosh

- Successful water utilities can be characterized by great leaders and their longevity in staying the course. Examples are Ek Sonn Chan in Phnom Penh, Tony Aquino in Manila, Chuanpit Dhamasiri in Bangkok, and Tan Gee Paw in Singapore.

Management

Arthur McIntosh

- Manage water and people at the lowest practicable level. This may mean initially hydraulically isolated zones of no more than 500 connections. More utilities are now following this “caretaker” approach.

Tony de Vera

- Success in a utility comes from good staff, good internal standards, a passion for accomplishment, and hard work.
- Focus on a single corporate goal (collection efficiency) was made.

Elsa Mejia

- Success is based on good communication and agreements with both communities and local governments.

Suman Sharma

- The quality of systematic measurement, documentation, and decision making based on factual information differentiates a good utility from a bad one. It is better to concentrate on how a utility measures its performance regularly, than on the issue of who operates the system.

Azharul Haq

- Trade unions can be converted into effective partners in improving billing and collection of a public water supply.
- A criteria for eligibility to become water board members should be established and the board should be accountable to someone for its actions.

Kurt Rippinger

- Sometimes in rural areas (and also in urban areas) it is quite appropriate to lay a pipe over the ground.

Ranjith Wirasinha

- High nonrevenue water could result from any of the following: defective planning, investigations, design, construction, operations or a combination of them. The full spectrum needs to be reviewed to identify the cause.

Rodora Gamboa

- Managing a water utility requires a lot of decision making. It may not be a good or a right decision, but at least make a decision. Be proactive not reactive. Considering water demand is ever increasing, passivity has no place in a water utility.
- As a public utility, it is important to let the public know what you are doing.

Bob Hood

- Some perceive that as water utilities are asset-intensive, they can only be led by engineers, but the truth is quite different. Success and continuity now is much more dependent on getting the customer relations right and managing finances and tariff setting.
- It is important to give credit to those managers who each day without fanfare deliver water services in developing countries.

Chuanpit Dhamasiri

- We streamlined and simplified many MWA working procedures. We put in place accountability measures and a time frame at every level. We set up working standards and monitored performance on a daily and monthly basis, replacing overtime with a system of staff incentives. We restructured MWA branch offices by modernizing their operations and improving their efficiency in providing services. We expanded the role of MWA beyond the meter to help customers. We introduced computerization and the payment of bills at convenience stores.

Sahana Singh

- It will be highly rewarding for the managers of water and sewerage infrastructure to look outside their boundaries and learn from what other industries are doing.

Corporatization and Privatization

Graham Jackson and Phomma Veoravanh

- Corporatization of water utilities in the Lao People's Democratic Republic has proven to need time to be properly effected. This is a paradigm shift in the way things operate for long-term civil servants. Better to be more process-oriented and gradually develop awareness and capacity over time.

Kurt Rippinger

- Privatization in the water sector is counterproductive to the aim to save water resources.

Arthur McIntosh

- How can demand management and conservation of water be compatible with selling water for profit?

Ranjith Wirasinha

- Electricity and telecommunications are conveniences, but water is life and so its control needs to be with the people and the state. However, some aspects of management may be contracted out to the private sector.

Chuanpit Dhamasiri

- Since the government had firmly announced the privatization policy, MWA was not in a good position to challenge alone. It needed to gain the support of its customers by improving its service and building good relationships with consumers. In the end, MWA did not succumb. Looking back, I see the 1997 financial crisis as a blessing in disguise. The restructuring of MWA might not have occurred had we not have to overcome the challenges posed by the crisis.

Alex Jorgensen

- Public–private partnerships (PPP) have generally failed in India due to a combination of many factors, such as high tariffs required to support PPP, high proportion of poor, cherry picking, lack of successful examples, and lack of regulatory authority.

Roland Liemberger

- Between 2008 and 2011 the volume of NRW in Maynilad has been reduced by more than 600,000m^3/day. This is more than the total demand of the city of Berlin.
- We used a holistic view on NRW management and this was reflected in organizational changes made, which led to the formation of an NRW management department. It grew from five staff to 430 engineers, all totally dedicated to NRW management.
- The enormous achievements in physical loss reduction enabled Maynilad to reduce water production, while significantly increasing the number of customers from 700,000 to more than 1,000,000.
- Maynilad's shareholders were satisfied with the impact of the NRW program, as income more than tripled from US$42 million in 2008 to US$136 million in 2011. This shows investing in NRW reduction is an excellent business proposition.

Digby Davies

- Having spent the late 1980s involved in the UK privatization of water utilities, I was never convinced. Now in 2012, we can see that just as over emphasis on social philosophy was a mistake, so has privatization not led to the efficiency and reduced corruption desired by its promoters.

Governance

Rory Villaluna

- Recognize the human right to water and sanitation through good local water governance, empowering the people.

Hervé Conan

- In Asia, water services in the peri-urban areas are mostly developed through private initiatives. These are supported more by the local government authority than the central government, which tends to bring up health, legal, and financial issues.

Jim Woodcock

- The key factor for sustainably improved piped water service is neither infrastructure nor funding. It is good governance.

Ek Sonn Chan

- Unless urban water governance practices are improved significantly, universal access to clean drinking water will remain an unachievable dream, even if billions of dollars of investment are provided with no strings attached.

Arthur McIntosh

- Time is of the essence in water supplies for developing countries. Cut red tape and bureaucracy as the South Koreans did to fuel their economic boom in the 1980s. Should poor people with no piped water wait at least 7 years for water? That is a normal project implementation time for a multilateral funding agency. We allow the tail (rules) to wag the dog (institution) instead of just deciding the best way to do a job and doing it that way.

Rodora Gamboa

- It is important to let the public know what you are doing. Good communication is essential.

Sahana Singh

- Communication is an issue. It needs to start in the schools and continue with the water invoice or bill.

Elsa Mejia

- For a small-scale water provider, time is of the essence, because borrowed money with 5% monthly interest must generate returns within 6 weeks.

Dipak Gyawali

- Politics, unlike academia or professional thinking, is often driven by short-term and mundane thinking.

Caspar Lambrechtsen

- Wherever money is involved, it is essential to ensure that all payments are made through the banking system.

Salma Sadikha

- In informal settlements, the single line provided with 2–3 public taps is sooner or later tapped by others who take individual connections (poorly made) illegally. This is also a source of revenue (illegal) for the frontline staff and therefore the state of affairs continues with the ad hoc servicing.
- With insufficient quantities of water, the utility in not keen to supply informal settlements and they are well aware that water supply meant for these areas can easily be diverted to other more profitable ones.
- Bills are not issued in time or regularly every month. This suits the utility because it can blame the irregular supply on nonpayment of water bills.
- Water literacy (especially billing and other procedures) is the need of the hour. Water literate groups can demand for their right in a mature manner.

Tariffs

Sam Parker

- Tailored pricing schemes, payment options, a choice of service levels, and easy consumer feedback mechanisms, have all proven effective and these are the same tools used to market soap, soft drinks, and mobile phones.

Art Villasan

- A Presidential Decree in 1973 established autonomous water districts throughout the Philippines with the concept of consumers paying fully for domestic water supplies. It did not all come easily. After 39 years we can count 600 out of 1,493 towns and 135 cities in 82 provinces.

Ian Binch

- Unless they cannot be avoided, there should be little or preferably no subsidies for water supply and sanitation programs. In this way, self-reliance and pride is enhanced and dependency reduced.

Alex Jorgensen

- User charges are too low to operate and maintain infrastructure. We should aim to regularize informal settlements and provide improved services of drainage, water, and sanitation. Then register property and ownership of dwellings and use

property tax revenues to subsidize water and sanitation. In parallel, all water users need to pay sustainable tariffs.

Jim Woodcock

- In Indonesia reformed utilities have been successful in gaining a tariff increase through two main avenues: (i) providing a credible promise of service improvement based on a realistic business plan, and (ii) increasing efficiency to demonstrate commitment and generate capital for small changes.
- Reformed Indonesian municipal water utilities and consumers are natural allies.
- It is much easier to get approval for tariff increases first from consumers and then from local governments, instead of the other way round.

Anton Soedjarwo

- Low and unrealistic tariffs is one key issue in urban water supplies. Others include management capacity and technical problems.
- If the water tariff needs to be approved by the local parliament, there is always a swinging between regarding water as a social or economic good.
- Packaging, appearance, service, status, and other things make people happy to pay. These things are not the "basic need" itself. To survive, people need to fulfil their basic needs. But to justify paying, people use "extra stuff."

Rory Villaluna

- Water service delivery should be commercially viable. Poor people are willing and able to pay.

Tony de Vera

- Focus on a single corporate goal, like collection efficiency, turned LWUA around by 2000.

M. Wickramage

- Perceptions of politicians are that people cannot afford to pay for water services, but this is a fallacy.
- The financial viability of the service provider is of the utmost importance to maintain good service.
- Strategic compromises made in the development of the water tariff structure at the beginning, to keep stakeholders satisfied, and constant lobbying for a rational tariff structure over the years, has helped to bring about many sustainable benefits to the water sector in Sri Lanka.

Kurt Rippinger

- In developing countries, very often a tariff is applied charging a flat rate for the first 10 cubic meters (m^3) regardless of consumption. Something like 3 m^3 is a more appropriate level for the basic fee.

Art Villasan

- Water districts were not designed to lose money!
- What resulted was an amendment to Presidential Decree 198 requiring public hearings for the presentation and approval of any tariff changes. The amendment served water districts well. It forced them to go to the grassroots to explain the new concept.

Arthur McIntosh

- Water and wastewater charges must be based on metered consumption. When we allow fixed charges to come into the equation, we take away the control of the consumer over what they consume and pay for water.

Urban Poor

Salma Sadikha

- Target the urban poor and provide affordable connections based on proof of residence, not ownership.
- Incorporate a social development unit in the water utility.
- Unfortunately, the vested interests of politicians, local government, and utility staff, work toward creating an environment of unwillingness to supply water to the urban poor. Only transparency and accountability will one day right these wrongs.
- Public fountains (taps) were ruled out. The poor after having been through the drudgery of collecting water from public taps, were happy that an encouraging atmosphere had been created for availing of individual household connections.

Arthur McIntosh

- Connect everyone, including the urban poor, to piped water for free and recover costs in tariffs to all consumers. “Hike the Tariffs to Help the Poor.” Viet Nam has done it. It is time for others to follow.

Graham Jackson and Phomma Veoravanh

- Connections provided for free under a civil works loan project have brought 95% service coverage rates with quick benefits to the people, including own sanitation facilities installed as a prerequisite to free water connection.

Azharul Haq

- Informal settlers who don’t have title to land can access piped water through the intermediary of an NGO, as was done successfully in Dhaka, Bangladesh.

Sam Parker

- “Urban poor” is a title that conveys neither dignity nor empowerment. Better to use the term “low-income consumers.”

- There is overwhelming evidence that low-income consumers who are offered a good service are more than happy to pay.

Jim Woodcock

- Social exclusion retards economic growth. Everyone in Indonesia will be better off if poor families have water connections.

Ek Sonn Chan

- We introduced the "Water for All" program. Poor consumers were supported so that they could afford to pay their water consumption.

Rory Villaluna

- Poor people are willing and able to pay. Water service delivery should be commercially viable.

Jelle van Gijn

- One of the basic needs that appears often overlooked by supposed development experts, but never by the harassed city engineer, or the woman trying to maintain her family's dignity in the slum dwelling, is a functioning network of drains.

Alex Jorgensen

- Improved drainage was usually stated to be the most urgent need as determined by surveys in participating informal settlements.
- A parallel program to the provision of basic services in informal settlements was income-generating activities to encourage young people in particular to learn a trade, and for women to set up self- help/savings groups and to establish informal schools.
- In the more progressive cities, these ADB-supported projects led to regularization of informal settlements, registration of property, and ownership of dwellings by the informal settlers. The informal settlers began to spend money on their residences. Within a year there were obvious improvements, including repairs to roofs, installation of windows, painting, and much better cleanliness.

Jim Woodcock

- Poverty alleviation interventions are planned and conducted by government officers who define and sustain the existing order, so any initiative that may be seen to threaten the order will be confronted quickly by the invisible finger.

Ranjith Wirasinha

- Often termed the peri-urban poor, they hold up the urban economy. Finding interim arrangements to overcome any administrative obstacles in providing services to them, with the least delay, is then an imperative for social and economic progress.

Sanitation

Jack Sim

- Inspirational marketing works much better than a rational approach to sanitation promotion. We promote toilets as status symbols and objects of desire. We make toilets attractive by selling to the emotional goals of daughters graduating and wives having privacy from prying eyes.
- Laugh at yourself and make them laugh. After that they listen to you.
- For sanitation to progress it needs to be decoupled from water.

Alex Jorgensen

- Sanitation remains a major challenge in Southeast Asia. Conventional piped sewage is physically difficult to implement in informal settlements and the cost is more than for water supply. On-site sanitation using pit privies is becoming the norm in many progressive informal settlements, but due to lack of space, is not sustainable in the long term. Millions of informal settlers still resort to open defecation.

Anton Soedjarwo

- Awareness creation and behavior change are the key issues in getting sanitation on the agenda. Technical support is also needed to solve site specific problems.
- The community sewerage project was implemented in Yogyakarta informal settlements around the year 2000 for 500 households at a time. Decentralization is appropriate for large older cities, as it is too costly to have centralized sewerage systems. It has been sustainable, despite the management involving gangsters, because they are committed to make it work and own the facility.

Christina Aristanti Tjondroputro

- Sanitation is always a much more difficult issue to solve than water. The needs are identified together. We look at sanitation coverage and always find it is worse than what is stated. People are often embarrassed to talk about sanitation.
- Since August 2008, the Government of Indonesia has launched the so-called Community Led Total Sanitation (known as STBM–Sanitasi Total Berbasis Masyarakat) that covers five pillars. These are (i) stop open defecation, (ii) wash hands with soap in running water, (iii) drink treated water, (iv) manage solid waste, and (v) manage household liquid waste.
- We try to make a difference in schools, especially by addressing the young. Often there are only one or two toilets for a school with 150 students. Often the school has funds, but don’t consider toilets a high priority.

Suman Sharma

- Decision makers, including large financiers, often tend to regard sanitation as a private household subject and hence only consider putting money into sanitation as a matter of charity or subsidy, rather than as an investment. Sanitation must

receive priority and be considered as an investment by the state, which is paid back through improved quality of life, health, well-being, and productivity, as well as reduction in expenses for curative health facilities.

- Engineers and social workers must be oriented and sensitized on the benefits of improved sanitation. It is necessary to find ways to even add a tinge of glamor to the subject, so that engineers, social workers, and decision makers start to take pride and feel dignified to claim they are working on sanitation promotion.
- In Nepal we successfully changed from the conventional approach of promoting sanitation on health grounds, to sell it as a matter of pride and dignity.

Sam Parker

- Urban sanitation can be transformed through being cross-subsidized by revenue from water supply.
- It is curious that in wealthier countries the idea that sewerage services are an integral part of water services is a given. Well over two thirds of the money spent by consumers on water is actually used to cover the cost of sewerage. So why is there not wider use of water revenues to pay for sanitation services in the developing world?

Kamal Kar

- Learning from the local community, we succeeded in persuading the local NGO to stop top-down toilet construction through subsidy. We advocated changes in institutional attitude and the need to draw on intense local community participation and facilitation, and to empower them to analyze their sanitation and waste situation and take a collective decision to stop open defecation, without waiting for the outsider's dole.
- Today, CLTS is being implemented in more than 50 countries across the world and the governments of at least 17 countries have adopted CLTS in their respective national sanitation policies.
- There was a shift from the outside agency-led supply-driven sanitation, to a local community-led demand-driven sanitation approach, which was entirely self-mobilization. This gave rise to acceptance of the *public good,* rather than *individual good* in sanitation, which was only household toilet acquisition by some.

Sahana Singh

- Sacred rivers of water are now sacred sewers, yet religious followers do nothing. Water projects rarely include wastewater management. We need to integrate the use of water across various sections of the economy. We need to look outside the water sector to learn from other industries.
- One issue that needs to be debated on is how to ensure one's wastewater can become another's feed water.

Tan Gee Paw

- The success of a nation is not measured by the glitter of its high rise buildings, but rather the way it disposes of its human wastes. The budget for sewerage is

considered as important as the budget for roads, electricity, and water. Without this budget priority, no effort to transform Singapore into a global city will succeed.

Ranjith Wirasinha

- Waterborne or pipe-borne reticulated sewerage is convenient but expensive and often environmentally unsound and hazardous to the protection and conservation of precious water resources. Other alternatives must first be explored.

THE PEARLS IN CONTEXT

Nancy Barnes *is a management consultant with CH2M Hill. She has over 25 years of capacity building, organizational development, and utility management experience in the water and wastewater sector in a broad range of projects in the United States and in 17 other countries including Egypt, Jordan, the Maldives, Mauritius, Nepal, Palestine, Thailand, Tanzania, and United Arab Emirates. Ms. Barnes has held executive management positions in water utilities in the United States and project management positions for United States Agency for International Development (USAID)-funded projects. She has performed numerous consulting assignments in sector reform, operations improvement, strategic planning, and institutional strengthening. She is the main author of the books* A Challenging Experience in Organizational Development*:* Jerusalem Water Undertaking (2003)*, and* The Impact Capacity Development Guidebook (2012).

Relationships, Investment Priorities, and Capacity Building

Relationships

How often do we refer to the differences between countries, such as developed, undeveloped, north-south, first world-third world? How often do we refer to ourselves as local versus international experts? These distinctions can be patronizing and are swiftly becoming obsolete because we live in a global community that is hyper connected—thanks to the Internet and social media. The efforts of many have built the capacity of people around the world so that the differences have narrowed significantly over the last 20 years—enough that there is often no difference between the capabilities of people who are local or those who work internationally. Yet, we draw these distinctions, which may be barriers to effective working relationships.

We all find ourselves working together and doing the best we can to have good working relationships. This is often a challenge because of the differences between us, whether they are cultural-, religious-, gender-, socioeconomic-, or language-based. There are times when one of us does something with good intentions that is perfectly normal at home but is perceived as an insult by a person in another country. There are times when we are reluctant to ask a question for fear of losing face. There are times when we find ourselves in meetings that are conducted in a language that we do not understand, translation is not available, and we are not able to contribute. There are times when we are simply ignored. The tag line of an association in the United States is “A mind is a terrible thing to waste.” When

circumstances mean that we are not able to contribute, our thoughts are wasted even though they could add value.

We have a lot to learn from each other if only we are willing. Working outside my home country has been full of blessings—all of the wonderful people I have met and befriended; the elements of other cultures that have made me a much better person. I have become a better communicator. I have learned to think first before reacting so that I can figure out what is really going on. I have become more sensitive to cultural differences whether they are between Kathmandu, Nepal and Ramallah, Palestine or the cities of Austin and Denton, Texas in the United States.

Most people in the world are good, decent people who care about their families, their friends, and their work. Most of us approach our days with good intentions. Since we are human beings, we are usually similar to each other in terms of what we care about, what motivates us, and how our emotions can affect our behavior. If we could all overcome the natural barriers that come between us, we as a community could do a much better job. That is why I encourage all of us to:

- Think before we react – a lot of times our reactions may be wrong.
- Truly respect and trust each other.
- Look at every encounter with a person from another country as a chance to learn and enrich our lives.
- Make sure that everyone in a meeting understands what is going on so that they can contribute their ideas—even if it takes extra time.
- Realize that local people in a country know a lot about their own country and that people who work internationally know about a lot of countries. There is tremendous value in blending these two perspectives.
- Listen more and talk less—we have two ears and one mouth.

Investment Priorities

We all have our agendas and priorities. This is as true for individuals as it is for development agencies, countries, and utilities. Agendas and priorities may be very different from person to person or organization to organization. When we think about this in the development world, these differences can lead to investment decisions that may not be the right ones. I am sure that we can all think of situations where precious donor funding might have been spent more effectively. Two come to mind: After the 2004 tsunami in the Maldives, well-intentioned agencies provided desalination plants to islands in this archipelago, providing much-needed fresh water. Today, some of those plants are inoperable for various reasons, including availability of spare parts and operating knowledge. Some years ago, a well-intentioned agency built a wastewater treatment plant but there was no collection system to bring wastewater to the plant.

Hindsight gives us the luxury of seeing how these situations might have turned out better. With better coordination in the Maldives, the desalination plants might have all been of the same type and manufacturer, making it easier to train people to use them and to keep adequate spare parts on hand. With some persuasion, the wastewater plant donor might have built the collection system instead of the plant as a first line of defense to get the wastewater away from populated areas. Hindsight is one thing—but how do we avoid unfortunate situations like these in the future?

Coordination of agendas and priorities between and among donor agencies and international financial agencies is a daunting prospect and probably impossible to achieve save for initiatives such as the Millennium Development Goals. So, that is probably not a solution.

At the country level, let us consider the position of the minister of water in any country. A donor agency comes and offers funding for a particular project or initiative, possibly amounting to millions of dollars. It is probably fair to say that it would be political suicide for the minister to decline the donation.

Is there a solution? Perhaps if a country had its own prioritized list of water investments or projects in hand, this would help. The minister could then thank the donor agency and ask it to consider a project on the priority list. With standard specifications for key equipment, a country could ask the donors to comply with these specifications, making it easier to train people and stock spare parts. If these things happened, there is a good chance that the outcomes would be better for everyone, especially the people who are responsible for providing essential services to their citizens.

What would it take to accomplish this fundamental change in the way that donor funding is invested? First, a country needs to know what investments it requires to build or rehabilitate its infrastructure for water, wastewater, or irrigation. It needs to have priorities that direct attention to the investments that will provide the most benefit. In addition, standard specifications for facilities and equipment would go a long way to building infrastructure that the country can operate and maintain. And then, the donor agencies must be willing to entertain the priorities and requirements of the country, aligning them as best they can with their own agendas and priorities.

Capacity Building

Capacity building is not just about training. Yet, in so many documents, we can replace the words “capacity building” with “training” and we would not harm the content. Training is essential to ensure that people know how to do their jobs well. But training is not enough if an employee is not expected to get work done, or if the training encourages people to do things that are not allowed in their environment. To use a very simple example: it makes no sense to train someone how to use a

computer if they return to work and there is no computer available or there is no work that they can do on a computer.

The United Nations Development Programme (UNDP) defines three levels of capacity development[1]

- The enabling environment is the broader system within which individuals and organizations function and one that facilitates or hampers their existence and performance. It determines the 'rules of the game' for interaction between and among organizations through 'policies, legislation, power relations and social norms,' all of which govern the mandates, priorities, modes of operation, and civic engagement across different parts of society.
- The organizational level of capacity comprises the internal policies, arrangements, procedures, and frameworks that allow an organization to operate and deliver on its mandate, and that enable the coming together of individual capacities to work together and achieve goals.
- The individual level refers to the skills, experience, and knowledge of people. Each person is endowed with a mix of capacities that allows them to perform, whether at home, at work or in society at large. Some of these are acquired through formal training and education, others through learning by doing and experience.

Building on this framework, we can consider this definition of capacity building:

Create an enabling environment, give people compelling reasons to act; and support them with the experience, tools, resources, and knowledge they need to take action.

The enabling environment creates the legal, policy, and structural conditions that allow people to do the right things. A well-structured, performance-driven organization takes actions for good reasons and holds people accountable for making progress according to goals. Leaders keep the focus on the objectives of the organization. People who know how to achieve their goals and have the resources they need will succeed and help others succeed as well. In summary, based on these perspectives, capacity building is about unlocking the potential of organizations and individuals.

[1] United Nations Development Programme. 2008.*UNDP Practice Note: Capacity Development*.p.5.

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Development and Aid

The debate on the efficacy of development aid continues. Proponents claim that those who are able to should help those in need, purely for international and personal humanitarian reasons. Opponents say aid inculcates and perpetuates dependency, thereby in the long run actually hindering development. Reality probably lies somewhere in-between, depending on the type of aid provided. There are three broad aid forms: (i) altruistic; (ii) emergency, post-conflict, post-disaster; and (iii) institutionalized bilateral or multilateral aid. All have some common underlying principles, but are different in scale, implementation, and expected outcomes.

Experience suggests that altruistic development, practiced mainly by nongovernment organizations (NGOs) funded through public donations, principally from the more developed countries, is commonly small scale, short term, and probably has modest long-term impact on the local communities it aims to help. Positive impact on national social or economic development is usually slight. It may give donors and their NGO agents a good feeling, and it may cause little harm, but in the big picture, altruistic aid's addition to national development is marginal.

Emergency development responds to events resulting from natural or human-related catastrophic events that are beyond the capacity of many developing countries. In these instances, the international community via their governments, multilateral agencies, and NGOs band together to help. The scale of this assistance is normally large, limited to afflicted geographic areas, and only of limited duration. The impetus

for emergency development is a complex mix of international politics and altruism. There have been many recent instances of this type of development and while the issues of coordination, efficiency, and effectiveness in disaster situations remain challenging, because of its obvious need and limited purview, there can be little objection to emergency-type development.

The bulk of international development assistance is undertaken through bilateral and multilateral agencies, either via loans, grants, or a mix of both. This institutionalized aid is a huge international business. Wealthy countries may also provide grants and loans as part of their aid budgets. Institutionalized aid is used for a myriad of activities: water supply, ports, roads, agriculture, industry, health, education, power, drainage, solid waste disposal, institutional development, and training. In this sense it is intuitively worthy and it is the main source of income for the international aid industry. Development loans are usually so soft, and have such generous grace periods, that they are almost impossible for poor countries to reject. But, the loans do have to be paid back and if the aid is ineffective, or is stolen by corrupt officials, the people, their children and grandchildren, still have to repay the loan. If the loans are forgiven, as is now happening more frequently, it may help in the short term, but it would appear to do little to discourage the purveyors from doing it all over again, and may even encourage them.

It begs the question: is aid worthwhile?

There is no clear-cut answer.

One viewpoint reckons that all except emergency aid should stop, as aid only props up incompetent, despotic, and corrupt governments, creates a culture of dependency, and prevents development of national and personal initiative. They say that only by eliminating aid, opening up world trade, lowering tariffs and other protection mechanisms, having good policies, improving governance, reducing corruption, having good laws and enforcing them, and abiding by accepted human rights norms, can developing countries have any chance of increasing economic performance, creating jobs, and reducing poverty. On the other hand, some countries such as the Republic of Korea, Malaysia, and Thailand have leveraged aid and made the successful transition to developed status. They have weaned themselves off aid as soon as they could. Nevertheless, many countries rely on aid in its various forms.

It has been suggested that except for emergency and post-conflict situations, most aid is really just a stop-gap measure. Its effect is like keeping the lid on the boiling pot. All it can do really is to help buoy up countries and communities until time, good governance, and good policies help them emerge from developing to developed status. Sometimes countries may need to suffer turmoil or even revolution to achieve this. Aid can’t raise a country out of the mire—ultimately the people have to do it themselves. Finally, most governments and peoples of developing countries would surely prefer not to receive aid. After all, who feels good accepting hand outs?

On Water Supply and Sanitation

Urban and rural water supply and sanitation (WSS) are integral to the international aid effort and form an important element of the UN's Millennium Development Goals. With its economies of scale and capacity to cover costs through tariffs—assuming this is politically possible—urban WSS, while capital intensive, is usually technically, financially, economically, and socially feasible and sustainable. Rural WSS, however, despite its smaller scale, relatively lower capital cost, and simpler technology is, counter-intuitively, generally more complex and difficult to sustain. This is largely due to rural communities' lower capacity to pay, difficulty in establishing proper system management and maintenance, paucity of water resources of adequate capacity and quality, and the cost and complexity of water treatment.

These factors commonly result in rural water supplies deteriorating over time, irrespective of social mobilization and technical and financial training that may have been provided at the outset. Ongoing support from the government is usually weak and unreliable. Some have suggested that the current community participation and self-reliance approach to rural WSS implementation, which has been in vogue internationally for over 25 years, has yet to be proven sustainable through adequate ex-post evaluations of sufficient scope, geographical spread, and rigor. It seems not to be in the self-interest of either aid donors or recipients, most of whom improbably claim good progress toward MDG targets, to go back 5, 10, or 15 years to see the real outcome of their work. The lack of accurate ex-post evaluation of, particularly rural WSS, is considered to be a major flaw in international development assistance and could result in very large numbers of schemes needing rehabilitation or replacement in the future.

On a more positive note, many urban WSS projects are well done and could claim to be successful in the sense that they are locally sustainable, provide adequate services at an affordable price, and could be expanded to cater to a growing population without overly stressing the local water resources or the communities' financial and management capabilities.

Experience suggests that good WSS projects come about when a number of factors converge:

- **Leadership**. Strong, committed, and honest leadership at national, provincial, and local levels can almost guarantee a project's success. This is seen as being paramount; but unfortunately these qualities are not commonly seen.
- **Water resources**. The availability of a reliable, good quality water source within economic distance of a village, town, or city is another key factor in determining a WSS project's prospects of success. The presence of such sources seems to be diminishing.
- **Sanitation.** The health benefits of a good water supply are not fully realized unless accompanied by a parallel health education and sanitation program.

- **Subsidies**. Unless they cannot be avoided, there should be little, or preferably no, subsidies for WSS programs. In this way self-reliance and pride is enhanced and dependency reduced.
- **Flexible management**. Where leadership is good, there needs to be maximum flexibility and trust to allow quick, local decision making in WSS initiation, design, implementation, and subsequent operation and maintenance. This is rare in projects supported by multilateral and bilateral aid agencies.
- **Project selection**. The prospect of a project's success is enhanced when it originates from the community—this should be encouraged. Often, however, projects are selected collaboratively by politicians and public servants, sometimes with dubious intent.
- **Technology**. Generally, the technology used in rural WSS is fairly simple and not a factor in a project's success or failure. Nevertheless, a realistic self-appraisal of community capacity to operate and maintain proposed technologies should be done.
- **Each project unique**. Every country, and every location within a country, is different. Each project must be approached as a specific one-off activity. Broad, standardized approaches to communities, technologies, or management are almost bound to fail.

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Incentives, Donors, and Women as Change Agents

Societies begin to develop when members are convinced that positive change is possible, and when they have the capability to work toward improvement. In the plainest terms, this means the opportunity for positive material change, productive employment, and money. Without this fundamental, it is difficult to sustain the development impulse. This is the real incentive to change.

The surrounding environment has to be encouraging or at least not characterized by social exclusion, lack of markets, or excessive corruption, which stall development incentives. Positive change is most likely to happen when there is some political accountability and at some level there is both a pretty good idea of what is to be accomplished, and how to get there. Dozens of donors directing the resources they bring toward their own goals can constrain forward impetus.

Where they are allowed to be, women are excellent change agents. Incentives to change in water delivery systems are often higher for women—they bear the drudgery of carrying water, and the impossibility of managing a clean and healthy household without adequate supply. How sobering it is to see how little has changed in women's status in 4 decades in huge swaths of the Asian population. Governments do not necessarily invest in that which most rapidly accelerates development. Education—particularly for girls—is still the closest thing we have to a magic bullet to improve family health, community income, child nutrition, childcare practices, agricultural production, access to health facilities including family planning, and a host of other desirable changes. However, girls are still disproportionately left out of school.

Without substantial infrastructure investments, development doesn't happen. It enrages me to realize how much development fads and fancies from our infrastructure-rich countries have served to steer resources away from desperately needed capital projects.

Sustainable development is particularly challenging, unless ingenious win-win solutions can be worked out. If the global, national, or community commons have not much contributed to an individual's welfare, it may not be easy to stimulate the enthusiasm to protect and promote sustainability.

Two thoughts on Incentives: Map them; Make them the priority task.

If incentives don't line up, success is problematic, no matter how good the technology.

1. Why don't communities have water? Really?
2. Why aren't water projects sustained?
3. Who has incentives to make change and make things work?
4. Why does water often enjoy low political priority?

At the community level. The rhetoric of 1.2 billion people with "no water" can lead to the perception that people don't have water, but in reality people without water would be dead. Everyone has water. Far too often it is not clean or accessible and plentiful. The wish for water does NOT equal the ability to solve water system problems. People may prefer to spend their scarce resources on other services, such as telephones, transport, electricity or entertainment. What is being asked of people in water projects and what is their incentive to spend these resources in this manner? The gender breakdown here is probably very different where women's burden will be lightened. Sanitation is even tougher in terms of priority.

At the water project level. Have incentives been mapped? Conflicts and management issues that arise over water projects may demand too much from community management and may be overburdening communities with matters they can't handle. Does the functioning of the project depend on changes in local politics or stratification? Have the politics of the pricing issue, especially for maintenance been resolved? Is there an ethnic issue or are there pastoralist/farmer water conflicts? Has there been any community or informal settlement participation in talking through these issues? When something goes wrong, for whatever reason, and people stop paying, who will restore the broken links? Who will control the whole process to catch the problems early and correct them?

At the regional/national level. What would it take to increase the priority given to water? How might those parties be influenced? Is there any way to introduce more transparency in the processes?

The creation of delivery systems, communication, and system analysis underpin successful introduction of technology. At most water conferences, participants are

pursued by good sincere people who have labored to perfect a piece of technology—a community water purification unit, a household water cleaning system, a solar water pump, an inexpensive or new water urban water cleaning system—and are now looking for a financial, implementation agent, and/or marketer to “insert” the new invention into a development situation.

It is a challenge to explain that it is not the technology that is the missing element. Creating and maintaining a successful water delivery or wastewater system is the tougher part of the process, though good and cost-appropriate technology can well provide a positive impetus. It is a continuing dilemma that a lot of energy is spent on designing the technologies but it is the human systems—much harder to get at—that are the real issue.

Hervé Conan *has an engineering degree in water and sanitation from France and a master's degree in environment from Quebec. He started his career in 1983 as a sanitary engineer at the Health Department on Mayotte Island (Indian Ocean), where he developed basic services for water supply and sanitation, including a large awareness campaign on safe water and pilot projects to promote pit latrines. In 1987, he founded with urban planners, a consulting firm specializing in local development, where he designed a special approach to development of a master plan for rural areas in developing countries. He moved to Viet Nam in 1997 where he developed pilot projects in these sectors in Cambodia and studies in rural water supply and small-scale water service providers for donors and international companies. For the Asian Development Bank (ADB), he led a regional study on the role of small-scale water service providers, which was presented at the World Water Forum 2003 in Japan. In 2003, he joined the French Development Agency (AFD) as senior team leader in rural water supply and sanitation. In 2006, he was in charge of the AFD Office in Cambodia for water resources management and private sector development. Since 2009, he has been the AFD country director for the Palestinian Territories with a strong involvement in the water sector.*

Water is Life

The role of the developer is to support beneficiaries' initiatives and to translate hope and ideas into reality. The developer must take into account not only the needs and expectations of the population, but also the existing relationships between key stakeholders. One important issue for the developer is to analyze the existing initiatives, assess how to support them for scaling-up, and evaluate the possibility of legalizing informal activities. The key question often comes down to how to legalize the grass root initiatives without killing them.

Beyond the investment needed to respond to water supply and sanitation's (WSS) growing demand is the development of the appropriate tools to support on a long-term basis both the public and private WSS service providers. The main challenge of international funding institutions is to develop, along with governments, the appropriate financial tools to provide local stakeholders with long-term support.

The slogan "water is life" is used to highlight the vital importance of the water sector and the high priority of water projects. In needs assessment surveys, improvement of the water service is often the first need expressed by the population. Responding to a priority need of the population means that efforts should also emphasize the end effects of an improved level of service, including reduced costs, and ultimately decreased childhood diseases, among others. By doing so, we facilitate its

sustainability. “Water is life” and everyone is living, so the new water service has to compete with the existing ones, often traditional ones, well known to the users.

Water Management Systems

Africa. The water management system developed in Africa is based on the famous “tripod” of water users committee, caretaker, and spare parts retailer. All these stakeholders need to be set up along the project and backed up on a long-term basis. It is important to strongly challenge the beneficiaries to facilitate their ownership and their long-term involvement on the water service management. The “tripod” should be set up during the project, and the supplier selected on its capacity to establish a strong relationship with the caretakers and provide an efficient spare parts network.

Cambodia. In Cambodia, where the groundwater resource is more accessible, the efficient management system of a public well is quite different. The location of the water point is more flexible. It is very often implemented on a private plot and managed by the land owner, who leaves access to the water point to the neighboring families for a fee limited to cover the maintenance charge. A survey done in 2001[1] highlighted that the key step in the implementation process was the meeting where the land owner commits officially on the water service rules and signs a document with all the families. The level of ownership and the free access to the water point were linked to this step, which was skipped in fact very often. The simple technology used (a suction pump) and the large existing market eases the local supply as well as an existing spare parts network, without any support from the projects or the government.

The MIREP project (small-scale water supply network) in Cambodia was designed by the end of the 1990s on existing initiatives in a small town. Local stakeholders, private entrepreneurs, and also public servants invested in a small-scale water supply network. The starting point was in response to neighbors’ and personal needs, and included a simple system based on a pumping station in a pond, a small reservoir, and a pipe system to supply water at household level. Step by step, the initial system was expanded based on demand from villagers. The MIREP project focused its input on good governance and water quality.

In close relationship with local authorities, a simple concession agreement was established, based on negotiation among stakeholders clarifying the objectives and the commitment for the service extension, as well as the water tariff. The asset was more secured for the investor who was able to benefit from the MIREP support. MIREP financed only the water treatment unit, which was never taken into consideration by the investors. The infrastructure for water resource, pumping,

[1] Assessment of PRASAC’s Domestic Water Supply implementations and impact of the living conditions of the rural target groups (for the EU Representative Office in Cambodia).

storage, and distribution were still funded by the investor. The institutional framework was slowly improved. From support to existing networks, MIREP focused on new small towns based on a bidding process. The selection of the villages was linked to the investment plan developed at governorate level, and took into account the pipeline projects funded by international donors. MIREP was an opportunity for many small towns located out of the scope of formal projects to improve their water supply service, and so to accelerate the water coverage in rural areas. MIREP complements the “official” projects by supporting local initiatives.

It is crucial to develop an appropriate institutional framework with line ministries and local governments so they could provide long-term support to local stakeholders’ initiatives and respond to the demand for improved water service.

Asia. In Asia, in the peri-urban area of big cities or small towns, water services at home are developed through private initiatives. These are supported more by the local government authority than the central government, which tends to bring up health, legal, and financial issues. The water quality is sometimes poor, water is supplied by flexible pipe, and often implemented at ground level, through a house connection. Water service is provided sometimes intermittently, but more often, with a better quality and cheaper than the prior existing service. The local authority prioritizes the response to the population needs; the central authority tackles the issue through a global approach, including a master plan with a long-term solution. A decade is considered short term for a planner; it is quite long for the targeted population.

During a study done in 2003 for ADB in eight Asian countries, a finance manager from an international water company supported the integration of the small-scale water providers in the global water service for megacities. Yet all the politicians, managers, and engineers interviewed were reluctant and closed the door on any partnership arrangement.

Digby Davies *has worked for over 30 years in the international water supply and sanitation sector. He is a specialist in water sector reform, education, and institutional development. Before becoming a senior manager in Thames Water (United Kingdom), one of the largest water utilities in the world, he taught management subjects at Warwick and Manchester universities, the University of the South Pacific in Fiji, and Trinity College, Dublin, where he was Director of Studies of the Systems Development Program. In 1990, he left Thames Water to join the World Bank in India and later Indonesia to oversee the International Training Network of institutions offering training in low-cost urban and rural water supply and sanitation. From 1995, he led the GIZ water teams in Yemen for 4 years and later in the West Bank and Gaza for 3 years. From 2000–2009, he was a part-time member of Glas Cymru, where he helped transform Welsh Water into a public sector success. In 2007, with German government funds and the cooperation of eight Arab governments, he formed the Arab Countries Water Utilities Association, the main forum for water utility cooperation in the Arab world.*

Understanding Local Realities

The Need for Policy Balance

Ideas and fashions in development cooperation in water supply and sanitation have changed greatly over my more than 30 years in the field. During the 1980s and early 1990s, ideas of appropriate technology, training—described as local capacity building—and a range of cultural values such as gender equality, were popular with donors. Northern European countries and UN agencies such as UNESCO actively applied these ideas internationally, especially in the rural water subsector. The high point for this northern social philosophy was the 1990 New Delhi Conference, which I attended, ending the International Drinking Water Decade (IDWD), 1981–1990. The social philosophers and intermediate technologists had delivered some good things we learned, but nothing truly significant in meeting the IDWD goals.

From about 1990, the World Bank and the International Monetary Fund became powerful advocates of privatization. This had a major impact on development cooperation in the urban water supply and wastewater subsector. Many other donors followed suit. Having spent the late 1980s involved in the United Kingdom (UK) privatization of water utilities, I was never convinced. Now in 2012 we can see that just as the overemphasis on social philosophy was a mistake, so privatization has not led to the extra efficiency and reduced corruption desired by its promoters. The oil tanker of World Bank policy has started to turn away from the privatization panacea, but this is a truly slow retreat that will take some years. I expect the 2015

conference on the UN Millennium Development Goals (MDGs) to realize and reflect on this over-ambitious expectation.

Development goals and policy need equilibrium. There are no silver bullets. Social values need to be balanced by practical outcomes. Private finance may often be needed for infrastructure investment, but public authorities in national and local governments will always have a key role in water management. Our best chance for the future lies in finding balanced policies and integrated ways to meet the water needs of all stakeholders, i.e., the human race.

The Value of Water Operators' Partnerships

My first experience in Water Operators Partnership (WOP) was in the mid-1980s when I managed a partnership project financed by the World Bank between Thames Water (then in transition from government ownership to a private enterprise owned by shareholders) and the public Ghana Water and Sewerage Corporation. It took a year, absorbed large amounts of money, achieved few concrete improvements, but had a great impact on the water professionals who took part. The Ghanaians coming to London and the Thames people in Accra all said their experience was "an eye-opener." There was no reference source for what we did and no received wisdom on how to do it. It was a true learning experience and a pioneering effort by both utilities.

We failed, I suppose, at that time to communicate properly the message about the value of such partnerships. But now 25 years later, there is a thriving Global Water Operators' Partnership Alliance (GWOPA) currently hosted in UN-Habitat. GWOPA promotes and supports WOPs worldwide. The key insight is that most of the required resources of skills and knowledge lie with the operators themselves. The problem is one of unequal distribution. Partnering strong utilities with those that are weaker can help address that problem by sharing know-how, skills, and resources. The Asian Development Bank (ADB) is especially active, and in Africa and South America there are many new examples every year of successful WOPs. Direct and effective partnerships and networking between water operators at global, regional, and national levels will help markedly to improve performance for the benefit of the poor. Even modest upgrading of these developing world utilities will go a long way to help meet the MDG targets. Many more partnerships are needed to realize the potential value.

Understanding Others

Diagnosis and understanding are essential to good project design. Anecdotes abound of failure to understand other people and organizations across cultures.

- In the 1990s, a showpiece donor project in Nepal brought piped water supplies to remote villages on the understanding that the beneficiaries would contribute their own labor to finalizing the connections at the village level. When it came to providing that labor, the locals—who preferred to work on their farms—refused. In the ensuing standoff they judged, correctly, that the donor government would find it unacceptable for its engineers to leave the project unfinished.
- A donor built a latrine block in an informal settlement in a city in India. An inspection, sometime after it was commissioned, found that the latrines were unused and the block, now equipped with a lock and a watchman, was being used as a place where local people could leave their small valuables when they went out in search of work. The perceived need for security was higher than the need for hygienic sanitation.
- I recently studied a water operators' partnership in an Asian city. The engineers from the expert utility were convinced that the recipient needed the latest technology, equipment, and training to carry out pilot projects to reduce nonrevenue water. In reality it turned out that the local engineers were the true experts and knew far more than their counterparts about how to reduce water losses in a low-pressure distribution system. Moreover, the investments required to rehabilitate the distribution system were unaffordable.

The key message is that it really pays to spend the time needed to understand local realities. That way, bad projects can be avoided and good ones made excellent.

Antonio de Vera *is currently the chairman of the Subic Bay Water Regulatory Board (SBWRB) which regulates a private water utility in the Philippines. He spent 25 years with the Local Water Utilities Adminstration (LWUA) since 1974, where he rose through the ranks from training specialist to administrator and finally vice chair of the board. He is currently an international consultant in water supply (covering institutional, engineering, and regulatory aspects) for various institutions like ADB, USAID, GIZ and the World Bank. In 2006, Tony was named as an ADB Water Champion. Tony has also served as a consultant to several local water districts and several private corporations, aside from being a director of two private corporations and president of a corporation involved in water system operations.*

Making a Difference

My favorite piece of prayer goes as follows "*Lord, give me the strength to change what I can change, the serenity to understand those that I cannot change, and the wisdom to know the difference.*" This statement has been a guide all throughout my adult life, whether in the professional field or elsewhere.

Making a difference in whatever undertaking you do is fraught with obstacles. However, having the following attributes will help you tremendously:

- Having built-in or internal standards,
- Having a passion for accomplishment and hard work,
- Understanding that the stakeholders are really the ones making the changes and your role is to motivate them and develop their capabilities.

I was asked once, "which is the most important thing in making a water utility a success—having adequate water sources, adequate financing, or good staff?" You may not guess it, but it is having good staff. With poor staff, the water resources and financial resources will just be wasted. With good people, they will be sure to get the first two, if the utility does not have it. And the resources obtained will be optimally used. They will make the difference.

Why a built-in standard of performance? Some may call this a passion for excellence, but I look at it merely as a benchmark. If the work I have done is not up to my own standards, I will not be satisfied, even if extolled to high heaven by others. It will be refined or redone. Having a built-in standard also assures that everything will be analyzed based on that benchmark. Everything needing reforms will surface (based on the standards set) and the beginning prayer will help you determine where to start.

A passion for accomplishment and hard work is an offshoot of the internal standards. Making a difference is basically just bringing the institution or the project up to standard.

Ensuring buy-in of the different stakeholders into your plans is the third attribute. Making a positive difference in the lives of others necessitates their involvement. Assuming the buy-in is there, their understanding and capabilities must be developed to ensure their motivation and sustained action.

The Local Water Utilities Administration Experience

I joined LWUA[1] in 1974 as a training specialist. Over the years and several promotions later I became the deputy administrator for institutional development in 1991. Two years before becoming deputy administrator, LWUA had been recommended to be abolished by a sub-cabinet committee because of its poor financial performance (37% collection efficiency). Three months later, I was appointed the administrator with a caveat from the board that if I don't turn the agency around in 2 years, I will be asked to resign. My built-in standards told me that the poor financial performance was due to poor accountability and not enough focus on the collection problem. Reforms in the organizational structure had to be made even without the initial approval of higher government offices. Focus on a single corporate goal (collection efficiency) was made and representations and sanctions were made to improve collections. Even political projects with bad repayment records had to be delayed, earning for myself the ire of several politicians. After 2 years, LWUA became a viable organization again and the official government stand was now to strengthen it instead of abolish it. After I left LWUA in 2000, LWUA was in the pink of health. The three attributes had served me well.

The Subic Bay Water Regulatory Board Experience

After my retirement from LWUA in 2000, the Subic Bay Metropolitan Authority (SBMA) hired me as a consultant to look into the "reasonableness" of the proposed tariff adjustment submitted by a private utility company, as well as to recommend a regulatory framework.[2]

I made a proposal to SBMA that they should form a 5-person board to act as a contract administrator or regulatory body to oversee the private utility. My recommendation was accepted and after a few months, the position of chair of the

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[1] LWUA is a specialized government financing institution for water districts (WDs). It provides loans to these utilities and provides them with technical and institutional development support. LWUA is also tasked with regulatory functions over these WDs.

[2] SBMA entered into a franchise agreement with a private utility in 1997 and tariffs were being reviewed by an ad hoc committee.

regulatory body was offered to me in order to "just to start it and train the others." [3] The chair had a 4-year fixed term.

This was a difficult position. The service area covers two local government units with different political affiliations and differential tariffs but with only one integrated water system. Many board members did not have any knowledge of utility operations much less regulating same. To make matters worse, the franchise agreement was skewed in favor of the private utility and had no provisions on penalties for poor performance. But we had to make a difference regardless of what the contract said. After several years and an arbitration case later, the contract was modified and a provision for rewards and penalties was included at our insistence although we were not a party to the contract. I am now on my second extension.

Rural Water Supply Manuals

In 2010, the International Bank for Reconstruction and Development (IBRD) gave me a project to update the design manual for rural water supply. I convinced IBRD and the client agency (DILG) that the new manual should cover only piped systems (piped public taps or house connections) as my experience (internal standard) told me that the old system of point sources was not sustainable. The other stakeholders[4] also agreed and the manuals (now expanded to include operation and maintenance, and construction) became a multi-agency undertaking and in 2012 were endorsed by the president himself.

Making a difference? It can be done…if you really want to!

[3] Statement of the then SBMA chair.

[4] LWUA, Dept of Public Works, Dept. of Health, National Anti-Poverty Commission, National Water Resources Board.

Chuanpit Dhamasiri *received her bachelor's degree in Structural Engineering from Chulalongkorn University, Bangkok, Thailand. She earned her master's degree on Public Health Engineering from Asian Institute of Technology (AIT), Bangkok, Thailand, after which she immediately joined the Metropolitan Waterworks Authority (MWA) in Bangkok, where she was later appointed governor until 2002. She was also recognized as an outstanding engineer from Chulalongkorn University and AIT in 2000 and received Outstanding Executive Awards from various public and private institutions. Her other positions included president of AIT Alumni Association, president of Thai Waterworks Association, and president of International Water Supply Association (Asia-Pacific Region).*

Crises and Waterworks

The Metropolitan Waterworks Authority, or MWA, is a large state enterprise that provides water supply to the Bangkok Metropolitan area as well as the Nonthaburi and Samutprakarn provinces, covering more than 3,000 square kilometers. MWA has about 2 million connections with a net profit of about B4,000 million (about US$127.55 million in June 2012) even though the price of water has remained unchanged for the past 10 years.

I was the governor of the MWA from 1995–2002. At that time, there were about 1.2 million connections and approximately 5,000 employees. At the time I took office, there were two major crises. One was the flood in Bangkok and surrounding provinces, when so much polluted water from the swamps of the agriculture fields were entering Bangkok. This polluted water had seriously threatened the quality of raw water, to the extent that the level of dissolved oxygen in our raw waters was almost down to zero. It was the MWA's job to prevent this polluted water from flowing into the raw water canal, which is almost 30 kilometers, while, at the same time, come up with new and additional water treatment processes to ensure that the water was safe for consumption.

The quality of MWA waters is usually higher than that of the World Health Organization (WHO) standards, but during that period it had fallen to just on par. This crisis led to many sleepless nights for many of us and the press was on our tails day and night inquiring whether and when the water was safe to consume. Luckily, this ordeal lasted for just 2 months and everything went back to normal.

The second crisis is the financial crisis in 1997, or what is sometimes referred to as the *Tom Yum Kung* crisis.

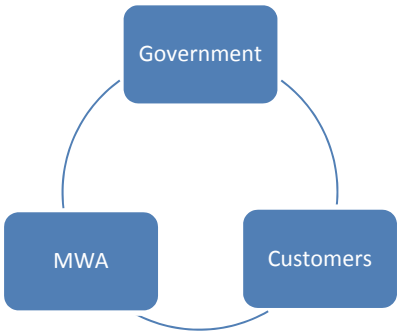
The impact of the Thai financial crisis was severe and lengthy, not only at the national level, but also for every organization and individual household. When the bubble burst, the government then was ill-prepared. Many financial institutions closed down, bank deposits were frozen, austerity measures were announced, investment projects were halted, and state budgets were cut. These measures caused a big stir in every public organization, including the MWA.

Two major issues affected the work and morale of state enterprises. One was the halting of investment projects and the second was the privatization of state enterprises. On the halting of investment projects, I opposed this policy from the beginning for three main reasons:

- State enterprises, such as MWA, are the supplier of basic and immediate necessities for the welfare of the people. Halting investment projects would mean that when the crisis was over, consumers would be lacking in basic necessities which, in turn, will hamper their productivity and the growth of the country as a whole.
- If the government decided to suspend development projects, then the private sector, such as contractors and suppliers, would have no work—leading to unemployment, thereby making the situation worse.
- Opening bids during a time of crisis could lower the costs of projects due to increased competition, which would help save the government budget (MWA projects signed during that time were about 40% less in cost than what it would have cost earlier).

Due to these reasons, the government decided not to cut the MWA investment budget and allowed us to continue with ongoing projects.

On the issue of privatization, which had disheartened MWA employees, I decided to use this issue as an opportunity to reinforce organizational value, pride, and team spirit among MWA staff. We had brainstorming sessions with all the over 400 MWA heads of divisions on a monthly basis and started to educate all MWA personnel about the privatization issue by setting up a general understanding of the linkage between parties involved:



Since the government had firmly announced the privatization policy, MWA was then not in a good position to challenge alone. We needed to gain the support from our customers. MWA had to improve its services, not only to provide better services, but also to build a good relationship with its customers. We thought that the more the customers were satisfied with our services, the more they were likely to support our cause. If they were not, then they would be more likely to support the government's idea of having "other(s)" manage and provide public utility services. Once MWA employees agreed on this strategy, it became much easier to put the various changes into effect in a systematic manner, including:

- Streamlining and simplifying many of MWA working procedures;
- Gradually putting in place accountability measures and a time frame at every working level; more time was initially given during the transition period, and the time span was gradually shortened once the employees were accustomed to the new system;
- Setting up working standards and measuring performances on a daily and monthly basis, and replacing the overtime payment method with a system of incentives, which is more efficient, less costly, and fairer to our staff;
- Restructuring MWA branch offices by modernizing their operations and improving their efficiency in providing services;
- Expanding the role of MWA beyond the point of water meter, normally located outside the compounds, to offer services within the customer's grounds and initiating the "Drinkable Tap Water" project. To this end, MWA teams were sent to government offices, schools, hospitals, office buildings, and households to inspect water quality and pipe networks, fix leakages, and offer advice on how to improve water quality. Once the water quality met the drinkable standard, MWA would issue a certificate guaranteeing the quality of the water, so that customers were assured. This project greatly strengthened MWA ties with the public; and
- Introducing a computer system to facilitate our works and connect our operations online, so that our customers could contact MWA off-premise. Even during that time when e-mail was still uncommon, customers could submit their request(s) via telephone, fax, or mail. MWA was also the first public organization that was able to provide "pay point" services in which customers could pay their water bills at convenience stores.

Undoubtedly, the fact that MWA was able to achieve all this restructuring was because of the full cooperation and dedication of all our staff. The concrete outcomes of the restructuring process, together with the praise received from our customers also became a source of inspiration for us to become more proactive and to create new ideas and innovations to further improve our operations and services. MWA has received numerous awards from various institutions and is now one of the most successful state enterprises in the country. More importantly, through these efforts, MWA was able to gain the trust and support of its customers.

Once we had the customers on our side, the next task was to convince another important stakeholder in the privatization process, the government, to support our cause. I was fully aware that it was close to impossible to request the government to abandon the privatization plan. Rather, my intention was to delay the process. It was my belief that, once the Thai economy had recovered, the issue of privatization would be put on the back burner. To do so, MWA joined with other state enterprises under the purview of the Ministry of Interior, which were the Metropolitan Electricity Authority (MEA), the Provincial Electricity Authority (PEA), and the Provincial Waterworks Authority (PWA) and began to discuss and exchange information on the experiences of other countries, particularly within the Asian region.

I was fortunate to receive a study by a well-wisher on this subject, which revealed the pros and cons of privatization, in particular the massive benefits to be reaped by multinational companies from the privatization of large-scale state enterprises. From this document, my understanding on this topic was enhanced and I became increasingly aware of the potential outcomes. I was the chairperson of the State Enterprise Manager's Club, which consisted of more than 60 state enterprises in Thailand. I shared this study with some state enterprise governors and delivered a copy to the minister of Interior. Subsequently, the minister agreed with our assessment and became more cautious in proceeding, letting the Ministry of Finance lead the process amid increasing opposition from the labor unions and the press. As anticipated, after more than 15 years, there is still no state enterprise in the utility sector that has been privatized.

I believe that MWA was very fortunate in many ways. We were supervised by a minister who fully recognized the importance of the public utility to national welfare. We had board members who were selfless and had the public interests at heart. More importantly, our employees were united, determined, and sacrificed themselves to transform MWA into one of the leading state enterprises in Thailand. Looking back, I now see the financial crisis in 1997 as a blessing in disguise. The restructuring of MWA might not have occurred had we not have to overcome the challenges posed by the crisis.

Crisis is not always bad. If we are well-prepared and can effectively adapt to change, then we can overcome any crisis and might come out even stronger than before.

I would like to emphasise that "water" is not a goods but a national resource. Water is not only a basic necessity for the health and the welfare of the people, which must be adequately provided to all by their governments, but also a matter of national security. In times of crisis, whether it is a natural disaster or economic meltdown, any country needing to depend on external water supply would undoubtedly have less clout in the international arena. Conversely, any country that has full autonomy on its water resources, both supply and management, would be in a better position to look after the welfare of its people, protect national interests, and ensure the future prosperity of the nation.

Ek Sonn Chan *as a young engineering graduate, lost his entire family to the killing fields of the Khmer Rouge. Managing to survive as a farmer, he found work in 1979 in Phnom Penh, and rose to greater responsibilities until in 1993 he was appointed head of the Phnom Penh Water Supply Authority (PPWSA). He succeeded in rehabilitating this ruined public utility, bringing safe drinking water to a million people in Cambodia's capital city. He and PPWSA have been recognized locally and internationally, and among their awards are the ADB Water Prize, the Ramon Magsaysay Award for Government Service, the French Honor Medial Chevalier Dans L'ordre de la Légion D'honneur, and Stockholm Industry Water Award. Mr. Ek is advisor to the Cambodian President of Senate and member of the International Advisory Panel of Institute of Water Policy of Lee Kuan Yew School of Public Policy in Singapore. He has recently been appointed undersecretary of state for the Ministry of Industry, Mines and Energy, Cambodia.*

Water Supply Sector Reform in Phnom Penh

During the Khmer Rouge regime from 1975-1979, much of the water supply facilities of Phnom Penh were destroyed and many of its qualified staff were killed. Then from 1980–1993, due to lack of maintenance, the system deteriorated further. Only 25% of the population was served with piped water. Very few connections had water meters, the collection ratio was less than 50% and nonrevenue water (NRW) was about 70%.

In 1993 with a new government, Cambodia started the reconstruction of its infrastructure and I was appointed to be head of PPWSA. Although I set up a new dynamic young working team, restructured the organization, and changed the culture to one that was more transparent and modeled on good management, the real change did not come until in 1996, when with the support of the government and donors, PPWSA was made an independent autonomous public enterprise. Only then was I able to pursue institutional reforms in earnest. There were six main steps taken that led to the ultimate success of PPWSA as a water utility.

- A new organizational structure was established and old inactive managers were replaced by young, dynamic, and educated staff.
- We paid the staff well so that they could have a good standard of living and this enabled us to attract good staff.
- We concentrated on improving the collection ratio and creating an accurate customer database.
- We pursued the reduction of NRW vigorously with a system of penalty and reward for staff.

- In 2005 we introduced a “Water for All” program that ensured the poor consumers were provided for, so that they could pay for their water consumption.
- We increased production and expanded the distribution network progressively to serve more and more customers.

Where are we now? We provide 112 l/c/d to our domestic customers on a 24/7 basis. Water production was increased by 461% and the customer base by 818%. NRW was reduced from around 70% to now only 6%. Everyone is now paying for the water they consume.

Lessons

Based on our analysis, the road map for success of water utilities include:

- No political interference as to how the water utilities managers decide to perform their tasks.
- The ability to leverage the company’s internal strengths with external opportunities. For successful transformation, we believe that the internal effort plays 70%, compared to the development partners’ inputs of 30%.

We also found out some common mistakes that lead to ineffective water services management.

1. Policy maker
   - Does not provide autonomy to water utilities for fear of loss of control
   - Considers drinking water as a political issue with fear of social or political unrest. This leads to considering water is free. Regarding this concept, we learned that a number of government officials, managers, and individuals in water utilities do not pay for water they consume. But the uniform global experience has been that if the consumers have to receive a 24-hour, uninterrupted, and reliable water service, they have to pay, otherwise free water will invariably lead to a third-grade and unacceptable service.

2. Water utilities’ management
   - Most water utility managers think that with a low water tariff they could not generate profit. This concept ignores the utility’s commitment for the improvement of utility performances.
   - Purposely cheating their performances to lower NRW and report higher collection efficiency. This tactic is aimed at increasing the water tariff, instead of improving their management efficiency.
   - The management is not willing to learn and train. They normally dispatch their subordinate for training instead.

3. Consumers
    - The water is drawn from the river. It should be cheap or free. This understanding leads eventually to no water at the tap.

Conclusion

The above common mistakes make the improvement of water service management uncertain, and need to be challenged. Many reasons are given by water utility managers, political leaders, and many members of the water profession, as to why it has not been possible to provide clean, drinkable water to the urban centers of the developing world. Among these have been the physical scarcity of water, lack of availability of investment funds, inability of the poor to pay for water, low water tariff, lack of expertise, and many more. All these constraints are mostly institutional and governance-related issues, including regular political interference in the work of the water utilities. **Unless the urban water governance practices are significantly improved, universal access to clean drinking water will remain an unachievable dream, even if hundreds of billions of dollars are made available to this sector each year with no strings attached.**

Rodora N. Gamboa *is a licensed chemical engineer and holds a master's degree in environmental planning. Her work experiences are in the fields of information technology, corporate planning and human resources. Her 25 years of experience in the water sector as manager, trainer, and consultant includes her post as general manager of the Davao City Water District (DCWD), Philippines from 2006 to 2011. She is currently with the Maynilad Water Services Inc. as head of the Maynilad Water Academy. She is a resource speaker and facilitator in local and international trainings, seminars, conferences, and conventions on topics such as strategic planning, corporate planning, water supply operations and management, nonrevenue water, gender and development, watershed management, integrated water resource management, and rainwater harvesting. She is currently chair-elect of the Philippine Water Partnership (PWP), and secretary of the Philippine Watershed Management Coalition (PWMC). In 2007, she was awarded Outstanding Chemical Engineer in the Government Service Category by the Philippine Institute of Chemical Engineers and again by the Board of Chemical Engineering of the Professional Regulations Commission.*

Proactive Utility Management

Managing a water utility requires a lot of decision making. Good or bad, a decision needs to be made. I have been confronted with some major decision challenges—whether to use groundwater or surface water, to aggressively increase coverage and water sustainability but get a loan or just maintain a status quo and rely on internal funds, to fight against a power company over water rights or not, to discipline employees or not, to go against political intervention or not.

Proactiveness—not reactiveness—is needed in managing a water utility. This may be difficult though if new chief operating officers or general managers inherited a company that has been overtaken by development. For this reason, many utilities are cramming to cope with development.

Effective water management requires careful planning, focus, communication, informed decision making and strong political will. For a water utility that is in crisis, be it financial, confrontational, or natural, strong political will is not only desired but is a must.

Wherever you are placed, love your work and give your best in everything you do. Managing a water utility is full of challenges.

On Human Resource

Human resource is the most important resource. Taking care of people means giving them what they need, balanced with what they want, so that the organization will grow to further serve the population. Let the employees grow with the organization financially, socially, technologically, and spiritually.

Learn, share, and learn. Sharing knowledge is creating power in others. I want to learn more so I can share more. I want to provide a venue for learning, capacity building, sharing, and empowering others.

My work at the Maynilad Water Academy is what I wanted because it gives opportunities for Maynilad employees to learn and grow with the company. It is a venue for those in the water and sanitation sector, in the Philippines and in Asia, to have an opportunity to share experiences and knowledge.

Water utilities should have a direction that is known to all employees. When I was in DCWD, my thrust was coined as NICE. NICE lady with an iron hand. NICE means nonrevenue water, infrastructure development, customer satisfaction, and environmental protection. Upon consultation with the management and staff, they suggested to include “R” which means Resource Management (including human resource and water resource). It then became a company-wide direction. Because they contributed the “R” there is now ownership. NICER agenda became the direction.

Other Thoughts

As a public utility, transparency is important. Communication is essential. Plan out properly what you want to project to the public.

Good relationship with all stakeholders is essential. Good relationship with the local government doesn’t necessarily mean agreeing to whatever they say, or following what they want you to do. It is a matter of respecting each other’s opinion.

Dipak Gyawali *is currently* pragya *(academician) of the Nepal Academy of Science and Technology (NAST) and chair of the nonprofit Nepal Water Conservation Foundation, as well as the private research company Interdisciplinary Analysts that specializes in quantitative social sciences. He is a hydroelectric power engineer and a political economist who, during his time as minister of Water Resources, initiated reforms in the electricity and irrigation sectors focused on decentralization and promotion of rural participation in governance. He also initiated the first national review and comparison of Nepali laws with the guidelines of the World Commission on Dams. He has served as a member of the panel of experts for the Mekong River Commission, reviewing its basin development plan and is on the Steering Committee of M-Power, the Mekong Program on Water, Environment and Resilience. He is the founding chair of Nepal's first liberal arts college, the Nepal School of Social Sciences and Humanities and was the founding chair of a rural empowerment nongovernment organization, the Rural Self-Reliance Development Centre. Mr. Gyawali has been conducting interdisciplinary research on the interface between technology and society, and has published numerous articles on the topic of water, energy, dams, and climate change issues.*

The Chasm between Water Punditry and Water Politics

It is perplexing, this gap between what academics and experts studying water think, and where politicians and their politics drive water development. Those of us who are battle-scarred veterans of water policy wars in Nepal (and by default South Asia's Ganga Basin) remember the last 2 decades of the 20th century as those of intense water disputes. Several water projects such as the World Bank-promoted Arun-3, the Mahakali Treaty with its Pancheshwar High Dam, the Melamchi transbasin water supply project and the export-oriented West Seti multipurpose reservoir project, have as a result, become household names in Nepal and often abroad as well.

On hindsight, it can be seen that those decades of popular as well as academic activism have helped the discourse in Nepal move beyond simplistic emotional sloganeering to what are more complex second-generation issues. The debate is no longer just large versus small: it has shifted to that of risks, justice, and indeed the correctness (or lack thereof) of the development pathway itself. Are risks large or small, for whom and under what terms? Is hydropower development meant to be for national industrialization that helps expand upstream-downstream linkages in its economy, creating jobs within the country, or is it for export in what is increasingly being termed a neo-colonial path of resource export? Dams are always a public policy lightning rod that polarizes the debate: water storage, however, has an undeniable legitimacy behind it. But how should multipurpose use of reservoirs be planned and implemented so that those benefitting from the supply of regulated water in seasons

of acute scarcity also pay for the cost of the dam and not be free riders by having everything loaded onto the electricity sector? What is a fair price for both the developers and the consumers, and who should adjudicate? Indeed, who has prior rights over natural resources, the state at the central level, the local units of government, the business sector that can pay to privately own public goods, or those communes and religious entities who uphold the nonfiscal values of common property? Are our water-related institutions, designed with technocratic certitude for a bygone era, capable of addressing such issues of value-leavened complexity?

A review of Nepali laws in 2003–2004, comparing them with the recommendations of the World Commission on Dams (WCD),[1] revealed the surprising fact that these public debates of the 1990s were responsible for making many Nepali laws fairly robust in social and environmental terms. These controversies, in fact, led to the incorporation of many of what subsequently became the WCD recommendations into the Nepali legal system, even before the WCD was formed. The need, therefore, was not for a knee-jerk rejection of the WCD guidelines as advocated by many hydrocrats, but for a constructive engagement with them and to see if more global concerns regarding equity and justice in water resources development could be further addressed by Nepal's legal practice. The irony is that while the professional discourse has thus moved to a higher and saner level, there is a strange regressing back to self-defeating populism at the level of partisan politics within Nepal and at the transboundary level with the lower riparians in the Ganga basin. What explains this incongruity?

A stepping back to re-examine the iconic projects of controversy listed above might help. The World Bank eventually had to pull out of the Arun-3 hydropower project, not because of what the fractious political parties of Nepal did, but because the activists caught the bank doing bad economics. The hydropower project on the eponymous river was planned to be built by the Nepal government with the World Bank and seven other donors in the lead at US$5,400/kilowatt (kW) when the private sector was building hydro projects in Nepal at a mere $1,000/kW. The forty-odd conditions attached to the project ensured a monopoly environment that would fleece the Nepali consumer dry and destroy the nascent small hydropower industry in Nepal. This is what riled many and fuelled the opposition. The activists have subsequently been vindicated by the fact that, with the collapse of Arun-3, half a dozen other projects have been built with donor and private sector funding that has provided Nepal with a third *more* of electricity than Arun-3 would have and at half the cost and half the time. Indeed, private entrepreneurs have subsequently built a 4 megawatt Piluwa Khola hydropower project in the same roadless Arun valley at only $1,200/kW, vindicating the stance of the activists.

Unfortunately, the powers-that-be have not learned the right lessons from this event and chose instead even today, a decade-and-a-half later, to engage in the politics of scapegoating each other and the activists. Arguing populistically that they would

[1] See Special Issue of Water Alternatives on WCD+10.

"return Arun-3 at all cost" (instead of at the right cost), the big political parties ended up handing this project over to a developer from India—for export to India—even when Nepal currently faces crippling power shortages. This has riled up a new round of activism based on the concept of national development that promises even more fireworks—and more impasse—than in the past. Incidentally, the developer from India proposes to develop this at $1,000/kW, again vindicating the activists regarding their Arun-3 opposition.

While Arun-3 was a controversy at the eastern end of Nepal, another project on the western end has recently hit the headlines. The West Seti is a multipurpose reservoir project direly needed to even out the imbalanced seasonal capacity in the national grid. Its stored water would provide additional multiple benefits of dry season irrigation, fisheries, and even river transport. It was wrongly designed as a hydroelectric project and designated for power export to India, ignoring Nepal's internal needs and the constitutional provision of parliamentary ratification. Because of these and other contradictions, the Australian developer who bagged its "hunting license" failed to move it forward even for a decade and a half, and the license was scrapped a year ago. Subsequently, the developer from the People's Republic of China—*Three Gorges*—has entered the fray, proposing to develop it for meeting Nepal's needs, a proposition that has won it widespread support even from dam critics, despite enduring reservations on issues of resettlement, pricing etc. It received support even from a highly critical parliamentary committee.

The Melamchi transbasin project to supply water to a growing Kathmandu city, which at the current rate of progress may not see water at the end of the tunnel during the lifetime of this generation of professionals, is another water controversy that has a strange twist to it. There is no denying that Kathmandu needs water, especially when the city has ballooned to now include 10% of Nepal's total population. However, there are issues other than just new supply: who is to be held responsible for the massive leakage in the system? What sense does it make to increase supply if leakage and theft is to remain the same? What is the role of the elected municipalities, especially in the current debate on governance transformation in Nepal? Why is the used water, i.e., sewerage, on nobody's agenda? And are there ways to prevent this huge, multiyear effort from becoming a fiscally incontinent boondoggle as other such large projects have become? Without addressing these governance issues, just punching a hole in the mountain and bringing water from the other side will not solve the root problem, but will only make a few contractors and the politicians backing them rich.

On this last question, it is ironic that Nepali environmentalists, unlike their Euro-American counterparts who argue for "No Dams" or at best "Small Dams," are actually arguing for a "larger multipurpose Melamchi;" and it is the government and its donor agency that are arguing against it. The idea of the activists is that, if one went to all the trouble of building some 30-kilometer tunnel in Himalayan geology, one may as well get a "better bang for the buck"—that instead of designing it only to supply drinking water, it should be designed in a multipurpose fashion to generate

electricity from the height difference; have the electricity pay for most of the cost of the tunnel, thus provide cheaper water for Kathmandu; put in proper sewage treatment systems so that the sacred Bagmati river is cleaner; and the treated river water generates more electricity downstream of Kathmandu as well as irrigates the Tarai. Strangely, it is the government and the donors who want to stick to the smaller, less optimum solution for reasons of institutional inertia.

What do these disjunctures tell us? The first lesson is that, southern socio environmental activists do not uphold the slogan of the northern environmentalists of "No dams!" but argue instead for "No bad dams!" This provides ample space for constructive engagement in the policy terrain between the government, the business entrepreneurs, and the civil society to find common acceptable ground. Everyone in the south wants development. The question is what kind of development is good development and what kind bad development, and that debate will rage, has to rage, until the public policy terrain is satisfied the issues have been seen from all sides. No hydro hegemony should be allowed to hijack the process or the initiative; and if it does, grief and impasse will be the only outcome as has happened with the Mahakali Treaty that is languishing for the last 16 years, even after it was ratified with much fanfare in 1996 by over two-thirds of the Nepali parliament.

The second lesson is that what the experts and professionals think resembles a skin ointment: it can fill the room with fragrance but probably very little of its medicinal value seeps through the skin itself. Similarly, expert and academic view have great relevance at the national professional and international levels—and do influence thinking there—but at the level of mass politics in the myriad villages of a country, it is what the politicians and the political parties say that drives public opinion. If academics and activists cannot influence local politicians or win their confidence, some very bad projects can be pushed through, despite their correct objections.

The third lesson, related to the second, is that politics, unlike academia or professional thinking, is often driven by very short-term and mundane thinking. Many large water projects are attractive to politicians and political parties because they provide the opportunity for patronage dispensing, accumulation of party war chests, and make for good iconic propaganda. The arcane mathematics of cost-benefit analysis is for some future generation to worry about, or as the apocryphal story of an American politician has it who said, "Why should I worry about the future generation? What has the future generation done for me?" If the academics hope that the politicians, especially in the villages and districts of the global south listen to them, they better translate their concerns into a language that is understood in local political terms, something they have mostly failed to do.

And finally, for the politicians and hydrocrats pushing large projects that are opposed by socio environmental activists, stop thinking that a procedural victory through high governmental decision or the courts is the end of the matter. Issues of equity and justice have a habit of re-emerging from the woodworks and no amount of chorus singing in their favor by donor-, government-, business- or party-organized DONGOs,

GONGOs, BONGOs or PONGOs will come to the rescue when a sense of being unfairly treated prevails. The best example of that is the South Indian dacoit Veerappan who terrorized the states of Karnataka and Andhra Pradesh, provided protection to sandalwood smugglers among others, and even managed to kidnap chief ministers. It turns out he was the grandson of a Mettur Dam oustee, a dam built by the British Raj in 1924. The sense of unfairness can come back to haunt the system even generations hence.

Khondaker Azharul Haq *from Bangladesh has over 40 years of experience in the water sector in South Asia and Africa. He was the managing director and chief executive officer of Dhaka Water Supply and Sewerage Authority (the longest serving chief executive officer in the organization's 50 years history) and very successfully steered the utility into the new millennium with markedly improved service delivery. For his contribution to the urban poor access to water supply, he was recognized as a "Water Champion in Asia" by the Asian Development Bank in 2005. After his retirement from DWASA he has worked as a consultant to ADB, FAO, Danida, IUCN, Christian Aid etc. in water supply and impact of climate on water, food and eco-system security.*

Lessons in Utility Management

Trade unions can be converted into effective partners in improving billing and collection of a public sector water utility. In the developing countries of South Asia, trade unions are considered as unnecessary evils, standing in the way of improved technical and financial performance of water utilities. Trade unions were brought on-board to help improve revenue billing and collection through a contract in 3 out of 7 zones of the Dhaka Water Supply and Sewerage Authority (DWASA) in Bangladesh. They did such an impressive job that nonrevenue water (NRW) was reduced from over 40% to nearly 25% in their contracted areas. An impressive achievement indeed!

Lesson learned. Trade unions can be transformed into effective partners in improving performance of the public sector utilities.

The urban poor popularly known as informal settlers, which constitute about 30% of the capital cities' population had no legal rights to regular water supply. They were being exploited by the local "water lords" and in most cases, they had to pay 3 to 4 times more for water as compared to the regular customers. The "water lords" used to "steal" water from the supply lines and sell it to the urban poor. The water utility was deprived of the revenue, which in turn increased NRW. An innovative system was developed where water was delivered to the informal settlements through nongovernment organizations (NGOs). The NGOs were provided with a metered connection, and their role was to distribute the water within the informal settlements, collect revenue from the informal settlers, and pay to the utility as per consumption.

Lesson learned. A large section of the population who cannot legally access water supply as they do not hold title of the land can be served via an NGO to benefit both the client and service provider at a fraction of the cost earlier experienced.

DWASA has a very democratic 13-member board of directors representing different professions and stakeholder groups. Only two members are from the government. The chair of the board is usually appointed by the government from the consumer group. But there is no criteria set for eligibility of the board members, which needs to be introduced. The other important issue is that the board is not accountable to anybody, not even the government, for its actions. Therefore, if anything goes wrong from the action of the board, either the line ministry or the DWASA management is held responsible. This also needs to be corrected.

Another issue is that the managing director and deputy managing directors are recruited from the open market through a competitive process with a salary package comparable to the private sector. But their annual evaluation process is either totally absent or inadequate. A rational annual evaluation process should be introduced for assessing their performance.

Lesson learned. The selection of members of water boards needs to be based on clear eligibility criteria and they need to be held accountable for their actions.

Robert (Bob) Hood *is an independent international consultant working of late in Asia in the water and sanitation sector. His background includes services, local government, manufacturing, mining and utilities (energy, water, telecoms) as a management consultant and partner with Coopers & Lybrand (now Price-Waterhouse-Coopers) and as managing director of ACIG International, an Australian-based consultancy practice. Other positions held include director of Generation, Victoria; director, Southern Hydro Ltd.; president (Victoria) of Certified Public Accountants, Australia; chair, various audit committees; and financial roles with Caterpillar Australia and service companies in the United Kingdom. Formal qualifications include chartered accounting, a degree in economics, and formal training in organization and methods study. He was awarded an Australian Government Centennial Medal in recognition of his contribution to industry.*

When Too Many Cooks Spoil the Broth

Here are six observations about water utilities and the sector I would like to share with others.

First, it is the amazing level of commitment and dedication of many executives and middle managers of water utilities despite the many obstacles placed in their way. There are barriers of bureaucratic rules, slow decision making, political appointments, even a lack of funds and authority, yet they persevere and sustain a deep concern about delivering reliable water services to customers.

Somehow they find a way. In one experience, I encountered a manager who had no funds to build a needed small-scale treatment facility. With virtually no organizational support and just sheer ingenuity, and the fortunate availability of a number of shipping containers, he was able to fabricate an improvised but effective filtration plant.

Such a can-do attitude is crucial in providing an essential service like potable water and sanitation. Cases like that reinforce my view that given a better enabling environment, quite a number of utility personnel can perform as good as best in class. It is important to give credit to those managers who each day, without fanfare, deliver water services, especially in developing countries. Their job isn't easy.

Second, it is a concern that the sector is subject to the silver bullet syndrome. Rather than investigate and discover what might be the underlying causes holding back performance and then carefully weighing up solutions, there is a tendency to seek the silver bullet that will miraculously solve everything. There have been a string of silver bullets over the years with labels such as zero-based budgeting,

management by objectives, outsourcing, good governance, and more lately, corporatization and privatization. Certainly, the attraction of the all-inclusive solution is appealing and each of the strategies has something to commend it. Marketed with hype by financiers and consultants to politicians and utility top management, they seem a sure fire solution. The reality is much different and the consequences of failed change can hold back an organization for quite some time. What we need instead, is the application of sound diagnostics followed by common sense realism. Funnily enough, many advocates of silver bullet change fail to see that even within their own organizations, change is not easy, quick, nor able to produce dramatic improved performance results.

Third, some perceive that water utilities are asset-intensive and they can only be led by engineers, when the truth is actually quite different. Best in class water utilities realize that their success and continuity now is much more dependent upon getting the customer relations right and more importantly, managing finances and tariff setting. There has been a mindset that finance for example, was about paying the bills and collecting the debts—both essential tasks—but one that can be done by clerks and bookkeepers. Instead, the financial skills needed today in a utility are significant—as assets are so long lived—25, 50, 100 years, renewal and expansion investments are significant, service interruptions have severe revenue consequences, tariff levels are dictated by asset levels and productivity, plus bankers rely on prudent cash flow management to justify their utility lending. Consequently, utilities should employ and pay for a top class financial director as a key member of the executive team. The same can be said for marketing and customer relations.

Fourth, it astounds me just how many organizations have a finger in the water sector pie, and the challenge of keeping abreast of the torrent of events, papers, news, articles, publications, websites, and other information. How can the average person keep up-to-date and how can anything be done when so many organizations seek a place at the decision-making table? A case in point was a recent event concerned with cleaning up a polluted waterway in a major Asian city. On the face of it, one might guess that 5 or 7 key organizations would span the spectrum of interests, needed mandate, and authority. Not so—over 160 organizations attended, some of course to observe and some as suppliers but even the core number expected to sign a declaration of intent numbered 47. Such fragmentation would appear to be a major barrier to making progress—involving too much consultation and delay and little action. In another example, a number of utilities were able to consider a specific proposal and make a decision within a week. But one utility, because it had to refer the matter to a ministry, took 4 months. Inevitably the one that took the longest to decide was the quickest to fail. An old English saying goes “Too many cooks spoil the broth” and this truism applies to the water sector.

Fifth, I am impressed by the sharing nature of utilities and their executives. Having been fortunate enough to facilitate utility twinning in Asia and pay close attention to the chemistry of the relationship, it has been impressive how generous utility managers have been with their time to become actively engaged in solving other

utilities' problems. The camaraderie and friendships built through such a program have been a pleasure to witness. In one instance, the expert utility manager took his recipient utility colleague shopping to buy him headphones out of his own pocket so they could communicate conveniently and cheaply through Skype. Water sector people believe in what they do and when asked are more than willing to help. But we mustn't take such help for granted, or inappropriately credit the results achieved to the brokers. Still, twinning, when handled courteously, carefully, and with chemistry, augers well for participating utilities, the sector and its customers.

Sixth, **a huge amount of resources have been and continue to be misused in inappropriate training for developing countries.** Knowledge-sharing activities like training, workshops, and study tours are a staple in almost all development projects. While there are benefits to be gained from these activities, often, these are not realized because they are not tied to competencies but used as junket trips and/or as a sweetener to projects. It is crucial to target the right participants at the outset. This is difficult with bureaucratic processes of some governments that cycle foreign trips and training among their staff and inevitably award training if mixed with travel, to senior officials who are not necessarily connected to or would benefit from the training event. One example comes to mind of a training program conducted as a series with the expectation that there would be continuity of participation. In fact, one attendee of the first training session was barred from attending subsequent ones because his quota within any 6 months was up, even though he was essential to the follow-up implementation program. Only by written insistence he must attend, or the organization involvement would have to be discontinued, did we manage to achieve his attendance. Another issue is one of retaining the persons trained to stay in their jobs and/or the organization. Frequently, arbitrary rotation or transfer of staff mitigates training benefits, and worse still, the trained person quits the role to accept positions with other agencies. There are many lessons to be learned if investing in training is to pay off. They include (i) tying training to desired competencies; (ii) being able to apply the training immediately after a return to the job; (iii) preferably taking the training to the job holder's location, rather than requiring travel that immediately attracts unwanted appeal by others; (iv) development of training events in close collaboration with the agency concerned so that it takes place in context, the management is committed, and as far as possible, learning takes place in the local language; and (v) not relying on immediate course evaluation to confirm its success but instead following up with an assessment on job performance in the work place setting. Certainly, training can make a difference to development project success and agency performance, but first there has to be different thinking about training.

These thoughts reflect the views and contribution of my co-facilitator Cherry Ann Santos who worked with me on designing and implementing the Water Operators Partnership Project - (and subsequently went on to gain a master's degree in Human Resources Management at Melbourne University).For the first ever WoPs that ADB engaged, we ran training on continuous improvement and benchmarking as well as training by expert utility twins.

Graham Jackson *is a chartered professional engineer with over 30 years' experience in the design and implementation of water-related and environmental infrastructure in both developed and developing countries, working in the private sector and as a staff member of the Asian Development Bank from 1996 to 2005. During this time, he worked with governments, state enterprises, and bilateral and United Nations organizations on a wide range of development issues including policy and sector reform, strategic development, and corporatization programs. After having worked in a number of countries across South Asia, his work has more recently been mainly focused in Southeast Asia and, since 2006, he has served as team leader for project implementation and sector reform on two successive water supply sector projects in the Lao People's Democratic Republic.*

Phomma Veoravanh *graduated as Dipl-Ing in Urban Planning at Bauhaus University in Germany from 1981 to 1986 and graduated with a Regional Sciences and Planning degree at Karlsruhe University in Germany from 1993 to 1996. He has extensive experience working as a government official in urban development and the Water and Sanitation Sector Project. He has more than 15 years' experience in project preparation and project implementation.*

Connections and Corporatization

This article, which is based on our collective experience in the Southeast Asian region, and in particular Lao People's Democratic Republic (Lao PDR), discusses two issues (pearls of wisdom) that we believe can have a significant impact on development of the water supply sector.

The first issue is the high cost of a connection to a reticulated water supply system, and how it serves as a constraint on expansion of service coverage. To address this issue, the option of eliminating upfront fees for connection to a water supply system has been explored recently in Lao PDR. More commonly known and incorrectly referred to as a *free connection policy*, the initiative has been pilot-tested over the past few years under a water supply and sanitation project funded by the Asian Development Bank (ADB) in Lao PDR. Introduced to try and address the low coverage rates that had previously occurred in the sector, the concept was not well accepted by provincial water supply enterprises at first. After much discussion, it was found that the resistance was because the enterprises normally allocated connection costs

as operating expenses, and could not recover these expenses without collecting fees from the consumers.

Since water supply is seen as a vital basic social service in the country, which significantly reduces poverty and enhances health and productivity, it was decided a solution must be found to overcome the resistance of the enterprises and provide a safe water supply for all. Using ADB's concessional funding, materials were bought and supplied for the connections, which were then installed under the civil works contract. All residents wishing to avail themselves of a connection without an upfront fee were invited to apply during the construction period, and in every case to date (12 towns) there has been an overwhelming 90%–95% coverage rate achieved.

The pilots were intended to demonstrate (i) how to achieve the government's targets much faster, and (ii) how quickly the full extent of the social and economic benefits normally derived from safe water supply can be realized through immediate universal coverage. In terms of how the water supply enterprises recover their connection costs, we have now started working with their accountants to show them that if the connection is put on the asset register, they can then make provision for its depreciation in the annual financial statement, which can then be incorporated into the tariff calculation, thereby recovering the cost.

A spin-off benefit of the initiative has been the improved sanitation coverage that has been achieved. On each pilot project, a condition of each premise being granted a connection with no upfront fees, is that it must have an approved sanitation facility. Experience on the pilot projects to date indicates that the community's perceived value of a water supply connection is such that they will willingly install an approved sanitation facility to get the connection under the civil works contract. Using this approach on the 12 towns on which the pilot project has been tested, sanitation coverage of 90%–95% has been achieved. So that poor households are not disadvantaged, a social safety net in the form of a grant to cover the cost of materials is provided to them to install an approved sanitation facility, which together with the water supply connection, goes a considerable way to addressing a key dimension of poverty—access to basic services.

The second issue concerns the introduction of corporatization to the sector in Lao PDR. Up until quite recently, water supply operators were in departments within the government's administration. Although tariffs were in place, they were well below any level of cost recovery, and the water supply departments relied almost totally on subsidies for capital investment and to a large degree for operation and maintenance. They operated effectively as budget-sourced line agencies, carrying out repairs and expansion only when funds were available through the government's budgetary resources or from donor agencies. There was an acute lack of awareness of the need for cost recovery and the underlying business principles on which the water supply systems could be sustained. Under the Business Law of 1996 and its successor, the Enterprise Law of 2005, these water supply departments have been struggling to transform themselves into business enterprises (state-owned), weaning

themselves off subsidies and relying more on their revenues to meet all their costs.[1] To help with the transformation, and with support from ADB, the water supply enterprises are gradually starting to follow a path of corporatization in which new business principles are being introduced under the umbrella of a 3-year rolling corporate plan.

The corporate planning process has been slowly introduced to some eight provincial water supply enterprises over the past 3 years and with the benefit of hindsight, we can say the inherent challenges were seriously underestimated. Staffed with people trained throughout their careers as public servants, and functioning in what were essentially line agencies, the move to become business-oriented water supply enterprises represents nothing less than a paradigm shift in the way they operate. The lack of awareness and appropriate business and planning skills is apparent at all levels. However, working with these water supply enterprises on the development of their corporate plans, we are pleased to receive feedback that they are starting to think about the future operational needs and constraints of the systems for the very first time. Previously, staff had been preoccupied with the day-to-day tasks of operating the system.

In working with them on the corporatization process, it is clear that building awareness and skills within this context takes time. Based on our experience with this initiative, one-off workshops and/or meetings do not seem to provide a solution and invariably lead to misunderstandings. The answer seems to lie in adopting a process-oriented approach. In our opinion, there is no substitute for regular workshops and/or meetings in which concepts are presented and progressively explored and misconceptions aired and discussed. This approach gives all parties time to build awareness, develop an understanding and work toward a consensus.

Based on experience, the approach seems to fit well with the limited absorptive capacity of the sector at the administrative and operational levels. Awareness of all the implications of the corporatization initiatives is not yet fully developed or accepted, but progress is steady and has generally been positive. It is expected that as time passes, the benefits of the reform program will become more visible and will lift awareness at all levels.

[1] There are 16 provincial water supply enterprises and one in the capital city of Vientiane; a total of 17.

Dr. Vijay Jagannathan *was sector manager for Infrastructure in the East Asia and Pacific region of the World Bank; a unit that annually lends about $5 billion in transport, energy, water, and urban development investments in developing countries of the region. Before this, he managed the water portfolio of the Bank in the Middle East and North Africa Region, as well as the water supply and sanitation program of the Bank in Cambodia, Indonesia, and the Philippines. He has also worked on water supply and sanitation issues in Brazil, Costa Rica, Uganda and Zambia. Before joining the World Bank in 1988 he was a member of the Indian Administrative Service, and a former secretary of the Calcutta Metropolitan Development Authority. Dr. Jagannathan holds a PhD in Economics from Boston University, and blends a unique combination of operational experience, substantive knowledge, and client relationship skills developed through decades-long engagements with policy makers and project staff in over 25 developing countries, and multilateral and bilateral development organizations.*

Managing the Politics of Water Sector Reform

My engagement with water supply and sanitation challenges in Asia extends over two decades and a half, first as a civil servant managing a very large urban infrastructure program in what was then India's largest city, Calcutta, and thereafter in various professional capacities as a member of the water practice in the World Bank.

These years have witnessed significant economic growth in the Asian countries where I have worked. Vast numbers have risen above the poverty line, and even the recent global slowdown did not affect the growth paths of these countries. However, on the water supply and sanitation (WSS) side, progress has been overall disappointing in the three critical areas of service coverage, protection of the poor, and maintaining environmentally sustainable services—all the more worrisome, considering the vast sum of assistance and sweat put in by advocates for water reforms. I summarize my concerns below.

Service coverage. The Millennium Development Goals (MDGs) laid out ambitious targets for increasing WSS coverage. The Asian countries witnessed dramatic movements of population from rural to urban areas, significant improvements in housing stock, and most importantly of disposable incomes available with consumers. Yet, except for a few utilities, we find coverage in terms of reliable WSS services still a significant challenge. The very fact that "24/7" water services is still a target in countries like India (that has succeeded in placing rockets in space orbits!) speaks for itself. In many Asian countries water self-provisioning is a code word for dysfunctional WSS utilities.

Protection of the poor. Equally concerning is the plight of the urban poor living in informal settlements. For most of these persons, the lack of title to their shelter automatically translates into insufficient and poor quality access to water as well. The worst part of this depressing story is that they end up paying significantly higher unit prices for irregular and poor quality water services. Small wonder the children of the urban poor have morbidity rates that are often comparable to the poorest communities of Sub-Saharan Africa.

Maintaining environmentally sustainable services. On both counts of water quality and water management we have many more failures than successes to report. In most cities of Asia, wastewater collection, conveyance and disposal systems continue to be rudimentary, and what goes as onsite sanitation is often nothing more than large pits constructed at the subsurface of expensive homes, and euphemistically described as septic tanks! Fecal contamination of water bodies close to cities makes bathing a huge health risk, and in many communities over-exploitation of groundwater has led to land subsidence. Northern Jakarta faces greater risks of buildings collapsing in the near future because of land subsidence, than being inundated by sea level rise. Secondary cities in the Philippines are facing potential water crisis, due to a lack of political resolve to develop long-term water supply sources, despite the fact that only 28% of the water resources in the country is being utilized.

If the record is so mixed, whatever are the pearls of wisdom I have to offer? There are a few to be sure!

First, the few successes I have been associated with came because of country leadership in managing the politics of water reforms. For me, the most spectacular success with which I have had the honor of being associated, was the turnaround of the Phnom Penh Water Supply Authority (PPWSA), in which Mr. Ek Sonn Chan, ably supported by Long Naro turned around a bankrupt water utility to levels of service that are comparable with Singapore within a short span of 10 years. Another example is in the Philippines, where I had the privilege of being associated with Secretary Villar and Mark Dumol, when they skilfully navigated the various political minefields to successfully privatize Manila's Metropolitan Waterworks and Sewerage System (MWSS). We take for granted the dramatic improvements in service in Metro Manila today, and often forget how bad the services were in 1995! A third example is the design of a rural water supply program in Indonesia in the early 1990s, in which a demand-driven design was successfully introduced to extend coverage in thousands of Indonesian villages through demand-driven, community managed systems.

Second, WSS reforms require support from outside the sector. In the Philippines, former President Ramos' unwavering support made privatization possible. In PPWSA, the willingness of the country's political leadership to give Mr. Ek Sonn Chan and his band of brave staff the time to build their organization was equally important. In Indonesia, Dr. Sukirman of Bappenas (Central Planning Authority) was willing to risk his reputation in testing out new approaches to rural water provisioning.

Third, community engagement for reforms is essential. Building more trust between the water consumers and the water providers is essential before any meaningful change can take place. In the case of Indonesia, the World Bank project invested considerable resources in building community capacity by financing institutional intermediation by nongovernment organizations, which at the beginning was expensive. In the case of MWSS, the concessionaires invested significant resources and used the IBRD-financed public performance disclosure system (now called PAWS) to build rapport with consumers, and validate whether reliable services had indeed reached low-income neighborhoods. In the case of PPWSA, the employees led by example. When the very poor urban consumers were unable to pay tariffs, PPWSA staff contributed from their salaries to make up the deficit.

Finally, the biggest pearl of wisdom I have garnered is the need for us development practitioners to encourage a culture of learning collaboratively with our clients, as capacity building is a two-way process!

Alex Jorgensen, *BSc, MSc, Environmental Engineering, University of Manitoba, Canada. In 1975, Mr. Jorgensen joined Stanley Associates Engineering, a medium-sized multidisciplinary consulting company. For the next 16 years he planned, designed, and supervised construction of dozens of water and sewerage systems in western Canada. From 1980, Mr. Jorgensen worked for 9 years on water supply and sewerage projects funded by the Asian Development Bank (ADB) and the World Bank in South Korea. Subsequently he joined the ADB as staff in 1993, and for the next 6 years he worked out of the Manila Head Office preparing major water and wastewater loan projects in the Federated States of Micronesia, the People's Republic of China, and Indonesia. In 1999 he transferred to the India Resident Mission, working there for the next 8 years until retirement in 2007. During his stay in India he oversaw growth of ADB's urban portfolio from $200 million to more than $2 billion. In addition to administering the urban portfolio, Mr. Jorgensen was responsible for the urban reconstruction programs in India associated with the Gujarat earthquake and the Indian Ocean tsunami disasters. He also prepared urban loans for Jammu and Kashmir. Since retirement, Mr. Jorgensen has worked as an urban specialist on various ADB programs. He has also written an article on ADB's Experiences with Slum Rehabilitation, which was included in the April 2011* Inclusive Cities *publication.*

Informal Settlements and Public–Private Partnerships in Water Supply and Sanitation

Development in an urban context means improving access by rural citizens to jobs, housing, schools, and public health, supported by access to basic services including power, water, wastewater disposal, and solid waste collection. All projects supported by ADB included focus on the poor and low-income residents. In Asia, the opportunity for jobs has led to massive migration from rural to urban areas, leading to unprecedented population growth. While the large urban areas in Asia are now considered the major engines of economic growth of many countries, the investment in urban infrastructure has not been able to keep pace with the demand of literally hundreds of millions of new urban residents. This is exacerbating the already poor delivery of overstressed basic services in most towns and cities. As this urbanization trend continues throughout the region, local, regional, and national governments are hard pressed to find funds for the required investment in new and expanded facilities. The shortage of low-income housing is mainly the result of banks in the region being reluctant to provide housing loans or set up mortgages. A serious problem with much of the low-income housing that is constructed by governments or related housing authorities is the location. Such housing tends to be located on vacant lands or low-value lands on the outskirts of cities, far removed from where low-income urban dwellers work or have their source of income. As a result, these housing facilities often sit vacant. Governments need to make a concerted effort to

pass legislation requiring commercial banks to make housing loans, perhaps with a government guarantee, similar to the approach used in developed countries.

With respect to basic urban services, the lack of funds for new expansion also means funds to maintain the existing systems are insufficient. Ideally, the operation and maintenance of basic urban services should be fully funded through user charges. Because of lack of awareness and education, and often political expediency, user charges are too low. As a result, systems deteriorate at a rapid pace. Despite concerted efforts by national governments through their own programs or using external funding from development banks, increasing water and wastewater tariffs to sustainable levels is still a major challenge. One approach to overcome the political reluctance to increase user fees is to subsidize repair and preventative maintenance of water and wastewater services from municipal property taxes. Compared to property tax assessment in developed countries, this is a much underutilized source of revenue for local governments. This is partly due to a lack of awareness by local officials and partly due to strong resistance to such measures by the wealthy property owning class, who vehemently oppose any new property tax or any increases. Unfortunately, such successes do not appear to be readily replicable.

Rehabilitation of Informal Settlements

In India, the ADB, with the support of the national Ministry of Finance, was able to convince a number of cities who were beneficiaries of loans for water supply and sanitation, to spend a modest amount to improve conditions in their worst informal settlements. While the funding for these programs was quite modest, usually $2 million to $3 million out of a $250 million loan project, the results were gratifying, bringing improved services, public health, and economic activities to hundreds of thousands of informal settlers across a dozen or more cities. In the more progressive cities, these ADB-supported projects led to regularization of the informal settlements, registration of property, and ownership of the dwellings. For such projects to be approved, a nexus of a forward-looking state minister of urban development, a progressive mayor and council (especially the councilor from the ward in which the informal settlement was located), and a willing director of public works (usually a state-appointed Indian Administrative Services officer), were required. Having such fortuitous supporters in any given city at the same time was unusual, but those few instances did lead to excellent results. Unfortunately, several programs once started did fail because one or more of the aforementioned leaders was transferred[1] or was not re-elected.

A parallel program to the provision of basic services included income-generation activities to encourage young people in particular to learn a trade, for women to set up self-help/saving groups and to establish informal schools. The informal

[1] IAS officers in India are transferred every 2-3 years as a matter of course regardless of the performance of their duties.

settlements had no public schools, since such construction was not allowed in nonregularized areas. The self-help groups were hugely successful, eventually reaching and improving the lives of tens of thousands of women and their families. It took a long time to initiate these programs, as there was an innate distrust of government intervention in informal settlements. Usually, this meant a forced move. The state implementing agencies assigned social development officers to work with the informal settlers, but it often took 12–18 months to obtain the agreement of residents and their formal and informal leaders, before a program could be initiated. Local smaller nongovernment organizations (NGOs) were best able to implement the programs on behalf of the local government. The self-help groups and the NGOs supporting them quickly became financially independent from the project. They did request that while further funds were not necessary, they wanted ADB to continue to visit once in a while, to keep the spotlight on them and to prevent local authorities and bad influences from letting the programs backslide.

The main impacts of the ADB-supported informal settlement redevelopment components under water supply and sanitation loans included:

- Immediate improvement in public health as proper drainage was installed to remove sewage/kitchen wastewater from the roads and to stop flooding during monsoons. This helped reduce the incidence of waterborne diseases, skin rashes, and respiratory problems due to damp conditions; improved drainage was usually stated as the most urgent need, as determined by surveys of participating informal settlements;
- While private water service connections were usually not installed due to lack of space for piping and because of cost, standpipes/public hydrants were installed so that all residents had less than 100 meters to go for water. The large increase in the number of hydrants meant much less fetching and waiting time, freeing up girls to attend school and for women to initiate income activities;
- The informal settlers began to spend money on their residences and within a year or less; there were obvious improvements including repairs to roofs, installation of windows, painting, and much better cleanliness, as residents began proper disposal of their solid waste;
- Local politicians and senior civil servants saw the financial benefits of adding tens of thousands of new customers to their water tariff and tax rolls, and in some cases did regularize the informal settlements, granting ownership of their plots to long-term informal settlers; and,
- Thousands of informal settlement families were able to improve their economic circumstances and move toward middle class, or at least have one or more of their children achieve good jobs.

Public–Private Partnerships in Water Supply and Sanitation

Based on the author's experience,[2] there are a number of reasons why the heavy push by the multinational water companies in India did not lead to success. Since the same logic may prevail in other developing countries, these reasons may help funding agencies, financiers, and public–private partnership (PPP) aspirants understand the pitfalls they are likely to encounter. The reasons (not in order of importance) are:

- **Financia**l. Most water utilities in India would have to increase their water tariff by 200%–500% or higher to attract private sector financing. A related reluctance by the local authorities arose because the private company usually expected a 25%–35% return on investment, which was seen as unacceptable;
- **Efficiency.** The main selling point of the private water companies was that their efficiencies were much higher than the public sector utilities, and therefore they would save substantial amounts of operating and investment costs. However, while this assumption is correct in most cases, the savings because of the efficiencies do not equal the high rate of return that the private water companies expect, and therefore inevitably water tariffs would need to increase 200%–500% and higher;
- **Willingness to pay.** The price elasticity among poor and low income consumers is almost non-existent, so even if a PPP arrangement was negotiated with a gradual tariff increase, consumers would reduce consumption or find alternate, often unsafe sources. Though many willingness to pay studies seemed to indicate that consumers were willing to pay more for better service, practically this meant a 10%–15% increase, not the 200% actually required;
- **High populations of poor and low-income consumers.** In typical Indian cities this demographic is 60%–70%, or higher, of the total population, meaning that the ceiling for tariff increases is not high enough to be sustainable. There was also concern that private water companies would focus on the wealthier part of a city and ignore low-income and informal settlement areas;
- **Cherry-picking.** Most private water companies pursued the water supply component (raw supply, treatment plant and clear well) for their investment, not the more difficult and complicated distribution components, along with billing and collection. In fact, most cities' water utilities do a reasonable job of operating the water supply system, but most problems with preventative maintenance occur in the distribution system (leakage, metering, and billing and collection). This aspect made cities reluctant to give up control of their supply system, especially since the private company usually tries for a take or pay contract.

[2] The author worked in ADB's India Resident Mission from 1999–2007.

- **Lack of examples.** Except for France, where water utilities have traditionally been private, and recently the United Kingdom, there are few examples of western or Asian cities that have privatized their water systems. For example, in Canada[3] no major city water supply has been privatized. While sewage treatment plants have been tendered to private operators, the Canadian public is resisting the perceived loss of control of a vital service;
- **Lack of experienced regulatory authority.** Indian cities have no experience with regulating their water supplies and there is concern that an experienced private water company would take advantage of this inexperience. There was an example of this in the power sector in Maharashtra State about 10 years ago when ENRON negotiated a take or pay contact for electricity with the state's regulatory board. Unfortunately, as the rates increased over time, demand dropped as consumers cut back on consumption, and the state ended up having to pay millions of dollars per month for power that was not used. The regulatory board and ENRON had not foreseen this lack of price elasticity.

In summary, PPP may be an appropriate approach to meet the growing funding/financing gap in the urban water supply sector, but it will need to be carefully evaluated in an Asian and country-specific context.

[3] The author's home country.

Dr. Kamal Kar *pioneered the Community-Led Total Sanitation (CLTS) approach while evaluating a traditionally subsidized water and sanitation project of Water Aid Bangladesh and their nongovernment organization (NGO) partner VERC (Village Education Resource Centre), in Mosmoil, a village in Rajshahi district of Bangladesh in 1999–2000. Learning from the local community, he succeeded in persuading the local NGO to stop top-down toilet construction through subsidy. He advocated changes in institutional attitude and the need to draw on intense local community participation and facilitation to empower them to analyze their sanitation and waste situation and take a collective decision to stop open defecation without waiting for the outsider's dole. The results were remarkable. Over the last 10 years, working with international agencies, through training, advocacy, and consultation, Dr. Kar introduced and took an active role in the spread of CLTS in more than 40 countries in Asia, Africa, and Latin America. Today, CLTS is being implemented in more than 50 countries across the world and the governments of at least 17 countries have adopted CLTS in their respective national sanitation policies. The Foreign Policy Magazine, published in Washington D.C., selected Dr. Kar as one of the top hundred global thinkers of the world in 2010. The* Hand Book and the Trainers Guide on CLTS *written by Dr. Kar has been translated into more than 12 languages and is being used extensively by the practitioners of CLTS. The Asian Development Bank (ADB) Manila, recognized Dr. Kar as a Water Champion in 2011.*

Sanitation: About People, Not Things

More than 2.6 billion people in the world do not have access to basic sanitation. Diarrhea alone kills more people (mostly children under 5) than the total number of people who die from HIV, AIDS, malaria, and tuberculosis taken together. Most initiatives in the sanitation sector were designed and initiated by outsiders who felt sorry to see the plight of people living in filthy and unhygienic rural, peri-urban and informal settlement areas, who usually suffer from diarrhea, dysentery, cholera, typhoid, and other enteric diseases originating mostly from the practice of open defecation.

Most approaches in the past were based on the basic assumption that the people were poor and could not afford to build toilets. Hence, they must be helped with money, materials, technical aid, and prescriptive solutions of all kinds, including "teaching" hygiene behavior. The inherent potential of communities, their collective strengths, and existing local and indigenous knowledge, were mostly overlooked in favor of the external technology-dominated and hardware-focused approaches of the past few decades. Human elements of disgust, shock, and revulsion originating from the visual analysis and discussion of feces, were never thought of in terms of their potential to trigger collective local action to stop the practice of open defecation.

Unfortunately, sanitation has received low priority over water during the last several decades. While a lot of money was spent to create sanitation facilities, both at household and public uses, a large majority of those were not used or maintained for the purpose they were built. This happened due to the lack of collective hygiene behavior change at the community level, crucial for sustained use of sanitation infrastructure created. The obvious reason for this was the traditional mindset of most of the development professionals fixed more on *things* rather than *people*, where the construction of a latrine was viewed as a solution, not the behavior change.

Water Initiative without Sanitation

In the past decades water and sanitation were mostly considered under one single sector umbrella, where water remained as a big brother utilizing the major share of the financial and human resources over sanitation. Since everybody loved to work in water, sanitation never received priority and continued to remain as an orphan in the development sector. Unfortunately, the truth started revealing that creation of water facilities without adequate sanitation was doing more harm than good. Even when safe water was brought to the people, an unhygienic sanitation environment coupled with inappropriate hygiene behavior contaminated it, resulting in very little or no change on the health impact of the beneficiaries. Even in some places, the pace of spread of the cholera epidemic (e.g., Accra, Ghana) was hastened many times as compared to the speed of spread of the epidemic 10 years before, when access to water was far less. With the enhanced and easy access to water and without proper hygiene behavior change of the informal settlements, contamination spread faster than before. On the other hand, there was not a single case of cholera in the open defecation free (ODF) villages in large cholera endemic zones in Chad during the outbreak of 2011 and 2012. Cholera-free villages existed like islands in the middle of cholera-affected villages, only because of collective hygiene behavior change in those ODF villages. Sanitation through collective behavior change must be viewed as a precursor for creating water facilities if a sustained positive outcome on health is to be guaranteed.

A number of countries in Africa and Asia that spent a huge sum of money constructing toilets, teaching hygiene behavior, and distributing free sanitation hardware could not achieve as much as they could when they underplayed or stopped household-hardware sanitation subsidy, and refrained themselves from persuading communities to build toilets. Through the community-led total sanitation (CLTS) approach, more than 20 countries realized the basic truth that no human being in the world is willing to live on feces and eat each other's feces. From the moment they realize that, radical transformation begins from the process of triggering CLTS, which provokes and instigates the humane elements of disgust, shame, and self-respect. Communities anywhere in the world could be poor or illiterate, but they are all human beings who cannot accept the idea of eating each other's feces and would begin urgent action to stop that, as soon it is understood by

their own analysis. A drastic shift in the approach brought about by CLTS was the change in the basic assumption from *health* as a driver of change (as in traditional sanitation approaches) to *shame, disgust, and self-respect* as the shaker. The other point of departure was the shift from the outside agency-led, supply driven, partial sanitation drive, to local community-led, demand-driven total sanitation approach, which is a kind of self-mobilization. This gave rise to better acceptance/ understanding of the concept of *public good* from the traditional concept of *individual good* in sanitation, which was never total—i.e., household toilet acquisition by some.

Caspar Lambrechtsen, *was born in Nijmegen, the Netherlands in 1941. He studied Tropical Agriculture in Deventer, the Netherlands and then Civil Engineering in Christchurch, New Zealand. He worked in urban and rural development in Australia, including the design of the multiple arch buttress Julius Dam for the water supply of Mount Isa, Queensland, Australia. In the water supply and sanitation sector, he worked for 25 years on projects in Quetta, Pakistan (Netherlands funded); nine district towns in Bangladesh (ADB); Buon Ma Thuot (Danida); Vinh City (KfW) Viet Nam; Dhaka Water Supply, Bangladesh (ADB); and Issyk-Kul Sustainable Development Project, Kyrgyz Republic (ADB).*

Ownership of Development

The concept of development is a huge subject as it begs the question—development of what? I would like to focus on two small beams of light caught in the notions: *There but for good fortune, go you and I; one can lead a horse to water, but one can't make it drink.*

The first notion sets the environment in which a person finds himself or herself, through no fault of their own, but that has a significant influence in the development of the person's potential. Witness the potential for improvements to lives of immigrants moving from developing to developed countries. The success is influenced by the drive and determination of the persons involved. As fate has it, it is good fortune that created the potential and environment for development. In the development process, it should give rise to empathy and understanding from the fortunate for the circumstance of the less fortunate.

It must not be forgotten that the development process in the developed world has been ongoing for over 200 years and has been at a pace determined by our own mental capacity to accommodate the changes brought about in the process. Societies still have difficulty adapting to new circumstances, as any change brings about uncertainty. The rate of change even in the developed world is only accelerating.

For the developing countries, the rate of change is even faster as the old systems are being upgraded to modern standards along with the methodologies that make the systems functional. There is therefore a substantial educational gap that needs to be overcome. Ideally for society, this educational effort should have an impact right across the board not to create divisions in social structures. All generations should be able—and want—to share the fount of wisdom. There will however always be horses refusing to drink for a multitude of reasons.

This brings me back to the heading, for to have optimal impact, the beneficiaries of the development process should be able to take full ownership and make it

sustainable. External teachers can serve to transfer the knowledge, but internal teachers must carry the torch.

Development in Water Supply

Water, water everywhere and not a drop to drink. This is the extreme end of the development spectrum and applies especially to surface water that should serve as a supply source for generating potable water. It can also apply to ground water that is contaminated either from natural causes—whereby iron, manganese, and arsenic—are of particular concern, because of the cost of treatment.

Turbidity in surface/river water, resulting from snow melt and/or sedimentation transport, is highly seasonal but requires special pre-treatment measures to ensure that the water presented to the water treatment plant is within the design parameters of the plant. This requires economic optimization, as the level at which the design parameters are set will impact on both the cost of pre-treatment and the cost of treatment, including capital investments.

The contamination of groundwater is of further concern as often no alternative source of water is available, as Bangladesh can vouch. Shallow aquifers were extensively tapped in rural areas using hand tube wells to provide safe (naturally filtered) drinking water. It was only discovered later that arsenic was present from natural causes in these aquifers, but in a highly unpredictable distribution. One well would be arsenic-free, while a well close by, 30 meters away, would have arsenic above tolerable levels. This caused major distress to the community and required considerable effort to find an affordable solution.

Iron and manganese concentrations can be dealt with through aeration and the use of sand filters. It does add to the operational cost of the water supply system, and requires the safe disposal of the sludge intercepted in the sand filters. It does pose however, an additional problem for the operation and maintenance of the water distribution network. The residual iron/manganese that passes through the sand filters and enters the network has a tendency to oxidize and precipitate. Over time, the effective diameters of the network can reduce by 50% and more. This affects the hydraulic efficiency of the network, reducing the supply to the consumers. Particularly where intermittent supply patterns are adopted, the net result can be that the extremities of the network are permanently starved of water.

A further drawback of the intermittent network operations is that with significant water losses from the network, there is insufficient water in the storage reservoirs and/or network pump capacity, to fully pressurize the network and again the consumers at the extremities of the network miss out.

Thus there may be water available that can be suitably treated at affordable cost, but the consumer may not benefit. Operations and maintenance requirements must be

integrated into the design, and the operator must be fully familiar through a proper transfer of knowledge.

Development in Sanitation

"We don't want to build houses for the engineers." This statement was made during a community meeting to discuss the method of construction of what were to be privately owned sanitation facilities. The project promoted the use of twin pit pour flush latrines constructed within the owners' compound. Was the project to organize the implementation, or should the owner make the arrangements and the project ensure that the construction met quality standards?

The community was simply opposed to the project making the arrangements, fearing that they would be charged higher prices than if they were to make their own arrangements. The project being only interested to have sanitary latrines built to the required standard, agreed with the request of the community and good progress was achieved.

Wherever money is involved, it is essential to ensure that all payments are made through the banking system. It reduces the chance that money is creamed off when cash transactions are involved, and in the field of sanitation, where low-cost works are executed either through loans funded by the project from revolving funds, or in direct contract, under no circumstance should cash transactions be allowed to take place.

Once the facility has been installed, the follow-up by the community/NGO, supported by the project, becomes important as it is a question of honor for the owner to repay the funds borrowed through regular installments. The project has little leverage should the owner default; it cannot repossess the facility, plus it must monitor the use of the latrine that is kept in a hygienic condition. Thus, the project must keep following up on its education program within the community, even after the demand has been satisfied.

Roland Liemberger *has an MSc in Water and Sanitary Engineering, University of Applied Life Sciences In Vienna, Austria. Early in his career, in 1987, Mr. Liemberger specialized in nonrevenue water (NRW) reduction and distribution network efficiency improvements. His first project outside Europe was in Nepal and since then he has worked primarily in low and middle-income countries. Mr. Liemberger was involved in several large NRW reduction projects, such as the rehabilitation of the water supply system of the Kafr El Sheikh Governorate in Egypt, the Selangor NRW Reduction Project in Malaysia and the Ho Chi Minh City NRW Management Project in Viet Nam. Since March 2009 he has been based in Manila and is in charge of the world's largest NRW management project for Maynilad. Since 1999 he has specialized in the design of performance-based NRW reduction contracts, and was involved in a number of projects as adviser, contract designer, and technical auditor, as well as working with the contractor. Mr. Liemberger is a member of the International Water Association (IWA) Water Loss Task Force and was Conference President of the IWA's Water Loss 2012 Conference in Manila.*

A Nonrevenue Water Success Story

In the foreword to the most recent water loss publication[1] of the Asian Development Bank (ADB), Arjun Thapan, then special senior advisor to the president of ADB, wrote: *"Chronic water losses have been the hallmark of urban Asia's water management over the decades. This may not have mattered much during an era of assumed plenty. But the rapid growth of Asia's towns and cities, coupled with increased volumes of water for irrigated agriculture, energy, and industry, has meant that there is much less water to go around in the urban centres. The loss of an estimated 29 billion cubic meters of treated water every year, valued conservatively at $9 billion, is no longer something that Asia's urban water managers can ignore."*

Nonrevenue water (NRW) is the difference between the water put into the distribution system and the volume billed to customers. In well-managed water utilities, NRW would be a single digit percentage figure of the total water production, but in the vast majority of Asia's water utilities, NRW levels of 30, 40, 50 or even higher percentages are the rule rather than the exception.

Certainly, there are the often quoted champions like the Singapore's Public Utilities Board, the Phnom Penh Water Supply Authority or the Manila Water Company, but they are just drops in the bucket. In many countries in Southeast Asia, water utilities are only able to supply half the population in their service area—but by reducing

[1] Frauendorfer, Rudolf and Roland Liemberger. 2010. The Issues and Challenges of Reducing Non-Revenue Water. Manila: Asian Development Bank.
http://www.adb.org/documents/reports/reducing-non-revenue-water/default.asp

leakage aggressively it would be possible to supply nearly everyone without additional water sources. Local governments and utility managers do not know that they are sitting on a goldmine and that all water that is currently leaking away could be sold to new customers.

An example of a water utility that understood exactly that is Maynilad Water Services, Inc., the private utility which manages water supply in the western half of Metro Manila, one of the most densely populated metropolitan areas in the world.

In 2007, about one third of the 9 million people living in Maynilad's service area were still unserved and supplied by private water tankers or from boreholes. The water was often of doubtful quality and nearly always very expensive compared to the average tariff Maynilad's customers were paying. Since raw water for Metro Manila is limited, the only way of supplying these additional 3 million people was a drastic reduction of physical losses (leakage) from Maynilad's deteriorated distribution network.

At that time, Maynilad's NRW reduction plans were largely based on a large-scale pipeline replacement program and it was envisioned that this alone was adequate to significantly and sufficiently reduce NRW. Massive capital expenditure provisions were made, but the NRW management operations side was grossly underestimated if not overlooked.

At the end of 2007 these initial plans were reviewed by the author, who highlighted the shortcomings and suggested a complete change of project philosophy and design. Maynilad's management approved the plans and realized that there was a significant lack of expertise in the organization. Maynilad entered into a performance-based advisory contract with *Miya*, a global NRW management group, and under this contract the author started to work with Maynilad on the design and implementation of this ambitious program.

Together, the partners embarked on a massive NRW reduction and management program, which during its initial 5 years was so successful that it is now considered the world's largest NRW reduction program—as no utility has ever achieved such a massive water loss reduction in only a few years. Between 2008 and 2011, the volume of NRW has been reduced by more than 600 MLD (million liters per day) or 600,000m^3/day. This is more than the total water demand of Germany's capital city Berlin. And it will be possible to achieve a similar further reduction in the next 5 to 10 years.

It is important to understand the keys to the success:

- **Management support.** Most importantly, the full support of Maynilad's president and his management team with the backing of the board of directors. The president made NRW reduction the flagship activity of Maynilad. Suddenly it became attractive to make a career in NRW management.

- **A holistic view on NRW management**. This was reflected by organizational changes made, which led to the formation of a NRW management department. This department, established in the beginning of 2008, started with only five staff, but grew steadily to about 430 engineers, all totally dedicated to the many aspects of NRW management.
- **Sufficient funding**. NRW reduction does not come for free. From 2008 to 2011, Maynilad's NRW-related capital expenditures were $85 million and the NRW management operating cost amounted to $43 million.
- **Advisory team.** The involvement of a top international advisory team helped a lot.

Much work remains to be done at Maynilad, and although NRW has been dramatically reduced, it is still a long way to reaching an acceptable level. Maynilad's 430 NRW managers and engineers are fighting NRW literally day and night, given the fact that all leak detection teams have to use the quiet hours of the night to do their difficult job and detect the nonvisible leaks. However, with *Miya's* support, this young and ambitious team is on the best way to writing history in NRW management.

The results so far are impressive: NRW has been reduced from 1,550 MLD in the beginning of 2008 to 920 MLD in March 2012. This is a reduction of an unprecedented 630 MLD! As well, the level of service has improved significantly and the majority of the system is now supplied on a continuous basis and pressures have increased to a satisfactory level.

The enormous physical loss reduction achievements enabled Maynilad to reduce water production, while significantly increasing the number of customers from 700,000 to more than 1 million. An additional 1.5 million people can now enjoy reliable and safe water supply, and the remaining 1.5 million people will be connected during the next few years.

Maynilad's shareholders are also satisfied with the impact of the NRW program: Maynilad's income more than tripled from US$42 million in 2008 to US$136 million in 2011. This shows that investing in NRW reduction is an excellent business proposition.

As if he was referring to the Maynilad NRW management program, Arjun Thapan further wrote in his foreword to the ADB publication: *"Reducing water losses is critical to efficient resource utilization, efficient utility management, enhanced consumer satisfaction, and postponement of capital-intensive additions to capacity. Wherever active water loss reduction programs have been initiated and sustained, the gains to consumers and utilities alike, have been significant. In fact the costs of improved service delivery are much lower when undertaken through investments in non-revenue water reduction, than through investments in capital projects to augment supply capacities."*

Arthur McIntosh *is a New Zealander and civil engineer who has spent more than 35 years working in developing country water supplies, mostly in South and Southeast Asia. He worked with governments, headed a national water utility in Samoa, consulted in Australia, Canada, and New Zealand and worked for the World Health Organization. He spent 20 years working for the Asian Development Bank in Manila, during which time he initiated and edited water utility data books for the Asian and Pacific Region (1993, 1997) and authored* Asian Water Supplies - Reaching the Urban Poor *published by ADB and IWA in 2003. Since then he has been a consultant in developing country water supplies.*

Time is of the Essence

Time is of the essence. Cut red tape and bureaucracy. Put development on a war footing. Consider examples from the earthquake in Christchurch (new power lines laid above ground in just 2 days, served several suburbs), those from South Korea in the 1980s (a major water supply pipeline connecting two cites 40 kilometers apart completed in just 4 months), and India (to meet the deadline of serving hundreds of thousands of pilgrims attending a major religious festival, piped water was provided in just 6 weeks). Should poor people with no piped water wait 7 years for water after the first consultation? Yet that is a normal project life for multilateral funding agencies. Just decide how best the job can be done and do it. Don't look at the rules of government and other institutions and see how the project can be implemented within those rules. That is the tail wagging the dog.

Manage water and people at the lowest practical level. To reduce nonrevenue water and eliminate intermittent supply use the zonal caretaker approach. This means starting with independent hydraulic zones of just 500 connections and managing them successfully. It means knowing and monitoring every customer, such as the number of persons in a household and their average water consumption. It means analyzing the water bills of all consumers every month. Social engineering is needed to deal with nonrevenue water and intermittent supplies as well as consumer complaints of no water and wrong billing. Fundamental activities are fixing all visible leaks and connecting every household and business to piped water.

Connect everyone including the urban poor to piped water for free. Raise the tariff to connect the poor so that every customer contributes to the cost of new connections. There is no question of affordability. The hidden economy of water vending proves that. Alter the money source for development from governments to consumers, so that consumers are in control not politicians. This is possible. Just see what has happened in the Phnom Penn Water Supply Authority in Cambodia. If distribution costs can be included as a development cost, why can't connection

costs? It does not make sense. Why should a potential consumer be denied access to piped water because they are too poor to pay a connection fee, which equates to the equivalent of 10% of their average household income? Social engineering is needed to connect the poor, as was successfully done in Bangalore India. The recent move by Viet Nam to legalize piped water connections being provided without an upfront charge (but costs recovered through tariffs) is commendable.

Water and wastewater charges must be based on metered water consumption. This puts consumers in control. Fixed charges for service connections and for wastewater charges are nontransparent and take the size of the water bill out of the control of the consumer. Water bills should be analyzed on a monthly basis, so that too high or too low consumptions can be investigated in a timely manner. Water conservation cannot be effective if water demand is not managed through metered consumption.

Can demand management and conservation of water be compatible with selling water for profit? We are still waiting for an answer to that question. The potential advantages of private sector management of water supplies include (i) autonomy to manage without constant government or political interference, (ii) improved efficiency through reduction of nonrevenue water, (iii) provision of investment monies without relying on government, and (iv) ability to serve all (including the urban poor) with piped water. Considering the four major concession contracts in Manila and Jakarta, it would seem that leadership by a local rather than an international company was a major factor in success.

Development must be premised on transparent and accountable policies. The government policies regarding water and sanitation should be put up on the wall for everyone to see. They must be displayed on utility websites. Then we need somebody, or some organization (perhaps a nongovernment organization), to independently review the implementation of that policy in a timely manner and keep the public informed. Likewise, policies should not be developed in a vacuum, but in consultation with all stakeholders, rich and poor, women and men alike.

Leadership and longevity go hand in hand. Where water utilities and even government departments have had top leaders in control over a long period of time (10 years or more), success has been assured. We can look to Ek Sonn Chan in Phnom Penh Water Supply Authority, Tony Aquino in Manila Water, Tan Gee Paw in the Singapore Public Utilities Board, and the late Quamrul Siddique in the Local Government Engineering Department of Bangladesh, for good examples. And at the highest level, we can look to Lee Kuan Yew in Singapore, for leadership and continuity. Persistence is the most important ingredient of success.

Measuring Service Coverage. When a utility in a developing country declares it provides a 95% service coverage to the people in a given city, what does it mean? It means that the water from that utility is used by 95% of the population in the service area. Usually the utility will not spell out how many receive water from a single house connection, a shared connection, a standpipe or a community bulk supply. Only when

utilities reveal these details of service levels will we have transparency in service coverage reporting. In the meantime a good proxy for comparing service coverage between cities is obtained by dividing the city population by the number of utility connections.

Learning from the Field. One activity which can be carried out quickly and easily to determine the water access situation in the field is anonymous anecdotal interviews of people sampled across the city. This could comprise 20 interviews with people connected to piped water and 20 interviews with people not connected. These are undertaken with the help of a voice recorder and the dialogue is later analyzed. Another activity that takes little time, but reveals a great deal is, to do a house to house survey (20 successive houses) in a street in a typical low income area. The survey records the number of people in the household, details of the latest water bill from the utility, and the number of hours per day water is available from the utility. It also records other sources of water and reasons for not being connected. This survey can also reveal very high consumption, arrears of water bills, average consumption, and average water bill.

Elsa D. Mejia *used to be a housewife whose husband was in the construction of large steel water reservoirs. With no formal education and training on water provision, but armed with a strong desire to help the poor and informal settlers have access to potable water, in 1997, she and her husband expanded the construction business to water provision. From then on, she was involved in the business doing the community organizing and designing programs of water provision for the poor, such as creating employment, affordable and flexible individual household connection payment schemes, and community development. Because of her success in providing water to the poor and informal settlers, she became known to the national water sector and was thus given opportunities to attend national and international water forums, either as a participant or as a resource person, sharing her experiences. This eventually changed the mindset of other water providers to understand that it is not difficult to deal with the poor and informal settlers in terms of payments of water bills.*

A Small-Scale Water Provider Success Story

I am general manager of Inpart Waterworks and Development Company (IWADCO) a family enterprise that started as a small construction company specializing in the construction of water tanks and the drilling of water wells for small towns and municipalities in and around Metro Manila.

During the 1990s, IWADCO invested $350,000 over 5 years to serve 125,000 people in low-income communities through piped connections or hose connections from storage tanks. IWADCO could not get commercial loans from banks, so I borrowed money from my relatives and friends, at interest rates as high as 5% per month, to invest in the small piped water systems. With its $100,000 investment (equating to $30–$40 per household) IWADCO sold 30,000 cubic meters of water in a month serving over 3,000 households.

Since then, governments and donors such as the Asian Development Bank (ADB) have shown increasing interest in partnering with small-scale water providers. In August 2007, I became the founding president of the National Water and Sanitation Association of Small-Scale Water Providers, a new organization in the Philippines.

Small-scale water providers (SSWPs) like us deliver water to pockets of small communities in the country unserved by bigger water utilities. Sometimes these are on the outskirts of a city and sometimes deep inside the city. Our operations hinge on the partnerships we forge with communities and local governments. Changes in leadership can be difficult for us because there is the risk that the new leaders will affect our original agreements. Fortunately, because we work directly with and

provide employment for the poorest segments of the communities, we earn their trust and support.

We usually aim for a management contract with the local government, building on whatever water supply system is already in place. We offer to operate, improve, and expand at no cost to the local government. They also get a share in the gross income of the project. Customers appreciate our flexibility in terms of payments, which are mainly based on metered consumption. We do charge very minimal connection fees for individual household connections. We work with them to define water rates and from there decide on a billing system whether daily, weekly or bi-monthly depending on customer income flows.

Our rates are more expensive than Maynilad's or Manila Water's. Before, they treated us as commercial buyers of bulk water (since we are a business). Now, Maynilad charges us an *averes* (average residential rate lower than the regular residential rate) and Manila Water the social rate. Our pass-on rate to customers includes costs and a percentage that goes to the water tenders and the community or local government. Despite the higher price, our customers appreciate our projects because of our flexible payment scheme.

One of the facets of our business that sets us apart from many other projects is that we are very mindful that time is of the essence. If we took 1 year to complete a project after obtaining the finance we would go broke. The borrowed money attracts up to 5% interest per month so we must use this money to complete most water supply systems in about 6 weeks and get tariffs coming in to defray the interest costs and repay the principal. This is also good for the community because (unlike other funders who may take several years to deliver a project) we can deliver piped water 24/7 soon after we appraise the community needs.

At first, to some extent, our business was conceived as a temporary solution until the water concessionaires or other large utility can provide formal piped supply to these communities. Now that the roles of small water providers have been recognized, there are clearer terms of engagement and that protects the investments of small water providers.

Now, the National Water and Sanitation Association, which was formed in 2007, has hundreds of SSWP members and is growing stronger each year. While managing IWADCO I gained a lot of insights into this business and now as president of this association I can pass on some of my knowledge to others in the same business. First is the need to create strong relationships with partners. Next is the need to work together so that we can appeal more strongly to donors and governments and big companies for support. This will help us to obtain greater and cheaper financing for our projects. Already this borrowing rate is down to 3% per month and our good deeds and trust over 20 years are now bearing fruit, where investors are coming to us, rather than we seeking them.

Ravi Narayanan *is currently vice chair of the Asia Pacific Water Forum, international mentor to the Japan Water Forum, and chair of the International Steering Committee of the Water Integrity Network. He was a member of the World Panel on Financing Water Infrastructure (the Camdessus Panel) and the UN Millennium Task Force on Water and Sanitation. He is an associate of the National Institute of Advanced Studies in Bangalore, India. An engineer by training, Ravi's career has been almost equally divided between the corporate and not-for-profit sectors and in the latter he was formerly Asia director for Action Aid and chief executive of Water Aid. He was awarded an honorary Commander of the Most Excellent Order of the British Empire by the Government of the United Kingdom in 2009 for water and sanitation services to poor communities in Asia and Africa.*

Human Rights, Governance, and Water Policy

By bringing the issue of water into the ambit of the human rights discourse, the UN Economic and Social Council has attempted to elevate the water sector from a municipal services issue to a more appropriate level, consistent with the fundamental importance of water to human health and well-being.

Inevitably, such an attempt is complex when it comes to the responsibilities of the various parties involved in the implementation and interpretation of the various clauses of the UN general statement. The fact that the general statement calls for primacy to the availability of sufficient, safe, accessible, and affordable water for domestic use is a call to draw a red line around this aspect of water security and prevent any other use of water until this provision has been made. Three issues that impact the realization of this and the other principles of the general statement are:

First, the words "sufficient" and "affordable" are open to different interpretations. If the UN suggests a certain quantity as a minimum, there is a danger that the figure will be interpreted as a standard, especially if there are competing claims on water use for irrigation and industrial purposes. The figure that has been mentioned of 20 liters per day per person is probably too low if the requirements of drinking water, water for cooking, and domestic water for sanitation and hygiene are considered. And, there needs to be some headroom to increase domestic water provision so that poor people who are the ones who usually are deprived of adequate provision of safe water are not condemned to a minimal provision. This holds good for both rural and urban water provision.

There will inevitably be competing and conflicting claims for water to be used in pursuit of food security and creation of livelihood and employment. While these are

extremely important, there should be no ambiguity about the first call on water resources for domestic consumption as a nonnegotiable principle.

Second, the UN general statement lays the primary responsibility for implementing the right to water on national governments. In many, if not most developing countries, governance is poor and there is an asymmetry between the weak capacity of governments to negotiate, regulate, and enforce allocations of water (for different types of uses) and the better organized capacity of large corporate entities. If to this is added the imperfect process of community consultation, there are serious risks that poor people's rights to water could be compromised. It is therefore important that standards such as the Global Compact and the CEO Water Mandate are exercised in a manner that is understood by people in the locations and places where the corporate sector (especially extractive and process industries, which are heavy users of water) is one of competitors for the use of locally sourced water. Public information campaigns in the language and idiom of local people about the prevailing water situation, and the consequence of changed patterns of use and the opportunity for informed and open discussions, are unfortunately generally notable for their absence. This is a responsibility not only of civil society, but also of local and national governments and the corporate sector (individual companies and industry bodies).

Third, a special aspect of the right to water, and water security in general, relates to the use of groundwater. While surface water as a water source is certainly important, ground water is the source for drinking water for a large number of poor people in rural and urban areas. It is poorly understood and poorly regulated; it certainly suffers in comparison to surface water science and regulation. The corporate sector has both an opportunity and a special responsibility in this domain. The opportunity lies in the possibility that apart from the many innovations that the corporate sector can (and does) bring in the treatment and reuse of water through the development of filter and membrane technology, it can add to the science and knowledge of ground water mapping such as Cairn Energy's in Rajasthan, India. The more onerous responsibility is the use of groundwater by the corporate sector. Groundwater is a particularly vulnerable source of water not only through over extraction, but because of pollution. In many cases there is a trade-off between water for industrial use and for domestic use. In such instances ground water should not be available for use by extractive industries because there just cannot be a win-win situation. Enough cannot be said about the importance of increasing our understanding of groundwater.

Water Governance

Much has been written about the complexities of water policies and approaches in the search for sustainability and equity. Presentations of problems far exceed the offer of solutions. This is not surprising and viewing these through the prism of a governance paradigm, which includes but goes beyond governments, may indeed be a necessary step on the path out of the maze.

One way of approaching the conundrum might be to compare the governance process to unpicking a tangled knot. The first strand might be a more forensic approach to identifying the physical location of problems. While many of the problems around water are universal, the immensity and concentration of their impact in terms of affected people is likely to be most acutely centered in the People's Republic of China and India, and within those huge countries to specific regions. The problems in the two countries are representative of those elsewhere, except on a much larger scale.

The second strand is an attempt to understand the tussle for water resources within countries, between competing sectors, agriculture, industry, urban conglomerations, and across countries, states, and regions, especially at a time of rapid economic growth. Woven through this are competing policy priorities for food security, employment, and revenue generation within countries and between upper and lower riparian regions and problems with temporal and regional complexities, exacerbated in the case of South Asia by conditions of grinding poverty.

The third strand concerns divided institutional accountabilities between central and state legislatures in federated states and between countries that depend on common sources of water.

The fourth is the problem of fractured politics, societies divided between occupations, ethnicity, and national identities, which given the prevalence of water scarcity or super abundance and the very fragile fall back options especially for poor families, often leads to "dog eat dog" attitudes.

The fifth is the knee jerk reaction of public authorities, their predilection for big solutions and short-term fixes often associated with unacceptable collateral damage and weak remedial action.

There are more strands, of course, but dealing with these as part of a larger governance approach might be a start. The Cauvery river basin in South India across three states, locked in a water allocation dispute since 1922, offers one such opportunity. About 50 million people directly or indirectly depend on the water resources of this system, which supports agriculture, industry, and the domestic water needs of several large cities including Bangalore. In a process that could be described as one of expanding and interlocking circles, several baby steps involving both governments and citizens are being taken to bring about a wider understanding of the issues, bridge differences, and find solutions. These include a civil society initiative to establish an interstate farmers forum, steps to increase water efficiency for agriculture through research, a media campaign to alert citizens about water quality issues and put pressure on water utilities to deliver services to the urban poor, an action research project to develop a sustainable integrated urban water management model using groundwater, the application of wastewater recycling technologies, legislation to introduce rainwater harvesting in cities, and a reform of the tariff system to encourage conservation.

These steps are not necessarily harmonized and some are tentative. While they do offer, perhaps messy, solutions to complex problems, their outcomes remain uncertain.

IWRM Aspects of Water and Sanitation

Among the several targets that have to be reached if the Millennium Development Goals (MDGs) are to be met, are the ones relating to water and sanitation. Very few days pass without one international organization or the other commenting on the tardy progress of many countries, some in Asia, toward these targets. There is no denying the pressure that has been generated and the attention that has been focused on the achievement of the water and sanitation MDG targets.

While the urgency of the task deserves full recognition, comparatively little attention has been paid so far to the longer term consequences of an approach that places so much emphasis on the achievement of short-term targets. To address this issue, it might be worth recalling the general direction that the supply of safe water and sanitation has taken over the past 2 or 3 decades.

The International Decade of Water and Sanitation provided a tremendous impetus to the use of ground water as a source of safe drinking water, which was prompted by national governments and UN agencies as a quick and effective (as it was perceived then) solution to the problem of spreading services widely.

Simultaneously competitive impulses and political imperatives led to increasing segmentation of drinking water (and late sanitation) as special sectors in several countries with the creation of separate administrative units or ministries (with similar specializations among UN agencies). There seemed to be a separation between “big water” (which was associated with food and energy security, irrigation and power) and “small water” (which was associated with the provision of safe drinking water solutions). In fact this segmentation seems to extend to sanitation as well, which is often regarded as a separate challenge in its own right.

This is where we are today, with water and sanitation regarded and treated as very special sectors with their separate departments and budgets in many (if not all) countries and their own separate champions among bilateral donors, multilateral funding agencies, UN agencies, international nongovernment organizations and even international networks such as the Global Water Partnership, the World Water Council, and the Water Supply and Sanitation Collaborative Council, and with a high dependence on groundwater as the source for drinking water.

Emerging Issues

Perhaps all this was inevitable given the compulsions at the time and the nature of water itself—which is a unique substance, both matter and energy, and is difficult to

be harnessed in a holistic way. But there is now a growing (perhaps too slowly) recognition in several countries and several international organizations of the interconnectedness of several parts of the water cycle.

Two of the issues that have emerged are physical in nature though with larger policy implications:

The first is the impact of sinking water tables on groundwater-dependent drinking water sources. The second is the issue of water quality and groundwater contamination, the dimensions of which are still emerging. Both these issues are driving a move toward placing greater reliance on surface water sources. A third issue, more in the governance domain, is the relative neglect of proper and timely maintenance provision and practice. This is often driven by the need to demonstrate expenditure on water and sanitation facilities and consequent emphasis on new structures and new coverage without paying adequate attention to the less eye catching continuance of old coverage. The result in many cases is increasing levels of spending without proportionate impacts on net improvements.

A Way Forward

There are, of course, no easy answers to the current challenges. Perhaps one way of addressing these might be to see what could be done in the interconnected domains of policy, structures, technology, and capacity.

All four are complex areas with highly differentiated features depending on geographical location, climatic variations, governance arrangements, and political dispensations among many other factors. To pretend that there is a set of solutions that could be described in any degree of detail would be a conceit. What one could do is to suggest a few approaches which could be tried, adapted, and used as appropriate in each country or perhaps each subregion within a country. Inevitably these will be easy to suggest but often difficult to implement. But that should not defeat the effort.

The ideal solution would be for every country to have a comprehensive water policy that covers allocations of water use, rational pricing policies, provisions for water conservation, and replenishment and regulatory structures. Policy inputs would only make sense if there was a system of reliable data collection and public dissemination to ensure transparency and decisions based on objective data.

Sam Parker *graduated from Oxford University in 1983, started his career in business and worked for 6 years in the agro-chemical industry, with a particular focus on Latin America. After a 2-year break working as a volunteer with street children in Sao Paulo, Brazil, Sam returned to business with 11 years at a UK-based commodity trading company. Following posts in London, Caracas, New York, and Singapore, he was appointed managing director of Asian Business. In 2002, he returned to the development sector with a role at the International Save the Children Alliance, leading the organizational development of the charity's 30 national members. In 2006, Sam joined Water & Sanitation for the Urban Poor (WSUP), as its first chief executive officer. WSUP is a not-for-profit company that brings together expertise from the private sector and nongovernment organizations to address the pressing global challenge of delivering water and sanitation services to the growing number of people who live in informal settlements and shanty towns.*

One Roof for Water and Sanitation

Poor people would be shocked to know how many highly educated, first world professionals argue, fret, and even fight about what is best for them. Development professionals get so absorbed in analyzing what is best for the poor that they forget to ask the poor themselves and those who govern them. The millions of dollars that are spent on air travel, hotels, and conferences help to generate a frenzy of analysis and debate. Northern theories proliferate and everyone has views about the way the world should be and what we need to do to get there. But how much of this is making a difference to the lives of the poor? Conferences are always good for networking, but beyond that, it is difficult to argue that they lead to concrete improvements in the lives of the people they are discussing. Perhaps funding agencies in the sector, should think seriously about reallocating the funds currently used for international conferences to programs that create lasting improvements to peoples' lives. Would it not be better to spend more of this money in low-income countries, bringing people together who can make things happen and investing in their ideas? And beyond the money, would it not be better if international conferences were conceived, planned and led by recipient countries, calling in the assistance of the international finance agencies and technical experts to support them achieve their national priorities?

Message about Water Supply

The "urban poor" is a term that is well established in sector jargon. While technically accurate, it is at the same time unhelpful. First, I have not yet met a person who is comfortable being referred to as "urban poor." I have on several occasions been

asked by people living in poor neighborhoods, to remove signage that refers to a program benefiting the "urban poor." The title conveys neither dignity nor empowerment. It also fails to recognize that many people choose to live in informal settlements for pragmatic reasons and are consumers of a wide range of products and services. People in poor urban neighborhoods are all consumers of water, commonly paying prices well in excess of the city average. I prefer to use the term "low-income consumers." This description is not only more empowering but also bestows a degree of dignity on the people whom we are seeking to serve. It also reminds us that the most effective way to improve water services to low-income populations is to recognize them as a specific market segment, with its own special needs and preferences. Tailored pricing schemes, payment options, a choice of service levels, and easy consumer feedback mechanisms, have all proven to be effective, and these are the very same tools used by companies marketing soap, soft drinks, and mobile phones. There is overwhelming evidence that low-income consumers who are offered a good service are more than happy to pay.

Improving water services in poor communities means formalizing and legalizing arrangements. More often than not, this leads to a reduction in price as people switch away from inflated local vendor prices. So, perhaps we should spend less time searching for social tariff and cross subsidy solutions and more time finding ways to reach people with water services tailored to their needs. This approach often delivers solutions that are good for the consumer and good for the service provider. **The water business is not just about engineering, finance, human resources, and politics. It is about marketing. Perhaps a course on marketing should be an essential part of the induction process for any new utility manager.**

Urban Sanitation

It is curious that in wealthier countries, the idea that sewerage services are an integral part of water services is a given. Well over two thirds of the money spent by consumers on water is actually used to cover the costs of sewerage. This is a straightforward cross-subsidy system many developed countries used for generations. Yet, there seems to be extraordinarily little effort in lower-income countries to emulate these successful systems. Addressing this oversight represents a huge opportunity.

If sewerage were charged separately in the UK, few politicians and local government officers would be willing to stand up as champions of improved sewerage; it is no more appealing as a political campaign ticket in the United Kingdom as it is in Africa or Asia. In Europe, we are fortunate that water and sanitation are inextricably linked.

In the developing world, years of trying to clarify institutional mandates for sanitation have yielded negligible results. Water boards with a responsibility to ensure complete sanitation coverage are in a strong position. They understand consumers. They can promote sanitation behavior change, which is the starting point for all improvements

at scale. They can encourage market-based sanitation services, which are a vital part of the solution. And, crucially, they can combine this with transport, treatment, and reuse systems, which are needed to complete the sanitation value chain.

The world faces a huge and growing urban sanitation crisis in Africa and Asia; in light of the history of sanitation development in Europe and America, strong incentives should be given for governments of less-developed countries to explore all possible revenue-sharing options between sanitation and water. Revenue sharing can transform sanitation in cities. It should be given the priority it deserves.

Inspiring examples of leadership in this context have been demonstrated by water providers such as Lusaka Water & Sewerage Company and Manila Water Company.

Kurt Rippinger *is a German who has spent 33 years on water supplies in Germany and developing country water supply in Central Asia, Southeast Asia, South America, Eurasia, and East Europe. He worked on many water supply projects in Indonesia, carried out institutional development with the Local Water Utilities Association in the Philippines, and managed one of the world's largest water pipeline projects in Azerbaijan. He worked as a consultant with governments, bilateral and multilateral international donors and the private sector in developing country water supplies. More specifically, he was involved in design, project management, and operations of rural and urban water supply and sewerage systems including training and institutional strengthening.*

Privatization and Pipelines

Privatization in the water supply sector is counterproductive to the aim of saving resources. The private sector has the aim to increase sales. Communal service has the aim to save. I have seen big and small schemes (Berlin is one example) where the communal service provider spends years to educate the customers to save water. After giving a concession to a private service provider, the consumption of water was promoted again.

Personnel for operation and maintenance (O&M) plays a major role in the sector. Often it is argued that their income is insufficient. However, I have seen many operators of small schemes with minimum salaries doing a fantastic job, regardless of the small income. It is a matter of personality and not of the institutional system.

"On-the job training" backed up by a certain amount of classroom training, has shown excellent results in new water supply systems and even rehabilitated systems when the support is provided to the services provider over 2 years with intermittent assignments and clear performance benchmarking. Regardless of these specific project-related capacity building measures, the WSS sector in a developing country needs to establish professionalism in the sector. This cannot be achieved by the typical project cycle of design, build, train, operate. It requires regional, and/or national training and educational concepts and centers.

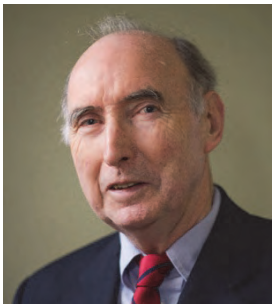
Lifeline rate. In developing countries, very often a tariff is applied charging 10 cubic meters (m^3) consumption as the first block, regardless of the consumption. Poor families use to consume far less because they use the water only for drinking and cooking. This tariff set is unfair. As low as $3m^3$ is a more appropriate first block for the basic fee.

Above-ground pipelines. In general, pipelines are buried underground providing protection from load and weather, particularly frost and intense sunshine. In warm

climates, as in the tropical region of Ecuador, we have laid in rural water supply systems the transmission main (high density polyethylene pipe) from spring to several kilometers distance above ground. The pipe is running in the forest, there is no expectation of vehicles, and no frost. Pipe above-ground is easy to inspect for illegal connections and leakages. It costs much less and you do not need to install pipe markers to find the buried pipe again.

Continuous flow. What we have in Albania is in contrast to what we have above. Here, in the mountains it is freezing cold. The pipe from the springs cannot be buried 70 centimeters into rocks or rocky terrain as it would be too costly. We bury the pipe about 40 centimeters and put some soil on top. In addition to that we are trying to have winter and summer tariffs. As we have spring water and abundance of water in the cold period, we may allow the water supply system to run continuously (in a small amount) to avoid freezing. The bottleneck, as in many cases, is a less flexible administration and the difficulty for a regulatory entity to allow various systems in the same region.

Serving those near a pipeline. A regularly overlooked problem is the inclusion of customers and/or villagers along a transmission main from a source to a city. If unattended, one faces the risk of social problems, such as the villagers along the route boycotting and even sabotaging the transmission main if they do not get a proper tapping point and water.



Professor Peter Rogers *has served as Gordon McKay Professor of Environmental Engineering at Harvard University since 1974. He was a member of the Centre for Population Studies, Harvard University, from 1966 to 1996; and has been a member of the Harvard University Centre for the Environment (HUCE), since 2000. He is currently a visiting professor at the Global Asia Institute, National University of Singapore. Professor Rogers has a wide range of research interests, including the consequences of population on natural resources development, improved methods for managing natural resources and the environment, the development of robust indexes of environmental quality and sustainable development, conflict resolution in international river basins, the impacts of global change on water resources and transportation and environment with an emphasis on Asian cities. He is co-author with Susan Leal of a book entitled* Running Out of Water, *published by Palgrave/Macmillan, 2010. Recent other books include* An Introduction to Sustainable Development *(with K. F. Jalal and J. A. Boyd), Earthscan, 2008; and* Water Crisis: Myth or Reality *(with M. R. Llamas and L. Martinez-Contina), Taylor & Francis, 2006. Professor Rogers is senior advisor to the Global Water Partnership; recipient of Guggenheim, Twentieth Century, Wenner-Gren, and Maass-White Fellowships, and the Warren A. Hall Medal of the Universities Council on Water Resources (UCOWR). He is a fellow of the American Association for the Advancement of Science. He received the 2010 Julian Hinds Award from the Environmental Water Resources Institute of the American Society of Civil Engineers.*

Measuring Water Security

Water is increasingly being viewed as one of the most important renewable resources on the globe. Much of the discussion links the interconnections among water, food, and energy as particularly important. A large part of the discussion focuses on “water security.” Unfortunately, there is no compelling definition of what this term means. The definitions so far are too broad to serve as operational tools for informing policy decisions. Part of the definition problem is spatial; because there are very large variations in the amounts of water available to, and within nations, and regions, part is temporal; the supplies are quite variable across time periods, and part is functional; there are many conflicting uses of water which may be, or may not be, simultaneously secure or insecure. In addition, there is also concern about the induced uncertainty due in large part to natural and human impacts on the water cycle.

It is important to emphasize the distinction between available water supplies and human-moderated water resources. Water resources imply the human management of water supply to meet human and ecosystem demands for water in the present and for the future. This distinction is particularly important in those countries and regions

typically labelled as “water scarce.” For example, even for those relatively well-watered regions such as Europe, and large parts of North and South America, the spatial and temporal variability can cause major water management crises. This may be due to the general view that there is ample supply of water that has not in the past required rigorous control of water as a resource to be managed. For the hyper-arid countries, such as those six countries of the Gulf Collaborative Council, much greater attention has to be paid to managing the supply as an important resource and hence, the crises of mismanagement can be smaller.

The discussion about water security is all about risk. It relates operationally to the risks associated with not having desired levels of water quantity and quality. So, a direct way to assess water security would be to establish those levels and compute the risk associated with not achieving those levels. Unfortunately we know little about the magnitudes of these risks. Even for the most obvious levels of water need, domestic water, the consequences of not achieving desired water quantity and quality levels are not well understood. We understand even less about the consequences for groups of individuals. Even if we knew these levels, there are many other water uses that conflict with these levels. For example, many societies assign acceptable statistical risk levels for floods (1 in a 100 years, or 1 in 10,000 years), but these levels may conflict directly with the acceptable risk levels for facing droughts. For instance, in the recent floods in Thailand there was a major connection between the storage of water for dry season agriculture and releasing water to make storage available to reduce some of the flood peaks. We are no longer looking at independent events, but rather coupled events that have joint probability distributions. In this case, the agricultural communities and the hydropower sellers and purchasers were much more secure due to the construction of the storage reservoirs, but downstream urban dwellers were made much more water insecure by the operation of these upstream storages.

Trying to assess the multidimensional aspects of water security leads directly to facing an insolvable index problem. The creation of an index of water security requires us to assess, and then integrate interpersonal and intergroup preferences, which are by themselves intractable problems. However, like many societal issues, some outcomes seem preferable to others. Hence the struggle to assess water security should focus on comparing and contrasting outcomes.

For instance, for some communities, the insecurity of facing a drought will have much larger economic consequences than a similarly risky flooding situation. Restricting the outcomes to single value measures such as economic losses, or at most two, such as economic losses and loss of life, would make the analysis much easier to understand. The actual measurement of security then could be easily computed by the well-known formula; risk equals outcome times the probability of its occurring. So if in a country, floods with magnitude of outcomes of $5 billion in damages and 200 deaths occurred with a probability of 0.1 in any given year, and droughts with $25 billion and 50 deaths with a probability of occurrence of 0.0001 in any year, would give the country an annual water security level of $502.5 million in economic loss potential

and 20.005 lives lost. If one were willing to use the statistical value of a life lost (a current US figure is around $3 million), then these two measurements could be collapsed into one water security simple metric of $562.5 million.

For two or more outcomes it becomes much more difficult to devise simple indexes. If, however, individuals were willing to rank in order of importance the outcomes associated with the components of the metric of water security, then the evaluation becomes substantially easier. These simple models have many hidden, and not so hidden, assumptions that make them less than analytically perfect tools, but they are fairly robust and easily understood approaches to the irresolvable index of water security.

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Salma Sadikha *works as a social development specialist at the Bangalore Water Supply and Sewerage Board in India. After playing the lead role in an AusAid project to provide water connections to the urban poor in Bangalore, she has participated in many workshops, seminars, and conferences, both nationally and internationally, to share her work. She is concerned with the underprivileged, disadvantaged sections of society, to make water and sanitation accessible and affordable to the poor without compromising the interests of the utility. She has formulated a state policy for water and sanitation for the urban poor. She has been acclaimed a water champion by the Asian Development Bank and her work has been the subject of a field note of the Water Supply and Sanitation Program of the World Bank in India. Since 2010, she has been in charge of the implementation of the Japan International Cooperation Agency-assisted Slum Development Project to cover 362 informal settlements in the core area of Bangalore. She originally graduated in Home Science from Mount Carmel College and received a Gold Medal for 1st Rank in her Master of Science. While in service she completed a law degree and in 2004 she completed a postgraduate certificate course in* Cross Sector Partnerships *from the University of Cambridge in United Kingdom.*

Unwillingness to Supply

Bangalore is India's fifth largest city with a population of about 8 million. The Bangalore Water Supply and Sewerage Board (BWSSB) is responsible for providing water supply and wastewater disposal services within the Bruhat Bangalore Mahanagara Palike (BBMP) area. It is the moral, social, and economic obligation of BWSSB to provide drinking water to every citizen in the metropolitan area of Bangalore.

Bangalore (BBMP area) has about 550 informal settlements officially recognized by the Karnataka Slum Clearance Board. The core area has 362 informal settlements. These informal settlements coexist with well-developed areas, as is the case in many big cities. Most such areas have large deficiencies in water supply and environmental sanitation infrastructure services. In addition to living in recognized informal settlements, a large number of poor households live in mixed settlements and in unrecognized low-income settlements. It is estimated that about 20% of Bangalore's population reside in informal settlements. These informal settlements are posing a major challenge to sustainable water supply and sanitation in the city as follows:

- Inadequate or poor services to urban poor communities has led to adverse impact on the BWSSB;
- Unauthorized or illegal tap connections, which lead to loss of revenue;

- Damage to the water supply system, because poorly made connections may lead to leaks and contamination of the water;
- Run-off of sewage in open places and sewage discharged directly into storm-water drains, all of which lead to serious public health concerns, pose environmental hazards and portray a poor public image.

Phase I

The BWSSB-AusAID Master Plan Project was implemented during 2000–2002. The Community Development Component of the Project worked on examining and testing options for improved services to the urban poor. Three informal settlements were selected for demonstration purposes, namely, Cement Huts, Sudamanagar, and Chandranagar in the core area of Bangalore city. These pilot projects provided opportunities to the BWSSB to implement innovative options for delivery of services to the urban poor and work out suitable strategies to reach the disadvantaged communities not supplied with water. After successful implementation of the pilot projects, it was considered imperative to replicate these experiences to the best advantage of the BWSSB, to increase its consumer base and broaden the revenue base.

The Social Development Unit of the BWSSB, in its endeavor to replicate and upscale the ideas and concepts of the pilot projects, continued the work to extend water supply and underground services to the informal settlements being covered under the Package Program. This was a joint infrastructure expansion program of the City Corporation and BWSSB, implemented between 2003–2006, to systematically cover the entire city with a water and sewerage network. The Social Development Unit worked in close coordination with nongovernment organizations, community-based organizations, and other social intermediaries.

Residents in the informal settlements were motivated to avail themselves of the opportunity to legally connect to the BWSSB water supply system and were discouraged from resorting to illegal means. The BWSSB offered a rationalized reduction in the connection rates. A house with an area of 150 square feet (sq. ft.) had to pay only the meter cost of Rs.550 (about US$10). Houses between 151–600 sq.ft. were charged Rs. 800, and houses above 600 sq.ft. had to pay the regular rates. As in the pilot projects, the informal settlers were allowed to pay the connection charges on installment. The water tariff rate was restructured with the minimum slab of 15 cubic meters (m^3) reduced to $8m^3$. The residents could apply for a connection enclosing *hakku patras* issued by the various authorities and any proof of residence, such as ration card, election identity card, or identity card issued by the Karnataka Slum Clearance Board, along with the application.

The service levels offered to the different categories of informal settlements were:

- Individual household connections for those with land tenure and having adequate space;
- Community level services such as shared metered connections, for those communities having land tenure, but not adequate space and communities without security of tenure.

Public fountains (standpipes) were ruled out. The poor, after having been through the drudgery of collecting water from public taps, were happy that an encouraging atmosphere had been created for availing themselves of individual household connections. The culture of user charges was very well accepted. Work was taken up in 43 informal settlements with the help of nongovernment and community-based organizations.

The Social Development Unit assumed the responsibility of reducing informal settlers' reliance on public taps by offering them the options of either individual or shared connections on payment. In many informal settlements, people had also connected illegally to the system and had been enjoying free water. Efforts were made to tackle this menace.

Phase II

The success of the BWSSB's Pro-Poor initiative led the Japan Bank of International Cooperation (now JICA- Japan International Cooperation Agency) to include "Slum Development" as a separate component under the JICA-assisted main Cauvery Water Supply Project. It proposed to cover all the informal settlements in the core area of Bangalore City in a phased manner (2008–2013). This project is currently under implementation. Four NGOs were contracted to work in 96 informal settlements in the first phase.

Present problems faced in the informal settlements include:

- Technical challenges leading to improper supply (narrow roads, rocky terrain, irregularly made connections);
- Illegal connections resulting in wastage of water and discontentment among metered households;
- Metered households not receiving water due to technical problems and unmetered households using water recklessly;
- Billing issues such as delay in the issue of first bill, and bills not being issued regularly, resulting in accumulation of dues, etc.

On the anvil is the "Sensitization of BWSSB frontline Staff" (to make them "slum-friendly"), apart from social mobilization and technical interventions and customer

friendly (pro-poor) grievance redressal mechanisms, with the broader objective of streamlining water supply services to the urban poor.

The urban poor's willingness to pay has been adequately proven, but the challenge before the Social Development Unit in Phase II, which is abundantly evident, is the utility's **unwillingness to supply**.

Most low-income settlements in Bangalore rely on a combination of public taps fed by the BWSSB distribution network or groundwater pumped through hand pumps or mechanized bore wells, open wells, vended water, and tanker supply provided by both private operators and the BWSSB. The BWSSB distribution line finds its way into the informal settlements more often than not at the behest of a political representative with the intention of pacifying the poor. The single line provided with two to three public taps is sooner or later tapped by others who take individual connections (poorly made) illegally. This is also a source of illegal revenue for the frontline staff and therefore this state of affairs continues with the adhoc servicing.

At some point when the pressure builds up to regularize illegal connections, the people are saddled with meters without a thought to the fact that the infrastructure is only partial and impromptu. The informal settlers feel that with metered connections, they can expect assured and better supply, but unfortunately for these unsuspecting people, the situation only worsens. The utility staff have lost their source of revenue and are not in the mood to indulge the people. So we are faced with a mixed bag of woes: (i) metered connections not getting water, (ii) illegal connections enjoying water for free, and (iii) metered connections getting water but not paying bills (they point their fingers at those with illegal connections). Added to all this is the local corporator's promise to get the arrears waived, which discourages the people from paying.

When the situation worsens (people not getting any water at all) the politicians intervene and network improvement is taken up. This happens in a rather unplanned manner without taking into account factors such as topography or density of informal settlements, resulting in the same problems.

With insufficient quantities of water, the utility is not keen to supply informal settlements and they are well aware that water supply meant for these areas can easily be diverted to other more profitable ones. The voices of the people as individual consumers or the collective voice of the people is not powerful enough to bring about a difference. With the ever-increasing responsibility of the utility to service a bourgeoning metropolis and limited quantities of water (unaccounted-for-water [UFW] is 45%), the department will cater mostly to powerful consumers and the poor are left to fend for themselves.

The other interesting fact is that the creation of these situations can be attributed to the utility. Bills are not issued on time or regularly every month. People understand that the monthly bill will be about Rs100 for $10m^3$. However, with a delay of sometimes 8–10 months in the issuance of bills, the four-figure bill deters them from

paying and the continued default results in the accumulation of arrears. This situation suits the utility fine because they can then blame the irregular supply on the nonpayment of water bills. This vicious circle is like a noose getting tighter and tighter. It is also in the interest of the utility to maintain status quo in the informal settlements so that the UFW can be loaded onto this segment.

A certain amount of commitment is required to serve the informal settlements in the same way as other consumers and the slum people on their part should desist from taking the easy way out. **Water literacy, especially billing and other procedures, is the need of the hour. Water-literate groups can demand for their right in a mature manner.** Unserviced or partially serviced informal settlements with adhoc water arrangements are goldmines for the frontline staff and they make all efforts to force situations that will result in even properly serviced informal settlements becoming a mixed bag of woes. The worst sufferers are those that do not get water but are billed regularly, and those that make the most of the situation are those who enjoy water and do not pay their bills.

The importance of the Social Development Unit in BWSSB may be viewed against this background. It is envisaged that with the measures introduced in respect of servicing of the urban poor, BWSSB would reduce its losses through public fountains and illegal connections, and increase its revenue and consumer base. It is expected to have a positive impact on its customer orientation and bring in social sensitivity to the crucial task of water supply and sanitation services provision.

Suman Sharma *has a Master of Engineering degree in Environmental Engineering from Asian Institute of Technology Bangkok. After graduation in Civil Engineering in 1984, he worked for nearly 28 years in the water and sanitation field, starting as a projects construction and design engineer in several areas of Nepal. Within these years he worked for about 7 years in the Melamchi water supply project in different capacities as a consultant, division chief of engineering division, deputy executive director, and finally the executive director between 2005 to 2007. After that, he held the position of joint secretary, Water and Sanitation Division, in the Ministry of Physical Planning and Works for about 32 months. During this period he was deeply involved in sector reform through establishing the Sector Efficiency Improvement Unit in the ministry and undertaking several policy reforms including drafting of the National Urban Water Supply and Sanitation Policy 2009. He is currently director general of the Department of Water Supply and Sewerage, Government of Nepal.*

Regulation, Metrics, and Marketing Sanitation

Water supplies in developing countries are usually not regulated both internally and externally, and this is the area that needs immediate improvement to inculcate a sense of responsibility and accountability among the utilities in service delivery. We usually do not systematically measure what is produced, transmitted, and delivered. Production volumes, water quality, nonrevenue water, system pressures, consumer satisfaction, asset upkeep, commercial aspects, etc. all need to be measured.

Benchmarking and measurement are critical components that must figure into our urban water supplies. We must have predefined indicators with target values that must be measured and documented at defined frequencies. This will not only provide a basis for internal regulation of supply and ensure consistency in service delivery, but this will also enable the utilities to make evidence-based decisions on reforms and investment priorities. The quality of systematic measurement, documentation, and decision making based on factual information, differentiates a good utility from a bad one. How systematic this process is within any utility will define its efficiency, irrespective of whether it is a public or a private entity. Given the choice, I would concentrate on measuring a utility's performance, rather than on the issue of who operates the system.

The state, provincial, or national agencies must mentor and externally regulate these suppliers with an intention of building the capacity of local water suppliers, and providing a basis of comparison for everyone to observe how the utilities are performing. Annual reports must be published with comparative figures to create a

sense of competition between utilities, and this comparison in itself will be a motivating factor for the utilities to improve on areas they are falling behind.

Making Sanitation Happen

Today, there is a large gap between water supply and sanitation coverage in the developing world. People are increasingly realizing that meeting the Millennium Development Goal (MDG) targets for sanitation is a much more difficult task than envisaged. Efforts are being applied by professionals working in this sector to overcome this gap and provide safe sanitation to people around the world. This includes launching sanitation campaigns and activities by high officials and other influential leaders of the society and getting their commitments to promote sanitation. However, obtaining high level support is not difficult. **The real challenge lies in the middle-level carriers of sanitation, both of governments and donors, who are responsible for allocating budgets and funds for development, and people who carry the sanitation messages across.**

While several studies have been done highlighting the benefits of good sanitation and attempts have been made to convert the benefits of sanitation in monetary terms, to the planners and state exchequers, sanitation still remains a miniscule activity and they do not consider that the subject is important enough to be included in the development agenda. Sanitation still appears to be a private household subject, hence a matter of charity rather than of investment. It is difficult to get budget line items for sanitation and even if fortunate to do so, attract significant funding on the issue.

Many engineers and social workers find this subject too low to be pursued at their levels and do not feel proud or dignified to claim that they are working for sanitation promotion. Hence, the messages are not always carried wholeheartedly and fail to make an impact at the beneficiary level. If middle-level carriers are convinced of the importance of this agenda, amazing results can be produced in the field at community, cluster, and village levels.

During the UN's International Year of Sanitation 2008, we decided to bring together all government and nongovernment partners working in this field under one umbrella of the Ministry of Physical Planning in Nepal by providing an International Year of Sanitation secretariat and harmonizing all activities under the same roof. It was not a coercive exercise by the government, but rather a call to work together in partnership. The government merely provided the much needed leadership and a networking platform. We changed the conventional approach of promoting sanitation only on health grounds and shifted to sell sanitation as a matter of pride and dignity. After this, Nepal has seen substantial growth in development and use of sanitation facilities in rural and urban areas alike. Already two districts and nearly 300 village development committees are fully covered by toilets and have declared themselves as open defecation free zones. The demand for these zones is so

overwhelming that the government is finding it hard to keep pace with public expectations for a better living environment. I believe proper leadership, partnership, harmony, and a cleverly built common strategy contributed to this achievement. The message is that, unlike water supply which is many times demand driven, sanitation still needs to be marketed with innovative approaches.

Dr. Roshan Shrestha *was born in Kathmandu and has been working in the water and sanitation sector as academician, technician, researcher, development worker, activist, and practitioner for the last 24 years. He started his career in a water analysis laboratory as a technician. This led toward the establishment of the Environment & Public Health Organization (ENPHO) in 1990. He was involved in raising awareness on water quality issues, production and promotion of a household water treatment option (PIYUSH – chlorine solution), introduction of constructed wetland system for decentralized wastewater treatment and reusing of treated water, production of Kanchan Arsenic Filter (household level arsenic filter), introduction of ecological sanitation, promotion of rain water harvesting, and demonstration of an Eco-Home concept. He contributed to the establishment of the NGO Forum for Urban Water and Sanitation in 2002. During this course of time, he completed a post-graduate course on Limnology (water ecology) in 1993 and PhD in Applied Natural Science from Austria. He joined UN-Habitat in mid-2005 to execute the Water for Asian Cities Program. Currently, he has been assigned by UN-Habitat to work with the Urban Partnership for Poverty Reduction Project in Bangladesh. This project aims to address the water and sanitation issue of one of the largest informal settlements in the world.*

Scaling Up Small Initiatives

Message about development in general

I grew together with the growth in urbanization of Nepal, and with it the complexities of water supply and sanitation. As one of the urbanites, it was part and parcel of my growing days. This prepared a strong base for my career. Half of my career has been spent on applied research related to water and sanitation technologies—in both sectors I came across various good technologies and practices developed by researchers and practitioners.

I myself developed and practiced several low-cost and simple technologies for managing water and sanitation. But these technologies and practices have hardly been replicated on a large scale. Most of the water supply and sanitation projects are still conceptualized and practised with the same conventional formula practised several decades back. Mega projects usually do not consider appropriate technologies, which are low cost and can be applied at household to community scale. Small-scale projects are not the priority of development banks and donors. For example, if large-scale water supply projects are planned, they usually consider surface or ground water as the primary source of water for the supply system, without any consideration to its future impact and its cost. Options such as utilization

of rainwater, which is the primary source of water alternative, is scarcely seen on a large scale to cope with a water crisis. We hardly see in the developing world in water and sanitation projects wastewater and/or grey water reuse components—that reduce about 50% of water demand.

Sanitation is another example where we can see less investment compared to water supply. In the unbalanced investment in sanitation compared to water supply, we see that either conventional centralized wastewater treatment plants in the case of cities, or pit latrines in rural or peri-urban settings is the prescribed solution by experts. Scientists and researchers have developed many types of environment-friendly decentralized and on-site sanitation options, but such options are yet to be seen on a large scale. There is a huge gap of understanding between researchers and professionals and/or consultants who normally develop and design water and sanitation projects.

Researchers and academics, are usually happy to produce and publish their findings in scientific journals (limited audience) for their degrees and career, whereas for so called senior consultants and developmental workers, innovations are quite far from their knowledge and always they use the same formula that they learned to complete their academic degree. It is perhaps the time for good researchers and professionals to coordinate and together be engaged in development of water and sanitation projects. Similarly, development banks and donors should also prioritize investment of sustainable water and sanitation projects, though they are small scale in terms of fund. The investments in the sanitation sector need to be thought out beyond the conventional concept of “latrinizing” the support. Besides, the projects are mainly focused on affordable groups, totally excluding the pro-poor access approach.

Water Supply and Sanitation

I believe we need very strong civil society involvement in any kind of developmental projects to make the project more transparent and inclusive. But we have to ensure that those civil societies are really representing the society. However, most of the developmental projects do not consider this as a serious issue. Civil societies’ engagement is usually considered a threat. I can recall this experience when I was engaged in the Kathmandu Valley Water Reform Program (a mega water supply project with support of the Asian Development Bank [ADB]) through the NGO Forum (The Forum) for Urban Water and Sanitation. The Forum’s concern was to make the project more transparent and pro-poor. At the beginning of its engagement, there was quite a good partnership between the project and the Forum. The Forum played the role of bridge between the citizen, particularly poor, and the project. To some extent this partnership helped the project to address development of the delivery mechanism to the poor. However in the latter stage, the project considered the Forum as a threat to the smooth implementation of the project. Finally, the relationship between the two parties went sour and they became suspicious of each

other. While this may not be the intent of ADB and the government, this might be due to the conventional thoughts and practices of officials who are responsible for handling civil societies.

Kathmandu Valley has been facing a chronic shortage of drinking water for more than a decade and the situation is predicted to be even worse in the future. All are waiting to benefit from the completion of the water supply project, which was initiated more than a decade back. I built a house in 2001 to demonstrate how people can live in Kathmandu without supplied water and sewer system as an "Eco Home". The two and half storey building built in 135m^2 included a rainwater harvesting system, ground water recharge through dug well, reed bed treatment plant for grey water treatment and reuse and a dry (ecosan) toilet managing the feces and urine separately. With all these systems I am living comfortably without city water supply and need for the sewer system to be connected. I learned that we have plenty of rain in the valley (annual rainfall is more than 1,900 millimeters) and it can be easily tapped and stored in the shallow underground aquifer layer through simple pits and shallow dug wells. Reed bed treatment systems can be built even in a small space for recycling and reuse of grey water for the garden, toilet flushing and cleaning of vehicles, and that reduces 50% of water demand. My experience shows that with simple orientation, any technician can install these systems and any individual from the community can easily practice this simple technology. One of the recent studies on ground water storage capacity in Kathmandu Valley by Yamanashi University, Japan, indicated that shallow groundwater storage capacity of the valley is 1.5 billion cubic meters, indicating that it can act as a huge water storage reservoir for the entire valley. By harvesting rainwater at local levels, such underground areas could be recharged, thereby alleviating the problem of water scarcity that Kathmandu urbanites are facing. This study proved and reinforced my practice. I was advocating these simple doable technologies for the last decade.

Many people visited my house, wrote about it, broadcast about it on television and made a movie out of it. Today rainwater harvesting is becoming a hot topic in the valley. We can see an increase in the number of households with rainwater harvesting and grey water recycling. This is a good example how small innovations at an individual level can be supported to scale up. Despite all these innovations and acceptance at a smaller scale, I still could not analyze, why this kind of initiative is not considered for large scale projects. Several times I heard from officials that this kind of initiative disrupts the ongoing mega water supply project. But this should not be true, as this is a practice for sustainable water and sanitation management in cities.

Jack Sim *retired from 16 commercial businesses at the age of 40 to devote the rest of his life as a full time volunteer to social work through sustainable economic empowerment business models for the poor to self-help. He started the World Toilet Organization in Singapore in 2001 and broke the global taboo on toilets and sanitation worldwide through his unique mix of humour and serious facts attracting the global media to this agenda. His Sani Shop micro-franchise model is now helping the poor to start their own micro-factories to produce latrines locally with local materials creating local jobs but using best practices and appropriate technology to deliver proper sanitation and safety to the 2.6 billion people still without access to proper sanitation today. For his work, Jack was named Time Magazine's Hero of the Environment 2008, ADB's Water Champion, Readers Digest's Asian of the Year 2011, Schwab Fellow of the World Economic Forum, Social Entrepreneur of the Year 2005, and Ashoka Global Fellow, among other awards globally.*

Inspirational Marketing of Sanitation

When I began to break the taboo, I took a lesson from Mr. Condom Mechai from Thailand. He taught me how he became so successful in breaking the taboo on condoms. Eventually, he saved millions of people's lives by not trying to be politically correct, but by doing what it takes to create a real impact.

When I started the World Toilet Organization (WTO), people laughed at me and told me nobody will take me seriously. The fact that WTO is getting their attention is already a success in itself. There is no such thing as bad press, if you are honest and mission-driven. WTO played the pun on World Trade Organization very appropriately and we appreciated the fact that Pascal Lamy took it in good humor. We actually took a photo of the two WTOs at the World Economic Forum too.

Inspirational marketing works much more effectively than a rational approach in sanitation promotion

Poor people have similar emotional needs as rich and middle-class people like us. Just like the rich who buy branded goods to show off to their peers, the poor buy mobile phones both as a status symbol and as a functional product. At Sani Shop, we not only promote toilets as a status symbol, but an object of desire. We made the toilet attractive by selling to the emotional goals of daughters, the wife who needs privacy, family pride for elders, and community acceptance. The rational models are much less effective, because one of the biggest needs for the poor is the need not to be looked down on by their neighbors.

Decoupling sanitation from water is necessary for sanitation to progress.

In the past, when water and sanitation were bundled together, nobody paid much attention to sanitation because water is glamorous and important. It was like putting a grandma next to Miss Universe. The contrast was too stark because the water agenda always overwhelmed the sanitation agenda. I tried so hard to insert sanitation into the Global Agenda Council for Water Security at the World Economic Forum. It was futile. We need to decouple the sanitation agenda to create its own space. Fortunately, we were able to make the “grandma” attractive by making her humorous.

Today, the world pays more attention to sanitation than ever before. It is only fair that we continue to talk about sanitation separately and give it its own space.

Dr. Mayling Simpson *a medical anthropologist, has worked in the field of public health, including water, sanitation, and hygiene education, since 1979. She has been an advisor on social issues related to water and sanitation development for the World Bank, USAID, UNDP, UNICEF, Swedish International Development Agency (SIDA) and the Asian Development Bank. She has held positions at the Johns Hopkins School of Public Health, the World Health Organization in Geneva and Catholic Relief Services in East Africa. She lived for 17 years in developing countries (Iran, Philippines, Nepal, Serbia, Ethiopia and Kenya) and conducted fieldwork and training in 20 developing countries in Asia, East Africa, and the Middle East with communities and government and nongovernmental agencies. She has published widely on water and sanitation and is a co-author of* Participatory Hygiene and Sanitation Transformation *(PHAST),* a new way of working with communities *(published by WHO), and* Ecological Sanitation *(published by SIDA). She introduced PHAST and ecological sanitation to Catholic Relief Services in East Africa, and these have become strong components of the Catholic Relief Services water and sanitation program.*

Spend Time with People Before Construction

As of 2012, about 1 billion people do not have reliable and convenient access to clean water and about 2 billion do not have access to sanitation. These figures have not changed much over the past 20 to 30 years due to global population growth and lack of equivalent growth in investments.

Most of those without water and sanitation live in rural areas. As such, millions of women and girls still carry water 1 to 6 hours per day, and people in rural communities still suffer from diseases because of poor sanitation. If our focus is on rural communities, then our focus must also be on community ownership and management of new water and sanitation systems. This means that we must invest heavily in training, education, and participation of rural people. The sustainability of new water and sanitation systems depends on how well the institutions working with rural communities conduct their social engineering.

New water systems bring huge social changes to communities—for which the communities may be unprepared. Often rural communities recognize these social changes only after the systems are put in. They fear what women will do with their free time if they don't have to collect water. They experience the social upheaval of having to pay for water when they have never had to pay before. They have to take on the responsibility of having to care for systems that require mechanical maintenance, security, and bookkeeping without prior experience.

Often, in our programming of development activities, we put the cart before the horse. We view the development of water supplies and new sanitation systems as technical goals to be accomplished, and because these are visible concrete actions, we want to do them first. But this is a mistake. If I have any pearl of wisdom to offer it is that **time should be spent with communities before any construction is done, helping them to understand the implications of new systems in terms of social change and responsibility.** This is often called the planning stage, but this stage usually turns into engineering planning rather than social planning. The most common cause of water and sanitation system failure is a lack of social planning and training for community management.

Another important area that is often weakly implemented is hygiene education for the communities. This too often comes after systems are built rather than before. When hygiene education is done before systems are built, it helps to build a sense of need and ownership of the new systems. People understand how these new systems can improve their lives and as such they want them. When they want them, they will own them and operate them properly.

One methodology that was developed to address all of these social issues, including hygiene education, is PHAST—Participatory Hygiene and Sanitation Transformation. PHAST requires trained facilitators and several days working with the community. CLTS—Community-led Total Sanitation can support the development of sanitation facilities. The important thing is to ensure that the methodology selected supports a community-led process.

The water and sanitation sector has realized these truths for a long time, that participatory planning with the community (including women) and training and education need to come first, and that the time invested in these social aspects pay off in terms of benefits and sustainability. While these truths have been recognized and promoted by lead sector agencies, there are still some implementing institutions that have not yet gotten the message. My pearl of wisdom is an old one that still holds true: **success of rural water and sanitation systems rests not on the engineering design so much as the understanding, ownership and responsibility of those systems by the people who must manage them in the decades following construction.** Health benefits will only come through understanding of the importance of hygiene. In my experience, investments in people pay off as much as investments in hardware. Investments in people should be given a high priority in terms of time, money, and trained staff who can facilitate a participatory planning process with communities.

Sahana Singh *is editor of Asian Water, a leading publication on water and wastewater with a special focus on the Asian region. Ms. Singh has over 15 years' experience in the water sector, which includes writing, editing, analyzing trends in the sector, advocacy, organizing workshops, participating in major water conferences worldwide and interviewing top industry executives and leading experts in the water sector. Ms. Singh has a Master's degree in civil engineering from the Delhi College of Engineering, India. She has won awards such as the Water Media Network Award (awarded by the World Bank during the World Water Forum, 2003) and the Developing Asia Journalism Award (awarded by Asian Development Bank Institute, 2008). Her short film "The Forgotten Cycle" calling for a paradigm shift in the management of the water cycle has won the first prize in the 2012 TU Delft Urban Water Movie Contest awarded by the Delft University of Technology in the Netherlands.*

The Paradox that is Water

What? Drink from the tap?

In the summer of 1997, my husband had a few days of work in Singapore and I seized the chance to accompany him and see a new country. At the hotel where we were staying, I called room service and asked them to send a jug of filtered water to our room. "Madam, you can drink water from the tap in your bathroom," said the hotel employee. I was horrified and repeated my request for filtered water. "Ma'am, the tap water *is* potable even in the bathroom; in Singapore you can safely drink water from the tap," said the employee. Finally, it dawned on me that the country's tap water actually did not need any further purification.

Back home in India, water filters were as common as televisions and refrigerators. No middle and upper class household could be without a water filter. The well-known brand Aquaguard had already become synonymous with household water filters just like Xerox had come to mean photocopiers.

Even today, the situation is not different with households and apartment blocks in cities in India having to make their own arrangements for accessing safe drinking water. Only now, the filters are even more sophisticated than before and equipped with reverse osmosis membranes, ultraviolet disinfection, and what have you. This is not surprising, considering that raw water sources are getting harder to distinguish from wastewater.

Since 1997, I have been drinking tap water in many cities, unfortunately most of them outside Asia. The day I can drink from the tap in New Delhi or Jakarta or some

random Asian city with the trust that the utility is in complete control of quality, it will be my dream come true.

Anomalous properties of water

Back in 2000, when I began writing about water issues, the first thing that struck me was that the whole sector was riddled with paradoxes, which is somewhat like the properties of water itself. In school, we learned about the distinctly anomalous properties of water, which makes it behave totally unlike any other substance. Instead of expanding when heated, ice contracts on heating until it reaches a temperature of 4^0C. As gas, water is one of the lightest known, as liquid, it is much denser than expected, and as solid it is much lighter than what it should be when compared to its liquid form.

However, the anomalous nature of water in the political, social and economic spheres is more baffling than the physical nature of the liquid.

No one would dispute that water is indispensable, that it cannot be substituted for anything else; we can transition from fossil fuels to solar, from fatty food to low-calorie diets, from Coke to Diet Coke but we can't invent another liquid to replace water.

Yet, when we look at the way water is priced, it appears that petroleum, diesel, kerosene and every other liquid is worth far more. According to a survey carried out in 2011, for buying one cubic meter of tap water, citizens pay just $0.53 in Jakarta, $0.62 in Beijing, $0.44 in Ho Chi Minh City, $0.16 in New Delhi, and $0.03 in Riyadh.

Huge amounts of water are lost every second from pipe networks around the world. If an oil pipeline network leaks half of all the oil it carries, managers would be fired and the leaks would become the world's most important talking point. Yet, when the same thing happens with water pipelines in cities, it is accepted as a fact of life. This is because water is dirt-cheap, while oil prices determine the state of the world's economy.

The most valuable liquid that sustains human life costs nothing, is wasted and is not valued; this anomaly is both puzzling and frustrating.

A visit to the informal settlements of Asia and Africa will quickly establish that the poor often pay three to seven times the price that middle and upper class citizens pay for water. Water vendors make profits out of the thirst of the urban poor. Meanwhile, the people living in houses and apartments pay monthly bills amounting to just 1 or 2 dollars ...another water anomaly.

Now let's move on to the paradoxical reverence accorded to water through numerous traditions and customs in almost every religion. For the Hindus, rivers such as Ganga and Yamuna are sacred. Hundreds of thousands of worshippers gather on

the banks of the rivers to symbolically wash off their sins. Yet, these “sacred” waters have been allowed to be so completely contaminated by wastewater from factories and cities that they could well be called the sacred open sewers of the world.

Water is an important part of rituals in every religion but this abstract reverence is rarely translated into tangible steps to conserve and protect water resources. Why do religious and spiritual leaders not join hands to speak against the pollution of their gods’ creations or mobilize their millions of followers to become agents of change for a more eco-friendly world?

More integration, more innovation needed

The widespread use of water by every sector of the economy reveals the important connections between water and everything else. How we manage our water is linked to how we manage our energy, waste, food, minerals, health and the list could go on. Each sector feeds into the other with complicated feedback loops. Energy policies that did not consider the impact on water resources and “green revolutions” that ignored the effect on water quality have been responsible for many crises, some of which are still unfolding. Integrated management is a catchword used liberally but not applied significantly.

Where water is supplied to farms, households, and industries without any arrangements to safely dispose or reuse the wastewater, and without a solid waste management program, the dirty wastewater and solid waste is bound to pollute its surroundings and eventually contaminate the water used by people living downstream. Yet even now, hundreds of water projects are being announced in developing countries without including any component for managing wastewater and solid waste. Years down the line, these very water projects will further choke rivers, lakes, and seas compounding the very problem they were meant to solve.

Traditionally, water and sewerage infrastructure have largely remained untouched by innovations which have transformed other industries such as power and telecommunications. It is a low-technology sector; investment in research and development is low; and there are insufficient rewards for innovation. There is also a scarcity of skilled people in the industry even in developed countries, so one can imagine the situation in developing countries.

No doubt, there have been pockets of innovation such as in desalination and wastewater reuse technologies, instrumentation, metering, pumping, leakage control, and others. However, these innovations have not reached most developing countries and are still far from working in an integrated manner even where they have.

At a recent conference, one presenter from the US gave an example of a thermal power plant which needed water to use in its air scrubber in order to comply with stringent air-pollution requirements. Meanwhile, a nearby wastewater treatment

plant found itself facing more restrictions to discharge its treated effluents into the environment in order to comply with nitrogen and phosphorous limits. A happy solution was found when both units decided to integrate their operations and the effluent from the treatment plant was transported to the thermal plant to use in its air-scrubbing process.

The hydrocarbon industry routinely uses *pinch analysis* to look at entire systems holistically, exploit the interactions between different processes and thereby optimize the use of energy and materials. For example, the heat rejected from one unit is used as an input to another unit until the overall energy consumed by the system reduces to the minimum. There is much potential for the *pinch analysis* to be applied to water used by entire systems, whether it is a factory, a city, a country or until wherever one wants to limit the boundary. It will be highly rewarding for the managers of water and sewerage infrastructure to look outside their boundaries and learn from what other industries are doing.

In the years to come, innovation will increasingly be about how to integrate the use of water across various sections of the economy and less about dazzling products which are wizards at measuring, purifying, and pumping.

It's the communication, stupid

Talk to school-going kids in Singapore and you will be surprised with their awareness about the country's water recycling program. Long before the tiny city-state's NEWater made waves in the world, Singapore's national water agency, the Public Utilities Board (PUB) had embarked on a well-planned communication strategy to get a buy-in from its citizens. The NEWater Visitor Centre is a tourist attraction where citizens and visitors learn about advanced technologies that are available to purify used water.

The term "used water" itself was coined by Singapore to drive home that wastewater is not to be wasted. The tagline of PUB, "Water for All – Conserve, Value, Enjoy," succinctly communicates the importance of water. When the prime minister himself constantly reminds people that almost the entire island is now serving as a catchment for supplying their water needs and thus, every scrap of rubbish thrown carelessly will contaminate their own drinking water, the people listen.

Unfortunately, countries with even more pressing water and sanitation issues do not appear to have any strategies to communicate these issues in order to arrive at a consensus to implement solutions. When a water or sewage facility is inaugurated, the occasion will be exploited to glorify a political party's achievements, rather than convey important messages about water or sewage.

Just a look at the utility invoices sent out to consumers in many cities makes it clear why water is an undervalued resource. The unclear language and confusing acronyms do nothing to educate or inform. In contrast, the consumers of Singapore, Sydney,

Melbourne, Kansas City and others receive utility invoices which not only state the amount owed by them with details about the charges, but include charts comparing their usage across previous months and the average used in the city. The invoice can be an important tool of communication, but this is not appreciated by many utilities.

Meanwhile, many nongovernment organizations have fuelled the media with vacuous debates about water as a human right, about protecting the poor from high water tariffs and finally the public–private sector dichotomy. The real debates on how to ensure that one's wastewater can become another's feed water, how to optimize the roles of public and private entities, how to secure financing, how to ensure transparency, and how to get all stakeholders to work in alignment are rarely communicated to the public domain.

Moving to the next level

According to Albert Einstein, we cannot solve our problems at the same level of thinking that created them. Wastewater, sludge, heat, waste, nutrients, endocrine-disrupting chemicals, brine and more, emerged from one level of thinking. Perhaps, the solutions will emerge only when we move to the next level with ecological intelligence and use pricing as an instrument of change.

Anton Soedjarwo *first became interested in rural resource issues in 1968 when, as a civil engineering student, he was tasked by a Swiss Catholic priest with solving a village water problem. In 1972 he and a group of other technically-oriented students started Yayasan Dian Desa (YDD) a nonprofit organization focusing on research and development and producing products and services for marginalized communities, using appropriate technology, and acting as intermediary to development organizations. Today, YDD is one of the largest foundations in Indonesia with a staff of about 300, who conduct projects all over the country. Among other things, Anton has been noted for his bamboo-cement rainwater collectors, his use of the hydraulic ram to bring water to rural villages, the development of efficient cooking stoves that use much less firewood, microfinancing for rural communities, and community-based sewer systems. Mr. Soedjarwo has received numerous awards, including the Ramon Magsaysay award in 1983 for community leadership, the Simavi Institute award in 1999 and the Schwab Foundation Social Entrepreneur of the Year for Indonesia in 2007.*

Water Provision: Relief and Release

Water – Utopic or Realistic?

Even until now the majority of rural people still perceive water is a free gift from God just like air. But on certain occasions such as parties or gatherings, people are served bottled water or plastic glass packed water, which is costly for low-income people. When I ask why they use such expensive water, they would say, “no… no… we paid for that nice and modern plastic glass.” Likewise when a local kiosk seller brings water to their house they say “we paid for the service”. So packaging, appearance, service, status and other things make people happy to pay. These things are not the “basic need” itself. To survive, people need to fulfil their basic needs. But to justify paying, people use “extra stuff.”

A similar mindset can also be found in urban water systems. Many water companies (PDAMs in Indonesia) have to run on a deficit. Low and unrealistic tariffs is one key issue among many others, including management capacity and technical problems. The water tariff needs to be approved by the local parliament. Always, there is a swing between regarding water as a social or economic good. Often politicians use this too as a vehicle to get empathy from their constituents. Just to increase the water tariff by 5 cents per cubic meter can become a long process. In the end we have many unrealistic water tariffs. This means revenues are low and often not sufficient to cover operational costs. These PDAMs run permanently on government subsidy for operations. Certainly there is no reserve fund for replacement and service

expansion, so poor or low income communities remain unserved. On the one hand, politicians argue that they must protect the poor from high water tariffs, but on the other hand, the poor already spend a lot more than the water tariff to get water.

Water – From Charity Toward Social Enterprise

A huge amount of effort and enormous resources have been allocated for water by governments, donor organizations (bilateral and multilateral), and nongovernment organizations (NGOs). In rural areas such efforts are implemented by involving NGOs or community-based organizations (CBOs). In general there are cases where NGOs or CBOs are assigned and paid to do the job, or do the fund raising and implement the water program. Implementation consists of three groups of activities: (i) planning, design, and community preparation; (ii) construction, and (iii) capacity building for operation and maintenance. The capacity building is conducted through community training, formation of water user organizations, and other types of facilitation. After the budget is finished, the NGO (or other implementing organization) hands over everything to the target communities with an expectation that after the capacity building process (training and facilitation) is done, everything will run well as expected.

In reality, too many rural water systems run for just several months then decline and even become totally ruined due to various reasons. The common reasons are (i) no money for operations, maintenance, and replacements of parts; and (ii) sociocultural problems. The big question to be asked is why the NGO or implementing organizations did not continue to manage the system in a sustainable manner. Maybe the service provider and communities are willing to pay for their service to make the system long lasting and sustainable.

One issue is that NGOs may have skills and experience in program implementation, including conducting various types of community training (in the name of capacity building) but have no skill in managing a social enterprise.

The other issue is that donor organizations are usually able to support the investment cost for water infrastructure and capacity building, but due to various reasons are not able to support the NGOs becoming a social enterprise.

Water – Not Only Relief but Release

Access to water will answer one problem of a basic human need. This may also serve as a platform for health and hygiene improvement, which in the end will improve health. Besides that, the availability of water will release low-income communities from their daily water-fetching burden. This becomes an important vehicle for economic improvement of the communities, especially considering that poverty is the main problem of many communities in developing countries. In other words,

provision is not only relief but also will release communities from unnecessary burden and enable them to embark on more productive activities.

Take the example of one village of 1,000 households where each household spends 3 hours a day fetching water. Provision of water will release them from that burden and 3,000 working hours per day (or more than 1 million working hours per year).

This momentum is not utilized appropriately. Organizations (or development actors) dealing with water often have no capacity in livelihood or product development activities. Besides that, they seem to think that community economic development is the role of other development actors. There is a similar problem with donor organizations. Support for water is possible but support for "post water" is not available. Consequently the huge momentum created by the water program is not utilized. All actors should widen their horizon to acknowledge that water brings not only *relief* but also *release*. There are many cases where water can be a strategic intervention serving as an ice breaker in the overall poverty alleviation program, if only the resulting momentum is utilized appropriately.

Sanitation – Some Points to Note

At least 40% of households in Indonesia (especially in rural and urban slum areas) still do not have a sanitation facility (toilet) and use open defecation.

There are various reasons for this including (i) being poor, (ii) habit, or (iii) natural problems. On the other hand, even the poor are willing to invest in a television or cell phone, which are status symbols.

Awareness is the main problem. Therefore awareness creation and behavior change are the key issues. We must make an effort toward awareness creation and improvement, which will lead to behavior change and "buy in." These can be done through various methodologies such as community-led total sanitation (CLTS).

Although these efforts are important, in reality it is not enough. Often, technical support is needed to solve the site specific problem. One important problem faced by rural communities, especially those who live in remote areas, or in small islands is the practicality of making a family toilet. To solve the problem of the poor we should not just stick to the traditional approach. If necessary we need to use modern technology and modern materials. An example of this is the Jamban Dian Desa portable modular model toilet which can be assembled in just 6 hours and costs US$350. It is paid off with instalments over 3 years.

A community sewerage project was implemented in Yogyakarta informal settlements around the year 2000 for 500 households at a time. Decentralization is appropriate for large older cities as it is too costly to have centralized sewerage systems. It has been sustainable despite the management involving gangsters, because they are committed to making it work and owning the facility.

We need to remember regulations and bureaucracy are made by humans. By keeping projects and NGO activities small, Dian Desa has been able to avoid heavy politics and avoid bureaucracy. The philosophy of Dian Desa has been to cooperate with local governments and communities at all times. Everything in moderation is a good way to go.

Tan Gee Paw *began his career in 1967 as a civil engineer in the Drainage Department of the Government. Since then he has been involved in the water resources development of Singapore, except for a short spell in academia, and was appointed chairman of the Public Utilities Board (PUB), Singapore's national water agency in 2001, a position he has held since then. During his career, he was involved in the development of the first water master plan for Singapore in the early 1970s. He formulated the action plan for cleaning up the Singapore River, and was instrumental in the development of NEWater, which is reclaimed used water using reverse osmosis (RO) technology for injection into Singapore's reservoirs. He is the founding chairperson of the Institute of Water Policy in the Lee Kuan Yew School of Public Policy in the National University of Singapore. Mr. Tan graduated with First Class Honours in Bachelor of Engineering (Civil) from the University of Malaya in 1967. In 1971, he obtained a Master of Science in Systems Engineering from the University of Singapore. He was conferred an honorary degree of Doctor of Science from the University of Westminster, UK in 1993; and an honorary doctorate in Engineering from Sheffield University, UK in 1995.*

Why Sanitation is Part of Water Supply

Development of Water Resources

For an emerging country, the development of water resources can be successfully undertaken only if there is parallel economic, social, and educational development—which in turn needs strong continuing political leadership.

Each time I reflect upon the development of water resources in Singapore and my role in it over the past 45 years since Singapore's independence, I would invariably find myself embedded in the story of Singapore's economic, social, and educational development. We need economic development so that with better income, people can afford to pay for good sanitation and safe water supply. That involves expensive infrastructure including large investments, which must be recovered to be sustainable. With economic development, squatters can be cleared and proper housing provided with modern sanitation and potable water supply. We need social development so that people understand the need to keep catchments clean of litter and rubbish, and waste water is not discarded into open drains that lead into reservoirs. The need to enforce antipollution laws will also be appreciated. We need educational development, so that the people understand water conservation is the way forward and water reuse is a safe option with the advent of modern water treatment membranes.

Economic, social, and educational development take place best under strong and continuing political stability and leadership.

Water policy development must keep in step with economic, social, and educational development, neither running ahead nor lagging behind. In fact many emerging countries do not even have a clear water policy to begin with. It is for this reason that PUB founded the Institute of Water Policy in the Lee Kuan Yew School of Public Policy within the National University of Singapore, to do research in water policy and promote awareness for good water policy development in developing countries.

Water Supply

A sustainable potable water supply in the urban context requires a mindset change for both the water agency and the consumer. The agency supplying the water must no longer consider its responsibility stops with the delivery of the water to the consumer, and the consumer must not think he has purchased the water that now belongs to him and he, as the new owner of the water, is then free to dispense with the water the way he chooses. Rather, both the water agency and the consumer must realize that water is a limited resource and therefore the agency only loans the water to the consumer who must then return it to the agency for refurbishment and reuse. The consumer pays a fee to the agency, not to own the water, but for the loan and use of the water, just as he borrows a book from the library and must return it. No longer is the agency responsible only to deliver the water, nor the consumer free to discard it into open drains or rivers.

In Singapore, as far back as the 1970s, we realized that we must collect back every drop of water we send out to the population. The potable water pipelines must have a twin sister called the sewerage system so that used water can be collected back and treated for safe discharge while awaiting the day when technology would allow it to be reused again safely. That technology is now available and is now widely used in Singapore. This is the only way an urban water supply system can become sustainable. This requires both water agency and consumer to have a mindset change. Public education is the key to this mindset change.

Sanitation

The success of a nation is not measured by the glitter of its high rise buildings, but the way it disposes of its human waste.

For Singapore to become a global city able to attract and retain the best of talent and investments, it must collect, treat, and dispose of its human waste. Without this, we will forever remain a global hotel, plagued by recurrent outbreaks of water and vector borne tropical diseases.

Recognizing this, we gave priority to our sanitation program when Singapore became independent. In our warm and humid weather, human waste must be removed as soon as it is generated and safely disposed. It cannot be left overnight in night soil buckets nor dropped into streams and drains in overhanging latrines. So we began our massive sewerage construction program to remove all night soil buckets and overhanging latrines and replace them with modern sanitation and a sewerage network. It took us some 25 years. Wastewater is treated in central sewage treatment plants for safe disposal to the sea, meeting international discharge standards. The budget for sewerage is considered as important as the budget to provide roads, electricity and water. Without this budget priority, no effort to transform Singapore into a global city will succeed.

Addressing Challenges Ahead

We are at an exciting moment in history as we face the new challenges of rapid urbanization and climate change, which will impose severe stress on our ability to use resources like water effectively. To be a city of the future, we need to constantly look ahead, be visionary, bold in thinking. We need innovation, not just in technology, but in our approach to integrated water management to make it part of the urban ecological system of which we are all part. The government does not have the ability to deal with every aspect of water. The community, industry, and government agencies all need to be co-opted to work together in the management of our water resources. Only then can we ensure environmental sustainability in our cities of the future.

Arjun Thapan *has been involved in water reform for over 30 years both nationally and globally. After 20 years in public audit in India, Mr. Thapan joined the Asian Development Bank in 1991 and designed, prepared, and helped implement numerous urban and rural water supply and sanitation projects in South and Southeast Asia. He helped prepare the Water Policy of the Asian Development Bank (ADB) that has guided ADB's work in water since 2001, and where he led the growth in water investments to $2.5 billion annually (about 25% of the bank's total annual program). He was the first chair of ADB's Water Community of Practice where he laid the foundation for enhanced sector work and knowledge development. He was director general of Southeast Asia Department from 2006–2009. In 2010, as the president's first special senior advisor for infrastructure and water, he designed and delivered ADB's first Water: Crisis and Choices conference that stimulated solution-based thinking. Before retiring from ADB, he designed the Water Operational Plan 2011–2020 to sit within a Green Growth paradigm in ADB. He designed and led the implementation of the Water Operators Partnership program in Asia—a global first that supports utility operational performance enhancement through peer-to-peer learning (now WaterLinks). He chaired the World Economic Forum's Global Agenda Council on Water Security where he leveraged the council's effort to propagate the Water-Energy-Food Nexus as a key determinant of development planning. He continues to work actively for water and is on the advisory boards of several water companies and organizations. WaterLinks has him as its first chair.*

A Magical Performance

It was sometime in 1993. The morning was brightly sunlit. And the sweat poured off one's brow at the slightest exertion. I was on my way to the Phnom Penh Water Supply Authority in the charming city of the same name. Upon arrival at what looked like a war zone with the detritus of a water company's innards strewn across the landscape, I walked up to the gentleman sitting on an unsteady chair in the porch. The table at which he sat was equally unsteady. It had only two legs, and was propped up by old files and registers. Smoke from a Gauloise laced the air above his head. He rose and introduced himself as Ek Sonn Chan, the General Director of the company. I was delighted. He was the very person I was looking for. I asked to meet his colleagues. He said he had none. He was alone. His technical staff—there were two—were busy somewhere on the premises of the treatment plant. A bicycle leaned against a pillar of the porch. It brought him to work.

Two years later, ADB provided a $20 million loan to PPWSA. A similar amount was loaned by the World Bank. Mr. Ek Sonn Chan did not look back. His magic transformed PPWSA from a worn out, completely destroyed, virtually defunct water company into one of the world's leading water utilities. It has won every prize worth

winning for its sustained performance in every department—24/7 service, maximum coverage area, world-class water quality, lowest water losses in Asia, top-flight customer relations, and high profitability. Its performance has not been a flash in the pan. It has repeated this year after year, for over a decade.

And what did we do to help PPWSA? The loan was incidental, though it helped. We stayed the course with Ek Sonn Chan and his team. We saw him through thick and thin. We held fast when he needed our support to fight lonely battles with political masters. He didn't get bureaucratic responses from us when he asked us to solve his problems. He got practical solutions. Results? The project was completed before schedule, within cost, and every loan covenant was not just met, it was exceeded. An exemplary development performance.

Urban water in Asia is a difficult world. It has few champions. If you identify them early, and correctly, and stay their course with friendship and professionalism, devoid of interminable processes and paper, you can be assured of a part in the kind of magic that PPWSA has wrought.

Bright Ideas in the Darkness before Dawn

The beer was warm, and the flies buzzed annoyingly. The air hung heavily over the extended verandah. The city of Vinh in north-central Viet Nam, was mainly asleep. It was 2 a.m. and there were four of us debating a day's work on a humid night in the summer of 1995. A couple of stray dogs, and a bar boy kept us company. Mr. Vu Kim Quyen, the director of the Management Board for Water Supply and Sanitation Projects in the government's Ministry of Construction, was pressing ADB to finance the oversized treatment plant and the expanded network. A useful echo was volunteered by the general director of the local water company. This was a typical supply-side solution to the city's water and sanitation needs. I thought it was time we extracted a price.

I suggested to Mr. Quyen that we (i) introduce city-wide sanitation standards; (ii) mandate the adoption of those standards by every household and every commercial or industrial establishment within 2 years; (iii) provide technical assistance to those who needed help to attain those standards, including a dedicated credit line to the poorest of the poor; (iv) merge the water supply and drainage companies to maximize synergies and efficiencies; (v) mandate the collection of a sanitation and sewerage tariff; and (vi) introduce wastewater treatment. Vinh was emerging as an industrial township and industrial wastewater needed attention.

The warm beer had taken effect. Mr. Quyen shook his head and it was difficult to fathom the message he sent. When his impassive face broke into a smile, the words that were interpreted for us said: "What a good idea! Shall we do this for all seven provincial towns included in this project?"

And so began a story of a government taking sanitation seriously, investing in its cities' health, and bringing the future to its people. The warm beer had done its work. It was now time to take a break. Don't ram "development" down a people. Sip it with them slowly. Always works!

Christina Aristanti Tjondroputro *graduated from a Sanata Dharma Teachers Training College, majoring in English language in 1979. She joined the nongovernment organization (NGO) Yayasan Dian Desa in Yogyakarta, Indonesia in January 1980 and is still with the same organization up to now. Christina addresses social issues related to development work, including programs and projects in water supply and sanitation. Her involvement in water supply and sanitation started when she became the team leader for the PVC hand pump program led by the International Development Research Centre of Canada. In the program, she not only addressed the technical issues, but also closely looked into the involvement of women as the main provider of clean water for the family. Since then she has been involved as project leader or consultant to national, international, and multilateral agencies, addressing the issues of water and sanitation and biomass energy.*

Community Participation

I have been involved in small-scale community water supply and sanitation as part of integrated community development for many years through the NGO Dian Desa.

Community projects are neither requested nor offered. We identify areas where there are needs, then we look for funding, but we discuss problems with the villagers without talking about funding. We use a participatory assessment approach where people have to be responsible. The gender aspect is strong in this methodology. We help the community to analyze their condition related to water supply and sanitation. To get the opinions and views of all people in the villages, separate meetings of high- and low-income households are held, and when necessary, we have separate group discussions for men and women, most especially when it relates to decision making. This way all opinions and decisions can be accommodated. In addition, assessments have proven to be more accurate when the community participates actively, and are not just interviewed. For example, during a group discussion, when asked about where they defecate, more than 75% of members of a community responded that they defecate in the toilet as there have been groups (of seven households) of two-room toilets built for them by an NGO. Yet, when facilitated using a “pocket voting” tool, it was then revealed that only 25% actually defecated in the toilet. Obtaining more accurate information can lead to better discussion of the problems and solutions. In many cases, it was found that sometimes the poor are more willing to participate and contribute than the richer people.

Sanitation is always a much more difficult issue to solve than water. The needs are identified together. We look at sanitation coverage and always find it is worse than what is stated. People are often embarrassed to talk about sanitation. The most important thing in development work is we don’t force people to cooperate. Sometimes we just have to say no to a village if they are clearly not willing to help

themselves. This will need the flexibility from the donor, who should be prepared to revise original target villages or areas with ones that are better prepared. Thus it is best when expressed need is from the bottom.

For water supply, there is often a common source of water (e.g., a spring) for several villages. This requires more effort in helping the community manage the water supply system. Collection of fees for the operation and maintenance of the system and services are often not fulfilled by the community as they regard water as free. Therefore, some communities have expressed a view that management of a water system can also be facilitated by Dian Desa.

In addition to providing clean water supply, we also provide drinking water. Dian Desa has introduced two household water treatment systems namely the Solar Water Disinfection known as SODIS and the Ceramic filter. These two household water systems have been better accepted by the community in general compared to the chlorination system introduced either by liquid chlorine known as "*air rahmat,*" or the "*Aquatab*" tablets. Experience in working with households shows that the community, especially those in the rural areas, do not opt for chlorine due to its after smell and taste. An experience in introducing "PUR" water also shows that sometimes what we as the developers think will be good for the community turns out the opposite—with the community thinking otherwise.

Since August 2008, the Government of Indonesia has launched the so called Community-Led Total Sanitation ([CLTS] in Indonesian known as STBM – Sanitasi Total Berbasis Masyarakat) that covers five pillars. These are (i) stopping open defecation, (ii) washing hands with soap in running water, (iii) drinking treated water, (iv) managing solid waste, and (v) managing household liquid waste. Yayasan Dian Desa tried to assist the government of two districts in Flores island, the Sikka district and Flores Timur district, to implement and achieve better sanitation through the STBM implementation. This requires capacity building for both the local government officials involved, as well as the community and community leaders. As this program focuses on awareness raising and education, it should be implemented with no subsidy for any of the facilities, as it should be the responsibility of the community.

We try to make a difference in schools especially by addressing the young. Often there are only one or two toilets for a school with 150 students. There is not much value in talking hygiene behavior if the infrastructure is not there. And it is not just about getting donor funds. Often the school has funds, but don't consider toilets a high priority. We need to address the people's interest. We need to think more about packaging and marketing sanitation. For example, we may think good hygiene is very important and the main reason for having a good toilet, but health is not always the main driver. As we have seen with CLTS, peer pressure and shame were the main drivers. For women and girls, dignity is an important driver.

The case of biogas is a good example of perception coloring acceptance. If the biogas is made from animal excreta, then there is no resistance to its use. But if it is made from human excreta, then there is very strong resistance to its use.

Recently it has been proven that cooking with wood fired stoves in poorly ventilated low-income community houses has caused serious long-term health problems to both mothers and children. Dian Desa has been working with UN agencies both on the awareness raising as well as viable options in fuels and cooking stoves.

Jelle van Gijn *worked all of his career in international development, and mainly in water and sanitation. Born in Indonesia, where his parents taught sciences, he was educated in Iran, Netherlands, UK, and Canada. He graduated with an MSc in Public Health Engineering from Delft University of Technology. A first year in Africa was spent as an environmental engineer in northern Nigeria, running the rapids of Kaduna River doing water quality sampling. With UNESCO, he taught hydrologists and water supply technicians in Tanzania, and in Mozambique he was part of the effort to establish a water resources directorate, after the sudden independence from Portugal left the country with an institutional vacuum. From 1987, Jelle worked with UK consulting firms throughout South and Southeast Asia, on urban development and water and sanitation projects, many for the Asian Development Bank (ADB). Apart from that, he worked in Bangladesh for 6 years on a Department for International Development UK (DFID) assignment of institutional and policy transformation of the transport sector. Since 2009, he has been part of the ADB Water Team in Viet Nam, helping to formulate policy and strategy for water supply and wastewater management. Separately, he is helping to formulate the response by ADB to the growing threat for water security in Asia.*

A Permanent Infrastructure of Training and Capacity Building

One of the advantages of increasing years in development is that it allows you to learn to recognize returning patterns. Circles within circles. Fashions and fads and obsessions come and go, but our basic needs for water, food, shelter, and dry feet remain. Circumstances may differ, but the essential issues remain the same globally. My godfather wrote a piece toward his PhD at the Massachusetts Institute of Technology in 1952, evaluating the capacity of a then newly independent Indonesia to receive technical assistance. The words he used then may no longer be considered correct among the development glitterati at international seminars now, but his sincerity and his breadth of intellectual enquiry is difficult to find now. Nearly 50 years later, representing the World Commission on Dams, he still tours the world explaining the continuing need for large dams.

Helping to Fill that Gap

Returning to Mozambique in 2009 to conduct a brief water and sanitation program evaluation, I was privileged and pleasantly surprised to meet and interview many who were young students at our training course during the mid- 1980s. One of the bright young women of our 1984 intake had now reached the top of the national organization for water management.

That 3-year water resources technician training course was a successful product of a carefully prepared joint program between The Netherlands and UNESCO. Despite the predictable logistical frictions created by the separate tracks of bilateral and UN processing, the course started to fill an important gap in a massive institutional void. You put together a group of Mozambican trainees, hungry for knowledge and practical experience, and a team of young enthusiastic and committed international hydrologists, water professionals and other educators: designing and running a course under such circumstances was all-absorbing fun and incredibly rewarding. It started as an in-house technical course, but we soon recognized that we had to give it more permanency, and thereby greater incentive to our succession of students, by incorporating it within the overall system of further education and transfer it to the Ministry of Education. The course still continues there, at the National Institute for Higher Technical Education.

Our brightest students—whom we also had to feed and clothe and house during the war years—went on to enjoy further academic education, some with international scholarships. So 25 years later our graduates can be found throughout the water sector, throughout the country, at central, provincial, and local level, managing hydrometric networks, deciding national policy or operating water treatment stations.

Technical training has not always been fashionable in development. And I just don't understand why not. Nearly everywhere we go, we come to the same conclusion: that the biggest impediment to a sustainable realization of our ambitious plans and investments and to secure maintenance of what has been built, is the shortage of skills at the planning and operational levels, in particular away from the capital, away from the big centers. **Establishing a permanent infrastructure of training and capacity building to support the water sector, from vocational to academic, is therefore as worthwhile an investment as any. And there is nothing neocolonial or politically incorrect for a bilateral agency or foundation to support such for 10 years or more.**

Still a Basic Need

Development fashions come and go. One of the basic needs that appears often overlooked under the avalanche of new buzzwords, but never by the harassed city engineer or the woman trying to maintain her family's dignity in the slum dwelling, is a functioning network of drains.

Wandering through countless Asian streets and back allies and trackside informal settlements, listening to needs and getting a sense of priorities, what always strikes me is how a decent urban environment begins with its storm water drains—an interconnected network with a place for the water to go. Especially where formal sewerage is still nonexistent, and where human waste may end up in open drains, the functioning of the drainage network is so critical for public health, but also to

preserve the structural integrity of roads and footpaths, allowing communities to move up the economic ladder.

Malaysian cities prove such a shining example, with their effective parabolic precast drains, and their obsession with avoiding any stagnant water to reduce the incidence of dengue fever.

And only just recently in Viet Nam, an expensive climate change adaptation adviser whispered to me that the best thing the towns in the cyclone-prone coastal strip can do is just to get their basic drainage network working and interconnected. “I can tell you that for nothing” he said, “and I don’t need to apply our interactive multilayer Global Information System software”—software which would never have reached our beleaguered city engineer anyway.

Our role, and our level of active involvement, in helping to secure these basic needs will be different, depending on circumstances. But we should not allow it to drop out of our sights.

Rory Villaluna *is currently the executive secretary of STREAMS of KNOWLEDGE, a Philippine-based network of water and sanitation resource centers. She has been actively engaged in the water and sanitation sector since 1996, when she joined the International Training Network in the Philippines. From then on, she has been involved in capacity development and policy advocacy for integrated water resources management, focusing most especially on issues relating to water and sanitation for the poor. She is currently the president of the Philippine Ecological Sanitation Network (PEN) and the chair-elect of the Philippine Water Partnership.*

Supporting Small-Scale Water Providers

Developing water supply and sanitation in the Philippines is an urgent matter that needs to be addressed both at national and local levels. Recognition of the human rights to water and sanitation imply that the state (represented by national agencies and local government units) are obligated to ensure that these rights are respected, fulfilled, and protected. For about 18 million Filipinos who still do not have access to safe improved water supplies and for the 10 million Filipinos who still defecate in the open, the ability to exercise this right is highly constrained by the limited capacity of national and local governments to provide the resources required to satisfy this right.

Ensuring access to safe and improved water supplies and sanitation for all is a sound investment based on the economic, social, and health benefits derived from such intervention. Investments may come from either public or private sources. **Women, men, and children in the communities themselves, no matter how poor, would always have something to contribute. The process of facilitating their constructive engagement is important in local water governance.**

Good local water governance empowers people and the state to work together in partnerships to respond to felt needs and local demands. Creating an enabling environment, improving knowledge, skills, and behavior and providing infrastructure should go hand in hand in meeting the goals of the Philippine Water Supply Road Map, which is universal coverage by 2025.

Investing in small water service providers will expand and sustain water service delivery. Most of the rural poor communities in the Philippines are served by small water service providers. They are either community-managed associations such as water cooperatives, water and sanitation associations, or local government unit (LGU)-run utilities. Some town centers or *poblacion* areas are served by water districts. A benchmarking study conducted by the Water and Sanitation Program of the World Bank compared the operations of these utilities and came to the conclusion that water districts are better managed and performed more efficiently than the other types of service providers. LGU-run systems performed worst.

Why is this so? Is it because only the water districts have access to the technical, institutional, and financial assistance that the Local Water Utilities Administration provides? Is it because only the water districts have coaching and mentoring partnership arrangements among themselves?

Recent developments in the country show that many small water service providers (SWSPs) have actually succeeded in providing services in poor communities in spite of lack of support from national government. Many of these SWSPs are community-owned and operated. Some are subsidized by LGUs through regular (either monthly or annual) contributions. The bottom line is that they constitute a large unknown number of service providers—that if mainstreamed and supported, will be the national and local governments' partners in expanding efficient and sustainable water service provision.

Poor people are willing and able to pay. Water service delivery should be commercially viable. Years ago, profit-seeking in a basic service such as water supply was for me, a big question. I assumed that poor people did not have money to pay for services and because they were poor, they were entitled to receive subsidies. Money was important for operation and maintenance. But I have learned that unless you operate a commercially viable system, it will not be a sustainable one. Profit earning is not so bad. Once it is earned, there can be many different ways to give it back to the community. In one project that we managed, the profit was pooled in a water and sanitation fund. People were willing to pay for the services rendered and in the process, helped build a community fund. This fund was used for drainage projects, public toilet construction, hygiene promotion, and livelihood projects with the community, under the leadership of *barangay* officials.

Arturo G. Villasan *graduated from the University of the Philippines College of Agriculture with a degree of B.S. Agriculture (Farm Management). He managed the family farm in Nueva Ecija up to 1963 but shifted to agri-business endeavors after the Land Reform Code was passed by Congress. In 1972, having accepted the position of secretary to the mayor and chief of staff, he organized and headed the City Planning and Development Staff and oversaw the first comprehensive road map for the development of Cabanatuan City. He organized the Cabanatuan City Water District in 1974. He then left the city government to head the water utility as its general manager. He became a very active participant in the organization of the Philippine Association of Water Districts (PAWD). Being an active player from its beginning in 1975, he became its president in 1990 and chairman of the board of governors from 2004 to 2006. In 2002, he revived AQUARIUS, the official publication of PAWD and has since been the chair of the editorial board. He is currently the chair, board of directors of Cabanatuan City Water District, a position to which he was appointed after retiring as its general manager. He is a Jaena Fellow in Journalism, University of the Philippines College of Mass Communications.*

Water Districts through the Years

The promulgation of Presidential Decree (P.D) 198 in 1973 and its subsequent implementation pointed the Philippines in the right direction in the mode of delivering domestic water supply in several ways. It reoriented the populist government attitude of subsidizing the delivery of domestic water supply to make it "affordable." The concept of consumers paying fully for domestic water supply was asserted. Up to that time most (except for a sprinkling of privately owned ones), water utilities were owned and operated by local or national government. Their infrastructure was regarded as capital layout with no provision in their tariff structure to provide for the recovery of these capital investments. Tariffs were meant to provide only for operational costs and more often than not even fell short of that.

Revenues derived from the operation of such utilities were remitted either to the local or national governments and became part of their general funds. Funds for the operation of said water utilities (mostly for wages) were then appropriated by congress or local government councils. In all cases, the basis for the provision of funds was political patronage. If there were incentives dangled for efficiency of operations of such utilities, they completely escape my memory.

A senate president once explained it this way: "Government corporations mostly are designed to not make any profit. They are organized to render essential services to the people and their operations costs come from taxes." This was his answer to persistent proposals for the abolition of some government corporations like the

National Food Authority, National Power Corporation, Manila Light Rail, etc. because they were losing money. He made this statement sometime in 2008 but way back in 1973 he could have said the same about water utilities.

The presidential decree provided for the formation and operation of water districts with the attendant support from the Local Water Utilities Administration (LWUA) created in part two of the same decree. It was clearly emphasized that the water districts formed pursuant to the law were to be autonomous and financially viable. In fact, the decree defined water districts as quasi-public corporations. "Public corporation" is a term often misunderstood in Philippine jurisprudence to mean government corporations. The use of the term quasi-public corporation can be explained that PD 198 was the result of a study conducted by two American engineering consultancy firms Adrian Wilson and James Montgomery working jointly. The American consultants thus collaborated with the forerunner of the the National Economic Development Authority (NEDA) in drafting the proposed bill and must have provided that particular term.

The water district concept, then a novel idea, is an adaptation of the practices in the United States but more particulary, the arid Southern California. Although they were meant to be nonprofit organizations, nevertheless they were mandated to devise tariff systems sufficient to provide funds for operations, debt servicing, maintenance and improvement, replacement of aging equipment and expansion of service coverage. While there was no provision for profits, they were mandated to build up reserves for debt service and contingencies. **Water districts were not designed to lose money.**

Like most new ideas, it took some time to catch on. The decree provided that formation of a water district was voluntary. Today, very few people recognize the significance of this seemingly minor provision of the law and how indispensible it was. The new model called for a drastic departure from the usual practice so that the community had to exhibit full awareness of the undertaking. Initially, only the most progressive local executives dared organize their water districts.

Although at the start, an unprecedented substantial amount of funds were provided to jump start the program, local executives were reluctant to take a plunge. The idea of losing control over a seemingly lucrative endeavor was and is anathema to Philippine political culture. The fact that water districts after being organized become independent of the local government and subject only to the provisions of PD 198 did not sit well with encumbent locals. Slowly but surely though, civic conciousness gradually won out.

The more difficult problems were to follow. First, was the acceptance by the consumers of reasonable tariffs. LWUA started forming water districts in cities with existing water systems. With no exception, these were heavily subsidized operations. Transition to financial viability required formulation of tariffs that shocked consumers. It was not unusual to arrive at figures five times the former ones. Collection

enforcement was something most local executives used for political patronage, so that it was not unusual for a political patron or leader to be spared the burden of paying for his water bills although most likely they were among the biggest consumers.

To make matters more challenging, LWUA insisted on tariff revision as soon as a water district had been formed, even before starting any new improvements. It served as a not so subtle message that the new water district was done with the old system. It was not surprising that the clamor of politicians reached the ears of then President Marcos barely 3 years after the first water district was organized, and who reacted by suspending the operations of LWUA/water districts pending investigation. What resulted was an amendment to PD 198 requiring public hearings for the presentation and approval of any water tariff changes. The amendment served water districts well. It forced them to go the the grassroots to explain the new concept. We may not have realized it at the time, but that was the beginning of awareness of the importance of customer satisfaction among water districts.

LWUA did not just provide loans. It provided a very stringent institutional development program for water districts. This was in addition to appropriate technical standards that were prescribed, with which the client water districts were resolutely made to conform. It also conducted a very effective training program for water district management and staff. There were regular monthly visits from LWUA management advisors who closely monitored the progress of the water districts. Realizing that the LWUA–water district relationship was without precedent, regular forums or consultative conferences were held twice each year to thrash out problems and amend procedures.

So began a transition in the way domestic water supply was availed of by provincial communities—autonomous water districts operating on self-sufficiency basis with reasonable tariff rates providing for debt service, operation and maintenance, replacement of machinery and equipment, and expansion of services, all managed by professionals. The water district concept caught fire as those earlier organized became almost instant successes under the self-help policy, so that, today there are more than 600 water districts in the country in various stages of development, sparing local and national governments the task of delivering this vital service to their taxpayers.

Did it come that easy? I'm counting 39 years and 600 out of 1,493 towns and 135 cities in 82 provinces. It is not much to crow about.

While PD 198 was supposed to have laid out the road map for domestic water supply delivery in provincial urban centers, it was never taken up in the congress of the Philippines. It was one of the earliest and most innovative decrees and yet had not even been deliberated, because congress had already been abolished. It dealt with a public policy that a very limited number of people were aware of initially. This is the only plausible explanation of why almost all succeeding administrations that came after President Marcos remained ignorant about this supposed road map. Neither has there been any substantial support of any kind.

After the fall of President Marcos, sheer good fortune saved water districts from abolition. The first secretary of Interior and Local Governments was the former mayor of Cagayan de Oro City later succeeded by the former mayor of Davao City. The first water district formed in the country was the Cagayan de Oro water district, and Davao was the fifth. Both secretaries, totally familiar with the water district concept, battled for the survival of water districts.

Fortunately, by that time the Philippine Association of Water Districts had gained formidable strength and cohesiveness and it succession of leaders somehow managed to claw their way to preserve the status of water districts.

Little has changed since then. The national government still appears to be unaware of the real nature of water districts.

About Taxes

The government was close to bankruptcy upon the assumption in 1986 of President Corazon Aquino, who promptly declared a revolutionary government. One of the first orders or decrees was to abolish tax exemptions of all kinds. It was so sweeping there had to be some confusion. Revenue collectors could not get their acts together fast enough on water districts. Before any action could be taken by the tax people, the Philippine Association of Water Districts (PAWD) started lobbying with the newly elected and constituted congress. I had been elected president and took the lead to seek restoration of tax exemption. We succeeded but during the bicameral conference of both houses, the bill was amended to last only for 5 years.

The exemption lasted from 1991 to 1996. It was not until 2 years later that the Bureau of Internal Revenue started to demand taxes. By that time a new Internal Revenue Code was in force and PAWD officers found a loop hole to defend themselves. Water districts defended themselves through the PAWD, which coordinated with the Office of the Government Corporate Counsel, their official legal counsel. The legal battle lasted until 8 March 2010 when the PAWD got the Revised Internal Revenue Code of 1997 amended to clarify/include water districts among those specifically exempted from the payment of income taxes. As of this moment, the Bureau of Internal Revenue has been dragging its feet and has not promulgated the corresponding implementing rules for the said exemption. This is a minor skirmish and PAWD fights on.

Several water districts like the ones in Davao city, Cagayan de Oro, Butuan City, and Camarines Sur were assessed taxes in the hundreds of millions. In fact the funds in the bank accounts of Butuan City and Cagayan de Oro water districts were frozen. A criminal case of tax evasion was filed against the general manager of the Davao City water district. Water districts, through PAWD, conceded to pay 2% of gross revenues as “franchise” tax, which most passed on to their users through their tariffs. All court cases have become moot and no water district has yet paid any income taxes.

Mithrasena Wickramage *has, except for a relatively short period in water resource management, been working in the water supply and sanitation sector in Sri Lanka since he started working as a young graduate engineer in 1974 in the National Water Supply and Drainage Board (NWSDB). New national policies in water supply and sanitation were introduced along with the beginning of the UN Water Supply and Sanitation Decade in 1980. He played an active role in the transformation period and the development phase that followed as an officer of the lead organization of the sector, the NWSDB. He worked in the nontraditional and untouched functional areas such as universal metering, billing and collection of revenue, working on policy alternatives for investment and achieving financial viability, extensive management training, reorganization and decentralization of the functions of NWSDB. Along with this work, greater emphasis was made to achieve financial viability of NWSDB, both at individual water supply scheme level and as a whole. The culmination of his career came when he served as the general manager of NWSDB, which was by then a large and mature utility.*

The Sri Lankan Experience

Development is all about improving living standards of people. Improved water supply and sanitation are vital attributes among many others for a healthy and productive life. These improved services should be technically and financially sustainable and affordable. Sustainable services are possible only when they are supported by sound policies, strong institutions, and political commitment. The common perception among policy makers is that the people who are recipients of water services are not prepared to pay for such services. Lessons learned from consultations and working closely with the communities of Sri Lanka amply demonstrate that this is a fallacy.

People know exactly what they can afford and their priorities. They are willing to pay far more for a better and reliable service than most policy makers believe. When water services are improved with large investments—in most instances with borrowed funds—it is more than justified to ask water consumers to pay more than before. The inability of the service provider institution to generate sufficient revenue to meet its financial commitments produces an inevitable result, which is adverse impact on its financial viability. This will ultimately result in deterioration of overall performance and quality of service provided to the consumers. A rational water tariff should also provide flexibility to grant concessions to deserving segments of the community.

Water Resources in Sri Lanka and Conflicts

In the early part of the post-independent era of Sri Lanka (1948–1985), allocation and development of water resources primarily focused on production of more food and hydropower generation for an increasing population. Most viable water resources had been developed and these two water use subsectors were presumed to be having prior rights to use of water. With rapid urbanization, increase in population, rising incomes and changing lifestyles, the demand for drinking water escalated rapidly.

Under these circumstances, securing adequate water resource with reasonable quality, within viable distance was increasingly difficult. This was particularly true for many urban and semi-urban settlements in the dry zone of Sri Lanka. The equitable reallocation and sharing of water resources was attempted through development of policy, legislation, and institutional framework but was not very successful. Underlying social, political, and institutional issues confronted during this process were far too complex and complicated. However, extensive dialogue and debate on water resource management issues generated deeper understanding and awareness about needs of emerging new water subsectors. As a result, a culture of consultation and collaborative planning of development and management of water resources emerged among competing subsectors and institutions. So attempts to resolve a set of complicated intersector issues was a failure. But an informal and workable solution was evolved through the process.

Introduction of Water Tariff in Sri Lanka

With the launching of the International Water Supply and Sanitation Decade in 1980, the water supply and sanitation sector began to emerge as a very important sector in Sri Lanka. The Government of Sri Lanka sought much needed funds for development of an important utility, which was not a national priority until then. As a part of a new policy framework for development assistance, in 1982, the government, through the lead development agency, National Water Supply and Drainage Board (NWSDB) decided to levy water tariffs on all consumers of piped water in Sri Lanka based on universal metering of water consumption. The target of this exercise was to generate adequate revenue to meet operation expenditure and a part of capital cost.

Moderate initial resistance from the water consumers was successfully neutralized through awareness and public debate. However, policymakers were ever concerned about political consequences of a large-scale public backlash, particularly at a time of national election. To accommodate such concerns, several compromises were made. This includes free supply of 10 cubic meters per month for every domestic consumer and every religious institution, introduction of separate tariffs for these two categories of consumers, and a continuation of free water supply through public stand posts to the low-income population. These tariffs were kept significantly low

compared with commercial and industrial tariffs. Initial reluctance to implement it was overcome gradually and now, water tariffs are here to stay.

However, upward revision of tariffs and addressing serious distortions of the tariff structure have remained very contentious issues, with the reluctance of policy makers to make changes for many years. This problem persisted in spite of strong reminders of major donors that such inaction is a violation of fundamental agreements with them. Nevertheless, the concept of free water has gradually disappeared and there is no more free water allocation for domestic and religious consumers. These developments resulted in the greater financial viability of operations of NWSDB, water demand management, and vastly improved services to water consumers.

Strategic compromises made in development of the water tariff structure at the beginning to keep concerned stakeholders satisfied, and constant lobbying for a rational tariff structure over the years, has helped to bring about many sustainable benefits to the water sector in Sri Lanka.

Ranjith Wirasinha *retired in 2001 from the position of executive director, United Nations Water Supply and Sanitation Collaborative Council, Geneva, Switzerland. The council was set up under a UN resolution to bring about better collaboration between the external support agencies and the developing countries. As its first chief executive officer, Ranjith set up and managed inclusive international task forces, organized global forums once every 2 years, and helped set up global networks where continuous communication and exchange was considered necessary. He was on founding committees for the World Water Council and the Global Water Partnership and on the Board of Governors of the International Centre for Water and Sanitation in the Netherlands. He is a civil engineer who specialized in water supply and sanitation and later management, starting with the Department of Water Supply and Drainage in Sri Lanka and moving on to consulting engineering and later with the Asian Development Bank in Manila for 12 years. Since retirement, he has continued to work as a national and international consultant.*

Water Wisdom

Social context. Water supply and sanitation are social needs and often the issues that arise in operations have social elements. Initiation of a program or project therefore must begin with a good understanding of the social content and the important social elements must be recognized throughout the process of formulation and implementation. Often, the lack or inadequacy of these inputs have resulted in issues that later arise. Technical education and upbringing needs to inculcate a social culture for the good of the water supply and sanitation sector.

Collaboration of partners. Trust and collaboration between partners for a cause, brings forth salutary collective wisdom, and strengthens achievement and sustainability. A near paradigm change in approach among partners, from a two-tier partnership—the donors and the recipients—to a single collaborative partnership, came about after the United Nations declared the International Drinking Water Supply and Sanitation Decade (1980s). *It happened through the establishment of an inclusive and neutral mechanism, with equal ownership by all, big and small, namely the Water Supply & Sanitation Collaborative Council (WSSCC).* It not only strengthened the collaboration and the trust between the partners, but also the level of consensus in the policy and strategy regimes in operation in the sector, resulting in most stakeholders today talking the same language.

Vision 21. The formulation of Vision 21: Water for People at the turn of the century and presented at the Second World Water Forum in 2000, was achieved through good global collaboration by all stakeholders and received unreserved acceptance. By the process of formulation, it is commonly owned by all stakeholders. The Vision 21

principles are somewhat generic and may be recommended for adoption, not only in the water and sanitation sector, but also in other disciplines.

The peri-urban poor. Urbanization, a global phenomenon, results almost without exception in a marginalized community, often termed the peri-urban poor. Paradoxically, research carried out by the United Nations Agency for Human Settlements (HABITAT) et al has shown that they have become not only a large part of the urban community, but also that they hold up the urban economy. To deny them water supply and sanitation services and land tenure is to increase the social costs to the community through squalor, disease, and crime. To provide them such benefits is to boost the urban economy and sustain the environment. Finding interim arrangements to overcome any administrative obstacles in providing services with the least delay, is then imperative for social and economic progress.

IWRM starts at home. Effective management of water has an influence on the achievement of most of the Millennium Development Goals. Integrated water resources management (IWRM), which is integral to the need, is philosophically attractive, but does not seem to happen as well in practice. Convergence in IWRM takes place effectively however, at the household level and there are only two institutions to coordinate with—the father and the mother. What also merits recognition is that what happens at the household level is a good indicator of the relative priorities for competing demands for water in that locality.

Educating consumers. Given that water demand management has important environmental as well as economic implications, a well-informed and educated water clientele is an indispensable instrument for achieving progress in water demand management. A strategic water tariff policy is a necessity but not enough. Information management, dissemination, and awareness-raising are critical.

Behavior change for hygiene. Water supply and sanitation, beyond providing the social and economic needs of people and communities, is indispensable for achieving better hygiene. Good hygiene is synonymous with commensurate behavior and in many situations a change in behavior is seen as necessary. Behavior change more often than not happens through a generational change, since the best informed and influential change agents inevitably are children. Child-friendly school water and sanitation hygiene is therefore more than just a priority, it is an imperative.

Rainwater harvesting. In a scenario of increasing water demands and diminishing water resources, much greater attention to and support for rainwater harvesting is required in policy formulation, awareness raising, and education and implementation of programs, recognizing the economic and financial benefits to accrue.

Sewerage. Waterborne or pipe-borne reticulated sewerage is convenient but expensive and often environmentally unsound and hazardous to protection and conservation of precious water resources. Other alternatives must always be first explored.

Nonrevenue water. Just as a high temperature is a symptom of an issue in the human body system, a high level of nonrevenue water (NRW) in a water supply system is indicative of issues in the system and is cause for summoning the doctors. A high NRW could result from any of the following: defective planning, investigations, design, construction, operations, or a combination of them. The full spectrum needs to be reviewed to identify the cause.

Privatization Electricity and telecommunications are conveniences but water is life and so its control needs to be with the people and the state. However, some aspects of management may be contracted out to the private sector.

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Utilities and Consumers are Natural Allies

Since 2000, I have subscribed to the postulate of the invisible finger, which is that the sum of the decisions of every government power holder pursuing his or her own good, like an invisible finger, appoints what groups will be empowered and what groups will not. This simple postulate explains phenomena such as the fleeting successes of poverty alleviation programs and the persistent correlation between poverty and perceived corruption among countries. It also reminds project designers that poverty alleviation interventions are planned and conducted by government officers who define and sustain the existing order, so any initiative that may be seen to threaten the order could be confronted quickly by the invisible finger.

In 2003, the publication by the Asian Development Bank and International Water Association, *Asian Water Supplies* identified governance and low tariffs as the main obstacles to providing water for the poor. Since that time, despite the expenditure of hundreds of millions of dollars on programs to increase the stock of urban water infrastructure in Indonesia, virtually nothing has been spent to establish sustainable habits for management of that infrastructure, thus condoning, if not encouraging, broken equipment, low tariffs, poor service, and low piped water coverage. Water governance appears to have been neglected over the last 40 years mainly because of (i) a simple assumption that managers would manage better if only they were better trained, (ii) a lack of awareness of the importance of some small sustainable governance habits that are being established on a spontaneous basis by sector participants in Indonesia today, and (iii) government and donor procedures that limit programming to short-horizon activities with "safe" neatly predictable and quantified

outputs. Sustainable water governance outputs, on the other hand, are easy to recognize but more difficult to predict, and they usually need a decade of nurturing to become habits. Nevertheless, some projects and activities in small and medium-sized jurisdictions are demonstrating the possibilities for project assistance to help stimulate growth of sustainable urban water services in targeted areas. The piped water sector is the logical leading sector for building greater local accountability in all urban services, because piped water is the only utility that is sourced, processed, managed, and distributed entirely locally.

Tariff increases are being achieved in Indonesia without input of capital. When Indonesian water utilities want to reform, they face the chicken-and-egg credibility dilemma. Consumers or the local government feel strongly that service has to be improved before they will agree to a tariff increase, and utilities feel equally strongly that service cannot be improved without capital inputs. Reformed utilities have been successful in gaining an initial tariff increase through two main avenues: (i) providing a credible promise of service improvement based on a realistic business plan, and (ii) increasing efficiency to demonstrate commitment and generate capital for small changes. The two approaches usually take place at the same time because newly motivated utility management can find many ways to increase efficiency. Foreign assistance funds are especially useful in helping create business plans and lending their credibility to requests for tariff increases.

The most dramatic efficiency results have come from elimination of physical and administrative leaks, including illegal connections. The city water utility in Pontianak, West Kalimantan, was reported in 2005 to have reduced its water losses from 51% to 35% in little more than a year, by collecting unpaid bills and eliminating illegal connections among the largest business customers. Palembang city's utility had a similar experience in 2003, sweeping for illegal connections and successfully using the second most common efficiency method: selling of excess water capacity through new connections. Other efficiency measures that can be implemented without capital inputs are repair of broken meters and reduction of bill preparation time. The most replicable example of efficiency is USAID's Water Efficiency Team-Local Government Water Services Project. This project set out to help 20 utilities reach profitability. At the end of the project in 2003, eight utilities had implemented sufficient efficiencies and tariff increases to move out of the red into profitability, without the addition of any project inputs except technical assistance and a new accounting system, and four more utilities had become significantly more profitable. The average tariff of the first and weakest utilities that joined the program had doubled. No subsequent technical assistance project in Indonesia has focused solely on cost recovery and thus no subsequent activity has achieved such results, although the methodology still is replicable. The process launched by tariff increases without the addition of capital has not yet reached full piped water coverage in any water utility, because conditions change over the long term. Increases of tariffs without addition of capital provide a good start toward sustainability of reformed utility service, which requires longer-term attention to water governance matters such as changes of utility managers and local government owners.

Everyone in Indonesia will be better off if all urban poor families have house water connections (so why don't they?) A World Bank report on a 2003 study of several countries in Latin America found that a 10% reduction in the poverty rate resulted in both a 1% increase in gross development product and an 8% increase in investment—and vice versa. In other words, social exclusion retards economic growth. Although a rising tide floats all ships, this principle may be counterintuitive to some who cling to the idea that the urban poor cannot afford to pay the full tariff or consume enough water to enable the water utility to recover costs. But these old concerns were put to rest by the results of the Urban Poor Data Acquisition and Technical Evaluation study in three Indonesian cities in 2000 that showed that, if they were given a house water connection, the urban poor in the sample locations could pay the full water tariff, consume five times more water, and still add 12% to their financial income through savings. In 2005, a revealed preference study in Africa found that the total (financial and welfare) effects of a household connection "typically add 20–50% to households' current real income." Thus, at no risk to themselves, it appears that local governments can create wealth among the urban poor simply by relaxing restrictions, such as home ownership and up-front pre-payment on applications for house connections. Local governments can eliminate inefficiencies such as rent-seeking water mafia and illegal connections that accompany denial of service, and they can invest in new infrastructure in full knowledge that the urban poor users can pay the full tariff while stimulating the economy with their new-found wealth. So why don't they?

Utilities naturally prefer to serve higher income groups, and sometimes there are difficulties of serving illegal settlements or of installing water and wastewater pipes in densely habited areas. These difficulties have been overcome by dedicated local governments in a few municipalities. But most local government leaders need more knowledge of and interest in their local water services before they appreciate the benefits of full piped water coverage. In 2003, a survey of 15 municipalities in six Indonesian provinces found that local government owners were not aware of the proportion of people in their district who were unserved by piped water, the amount of water that is lost, or the financial condition of the water utility. They did know, however, the amount of dividend paid by the utility to the local government owner at the end of the year. There is a widespread local misconception that (i) the water utilities—and not the local governments—are responsible to consumers for providing piped water services; and (ii) the principal aim of urban water supply is health, and if there are no epidemics, the local government's job is done. **Yet, it is clear that the principal target of adequate access to urban water supply goes beyond health: it is now wealth.** The persistence of these misconceptions indicates that the key factor that requires increased emphasis for sustainably improved piped water service is neither infrastructure nor funding. The key factor is identified in a 2009 report to the World Bank on *Policies for Better Water and Sanitation Services in Indonesia* that stated simply, **"Good governance is the key factor for improved service."**

Reformed Indonesian municipal water utilities and consumers are natural allies. In practical terms, it is comparatively easy to bring together reformed utilities that need tariff increases and consumers who yearn for adequate water services. It is more

difficult for consumers to make their needs for adequate water service heard by local government owners. The definition of a reformed water utility is one that takes its mandate seriously, possessing a well thought-out business plan for improving service and sufficient transparency to explain its operations to the public. A reformed utility-consumer alliance is the all-important first step in a process leading to (i) eventual absorption of local government into the alliance, and (ii) formation of sustainable accountability habits for water supply services in Indonesia.

In Indonesia, reformed water utilities have found that it is much easier to gain approval for tariff increases, first from consumers, and then from local governments, instead of the other way around. In fact, I have not spoken with anyone in Indonesia who has ever seen either a tariff request from a reformed water utility refused by consumers, or a consumer-agreed request refused by local government. Yet, everyone has seen Indonesian local governments routinely deny requests for tariff increases, especially during election years. Because over the long run, no water utility can be better than its local government owner will allow, a reformed water utility must address the root cause of poor governance and low tariffs, which in Indonesia is neglect of adequate water service by the local government owner, aggravated by money politics. Even if there is an advance during one enlightened local government administration, it may be undone by a newly-elected government owner, so Indonesian water utilities usually go through cycles of good service and bad service rather than progressing gradually ever-upward. The cycle can be broken by a project-brokered consumer-owner-utility alliance that practices accountability habits, such as holding regular public forums where utilities explain and get agreement to their business plans and operations. The result of a first step in forming the consumer-utility alliance may be seen in an AusAID-supported project that in 2011 helped four small, weak water utilities in eastern Indonesia prepare and present business plans and answer questions from their most outspoken consumer critics with dramatic results. After the presentation, one retired civil servant community leader and consumer said, *"I have always protested and felt angry toward the water utility. After I saw for myself the condition of the utility, I became the number one supporter of a tariff increase. I will talk with the Regent and the parliament."* A religious leader said, *"The utility is like a child whose parents kicked him out of the house. The Regent should support it."* Another religious leader said, *"I have to admit that, previously I said from the pulpit that I supported those in my congregation who wanted to demonstrate against the utility. From today onward, both from the pulpit and in performance of my duties, I will be the biggest supporter of the utility."*

Multilateral development banks need bilateral assistance agencies to help achieve sustainable benefits of loans to developing countries. Multilateral development banks loan huge sums of money against targets such as number of people with access to water. The unit cost usually is low, and in most developing countries, the value of the works is based on the historically inaccurate assumption that they will be properly managed and maintained. Unless there is parallel assistance for additional nontechnical sustainability aspects, governance-blind targets can encourage corruption and low levels of service by providing funds to unaccountable elites at less than market rates for

questionable investments. Multilateral banks do not need to ensure that new public service infrastructure fulfils design specifications in order to be repaid because the sovereign guarantee ensures repayment. Thus there is a high risk that public infrastructure funded by loans to sovereign governments will not achieve service targets or reduce poverty because borrower governments rarely feel pressed to enhance the level of their governance.

Toward the end of the millennium, the World Bank reviewed their worldwide lending program, and the incisive 1998 report entitled, *Assessing Aid—What Works, What Doesn't, and Why*, revealed that in the last half-century, the west had loaned nearly a trillion dollars, with little effect on poverty reduction. There was even some evidence that the main states receiving aid had grown relatively poorer. **The World Bank study concluded that loaning money doesn't work until countries have reformed.**

If money works when countries have reformed, that helps explain why the Marshall Plan worked so well. Proposed in 1947, the Marshall Plan spent only $13 billion (equivalent to about $33 billion of today's dollars) over 4 years and stimulated the recovery of all of Western Europe's war-torn economies. By contrast, Indonesia, an unreformed resource-rich country, is a huge aid recipient with an official 12.5% poverty rate despite borrowings of over $30 billion just from the World Bank alone. Reformed borrowers invest money responsibly over several decades because traditional practice, together with checks and balances, prevent inefficiencies accompanying the concentration of unaccountable political power. So what works in unreformed countries such as Indonesia? The answer is summed up in one sentence in the World Bank's study: "The ideas—or knowledge creation—side of aid is critical for helping countries reform and for helping communities effectively provide public services: education, health, water supply, and others."

Projects of knowledge creation and assistance to communities are best implemented by the more adroit and flexible bilateral agencies because their grants provide an incentive for knowledge creation to leverage the effectiveness of large bank loans. But bilateral development agencies have a double challenge, because the outcome of better governance activities often is hard to predict, especially when it emerges from trial and error. Lawmakers back in national capitals are naturally hesitant about funding activities that lack fixed outcomes, which has been a part of the sustainability problem until now.

This is the current challenge of bilateral agencies: to propose measurable targets for projects that simultaneously generate additionality in the form of insights, ideas, and methods to lead recipient countries to reform—to help establish checks, balances, and community participation in decision making that lead to responsible use of money over time. As they develop grant programs, bilateral agencies would do well to properly weight the value of knowledge creation for its leverage on multilateral bank loans; otherwise, they will appear to outsiders like pale reflections of "more efficient" multilateral banks instead of the main engines of assistance for reform and sustainability in developing countries, which is their proper role.

Cesar Yñiguez *has worked in the water supply and sanitation sector for 35 years and as a freelance consultant the last 22 years. He has worked with the Philippine programs and continued with the latter with UNICEF Philippines. As a freelance consultant he worked in Southeast Asia, South Asia, and the Pacific, mostly in urban water supplies, particularly, on performance benchmarking and performance improvement. Mr. Yñiguez worked with Arthur McIntosh in the preparation of two editions of the* Water Utilities Data Book for Asia and the Pacific *for the Asian Development Bank (ADB). This was followed by similar data books for India and Southeast Asia for ADB, in Bangladesh, Pakistan, India, and the Philippines for the Water and Sanitation Program (WSP) of the World Bank, and for two Philippine provinces for GIZ. It was while working on performance benchmarking and preparing the case studies that he gained insights into what affects water utility performance under varying conditions and operating environments in different parts of Asia and the Pacific. His other works involve the preparation of water sector road maps, sector assessments, studies on privatization, and post evaluation of water supply projects for ADB, GIZ, WHO, UNICEF and USAID in the Philippines, Cambodia, Viet Nam, Nepal, Republic of Korea, Lao People's Democratic Republic, East Timor, and Papua New Guinea.*

Investing in People

Getting good quality water to people 24/7 is what development is all about—whether in urban or rural areas, in Asia or in the Americas, or anywhere else in the world. Settings and operating environment may differ, but the principles of development remain the same. You need hardware, people, and software to run things. Utility performance is better in developed countries in general. Some utilities in developing countries are doing well also—not only those in the large cities but even those in small cities too. What makes them different then? There are many factors, but a major one is efficiency in operation and maintenance. The high-performing utilities care for their equipment and their people and learn to do things well. Forget these things and you will be looking for the next funding to rehabilitate your system. Your customers don't get the service and they stop paying tariffs. Then people complain about not having enough resources to do proper repair and maintenance to deliver an efficient service.

Where do we get the required efficiencies? It comes from investing in people; developing their capacities. While it is true that private businesses are more successful, there are also many public utilities that have been just as successful. The Public Utilities Board in Singapore and Phnom Penh Water Supply Authority are two successful utilities operating under different environments. Both care about their people and develop their capacities.

Investing in People

Money, time, and effort are spent by funding agencies in preparing and implementing water supply projects. Technical assistance is provided at both stages mostly through consultants. Once the facilities are constructed, these are turned over mostly to local governments. New facilities are usually managed by newly created departments or enterprises. In most cases, the only training on operations and maintenance that are given to staff are provided by consultants or equipment manufacturers while the facilities are being installed and constructed. Many inexperienced staff when confronted by unfamiliar problems are unable to solve them. Facilities then deteriorate until they are no longer working. **Why can't governments develop capacity building programs that support water utilities on a continuing basis and not just for projects, but at the most important operations and maintenance stage?**

Benchmarking results in the Philippines show that water districts that receive technical, institutional, and financial training and advice, perform better than other utilities operated by local governments, user cooperatives and associations, and even private operators. This is more pronounced among small water utilities, which tend to be left on their own and do not have the capacity to hire better qualified staff. Water districts send their staff to training courses and pay for advisory services out of loans that they get from the Local Water Utilities Administration, a special lending institution for the water sector that provides the training as well.

Learning from Others

The majority of water utilities in developing countries are small. About 90% of water utilities in the Philippines have less than 5,000 connections. Such utilities are mostly in the rural areas, hardly even in secondary towns, yet there are many of them. These utilities can hardly afford consultants to give them advice on solving pumping and reservoir problems, leaks and water losses, billing and collection problems, tariffs, training people, etc. What can they do? Where do they look for help? What if training programs are not available? They can create their own solutions.

During the workshops on benchmarking that I have conducted in South Asia, there were lively discussions on performance improvement whenever the results were presented showing their performance indicators. A lot of ideas go around and I always ask if they have often met to discuss these problems. Invariably, the answer is no. This is where the discussion on possible establishment of water utilities' networks would come in.

Water utilities in Southeast Asia have national water associations. They band together to find solutions to their problems—discussing them, exchanging visits. The Philippine Association of Water Districts has its own training programs available to their members. Viet Nam, Indonesia, and Malaysia have their own national water

associations. Water operators' partnerships have brought utilities together helping each other. National water associations have been doing this among themselves. Help could be found in one's backyard. You do not have to look far for help.

ABOUT THIS BOOK

- This book is for those involved in developing country water supplies, who will likely be working for governments, utilities, consultants, donors, NGOs, academia or the media.
- The key messages or "pearls of wisdom" are aggregated by the editor into common subject headings, including development in general, urban water supply, rural water supply, sanitation, water resources, capacity building, leadership, management, corporatization, privatization, governance, tariffs and the urban poor.
- The 42 authors, coming from 19 countries, are engineers, accountants, teachers, sociologists, economists, contractors, politicians, farmers, journalists, scientists, anthropologists and entrepreneurs. They include giants of the water industry, such as Margaret Catley-Carlson, Ravi Narayanan, Dipak Gyawali, Kamal Kar, Arjun Thapan, Tan Gee Paw, Ek Sonn Chan, Chuanpit Dhamasiri, Anton Soedjarwo, Ranjith Wirasinha and Peter Rogers. Most have 20-30 years experience in the water supply and sanitation sector in developing countries.
- The authors were asked to write about anything on which they felt passionate, on development in general, as well as the water supply and sanitation sector in particular. They could write a story, or just put down their thoughts on various issues. Thus, the book is not structured nor pointed in any one direction, nor by its nature was it ever intended to be.
- The objective is to identify those very important elements of development which make or break water supply and sanitation projects and their long term sustainable operation. It is therefore both a reference and tool for anyone working in this sector in developing countries.

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