Seminar on "*A Day without Water: Managing Sri Lanka's Water Resources*"

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Water Security – adapting to changing contexts

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The title of the seminar is both evocative and simple. But underlying it there are complexities to consider. Is it just about a physical scarcity of water? And what does water shortage mean for different groups of people? I will try to unpack some of this complexity, and then provide examples of how problems with water management have been addressed elsewhere.

Water scarcity and water security

Physical water scarcity is easy to visualize – just imagine a tap in your kitchen that doesn't flow or a drinking well that has dried up. Visualize the parched soil of a farmer's field. Yet, it can also mean having water but of a quality that cannot be used. Imagine now a well full of contaminated water or a stream bubbling black with industrial or urban waste. Or alternatively water supplies that are not predictable, for example a tap that flows for a couple of hours, but at different times of the day. Or as used to be the case in South Africa, a pipeline that passes your community, but it is too expensive to make a connection.

In IWMI we differentiate between three kinds of water scarcity; *-physical, economical and institutional*. As I mentioned *physical* scarcity is easily understandable – not having adequate quantity of suitable quality water all the time. However, there may be water available physically, but economically inaccessible, either accessing that water is not feasible economically or there are no resources to access that water. On the other hand, water may be available physically as well economically, but there are no proper policies, institutions or legislation in place to make it available to all, particularly for marginalized groups in society. This we call *institutional water scarcity*. Water insecurity may be caused by varying combinations of these three.

These are the realities facing millions of families and which lead to health risks and foregone opportunities for earning incomes and securing livelihoods. Therefore, being 'without water' has many different dimensions and is more related to economic and political considerations than absolute physical scarcity. It is about the way we manage the water.

The concept of water security is gaining momentum in the international development discourse and is linked closely to food security (and increasingly a focus not just on food supply, but also nutrition levels), energy security and ecosystem security. Ultimately it is about human security.

After extensive consultation, UN Water, an alliance of about 30 UN agencies dealing with water and a broad range of other partners, came up with a proposed working definition of water security that was launched on World Water Day in March this year:

"The capacity of the population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being and socio-economic development, for ensuring protection against water-borne pollution and water related disasters and for preserving ecosystems in a climate of peace and political stability"

The dimensions of quantity and quality are embedded in this definition as are consideration of livelihoods, sustainability of resources use and environmental protection. The complexity of water management is apparent, involving many different actors at a range of scales.

A separate activity sponsored by the Asian Development Bank and the Asia Pacific Water Forum is presented in the 2013 Asian Water Development Outlook also published on World Water Day. This is referenced in the concept note for this seminar and attempts to assess water security through five main component parts:

1. Household Water Security (water supply, sanitation, hygiene),
2. Economic Water Security (agricultural, industrial and energy water security),
3. Urban Water Security (water supply, wastewater treatment, drainage),
4. Environmental Water security to restore healthy rivers and ecosystems (watershed disturbance, pollution, water resources development, biotic factors), and
5. Resilience to Water-related Disasters (exposure, vulnerability, hard and soft coping capacities).

In this assessment Sri Lanka has secured a place better than some neighbouring countries in South Asia but big gaps remain. In the Asia and Pacific region, water plays a much larger role than an economic good. It has cultural, religious and many other facets that are important at a local level. The flip side of water security is water insecurity as the seminar title suggests. It is clear that water insecurity in any of these areas can jeopardize development gains and suppress growth. Beyond the humanitarian case for water, there is also a strong economic case, and therefore political case, for promoting water security.

Agricultural water management remains important

Sri Lanka in particular has a long history of water management. There are wide differences in climate across the country and people have adapted to these over the years in various ways. A classic case is with small tanks. These ingenious tank cascades help people living in the Dry Zone to capture the three months of rainfall to sustain essential water needs. In these cascade

based ecosystems, rain-fed agriculture, irrigated agriculture, other soil and water conservation measures, and forest and grassland management created a system where food, water, energy and ecosystem security was assured.

One of the measures of adaptation for climate change is water storage and here, we do not just mean large reservoirs. Storing water across a continuum – from storing as soil moisture, underground in aquifers, through rainwater harvesting, or in wetlands, small ponds, small tanks, and medium and large reservoirs provide a menu of options. The ancient tank cascades serve this purpose and a well-functioning system is equally good at mitigating floods as well as droughts. However, times change and pressures increase, so the real challenge is not just rehabilitating those cascades in their original form, but making them relevant to today's socio-economic context, recognizing all the other physical changes that are taking place around the catchments of these tank cascades, including expansion of agro-wells, new settlements, etc. Based on research work carried out on tank systems in both Sri Lanka and southern India, it is possible to identify rehabilitation priorities and new innovative approaches, for example exploring the potential of tank systems for groundwater recharge.

Sri Lanka also remains a predominately rural and agrarian society although this is gradually changing. Approximately 72% of the population still live in rural areas, far more than the global average which is now below 50%. About 33% of those employed in the country are still involved in agriculture in some form. Sri Lanka has also reached rice self-sufficiency in recent years and paddy production is increasing with scope for higher yields as new varieties are adopted. The proportion of water withdrawn for agriculture is 85% of the total of which 90% is used for the irrigation of paddy rice.

A key challenge now is how to maintain the trend of rice self-sufficiency through innovations in crop varieties while lowering water consumption, reducing the consequences of poorly managed agrochemical usage and at the same time intensifying high value non-paddy crops. As well as careful planning of agriculture across the rich agro-climatic diversity of the country, it will require introduction of water saving irrigation technologies. In other words, "intensification and not expansion". The Government has set a target of reducing water use in agriculture to 60% of withdrawals but, as has been seen in India where a similar saving of 20% of water use in agriculture was announced in the Twelfth Fiver Year Plan, this will require major initiatives in the form of incentives to bring about the required behavioural change.

Changing contexts

The agrarian context is changing though in other ways, specific to different areas of the country and leading to pressures on water. Urban, industrial and tourism development in some areas is demanding more water and increasing pollution loads; more intensive agriculture is contaminating surface and ground water bodies and reducing groundwater levels affecting community drinking water wells; population growth and urban expansion increases the

competition among users of water; and pressures to meet rising energy demands places priority on hydropower generation over irrigation supplies. This is where water allocation within a basin comes to the fore involving trade-off decisions between competing users, not only from an economic perspective, but also taking into account other societal and cultural values.

The Sri Lankan weather has always experienced variability and traditional water management systems have adapted to accommodate late and intermittent rains. This variability is however increasing and climate change projections predict that it will become a bigger part of the water management challenges for coming generations. Analysing historic records no longer provides the same degree of predictability for the future. By the end of this century, the mean temperature is expected to rise somewhere in the range of 1 to 4 degrees Celsius accompanied by an increase of up to 20% in water requirements for the Maha or wet season crop. The main climate change impacts will be felt in the north-eastern, eastern dry zones and hilly areas of the country. Rainfall in the monsoon is reducing and the number of days without rain is increasing.

Whether you are a believer in climate change or a sceptic, the measures required to adapt to increasing variability in the weather are already needed to address vulnerability of rural and urban communities to the vagaries of floods and droughts. Compared with many other countries Sri Lanka does not contribute significantly to climate change. Through water management though, it has a major opportunity to adapt and reducing vulnerability. It is inevitable that pressure on groundwater will increase as it is seen as a means of reducing vulnerability to drought. And with this expansion, will come concerns about affordability, sustainability and health risks of over abstraction.

Search for solutions

In a country as diverse in climate and geography as Sri Lanka, the problems are inevitably local and they need context specific solutions. Looking around Sri Lanka and other countries where IWMI works, we see that people have faced similar problems and found solutions. In some cases, the situation has deteriorated until a crisis of some form occurs, e.g. food shortage, health risk, or local dissent. In others, a champion of change has emerged early and recognized both the economic and political cases for a new approach and then guided through necessary changes in behaviour or reform and overcome vested interests. It is a choice for society, but unfortunately one that is sometimes made by default due to inaction.

Some of the solutions have involved innovative approaches for improving watershed management; giving attention to the effectiveness of water management institutions and processes rather than a focus only on infrastructure development and rehabilitation alone. Others take a broad approach by improving productivity across a spectrum of water management practices from rainwater harvesting to more efficient irrigation technologies.

The examples referenced briefly below are a sample of what has been done and what is possible given commitment and the right incentive structures. Other speakers today will no doubt add to this list.

We have been advocates for a more integrated approach to water resources management and it remains important. But we should not preclude other pragmatic solutions in the quest for perfection. A truly integrated approach is not always attainable in the timeframe needed to solve some of today's problems. Take the case of over-exploited groundwater in Gujarat, India where there was a groundwater irrigation boom as a result of free electricity for farmers. A downward spiral of over-pumping and electricity subsidy led to unreliable water supplies and excessive electricity consumption. A simple technical fix of separating out electricity feeder lines for agricultural supplies from the domestic supplies and introducing a rationing rotation for the tube-wells has led to reductions in overall pumping, reduced electricity consumption, recovered water tables and increased yields due to less waterlogging. A simple, but effective approach that is now spreading to other States in India. The earlier prescribed solution of the development banks to remove subsidies for electricity was politically unacceptable and the ensuing debate had effectively perpetuated the problem by delaying the quest for an alternative solution. The lesson here is to think 'out of the box' to come up with culturally and politically appropriate solutions.

Another example of looking at problems in a different way is that of turning waste into a resource. This is a fast growing area of our work. It started by tackling the problem of how to make urban wastewater safer to use in peri-urban agriculture – safer both for those using wastewater for irrigation and for those who consume the agricultural produce. Various technological and procedural systems were developed that have now found their way into mainstream guidance of the UN's World Health Organisation, among others.

We are now working with the Ministry of Water Supply and Drainage in Sri Lanka on how to deal with another source of pollution – safer management of fecal sludge. The aim is to reduce pollution and health risks and at the same time enhance the agriculture value chain. One gully bowser empties the waste of five thousand people, often into unofficial dumping sites – streams, landfills, wetlands etc. Building on our work in Ghana, we have developed ways to turn such waste into a productive fertilizer through a composting and pelletization process. For it to flourish, this business opportunity requires policy change, technological innovation and a change of mind set.

Both the examples from Gujarat and Ghana provide an example of interconnectivity or nexus between the water, food and energy sectors. Understanding the connectivity between the multiple dimensions of water is a critical step in effective policy design, policy implementation, and consensus building.

Prior action to minimize and reverse the over-abstraction and degradation of the groundwater resource has eluded many societies, including in the US and China. In Sri Lanka there are areas like Jaffna, where the only source of drinking and agricultural water is currently from under the ground. The expansion in agricultural chemical use as well as development pressures in the period of post-conflict rehabilitation and development pose major risks. A recent inventory of groundwater wells assessed the water quality of aquifers and identified some of the areas at risk including salinity intrusion and elevated levels of nitrates. We aim to develop a predictive capacity to identify critical areas where conservation measures would be required. As a first step workshops are planned for Jaffna and Colombo to raise awareness and help build alliances and partnerships among infrastructure developers and planners and groundwater managers.

Increasing resilience to natural disasters is another critical area for Sri Lanka, Over the past few years floods have affected over 1.5 million people in the island. Properties were damaged and livelihoods disrupted costing billions of rupees. A range of 'soft' and 'hard' measures can help reduce this exposure and IWMI is working with the Disaster Management Centre on initial flood prone area mapping using satellite imagery which can then be used as the basis of preparedness plans and targeting of support programs.

IWMI's new strategy in Sri Lanka

To help address some of the water security issues, IWMI last month launched a new strategic framework for its research program in Sri Lanka. The first three years of the strategy focuses on four main areas: (i) improving agricultural water use and productivity; (ii) helping to better manage floods, droughts and climate change impacts; (iii) the sustainable management of natural resources and ecosystems; and (iv) capacity development for knowledge management and sharing. Details of the priority activities and partnership arrangements are being finalized with our partners, but initially we will be setting up a common water information system for Sri Lanka, accessible for professional and public use; promoting sustainable governance of groundwater resources across the country and in particular in Jaffna; and supporting the management of human waste through improved policies on wastewater and sludge management.

Concluding remarks

The image of a "Day Without Water" means different things to different people. For many of us, it would be an inconvenience. For others less fortunate it would have serious impacts on lives and livelihoods. We can be encouraged that some solutions exist and others are emerging so that water insecurity does not continue to be a reality for many. Yet, we need to create the enabling environment for those solutions to be implemented. A key facet behind the success stories that we have witnessed from different parts of the word is visionary and strong

leadership that brings opposing interests into balance, informs policy making with scientific understanding, and negotiates decisions that are socially acceptable. Only then will we be able to say there is no such thing as a day without water.