WATER FOR CITIES CHALLENGES AND SOLUTIONS

By

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Clean water supply to the people in world is a major task taken in the millennium besides, the quest for renewable energy resources. The former is the basic necessity of life and yet now limited to a privileged few. The UN millennium development goals (2000) and the World Summit on Sustainable Development (2002) focuses on the target of reducing the proportion of people with no access to safe drinking water by half, by the year 2015 i.e., only four years off. The sanitation problems are also a target likewise. The people of Africa (150 million urban residents) and Asia (180 million in cities) are the prime sufferers that do not have adequate facilities in the context.

Water stress has arisen in the world due to unprecedented population growth. A huge flux of people towards cities is rated at 2% increase every day. Cities gain an average of 5 million residents every month. One out of four city residents, 794 million in total, live without access to improved sanitation conditions. The world's slum is continuously growing. It is estimated that there are almost one billion people living in slums in the world. These account for 32% of the global urban population. 141 million urban people do not have access to safe drinking water.Consequently, the poor pay a higher price for clean water as compared to their better compatriot. The private sector managing the water supplies add more burden to the lives of the poor instead of being a subsidy dispenser. Each person on earth requires at least 20 to 50 liters of clean safe water a day for drinking, cooking, and simply keeping themselves clean.

In Pakistan (2004-2005), about 38.5 million people did not have access to safe drinking water. Every year 200,000 children die due to diarrhea only. 30,000 Karachites perish (20,000 are children) for the same reason. Water and Sanitation Agency announced (2007) that 64 percent of Rawalpindi's drinking water supply contained human waste and used water—and that 70 percent of the city's water supply lines were carrying sewage water to consumers. The World Bank estimated for Lahore (2006) that only 3 out of 100 industries using hazardous chemicals treat their wastewater adequately. PCSIR (2008) determined that more than two million people drink contaminated water.

World Bank reports that 1.8% GDP of Pakistan is spent on water borne diseases. Pakistan is expected to become water scarce (the designation of a country with annual water availability below 1,000 m^3 per capita) by 2035, though some experts project this may happen as soon as 2020, if not earlier (Asia's Next Challenge: Securing the Region's Water Future, Report by the Leadership Group on Water Security in Asia, N.Y.: Asia Soc., April 2009, 45).

Globally, Africa with approximately 150 million urban residents i.e., up to 50% of the continent's urban population – lacks adequate water supplies. 3/4 of the global

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population lives in Asia without access to water supply. In China, about 90% of the cities suffer from some degree of water pollution. Latin America and Caribbean that has 30% of the world's freshwater resources; is also suffering with pollution of water by domestic sewage that makes access to drinking water difficult in some cities. 45 percent of assessed stream miles, 47 percent of assessed lake acres, and 32 percent of assessed bay and estuarine square miles are classified as polluted in United States.



The beauty of cheerful youth in polluted water

Water reservoirs are at a risk of contamination from several sources e.g., weed killer, pesticides, insecticides, herbicides, pathogens, chloramines, industrial effluent additions, seepage from dumping sites etc. It can be non point i.e., multiple or a point source water pollution.Inorganic contaminants e.g., nitrates, phosphates, arsenic, mercury, chromium, lead etc., can enter ground waters through natural sources, mining activities and industrial or domestic waste water discharge. The microbial contaminants are added to water from the sewage sources and from the hospital waste leaching from the landfill. Water to the cities is mainly contaminated due to seepage and mixing with the municipal waste due to deteriorated pipes or due to casual pipe linking. Up to 30% of fresh water supplies are lost due to leakage in developed countries, and in some major cities, losses can run as high as 40% to 70%. Sewer water mixing in the urban drinking water supplies is especially escalated during monsoons that directly affects the humans giving rise to Jaundice, dysentery, typhoid, diarrhea, hepatitis A. Methods are available to cure a disease but for the poor these generally prove to be fatal diseases.

METHODS OF PURIFICATION OF WATER

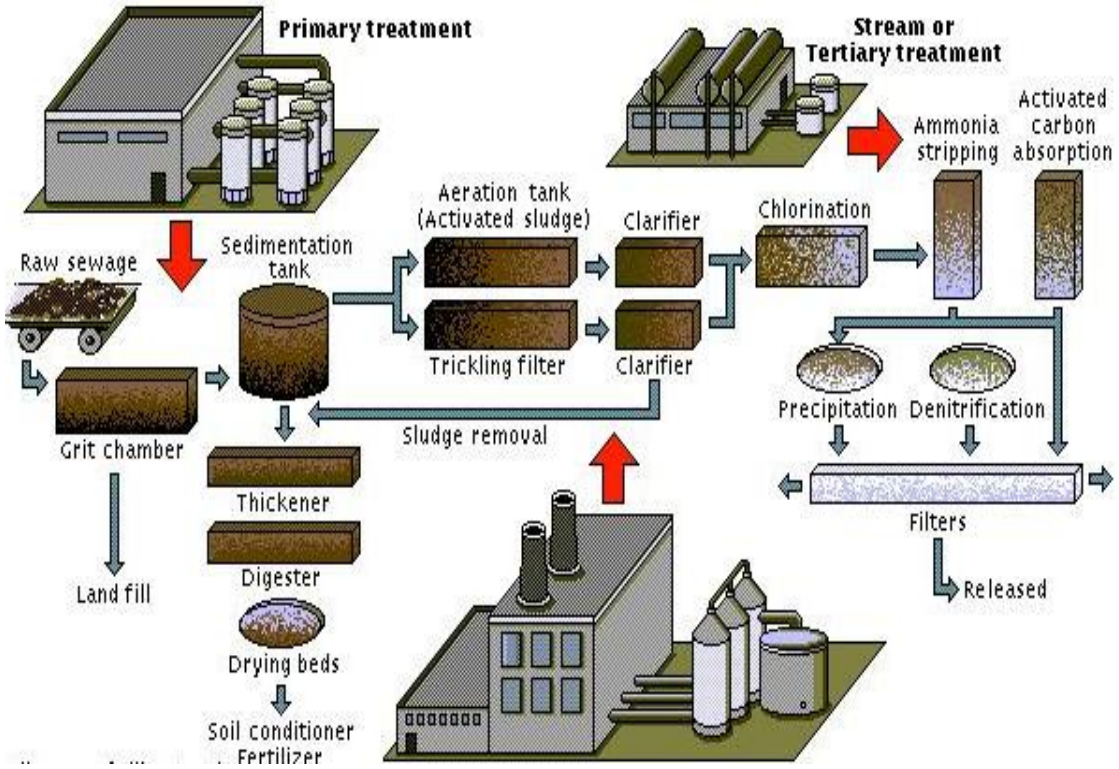
Several methods are available for water purification and any of these can be applied to obtain standard quality water. The method applied depends upon the amount and the type of pollutants presents. The most commonly used methods are:

- Chlorination
- Ozonation
- Reverse osmosis (RO)
- Photovoltaic + RO
- Solar distillation
- Filters
- UV irradiation

Each method requires skills and quality of water must be checked after treatment to ensure that pollutants are either totally eliminated or at least, fall within the permissible limits as defined by the WHO standards. Due to the energy crises it is a need to adopt hybrid technologies e.g., photovoltaic – solar – reverse osmosis combination to deal with both the crucially vital issues.

It is imperative that the industries treat waste water before release to the water bodies or ground. Due to the diversity of process industries the treatment has to be performed according to the nature of the contaminating species e.g; the chromium (VI) from the tanning of leather. A better approach is to incorporate enymes instead of basic chromium sulphate in the process so that the hazard of chromium (IV) is eliminated. Several other examples exist where the industrial effluents have totally destroyed the drinking water quality e.g., Multan Road, Lahore. The treatment methods will vary from industry to industry and require skill and dedication to the just cause. The experts are also forecasting that the Ravi River pollution (the dumping site for several industries and the Lahore municipal) will be further disturbing the Lahore water quality. The pollutants will diffuse with time and already it seems too late to control the growing menace.

Times are approaching when the domestic waste water will have to be treated to recover water for reuse. A simplified process is given below (UN-Habitat. 2003. Water and Sanitation in the World's Cities. Earthscan Publications):



The use of treated municipal waste water will release the burden on the clean water sources and will also negate contamination of ground water.

SOLUTIONS

- Identification of water polluting factors from natural to human perpetrators
- Concerted enforcement of the Safe Drinking Water Act of 1974 that protects the safety of public drinking water.
- The establishment of the National Pollutant Discharge Elimination System (NPDES) permitting program, which requires any organization that discharges pollutants into surface water to obtain a permit.
- Enforcement of NEQS
- Regular monitoring of water quality
- Construction of proper landfill sites
- Waste water management by the industries

- Adoption of Green technologies
- Routine health checkups of users. Information should be shared by the Government and the water users
- More water Research projects
- Incorporation of Integrated Water Resources Management (IWRM); that deals in particular with: Supply optimization, Demand management, Equitable access, Improved policy, regulatory and institutional frameworks
- Reliable and sustainable financing in the clean water projects
- Installation of high efficiency pipes, taps and shower heads
- Leakages to minimum
- Separation of litter at source
- Coordinated efforts both on part of Government and the community.
- Appreciation of Community based Organizations (CBO's) through certificates and awards for the best performance and maintenance of all records. At present, 2055 CBO's are working in the Punjab province (private communication, Award ceremony of CBO's, Hotel Avari, April 19-21, 2011)
- Understand the links between agricultural and urban water pressures.

In essence, **the functionality of 10 C'sis of prime importance.**

- Commitment : to achieve effective implementation is indispensable on the part of those taking part – both in public and private sector.
- Content : Policies must be meaningful – especially for the under privileged in the developing countries.
- Cooperation : Water management need to be prepared with the full involvement of the stakeholders concerned.
- Checking : Monitoring of implementation and of results is essential – with all stakeholders involved.
- Communication : Successful communication includes reporting to the public on results, as well as listening to feedback.
- Convoke : Seminars and conferences must be held on water issues to increase public awareness about water issues.

- Converse : With the poor about the methods of securing clean water.
- Conserve : No leakages and careful use of clean water.
- Cost effective schemes for the production of clean water.
- Creation of a clean water conscious society through multiple steps and dialogues with the common people.

Crux of the matter is education to conserve water and water quality at all levels.

Water is a public good, human right, and not simply an economic good.



So much and yet so scarce
Let us be careful how we use water as well and how we waste it and how we could reuse and save it.

ACKNOWLEDGEMENTS
The author is thankful to Miss Fouzia Sardar, Mr. Ijaz Hussain and Mr. Nowsherwan Riaz, the M. Phil students, Forman Christian College – A chartered University, Lahore, for their valuable input in summarizing the water issues and challenges.