Water Sustainability: Issues for Development

1. Introduction

Water is needed in all aspects of life. However, the United Nations estimate that still more than a billion people lack access to fresh water. The looming water crisis is one of the most critical challenges facing the world today. 1.2 billion people - or almost 1 out of 5 people in the world - are without access to safe drinking water and half of the world's population lacks adequate water purification systems. Global consumption of water is doubling every 20 years, and according to UN more than 1 billion people on earth already lack access to fresh drinking water. If the current trend continues, by 2025 the demand for fresh water is expected to rise by 56 percent more than it is currently available. The UN estimates that in less than 25 years, if present water consumption rate is maintained, 5 billion people will be living in areas where it will be impossible or difficult to meet basic water needs for sanitation, cooking and drinking.

This Briefing Paper examines the problems related to availability, use and management aspects of water resources. Then it tries to highlight some options available for better management of water resources. It also tries to highlight another important dimension from the point of view of sustainability viz. private-public partnership (PPP) in water use and management.

2. Background

In the coming decades, humanity is headed towards a critical environmental crisis with fast depletion of the Earth's freshwater. As a consequence of unsustainable extraction rates, river systems and aquifers of the globe are literally drying up. Global demand for this 'Limiting Resource' has increased more than six-fold over the past century compared to a threefold increase in world population. Growing population pressure, abusive land use practices such as deforestation, the increasing demands of water-intensive industries and agriculture is causing freshwater to get depleted and contaminated at rates greater than nature can replenish.

Although 70 percent of the Earth is covered with water, in reality out of this around 97.5 percent is salt water, leaving only 2.5 percent as freshwater. Again around 70 percent of that freshwater is frozen in the ice caps of Antarctica and Greenland and most of the remainder is present as soil moisture or lies in deep underground aquifers as groundwater not accessible to human use. As a result, less than 1 percent of the world's freshwater on Earth is readily accessible for direct human uses. This is the water found in lakes, rivers, reservoirs and those underground sources that are shallow enough to be tapped at an affordable cost. Only this amount is regularly renewed by rain and snowfall, and therefore available on a sustainable basis.

Freshwater resources are very unevenly distributed. Out of 191 nations in the world, 10 nations share 65 percent of the world's annual water resources. At one extreme are the deserts, where almost no rain falls and at the other are the most humid regions, which can receive several metres of rainfall a year. Most of the flow is in a limited number of rivers viz. Amazon carries 16 percent of global run-off, while the Congo-Zaire river basin carries one third of the river flow in all of Africa. The arid and semi-arid zones of the world, which constitute 40 percent of the landmass, have only 2 percent of global run off. Many arid areas are already suffering from continuous shortages leading to droughts.

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Table1: Freshwater resources and withdrawals

	Average Annual Internal Renewable Water Resources		Annual Withdrawals					
	Total (km3)	Per Capita (m3) 2000	Total (km3)	Percentage of Internal Water Resources	Per Capita (m3)	Sectoral Withdrawals (percent)		
						Domestic	Industry	Agriculture
WORLD	42,655.0	7,045	3760.0	9	664.0	9	19	67
EUROPE	2,900.0	3,981	512.0	18	704.0	14	45	39
NORTH AMERICA	6,680.0	21,583	565.8	8	1907.0	10	39	46
AMERICA & CARIBBEAN	1,090.0	6,290	114.0	10	716.0	X	x	X
SOUTH AMERICA	12,030.0	34,791	166.0	1	518.0	20	11	60
OCEANIA	2,400.0	78,886	33.6	1	1,178.0	X	x	X
AFRICA	4,047.0	5,159	214.0	5	307.0	8	4	63
ASIA	13,508.0	3,668	2,156.0	16	627.0	7	9	81

Source: World Resources 2000-2001

Further climate events like El Nino or South Oscillation have been acerbating drought in some regions and excess rain, storms and floods in others. Again drought in one area is affecting other regions sporadically and aquifers are being drawn down more rapidly than natural replenishment of water. Even saltwater intrusion is making much freshwater undrinkable. The above table shows the distribution and use of the world freshwater resources.

From table 1, it can been seen that a crucial aspect of the consumption pattern of water in developed and developing countries lie in the sectoral use of water. While developing countries use more freshwater for agriculture, in developed countries the use of freshwater is more in industrial and domestic consumption.

In 1998, 31 countries faced chronic freshwater shortages. By the year 2025, however, 48 countries are expected to face shortages, affecting nearly 3 billion people - 35 percent of the world's projected population. Countries in danger of running short of water in the next 25 years include Ethiopia, India, Kenya, Nigeria and Peru. In the past, tensions over water were not uncommon. In 1997, Malaysia, which supplied about half of Singapore's water, threatened to cut off that supply after Singapore criticised government policies of that country. The relations between Namibia and Botswana were seriously strained after Namibia planned to construct a pipeline to divert water from the Okavango river. Namibia and Botswana share the waters of this river. King Hussein of Jordan once said that the only thing for which we could wage a war with Israel was water. Israel controls the supply of water to Jordan. The Global Environment Outlook (GEO 2000) substantiates this projecting that over the next 25 years, the world would begin to run out of fresh water and 'water wars' could spread across a wide belt of north Africa, west Asia and east Asia.

While international tensions relating to access to freshwater have further escalated, another worrying development has been the speed of the commercialisation of water. Water has steadily transformed into a billion dollar industry. Multinational corporations, aided by irresponsible or corrupt governments, are taking control of once publicly owned water supplies for a singular purpose of profit. Their narrow, self-serving philosophy dictates the price and distribution of water. Having seized a significant portion of public supplies already, they are anxiously counting on an increasing share by getting permissions to export water to other countries. While corporations presently provide only five percent of the world's population with water, this current market is valued at a staggering $1 trillion. The potential for the growth of the corporate water market is, therefore, enormous.

Even the difference in consumption patterns of water in developed and developing countries clearly reflects the cavalier and irreverent attitude that humanity has towards water, especially by the most prosperous segments of society. Canada consumes 1.6 million litres of water per capita each year, twice as much water as the per capita rate of water consumption in France. In Germany, daily per capita water use is 128 litres, in the United Kingdom, 149 litres. On the other hand people in Ethiopia, Eritrea, Djibouti, Gambia, Somalia, Mali, Mozambique, Tanzania and Uganda have to live on an average of less than ten litres of water a day. In sub-Saharan Africa, only about 60

Box-1: Water as mentioned in International Agreements

International Consensus on water principles (Dublin Principles)

- Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.
- Water development and management should be based on a participatory approach, involving users, planners and policy maker at all levels.
- Women play a central part in the provision management and safeguarding of water
- Water has an economic value in all its competing uses and should be recognised as an economic good.

AGENDA 21 of United Nations Conference on Environment & Development (UNCED)

- Ensure the integrated management and development of water resources.
- Asses water quality supply and demand.
- Protect water quality resources and aquatic ecosystem.
- Improve water supply and sanitation.
- Ensure sustainable water supply and use for cities,
- Manage water resources for sustainable food production and development.
- Assess the impact of climate change and water resources.

Source: ECSC-EEE-EAEC, Brussels, 1998.

percent of the 680 million people have access to safe water supplies.

The access to clean water for basic needs is a fundamental human right. According to Peter Gleick, a co-founder of the Pacific Institute for Studies in Development, Environment and Security, on average person needs a minimum of 50 litre of water per day, with 5 litre for drinking, 10 litre for cooking, 15 litre for bathing and 20 litre spent on sanitation needs. Each generation has a responsibility to ensure that its actions do not diminish the abundance and quality of water available to it and future generations. UN reports that Europeans spend more than $11 billion on ice cream each year, which is $2 billion more than the amount, required to provide clean water and sewers for world's population.

There is also a need for putting in concerted effort to restore the health of degraded aquatic ecosystems and preserving the unaffected ones. Without government intervention, the corporate share of the world water market could increase rapidly within the coming decades, resulting in corporate domination of this basic human right.

The above box summarises the key statements on water endorsed by nations in international arena.

3. Problems related to availability, use and management aspects of water resources

The major factor influencing the demand for freshwater is the world's changing patterns of population growth, irrigation, distribution and wealth. The world's population is expected to increase from 5.3 billion in 1990 to somewhere between 8 and 10 billion people in 2050. Out of this future population growth, 90 percent will be attributable to developing countries.

It is estimated that around 67 percent of earth's freshwater is used by the agricultural sector for irrigation. The United Nations projects a 50-100 percent increase in irrigation water by 2025 as a result of growth in world food demand. Industry currently accounts for approximately 19 percent of the total freshwater used. The percentage varies from region to region. Industrial water use, for example, is predicted to double by 2025 if current growth trends persist. Only around 9 percent of the freshwater are used for household consumption.

The agricultural sector also is the largest polluter of freshwater in most developed and developing countries. Water pollution takes place from poor land management practices including unwise use of pesticides and inorganic fertilisers, inefficiencies in irrigation, unrealistically low subsidised water costs which encourage wasteful practices. Inorganic fertilisers have been found to consume more water than organic fertilisers. In addition, awarding private rights to the use of groundwater have often led to overuse and misuse world over. This has led to indiscriminate tapping of ground water.

Since 1965, the shallow water table under Beijing city has fallen nearly 200 feet. In some parts of Beijing it is reported that deep wells have to reach 1000 metres to tap fresh water. Earlier data showed the water table dropping by an average of 1.5 metres a year under the North China Plain. Even in the southern Great Planes of the United States, water table has fallen due to continuous pumping of ground water. As water levels fell in many places farmers were forced to abandon irrigated agriculture. As a result, in several states like Colorado, Kansas, Oklahoma, and Texas, that dominate US food production, the irrigated area is slowly shrinking.

As water level declined, numerous plants, which thrived on ground water, have perished from the earth. Apart

from affecting the biodiversity and ecological balance, it has adversely affected the life of animals due to scarcity of fodder. The pesticides used in the fields, has eliminated many species. Many aquatic species have been perished from earth due to contamination of water.

Governments have failed to properly maintain ageing water infrastructure. According to the World Bank, the developing world loses as much as 50 percent of its municipal water through system leakage. Many developing countries undergoing rapid industrialisation are now faced with the full range of modern toxic pollution problems viz. eutrophication, heavy metals, acidification, persistent-organic-pollutants (POPs) while they are still struggling to deal with traditional problems of poor water supply and lack of sanitation services. The pollution threat is particularly serious when it affects groundwater supplies, where contamination is slow to dilute and purification measures are costly.

Women provide nearly all the water for the household in rural areas. They are known to make multiple and maximum use of water sources assuring that these sources do not become polluted. Domestic water is used for processing and preparing food, for drinking, bathing and washing, irrigating home gardens and watering livestock. Women know the location, reliability and quality of local water resources. They collect water, store it and control its use and sanitation. However, women have been affected mostly as traditional sources of water have been dried up due to mismanagement or contamination from humans, animals or agricultural runoff.

In many rural areas, women have to walk miles in scorching sun to get few liters of drinking water. Some 30 percent of women in Egypt walk over an hour a day to meet water needs. In some parts of Africa, women and children spend eight hours everyday collecting water. Poor water access and quality affect not only women's crop and livestock production and the amount of labour they must expend to collect, store, protect and distribute water, it also affects their health and that of their families.

Domestic water and sanitation are the everyday responsibilities of women and yet men normally take major decisions in the community. The same gender demarcation applies albeit to a lesser extent to water for agriculture. Well planned water and sanitation programmes offer a real opportunity for women to exercise leadership and authority within a community, and to extend their influence beyond community level to address the strategic needs of women in the water sector.

4. The Road Ahead

The linkage between poverty and sustainability of water is a key issue in developing countries. The supply of safe drinking water is of vital importance because 80 percent of all diseases are caused by the use of unsafe water and absence or improper use of sanitation facilities. The goal for freshwater in the UN Millennium Declaration, is to halve by the year 2015 the proportion of people who do not have access to safe drinking water and to stop the unsustainable exploitation of water resources.

Till date, the focus of our water management strategy has been only on the increase in supply of water not paying much attention to demand management. Hence an integrated approach to freshwater management offers the best means of reconciling competing demands with dwindling supplies and a framework in which hard choices can be made and where effective operational actions can be taken. It is thus valuable for all countries at all stages of development.

In the longer term, the United Nations water assessment makes clear that looming water crisis in many regions must be addressed through hard policy decisions that reallocate water to the most economically and socially beneficial uses. Far greater emphasis on water-efficient

Box-2: Some major arguments against privatisation of water

- The profit motives of transnational corporations are not consistent with the basic needs of poor and water-stressed people
- Against the wishes of the people, or often without their knowledge and participation, an extensive array of free trade agreements and treaties has already been signed that threaten global water resources.
- These international agreements are unsound from an environmental perspective because they place free trade and profit above ecological principles
- Privatisation of water increases the cost to consumers
- Privatisation promotes water monopolies and corruption
- Privatisation favours the highest bidder
- Privatisation restricts the flow of information on water quality, especially testing for water-borne parasites and toxic contaminants.
- The track record of corporate water purveyors is replete with evidence of environmental abuses and the inequitable distribution of water
- Transnational corporations, lacking long-term ties to the community and interested solely in profit maximisation, cannot be expected to be proper stewards of water resources
- The supply and quality of water must remain in public control whereby a more holistic and pluralistic assessment of the needs of humans and their ecosystems may be conducted

technologies and pollution control are also essential. However, even with measures to contain the growth of demand and use water more efficiently, new supplies will be needed. The World Bank has estimated that the financial and environmental costs of tapping new supplies will be, on average, two or three times those of existing investments, because most of the low-cost, accessible water reserves have already been exploited.

Despite mounting worldwide evidence of the negative effects of unsustainable water extractions and other environmentally destructive practices, transnational corporations have not stemmed their assault on the natural world. It is estimated that at present private operators provide less than 10 percent of the world's population with drinking water and sanitation services. In fact, the transnational corporations have, in alliance with their collaborators in government, established a system of trade agreements, treaties and regulations that removes any barriers to trade. The removal of trade barriers is accelerating the destructive extraction of natural resources such as timber, ores, oil and most recently water from the environment.

As clean water supplies have diminished, competition for them has been growing, usually between expanding urban areas and rural users. Where systems of water law and allocation exist, water markets can operate to transfer supplies between buyers and sellers for an agreed price. Such systems are operating with some success in an increasing number of countries, including the western United States and Australia.

However, effective water pricing, which sets water prices high enough to discourage waste, remains a highly sensitive issue in low-income countries, where most people depend on irrigated agriculture for their living. Even so, socio-economic development in water-scarce countries may depend critically on more rational distribution of scarce supplies. According to most civil society groups, commodification and pricing of water might lead to worsening of the present situation hampering the access to safe drinking water among weaker sections of the society. According to them, when access to drinking water is considered as a basic human right, then any kind of price on water would stop these weaker sections from accessing water at all. *(see box 2)*

In Orissa, a state in the Eastern part of India, a local water governance structure, termed in local parlance as "Pani Panchayat", influenced by the World Bank, was tried as a model to manage water resources. However, 'model pani panchayats' never had any election. Ironically, the control over water resources is reported to be swiftly moving in the hands of powerful landlords and contractors. A leading national newspaper has recently published a news that 'Pani Panchayat' is privatisation of water through the backdoor with the jargon of "community onership" and "farmers' control" In this scheme of things it is the small farmers who faces bankrupcy and ruin.

The alternative governance structure suggested to replace privatisation of the world's water supply is private-public partnership (PPP) with multi-stakeholders. PPP is different from privatisation as private sector is one of the stakeholders to such initiatives. Many fund-starved governments are eager to use the technology and management skills of private sector and they may do so with the help of PPP. PPPs also have the potential to improve efficiency. However, even in the case of PPPs, civil society is showing concern, as transnational corporations would be involved. Past track record of such corporations, show that they have often overridden other stakeholders with their own agenda of reaping higher profits.

It is said that PPPs in water supply and management in urban areas with a commercial tariff structure and national level autonomous regulatory authority can take care of consumer interests. As the merits of PPP are case specific, instead of discarding all PPPs, one should judge such PPPs on merit. While such PPP efforts of water have failed in Africa there are success stories which may be extremely beneficial if they can be replicated. *(see box 3)*

Box-3: A Successful Partnership Initiative

The Metro Manila Waterworks & Sewerage System (MWSS) experience has been an immense success story in Philippines. The model adopted was a hybrid of both the 25-year concession period model of Buenos Aires and the 2-zone approach of Paris. In the MWSS project a 25-year concession period for both water supply and sewerage was chosen, and 2 zones in East and West were selected. Then bids were invited based on international competitive bidding that comprises both technical bidding and financial bidding (based on water tariff where bidder with minimum proposed tariff wins).

Though operational and capital expenditure responsibility was left to the private sector, government retained the asset ownership. This approach was chosen to promote a healthy competition and it would also help the regulator to compare between the performances of the 2 zones. All these were preceded by an extensive awareness campaign initiated by none other than the President of Philippines himself.

The entire exercise was based on a consensus approach where the labour unions were taken into confidence. The transparent approach adopted for this project had immediate spin-off effects with coverage of service area increasing from 67 percent to more than 80 percent within a period of just over 1 year. Water tariffs dropped drastically by 6-12 times and lower tariff, in turn, led to better tax compliance and increase in tax revenue for government. To protect the consumers' interests a regulatory authority was also set up.

Source: Mark A Dumol, Former Adviser-Govt of Phillipines at International Conference titled "New perspectives on Water for Urban & Rural India", New Delhi 2001.

A PPP initiative is likely to be successful if it has sufficient funding, adequate civil society and government involvement to act as a pressure group to promote healthy competition among private organisations.

Apart from a healthy PPP, laws to control groundwater overuse should also be enacted. There should be a reasonable water tariff based on quantum to check the overuse/wastage of water. People need to be educated about the ensuing crisis of water scarcity and a new taxation mechanism needs to be introduced to penalise those who consume more and reward those who consume less. This is likely to minimise wastage and increase revenue.

Substantial percent of irrigation water never reaches the crop and is lost due to evaporation or runoff. Although the use of water-efficient drip irrigation has increased 28-fold since the mid-1970s, it is still employed in less than 1 percent of the world's irrigated areas. To ensure increase in supply of surface water, the major objective should be to clean the lakes, canals and rivers so that water-holding capacity increases. The needs of drinking water of human being can also be fulfilled through rainwater harvesting in rural as well as in urban areas. Apart from recharging the ground water sources, these will also reduce floods during rainy season. Further, as inorganic farming requires more water it is essential that the governments stress on organic farming and traditional watershed management techniques are revived. Most importantly, lifting of underground water should be strictly regulated.

Corporate bodies like airports and industries should be motivated to take up projects to meet their own water requirements. A roof top water-harvesting programme should be launched in urban as well as rural areas wherever it is feasible. Infact it was suggested that roof top water harvesting should be made an integral part of all rural housing development programmes.

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Conclusion:

Better management of water resources is the key to mitigating water scarcities in the future and avoiding further damage to aquatic ecosystems. On water and sanitation, the final Plan of Implementation of the World Summit on Sustainable Development agreed to halve by 2015 the proportion of people unable to reach or afford safe drinking water and who do not have access to basic sanitation. However, the matters related to Right to Water and commercialisation of water were not agreed upon at the World Summit on Sustainable Development.

In relation to water resources, the Johannesburg Plan of Implementation contains the following key commitments:

- launch a programme of actions to achieve safe drinking water and sanitation goals
- mobilise international and domestic financial resources, transfer technology, promote best practices and support capacity building
- promote and provide new and additional financial resources and innovative technologies to implement Chapter 18 of Agenda 21 which deals in "Protection of the quality and supply of freshwater resources application of integrated approches to the development, management and use of water resources", and
- develop integrated water resource management and water efficiency plans by 2005

Also at the summit the following additional initiatives has been committed: USA: $970 million, EU: `Water for life' Initiative, ADB: $5 million grant and $500 million credit, and Others: $20 million.

Now what is desired for the sustainability of water resources are:

- education and involvement of people about the ensuing crisis of water scarcity
- more involvement of women in decision-making process related to water
- emphasis on rainwater harvesting
- reasonable water tariff based on quantum to check the overuse/wastage of water
- stress on the use of organic manure in agriculture as it consumes less water.

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