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URBAN LOCAL GOVERNMENT AND WATER CONSUMPTION PATTERN IN BANGLADESH: CHALLENGES OF SUSTAINABLE WATER MANAGEMENT

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Abstract

Water-centric problems and limitations are many. Although 70% of the planet is covered with water, only 3% of the water is potable. Among this 3%, 23% is contained in Lake Baikal, in Russian Siberia, which is usually frozen and therefore not usable even by people living in that area. 7 billion people have to share the other 77% of 3% (about 2.2%) of the Earth's surface which is covered with water.

The point is that water, on which humans depend for life, is amazingly scarce. The demand for water is increasing at a terrific rate but no new water can be produced to meet it. Conservation and sharing of water supplies are our only options to survive. We do a poor job of this and thus billions of people have water problems.

Some 1.1 billion people worldwide lack access to potable water, and a total of 2.7 billion people find water scarce for at least one month each year. Inadequate sanitation is a problem for 2.4 billion people—they are exposed to diseases, such as cholera and typhoid fever, and other water-borne illnesses. Two million people, mostly children, die each year from diarrheal diseases.

One-third of the world's countries face moderate or extreme water problems. Almost all of them are located in North Africa, West or Central Asia and South Asia. High-level difficulties mean that, at some point in the year, these countries face severe difficulties in supplying potable water to all their people, all of the time.

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India, the country which literally surrounds Bangladesh, can be a great example of this endemic water crisis. India is considered to have the worst endemic national water crisis. More than half of the population has no potable water. 0.2 million people every year die in India due to insufficient, unsafe and/or non-potable water. More than three quarters of households in India lack such a supply of water, while 40% of the total population will lose access to such a water supply by 2030. Data from UNICEF estimated that the economic burden of waterborne diseases is close to 600 million USD due to chemicals contaminating the water supply of 1.96 million homes. In urban areas, 50 million people in 15 cities don't have access to safe and affordable water. The 2018 Composite Water Management Index (CWMI) indicated that the GDP of India will be reduced by 6% within the next 30 years due to unreliable supply of safe and potable water.

Despite the abundance of consumable fresh water, Bangladesh has a water problem. Though access to safe water is considered a human right, 40 million people in Bangladesh are still deprived of safe drinking water. 24,000 km of rivers flow, with usable water, in Bangladesh. Yet that river water is turning toxic over time as a result of human activities.

Wasting water is also one of the major causes of water scarcity throughout the world. Considering the previously-discussed water crises in India and Bangladesh, even minimal water wastage in these countries can significantly exacerbate their problems.

Two gallons of water is wasted every minute, throughout the world, due to humans shaving and brushing their teeth. Taking a long shower may result in 800 gallons of water waste. Repairing leaking pipes may save 140 gallons of water a day. Few people imagine that brushing their teeth with more water than is absolutely necessary could contribute to the death of a child in a far-off country from thirst or waterborne diseases but this is a reality. These common facts demonstrate how easy it is to create water crises on this planet, due to the fundamental shortage of water, as well as the extent to which every human on the planet is literally in the same "boat" (our planet) regarding the water shortage.

This study attempts to measure the water usage of the residents of four city corporations in Bangladesh daily. Then the sources of water and their affordability are measured in order to assess the sustainability of their water use.

Here, "sustainability" means that the pattern of water usage is leaving no significant impact on the natural water cycle or on the environment.

METHOD OF THE STUDY

The study was conducted in four City Corporations in Bangladesh: Rajshahi, Barishal, Sylhet and Gazipur. A total of 1,200 primary respondents, 300 from each of the City Corporations, were chosen randomly to participate in surveys. Numeric data were collected through an open ended questionnaire in face-to-face interview. The amount of water every person uses daily was calculated and tested. The confidence level was 95% l and the allowable error rate was 5% . IBM's SPSS ver. 26.

SUSTAINABILITY OF PER CAPITA WATER USAGE

Table 1 illustrates how much water is being used by people every day and for what purposes. People consume about 15.6 liters of water per day on average. This is, of course, an average and will not match many individuals' actual usage. Also, the study focused on water collected rather than water consumed. 22.54 liters of water per person is used for cooking, 126.65 liters per day for bathing and 127.02 liters per day is for cleaning. For drinking and cooking, the data is clustered around the mean, implying homogeneity, but the data for bathing and cleaning was more dispersed, implying greater differences person-to-person.

Table 1: Per Capita Water Usage Respect to Major Daily Activities

	N	Minimum (liter)	Maximum (liter)	Mean (liter)	Std. Deviation
Drinking	1200	3	60	15.60	10.243
Cooking	1200	3	100	22.54	20.107
Bathing	1200	3	1501	126.65	84.935
Cleaning	1200	2	500	127.02	112.217

[Source: Field survey, 2021]

Table 2 depicts the mean water usage of the residents of City Corporations of Bangladesh. A 1-tail T Test found 250 litres per day average water use in moderate climates around the world. Table 1.1 shows that the studied sample uses 291.81 liters of water on average. This is 41.814 litres, some 15%, more than the test value. This means that the city dwellers of Bangladesh are using more water than the global average. The significance level is 000 (< 0.05)

which means the result is statistically significant.

Table 1.1: Per Capita Water Usage One-Sample T Test with the Test Value of 250

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Computed total usage of water	1200	291.8146	168.99585	4.87849

Table 2.1: Per Capita Water Usage One-Sample T Test with the Test Value of 250

One-Sample Test

Test Value = 250

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Difference Lower	Interval of the Upper
Computed total usage of water	8.571	1199	.000	41.81458	32.2433	51.3859

In Table 3, the collected data of daily water usage is divided into two groups:

1. those who use less than or equal to the global average; and
2. those who use more than the global average.

According to the Table (Table 3) a slight majority (52.5%) of the sample are using more water than the average.

Table 3: Per Capita Water Usage in Groups

	Existing (250 lit.)		Sustainable (220 lit.)	
	Frequency	Percent	Frequency	Percent
Below or equal	570	47.5	483	40.3
Higher than expected	630	52.5	717	59.8

[Source: Field survey, 2021]

On the other hand, people usually waste about 30 liters of water daily per person on average. Therefore, comparing the sample with the standard of 220 litres which is sustainable water usage (250 litres – 30 lires wastage), a larger majority (59.8%) of the respondents wastes 30 liters or more water daily and only 40.3% use water sustainably, without waste (Table 3).

SUSTAINABILITY OF THE SOURCE OF WATER

The main source of drinking and agricultural water in Bangladesh is groundwater. This has been so for about 40 years. Most of the big cities of Bangladesh heavily rely on groundwater, i.e. in Dhaka city alone 78% of its total water demand is met by extracting water below the surface. This heavy burden of groundwater pumping is greater than it would be if the water were being used in a sustainable way.

Table 4: Users and their water source

Sources	Frequency	Percent
Supply (Govt.)	403	33.6
Tube well	60	5.0
Submersible	732	61.0
Bottled Water	5	0.4

[Source: Field survey, 2021]

According to Table 4, 33.6% of the people use water from the water supply of the government, meaning the tap. This supply system also uses water pumped up from the ground and is supplied through a network of pipes throughout the city. On the other hand, 61.0% of the respondents inform that they have their own submersible pumps for bringing water up from underground. Besides, 5% of the total respondents use tube wells which are also relying on groundwater. 99.6% of the total respondents rely on groundwater for normal daily use in drinking, washing, etc.

SUSTAINABILITY OF THE EXISTING WATER DEMAND AND SUPPLY SYSTEM

The obvious conclusion from the facts in Tables 1-3 is that the existing water usage pattern is not sustainable nor will it meet the targets under the Sustainable Development Goal 6, access to safe and affordable water for every person on the planet through an environmentally-friendly, recyclable, surface water-based integrated system.

Responding to Agenda 2030, Bangladesh introduced the first surface water treatment plant for Dhaka City Corporation (Saidabad Water Treatment Plant). On the other hand, Rajshahi WASA has recently signed a Tk 4062.22 crore (US$570 million) contract for a “Rajshahi Wasa Surface Water Treatment Plant”. Under the project, along with a surface water treatment facility for the water of the river Padma, a reinstallation of 53-kilometer main pipelines and 48- kilometers of primary and secondary distribution pipelines will take place. This is needed because most of the piping was made and installed under British rule, before 1947,

is rusted and delivers water contaminated with iron, that is dangerous to drink and bad for the skin. Besides these two facilities, another mega water treatment plant is also proposed (Gandhrabpur Water Treatment Plant) which will be serve 4.3 million people in Dhaka City, using the water of the river Meghna .

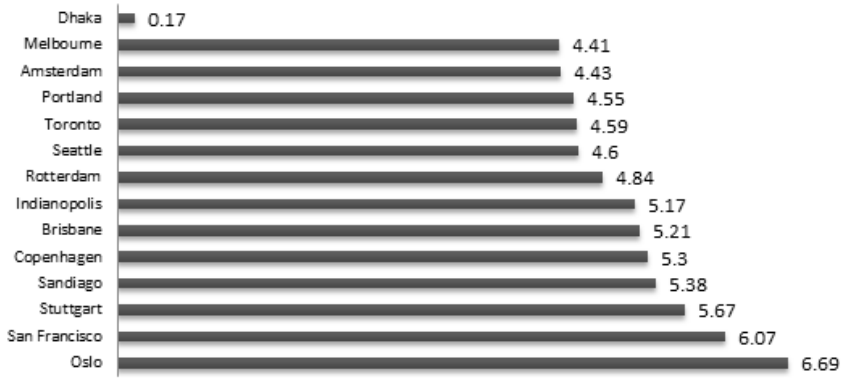
However, there are no plans to replace the existing groundwater extraction facilities or to shift to renewable energy sources to run all these facilities. . This is despite the fact that the energy used for extracting groundwater, as well as the energy that will be used for running the surface water treatment facilities, is still fossil-fuel based. This is a lacuna in the policy framework which will implement some Sustainable Development Goals at the expense of others. This resulting policy might be called "Healthy Humans On A Dying Planet".

A WAY FORWARD

Drastic measures must be taken immediately. The surface water treatment plants so far proposed are hardly sufficient. Currently, the surface water treatment plant is only functioning in a portion of Dhaka City. Even if the planned projects are successfully completed, they will only be able to serve a very small portion of the entire population in Bangladesh. For the sake of the environment, the Government must transform every single water supply facility into a surface-water-based system.

Another solution can be to increase the price of water. Bangladesh consumes almost 300 liters of water daily per person, which is around 685 litres per household. However, the water price in Bangladesh is only 0.17 USD or 14.44 BDT per 100 litres. If the water price were increased, the citizens might respond by reducing wastage of the valuable ground water. Chart 1 might clarify how cheap water is in Bangladesh in comparison to some major cities of the world.

Chart 1: Cost of water (USD/1000 liter)



https://www.statista.com/statistics/478870/leading-cities-by-highest-freshwater-prices/]

Present policy excludes private sector water supply, making such supply a State monopoly. The Government ought to consider what role the private sector might occupy productively, for the social purposes of providing better quality water to all in a way that stops contributing to dangerous global climate change. Some obvious opportunities are that international water supply companies have more capital to use in modernizing outdated treatment and distribution facilities; access to the latest technology from overseas; and more efficient management methods than the State has.

The major concerns are financial and ideological. Certainly, private suppliers would have to get a higher price for the water to avoid losing their assets and technology and collapsing financially, at least equal to the marginal cost of supplying the water. Then too, the socialist ideology of the current Government causes them to react negatively to proposals to involve the private sector in the supply and distribution of basic services, which most people cannot afford to pay full cost for. In one way, they are right: providing the best water to those with the greatest ability to pay, leaving most with no water supply, in a poor, developing country, would not be progress, it would be a nightmare. It almost happens in Bangladesh now: the urban rich drink bottled water, which is far safer than the tap and contains health-inducing minerals. The Government's reaction to this, since their first Budget in 2009, has been to drastically increase Value-Added Tax on bottled water, forever locking most Bangladeshis out of the market for this healthy water, consigning them to the tap, the tube well and the pond. There is an argument that it would have been more efficient, in financial and health terms, to have shut down the inefficient and unhealthy State water supply system, sold the materials and used this revenue and cost-savings to supply a daily ration of bottled water, only for drinking, free of cost, to the poor and working class.

One way of reconciling these concerns would be to change the hidden subsidy of running a loss-making State monopoly water supply policy into an overt subsidy, paying all or part of the water bills of poor and working class families, who cannot afford to pay higher water prices, out of tax money. It may be possible to partially fund this by a tax on water usage of commercial, industrial and high-income users, thus adding a social component to water prices which private distributors would feel uncomfortable trying to administer. For example, if the private supply market is competitive (as it should be: a private monopoly is worse than a state monopoly), the first private supplier to introduce social pricing of water would lose all of its high-revenue customers to competitors who did not use social pricing. Therefore, a tax on the water use of commercial, industrial, and high-income users is the only way to introduce social pricing that is pragmatic and fair in a private, competitive water supply market.

CONCLUSION

A few things are clear from the discussion above. Firstly, water is cheap in Bangladesh . Therefore, it is wasted recklessly by the people of Bangladesh. Secondly, authorities have hardly any intention of using renewable energy source for water supply instead of fossil fuel. Such apathy towards sustainable water management conflicts with the spirit of sustainable development in Bangladesh.

As a result, Bangladesh is sleepwalking towards an intractable water crisis, sooner rather than

later. It will be intractable so long as humans lack the technology to manufacture water. This is a product whose production, unusual in economics, is fixed both in the short-term and the long-term. Once we use it, we lose it. We have already seen a glimpse of the future of Bangladesh's water supply next door in India: it is not a pretty sight. We can derive some principles about what form action needs to take. Action is needed to conserve, even recycle water if possible. Consumption of water and wastage must be reduced. Equal access to high quality water must be developed. The State's water infrastructure is largely rubbish and needs to be replaced and modernized. The State, let alone local government, are not financially, politically, or managerially capable of doing so. Privatization of water supply in some form, whether fully competitive supply, including international companies with good records overseas or "Build-Operate-Transfer/Public-Private Partnership", should be considered and implemented. As water prices need to rise in Bangladesh whether under a nationalized, competitive or privatized regime, social pricing of water, by taxing industrial, commercial and high income use to provide (all or part of the) funds for directly subsidizing water cost for poor and working-class families, should be adopted. Finally, the energy used for delivering water to users should no longer come from earth-destroying fossil fuels but from earth-saving renewable energy sources: wind, solar power, hydroelectric power, nuclear.

The way forward is clear. We know what to do to prevent the coming water crisis. The difficulty is in doing it, rather than in just talking about it. Yes, first we need to wake the people of Bangladesh up and prepare their minds for change, making it clear that their next glass of water for drinking and bucket of water for bathing could become impossible sooner than they know it. Then huge amounts of money need to be spent and ideological dogma must be challenged: in a developing country, both are difficult. Saving lives usually is.

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