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An Overview: "Availability of clean drinking Water- A Global Problem yet needs to be solved"

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Abstract: Wherever they are, people need water to survive. Not only is the human body 60 percent water, the resource is also essential for producing food, clothing, and computers, moving our waste stream, and keeping us and the environment healthy. Unfortunately, humans have proved to be inefficient water users. (The average hamburger takes 2,400 liters, or 630 gallons, of water to produce, and many water-intensive crops, such as cotton, are grown in arid regions.) The availability of clean drinkink Drinking water is still the problem in the world.. A very simple Google search will will give the data about the millions of people who are having very dirty water for drinking. The natural disasters, unavailability of food and the weired geographical conditions of many places, are the reasons for this serious problem world wide. There are many new technologies but they are not in the approach of everybody. In this modern completely new technological world the many people are not aware of use of dirty water for drinking. The people of rural areas do not understand the importance of clean water. As there is no availability of water for their use. For developing countries water will be the key resource and political consideration in the coming 50 years.

Keywords: Water Scarcity, Drinking Water, Human Health, Natural disaste.

Introduction: In this COVID19 outbreak, the first and very important way to be safe is washing hands with clean and fresh water. Hand hygiene is essential to containing the spread of COVID-19, as well as other infectious diseases. For many years the researches are about the importance of clean water for drinking purposes. According to the United Nations, water use has grown at more than twice the rate of population increase in the last century. By 2025, an estimated 1.8 billion people will live in areas plagued by water scarcity, with two-thirds of the world's population living in water-stressed regions as a result of use, growth, and climate change. The challenge we now face as we head into the future is how to effectively conserve, manage, and distribute the water we have.The 2019 edition of the World Water Development Report (WWDR 2019) entitled 'Leaving No One Behind' seeks to inform policy and decision-makers, inside and outside the water community, how improvements in water resources management and access to water supply and sanitation services are essential to overcoming poverty and addressing various other social and economic inequities. It was launched at the Human Rights Council, at the Palais des Nations in Geneva (Switzerland), on 19 March 2019.The 2019 World Water Development Report reinforces the commitments made by the UN member states in adopting the 2030 Agenda for Sustainable Development and in recognizing the human rights to safe drinking water and sanitation, both of which are essential for eradicating poverty and for building prosperous, peaceful societies.Improved water resources management and access to safe water and sanitation for all is essential for eradicating poverty, building peaceful and prosperous societies, and ensuring that 'no one is left behind' on the road towards sustainable development.World Water Day, held on 22 March every year since 1993, focuses on the importance of freshwater.World Water Day celebrates water and raises awareness of the 2.2 billion people living without access to safe water. It is about taking action to tackle the global water crisis. A core focus of World Water Day is to support the achievement of Sustainable Development Goal 6: water and sanitation for all by 2030.On this World Water Day, and any other day, remember to wash your hands regularly with water and soap or with an alcohol-based hand gel. See UNICEF's guidelines on hand washing and UN Water's fast facts on hand washing/ hand hygiene. According to the World Health Organization's 2017 report, *safe* drinking-water is water that "does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages". A 'safely managed drinking water service" is "one located on premises, available when needed and free from contamination". By 2015, 5.2 billion people representing 71% of the global population used safely managed drinking water service.The terms 'improved water source' and 'unimproved water source' were coined in 2002 as a drinking water monitoring tool by the JMP of UNICEF and WHO. The term, improved water source refers to "piped water on premises (piped household water connection located inside the user's dwelling, plot or yard), and other improved drinking water sources (public taps or standpipes, tube wells or boreholes, protected dug wells, protected springs, and rainwater collection)".[9] Improved sources are also monitored based on whether water is available when needed (5.8 billion people), located on premises (5.4 billion), free from contamination (5.4 billion), and "within 30 minutes' round trip to collect water.'[8]:3 While improved water sources such as protected piped water are more likely to provide safe and adequate water as they may prevent contact with human excreta, for example, this is not always the case.[9] According to a 2014 study, approximately 25% of improved sources contained fecal contamination.[10]The SDC basic drinking water service is one in which a "round trip to collect water takes 30 minutes or less". Only Australia, New Zealand, North America and Europe have almost achieved universal basic drinking water services.[8]:3

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Only 61% of people in Sub-Saharan Africa have improved drinking water.

Singapore's "Toilet to Tap" concept

A Clean Water Crisis

The water you drink today has likely been around in one form or another since dinosaurs roamed the Earth, hundreds of millions of years ago.While the amount of freshwater on the planet has remained fairly constant over time—continually recycled through the atmosphere and back into our cups—the population has exploded. This means that every year competition for a clean, copious supply of water for drinking, cooking, bathing, and sustaining life intensifies.Water scarcity is an abstract concept to many and a stark reality for others. It is the result of myriad environmental, political, economic, and social forces.Freshwater makes up a very small fraction of all water on the planet. While nearly 70 percent of the world is covered by water, only 2.5 percent of it is fresh. The rest is saline and ocean-based. Even then, just 1 percent of our freshwater is easily accessible, with much of it trapped in glaciers and snowfields. In essence, only 0.007 percent of the planet's water is available to fuel and feed its 6.8 billion people.Due to geography, climate, engineering, regulation, and competition for resources, some regions seem relatively flush with freshwater, while others face drought and debilitating pollution. In much of the developing world, clean water is either hard to come by or a commodity that requires laborious work or significant currency to obtain.

Importance of safe drinking water:

According to the World Health Organization, "access to safe drinking-water is essential to health, a basic human right and a component of effective policy for health protection."[7]:2

The amount of drinking water required per day is variable.[1] It depends on physical activity, age, health, and environmental conditions. In a temperate climate under normal conditions, adequate water intake is about 2.7 litres for adult women and 3.7 litres for adult men. Physical exercise and heat exposure cause loss of water and therefore may induce thirst and greater water intake.[11] Physically active individuals in hot climates may have total daily water needs of 6 litres .[11] The European Food Safety Authority recommends 2.0 litres per day for adult women and 2.5 litres per day for adult men.[12]

In the United States, the reference daily intake (RDI) for total water is 3.7 litres per day for human males older than 18, and 2.7 litres per day for human females older than 18 which includes drinking water, water in beverages, and water contained in food.[13] An individual's thirst provides a better guide for how much water they require rather than a specific, fixed quantity.[14] Americans, on average, drink one litre of water a day and 95% drink less than three litres per day.[2]Water makes up about 60% of the body weight in men and 55% of weight in women.[15] A baby is composed of about 70% to 80% water while the elderly are composed of around 45%.[16]The drinking water contribution to mineral nutrients intake is also unclear. Inorganic minerals generally enter surface water and ground water via storm water runoff or through the Earth's crust. Treatment processes also lead to the presence of some minerals. Examples include calcium, zinc, manganese, phosphate, fluoride and sodium compounds.[17] Water generated from the biochemical metabolism of nutrients provides a significant proportion of the daily water requirements for some arthropods and desert animals, but provides only a small fraction of a human's necessary intake. There are a variety of trace elements present in virtually all potable water, some of which play a role in metabolism. For example, sodium, potassium and chloride are common chemicals found in small quantities in most waters, and these elements play a role in body metabolism. Other elements such as fluoride, while beneficial in low concentrations, can cause dental problems and other issues when present at high levels.Fluid balance is key. Profuse sweating can increase the need for electrolyte (salt) replacement. Water intoxication (which results in hyponatremia), the process of consuming too much water too quickly, can be fatal.[18][19]

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Global Water Resources:

Water covers some 70% of the Earth's surface. Approximately 97.2% of it is saline, just 2.8% fresh. Potable water is available in almost all populated areas of the Earth, although it may be expensive and the supply may not always be sustainable. Springs are often used as sources for bottled waters.[20] Tap water, delivered by domestic water systems refers to water piped to homes and delivered to a tap or spigot. For these water sources to be consumed safely, they must receive adequate treatment and meet drinking water regulations.[21]

The most efficient way to transport and deliver potable water is through pipes. Plumbing can require significant capital investment. Some systems suffer high operating costs. The cost to replace the deteriorating water and sanitation infrastructure of industrialized countries may be as high as $200 billion a year. Leakage of untreated and treated water from pipes reduces access to water. Leakage rates of 50% are not uncommon in urban systems.[22]

Because of the high initial investments, many less wealthy nations cannot afford to develop or sustain appropriate infrastructure, and as a consequence people in these areas may spend a correspondingly higher fraction of their income on water.[23] 2003 statistics from El Salvador, for example, indicate that the poorest 20% of households spend more than 10% of their total income on water. In the United Kingdom authorities define spending of more than 3% of one's income on water as a hardship.[24]

In 1990, only 76 percent of the global population had access to drinking water. By 2015 that number had increased to 91 percent.[9] 89% of people having access to water from a source that is suitable for drinking – called "improved water source".[3] In 1990, most countries in Latin America, East and South Asia, and Sub-Saharan Africa were well below 90%. In Sub-Saharan Africa, where the rates are lowest, household access ranges from 40 to 80 percent.[9]

Nearly 4.2 billion had access to tap water while another 2.4 billion had access to wells or public taps.[3]Estimates suggest that at least 25% of improved sources contain fecal contamination.[10] 1.8 billion people still use an unsafe drinking water source which may be contaminated by feces.[3] This can result in infectious diseases, such as gastroenteritis, cholera, and typhoid, among others.[3] Reduction of waterborne diseases and development of safe water resources is a major public health goal in developing countries. Bottled water is sold for public consumption in most parts of the world.

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Developing countries

One of the Millennium Development Goals (MDGs) set by the UN includes environmental sustainability. In 2004, only 42% of people in rural areas had access to clean water worldwide.[32] Projects such as Democratisation of Water and Sanitation Governance by Means of Socio-Technical Innovations work to develop new accessible water treatment systems for poor rural areas, reducing the price of drinking water from US$6.5 per cubic meter to US$1.[33]

The World Health Organization/UNICEF Joint Monitoring Program (JMP) for Water Supply and Sanitation[34] is the official United Nations mechanism tasked with monitoring progress towards the Millennium Development Goal (MDG) relating to drinking-water and sanitation (MDG 7, Target 7c), which is to: "Halve, by 2015, the proportion of people without sustainable access to safe drinking-water and basic sanitation".[35]

According to this indicator on improved water sources, the MDG was met in 2010, five years ahead of schedule. Over 2 billion more people used improved drinking water sources in 2010 than did in 1990. However, the job is far from finished. 780 million people are still without improved sources of drinking water, and many more people still lack safe drinking water. Estimates suggest that at least 25% of improved sources contain fecal contamination[10] and an estimated 1.8 billion people globally use a source of drinking water which suffers from fecal contamination.[36] The quality of these sources varies over time and often gets worse during the wet season.[37] Continued efforts are needed to reduce urban-rural disparities and inequities associated with poverty; to dramatically increase safe drinking water coverage in countries in sub-Saharan Africa and Oceania; to promote global monitoring of drinking water quality; and to look beyond the MDG target towards universal coverage.[38]

Expanding WASH (Water, Sanitation, Hygiene) coverage and monitoring in non-household settings such as schools, healthcare facilities, and work places, is one of the Sustainable Development Goals.[39]

One organisation working to improve the availability of safe drinking water in some the world's poorest countries is Water Aid International. Operating in 26 countries,[40] Water Aid is working to make lasting improvements to peoples' quality of life by providing long-term sustainable access to clean water in countries such as Nepal, Tanzania, Ghana and India. It also works to educate people about sanitation and hygiene.[41]

Sanitation and Water for All (SWA) is a partnership that brings together national governments, donors, UN agencies, NGOs and other development partners. They work to improve sustainable access to sanitation and water supply to meet and go beyond the MDG target.[42] In 2014, 77 countries had already met the MDG sanitation target, 29 were on track and, 79 were not on-track.[43]

Climate change aspects

The World Wildlife Fund predicts that in the Himalayas, retreating glaciers could reduce summer water flows by up to two-thirds. In the Ganges area, this would cause a water shortage for 500 million people. The head of China's national development agency in 2007 said 1/4th the length of China's seven main rivers were so poisoned the water harmed the skin. United Nations secretary-general Ban Ki-moon has said this may lead to violent conflicts.[44]

Health Aspects:

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Contaminated water is estimated to result in more than half a million deaths per year.[3] Contaminated water together with lack of sanitation was estimated to cause about one percent of disability adjusted life years worldwide in 2010.[45]

Diarrheal diseases

Over 90% of deaths from diarrheal diseases in the developing world today occur in children under five years old.[46]:11 Malnutrition, especially protein-energy malnutrition, can decrease the children's resistance to infections, including water-related diarrheal diseases. Between 2000 and 2003, 769,000 children under five years old in sub-Saharan Africa died each year from diarrheal diseases. Only thirty-six percent of the population in the sub-Saharan region have access to proper means of sanitation. More than 2,000 children's lives are lost every day. In South Asia, 683,000 children under five years old died each year from diarrheal disease from 2000 to 2003. During the same period, in developed countries, 700 children under five years old died from diarrheal disease. Improved water supply reduces diarrhea morbidity by 25% and improvements in drinking water through proper storage in the home and chlorination reduces diarrhea episodes by 39%.[46]

Well contamination with arsenic and fluoride

Some efforts at increasing the availability of safe drinking water have been disastrous. When the 1980s were declared the "International Decade of Water" by the United Nations, the assumption was made that groundwater is inherently safer than water from rivers, ponds, and canals. While instances of cholera, typhoid and diarrhea were reduced, other problems emerged due to polluted groundwater.

Sixty million people are estimated to have been poisoned by well water contaminated by excessive fluoride, which dissolved from granite rocks. The effects are particularly evident in the bone deformations of children. Similar or larger problems are anticipated in other countries including China, Uzbekistan, and Ethiopia. Although helpful for dental health in low dosage, fluoride in large amounts interferes with bone formation.[47]

Half of Bangladesh's 12 million tube wells contain unacceptable levels of arsenic due to the wells not dug deep enough (past 100 metres). The Bangladeshi government had spent less than US$7 million of the 34 million allocated for solving the problem by the World Bank in 1998.[47][48] Natural arsenic poisoning is a global threat with 140 million people affected in 70 countries globally.[49] These examples illustrate the need to examine each location on a case by case basis and not assume what works in one area will work in another.

Drinking water quality standards:

Drinking water quality standards describes the quality parameters set for drinking water. Despite the truth that every human on this planet needs drinking water to survive and that water may contain many harmful constituents, there are no universally recognized and accepted international standards for drinking water.[1] Even where standards do exist, and are applied, the permitted concentration of individual constituents may vary by as much as ten times from one set of standards to another.

Many developed countries specify standards to be applied in their own country. In Europe, this includes the European Drinking Water Directive[2] and in the United States the United States Environmental Protection Agency (EPA) establishes standards as required by the Safe Drinking Water Act.

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For countries without a legislative or administrative framework for such standards, the World Health Organization publishes guidelines on the standards that should be achieved.[3] China adopted its own drinking water standard GB3838-2002 (Type II) enacted by Ministry of Environmental Protection in 2002.[4]

Where drinking water quality standards do exist, most are expressed as guidelines or targets rather than requirements, and very few water standards have any legal basis or, are subject to enforcement.[5] Two exceptions are the European Drinking Water Directive and the Safe Drinking Water Act in the United States, which require legal compliance with specific standards.

In Europe, this includes a requirement for member states to enact appropriate local legislation to mandate the directive in each country. Routine inspection and, where required, enforcement is enacted by means of penalties imposed by the European Commission on non-compliant nations.

Countries with guideline values as their standards include Canada, which has guideline values for a relatively small suite of parameters, New Zealand, where there is a legislative basis, but water providers have to make "best endeavours" to comply with the standards,[6] and Australia.

Range of Standards:

Although drinking water standards frequently are referred to as if they are simple lists of parametric values, standards documents also specify the sampling location, sampling methods, sampling frequency, analytical methods, and laboratory accreditation AQC. In addition, a number of standards documents also require calculation to determine whether a level exceeds the standard, such as taking an average. Some standards give complex, detailed requirements for the statistical treatment of results, temporal and seasonal variations, summation of related parameters, and mathematical treatment of apparently aberrant results.

Parametric Values:

A parametric value in this context is most commonly the concentration of a substance, e.g. 30 mg/l of Iron. It may also be a count such as 500 *E. coli* per litre or a statistical value such as the average concentration of copper is 2 mg/l. Many countries not only specify parametric values that may have health impacts but also specify parametric values for a range of constituents that by themselves are unlikely to have any impact on health. These include colour, turbidity, pH, and the organopletic (aesthetic) parameters (taste and odour).

It is possible and technically acceptable to refer to the same parameter in different ways that may appear to suggest a variation in the standard required. For example, nitrite may be measured as nitrite ion or expressed as N. A standard of "Nitrite as N" set at 1.4 mg/l equals a nitrite ion concentration of 4.6 mg/l. This is an apparent difference of nearly threefold.

Standards by Country:

The World Health Organization (WHO) Guideline for Drinking-water Quality (GDWQ) include the following recommended limits on naturally occurring constituents that may have direct adverse health impact:

Element Quantity	Organic Compound Quantity
Arsenic 10µg/l Barium 10µg/l Boron 2400µg/l Chromium 50µg/l Fluoride 1500µg/l Selenium 40µg/l Uranium 30µg/l	Benzene 10µg/l Carbon tetrachloride 4µg/l 1,2-Dichlorobenzene 1000µg/l 1,4-Dichlorobenzene 300µg/l 1,2-Dichloroethane 30µg/l 1,2-Dichloroethene 50µg/l Dichloromethane 20µg/l Di(2-ethylhexyl)phthalate 8 µg/l 1,4-Dioxane 50µg/l Edetic acid 600µg/l Ethylbenzene 300 µg/l Hexachlorobutadiene 0.6 µg/l Nitrilotriacetic acid 200µg/l Pentachlorophenol 9µg/l Styrene 20µg/l Tetrachloroethene 40µg/l Toluene 700µg/l Trichloroethene 20µg/l Xylene 500µg/l

RECOMMENDATIONS:

This is one of the basic requirement of every human to have clean water for drinking purpose. This is really serious problem . Researchers are there for the problems of availability of clean water for drinking purposes. But still there are many areas where the availability of clean drinking water is actually not there. The cities in South Africa, the villages in India, Pakistan and many more, where the population is more but the people are not having clean water for even drinking. As mentioned in the given paper that now affordable and easy clean water supply is really required to every person. The remote areas should be selected for study to know about the clean water availability there. Whatever new technologies are being developed but still it should be taken in consideration for at least this basic need of everybody in the world. It is required in law and legislation that for the poor people specially belonging to remote area, rural area the clean and fresh water should be available.

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