

Concerns Regarding Drinkable Water

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Abstract

This paper deals with one of the basic needs of man at all-times namely drinking water. Sustainable Development Goal target 6.1 calls for universal and equitable access to safe and affordable drinking water. Potable water, also known as drinking water, comes from surface and ground sources and is treated to levels that meet state and federal standards for consumption. Water from natural sources is treated for microorganisms, bacteria, toxic chemicals, viruses and fecal matter. There are various health problems which are caused if we consume non-potable water, these problems can be reproductive problems, gastrointestinal issues, etc. If the amount of lead content in the water rises above a certain level then it can cause various complications, especially for young ones and pregnant women.

Keywords: Potable water; public health; water and health; SDGs

JEL Classification A11, O20, Q01 Q15, Q25

Introduction

Safe and readily available water is important for public health, whether it is used for drinking, domestic use, food production or recreational purposes. Improved water supply and sanitation, and better management of water resources, can boost countries' economic growth and can contribute greatly to poverty reduction.

In 2010, the UN General Assembly explicitly recognized the human right to water and sanitation. Everyone has the right to sufficient, continuous, safe, acceptable, physically accessible, and affordable water for personal and domestic use.

Water the critical resource of agriculture, has not been well managed in India, despite the country being an agricultural powerhouse. It has some 195 MH of land under cultivation of which some 62 per cent is rain-fed and 37 per cent, irrigated. Agriculture uses 85 per cent of the water resources with low efficiency. The rainfed area is the critical area of cultivation with the largest concentration of rural poverty spanning several agro ecological regions. Water management is related to three important challenges in the agricultural front today namely raising productivity per unit of land, reducing poverty, and responding to food security needs. In the light of the new call to achieve "more crop per drop", this paper discusses pertinent issues related to irrigation in India and the strategies and arrangements to address water scarcity for irrigation. Studies find that problems are largely institutional, structural, and administrative. Overcoming them is crucial for agricultural development in general and water management in particular (Hans).

Drinking water services

Sustainable Development Goal target 6.1 calls for universal and equitable access to safe and affordable drinking water. The target is tracked with the indicator of “safely managed drinking water services” – drinking water from an improved water source that is located on premises, available when needed, and free from faecal and priority chemical contamination.

In 2017, 5.3 billion people used safely managed drinking-water services – that is, they used improved water sources located on premises, available when needed, and free from contamination. The remaining 2.2 billion people without safely managed services in 2017 included:

- 1.4 billion people with *basic* services, meaning an improved water source located within a round trip of 30 minutes.
- 206 million people with *limited* services, or an improved water source requiring more than 30 minutes to collect water.
- 435 million people taking water from unprotected wells and springs.
- 144 million people collecting untreated surface water from lakes, ponds, rivers and streams.

Sharp geographic, sociocultural and economic inequalities persist, not only between rural and urban areas but also in towns and cities where people living in low-income, informal, or illegal settlements usually have less access to improved sources of drinking-water than other residents.

Water and health

Contaminated water and poor sanitation are linked to transmission of diseases such as cholera, diarrhoea, dysentery, hepatitis A, typhoid, and polio. Absent, inadequate, or inappropriately managed water and sanitation services expose individuals to preventable health risks. This is particularly the case in health care facilities where both patients and staff are placed at additional risk of infection and disease when water, sanitation, and hygiene services are lacking. Globally, 15% of patients develop an infection during a hospital stay, with the proportion much greater in low-income countries.

Inadequate management of urban, industrial, and agricultural wastewater means the drinking-water of hundreds of millions of people is dangerously contaminated or chemically polluted.

Some 829 000 people are estimated to die each year from diarrhoea as a result of unsafe drinking-water, sanitation, and hand hygiene. Yet diarrhoea is largely preventable, and the deaths of 297 000 children aged under 5 years could be avoided each year if these risk factors were addressed. Where water is not readily available, people may decide handwashing is not a priority, thereby adding to the likelihood of diarrhoea and other diseases.

Diarrhoea is the most widely known disease linked to contaminated food and water but there are other hazards. In 2017, over 220 million people required preventative treatment for schistosomiasis – an acute and chronic disease caused by parasitic worms contracted through exposure to infested water.

In many parts of the world, insects that live or breed in water carry and transmit diseases such as dengue fever. Some of these insects, known as vectors, breed in clean, rather than dirty water, and household drinking water containers can serve as breeding grounds. The simple intervention of covering water storage containers can reduce vector breeding and may also reduce faecal contamination of water at the household level.

Economic and social effects

When water comes from improved and more accessible sources, people spend less time and effort physically collecting it, meaning they can be productive in other ways. This can also result in greater personal safety by reducing the need to make long or risky journeys to collect water. Better water sources also mean less expenditure on health, as people are less likely to fall ill and incur medical

costs, and are better able to remain economically productive.

With children particularly at risk from water-related diseases, access to improved sources of water can result in better health, and therefore better school attendance, with positive longer-term consequences for their lives.

<i>Item</i>	<i>Specification</i>
Appearance	1 Turbidity Unit
Chloride	250 ppm
Fluoride	1.4 to 2.4 mg/L
Sulfate	250 ppm
Lead	0.05 mg/L
Fecal Coliforms	1/100 ml (Proposed: 0/100 ml)
Pyrogens	Not Specified
Other Microbes	Not Specified
Total Dissolved Solids	500 mg/L
Arsenic	0.05 mg/L
Barium	1.0 mg/L
Cadmium	0.010 mg/L
Chromium Hexavalent	0.05 mg/L
Chloroform	0.7 mg/L
Cyanide	0.2 mg/L
Mercury	0.002 mg/L
Nitrate	10 mg/L
Selenium	0.01 mg/L
Silver	0.05 mg/L
<i>Pesticides</i>	
Chlorodane	0.003 mg/L
Endrin	0.0002 mg/L
Heptachlor	0.0001 mg/L
Heptachlor Epoxide	0.0001 mg/L
Lindane	0.004 mg/L
Methoxychlor	0.1 mg/L
Toxaphene	0.005 mg/L
2, 4-D	0.1 mg/L
2, 4, 5-TP (Silvex)	0.01 mg/L
Specific Resistance	10,000 ohms/cm (typically)
pH	6.5-8.5

Table 1: Minimum Potable Water Standard.

Methods to make Potable water

There are various methods through which normal water can be converted to potable water or drinking water

- **Filtration:** Filtration is very helpful in purifying water. Basically, there are two types of filters that can be found on the market. Some are those which rely on carbon filters and remove the bacteria and others are those which use chemicals like iodine for the treatment of water. Filters are very heavy and require frequent replacement and are also very expensive.
- **Distillation:** Distillation of water involves boiling water and collecting the vapour and leaving the bacteria and contaminants behind. Distilled water is one of the purest forms of water; 98% of the contaminants are removed from the home distillation system and it gives water which is purer than that from filters.
- **Boiling:** The easiest way to purify water is boiling. It neutralizes a majority of viruses and bacteria in the supply but it cannot remove all the heavy contaminants.

SDGs

According to the United Nations, sustainable development is defined as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

The 17 sustainable development goals succeeded the United Nations’ eight Millennium development goals (MDGs) in 2015.

The eight MDGs were international development goals for the year 2015 established following the Millennium Summit of the United Nations and adoption of the United Nations Millennium Declaration in September 2000.

In September 2015, 193 countries of the UN General Assembly adopted the 2030 Development Agenda (“Agenda 2030”) which paragraph 59 outlines the 17 Sustainable Development Goals and the associated 169 targets and 232 indicators. Currently, the aim is to achieve all SDGs by 2030 and the progress is monitored continuously (United Nations 2015, 2019; Sachs 2019). The 17 SDGs are:

Goal 1. End poverty in all its forms everywhere.

Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

Goal 3. Ensure healthy lives and promote well-being for all at all ages.

Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Goal 5. Achieve gender equality and empower all women and girls.

Goal 6. Ensure availability and sustainable management of water and sanitation for all.

Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all.

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

Goal 10. Reduce inequality within and among countries.

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable.

Goal 12. Ensure sustainable consumption and production patterns Goal 13. Take urgent action to combat climate change and its impacts.

Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.

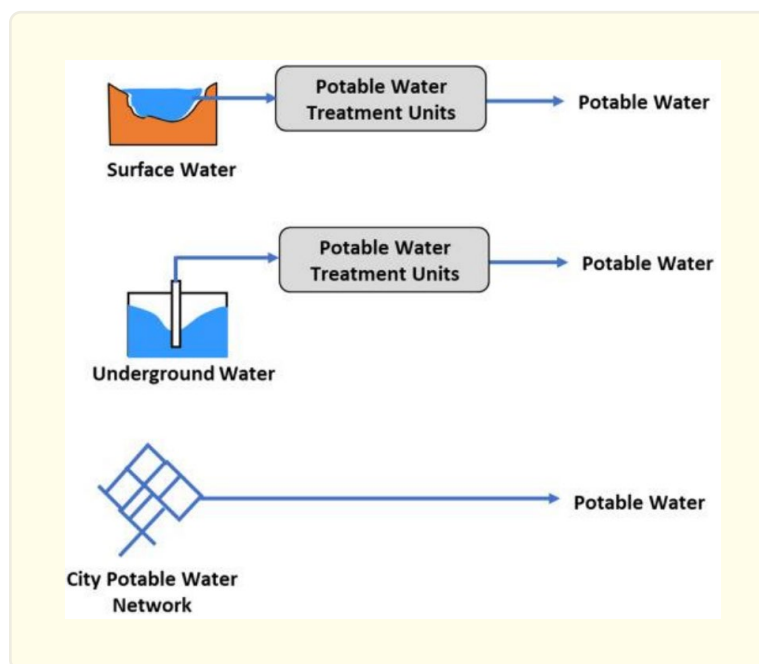
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.

Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development (Heikkilä, 2020).

Potable water needs to be provided and distributed because a plant has operators, and they need water. The purpose of this potable water is not only for drinking; it could also be used for the safety showers and eye washing stations that are installed in different locations around the plant. This is because the quality of the water for such systems must be similar to that of potable water. Potable water specifications are usually defined by the regulating bodies in the jurisdiction where the plant is located. For the safety of users, plant water (PW) is usually provided with a pressure similar to that of city water. Therefore, potable water should have a pressure between 30 and 50 kPag at the point of use.

Potable water in plants are generated by a water treatment system similar to municipal water treatment systems. Such system could be fed by raw surface water or raw underground water. In some smaller plants, city water is directly used as potable water (Fig.1).



Theoretically, there should not be any “used” potable water. However, there is always some spillage of water which should be handled together with other surface drainage waters (Toghraei, 2022).

Challenges

Climate change, increasing water scarcity, population growth, demographic changes and urbanization already pose challenges for water supply systems. By 2025, half of the world’s population will be living in water-stressed areas. Re-use of wastewater, to recover water, nutrients, or energy, is becoming an important strategy. Increasingly countries are using wastewater for irrigation – in developing countries this represents 7% of irrigated land. While this practice if done inappropriately poses health risks, safe management of

wastewater can yield multiple benefits, including increased food production.

Options for water sources used for drinking water and irrigation will continue to evolve, with an increasing reliance on groundwater and alternative sources, including wastewater. Climate change will lead to greater fluctuations in harvested rainwater. Management of all water resources will need to be improved to ensure provision and quality.

WHO's response

As the international authority on public health and water quality, WHO leads global efforts to prevent transmission of waterborne disease, advising governments on the development of health-based targets and regulations.

WHO produces a series of water quality guidelines, including on drinking-water, safe use of wastewater, and safe recreational water environments. The water quality guidelines are based on managing risks, and since 2004 the *Guidelines for drinking-water quality* promote the Framework for Safe Drinking-water. The Framework recommends establishment of health-based targets, the development and implementation of Water Safety Plans by water suppliers to most effectively identify and manage risks from catchment to consumer, and independent surveillance to ensure that Water Safety Plans are effective and health-based targets are being met.

WHO also supports countries to implement the drinking-water quality guidelines through the development of practical guidance materials and provision of direct country support. This includes the development of locally relevant drinking-water quality regulations aligned to the principles in the Guidelines, the development, implementation and auditing of Water Safety Plans and strengthening of surveillance practices.

- Guidelines for drinking-water quality.
- Water Safety Plan resources.
- Developing drinking-water quality regulations and standards.

Since 2014, WHO has been testing household water treatment products against WHO health-based performance criteria through the WHO International 'Scheme' to Evaluate Household Water Treatment Technologies. The aim of the scheme is to ensure that products protect users from the pathogens that cause diarrhoeal disease and to strengthen policy, regulatory, and monitoring mechanisms at the national level to support appropriate targeting and consistent and correct use of such products.

WHO works closely with UNICEF in a number of areas concerning water and health, including on water, sanitation, and hygiene in health care facilities. In 2015 the two agencies jointly developed WASH FIT (Water and Sanitation for Health Facility Improvement Tool), an adaptation of the water safety plan approach. WASH FIT aims to guide small, primary health care facilities in low- and middle-income settings through a continuous cycle of improvement through assessments, prioritization of risk, and definition of specific, targeted actions. A 2019 report describes practical steps that countries can take to improve water, sanitation and hygiene in health care facilities.

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