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WATER FILES

24x7 Potable Water Supply

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Govt. of Assam

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To South Guwahati East Region

Drinking Water in Guwahati

Guwahati is one of the fastest growing cities of Northeast India. However, the haphazard growth of the city has resulted in a chaotic situation and has provided the residents with not so favorable circumstances in many aspects. Amongst these, drinking water is the most crucial problem confronting the residents. The city is lagging behind in terms of basic infrastructural facilities like 24 x7 potable water supply. With Brahmaputra being the prime source for quenching the the thirst of over 10 lakh denizens of the city compressed within an area of 216 square kilometers, at present only 30% of the population in Guwahati has access to piped water supply. When and which agency will fulfill the demand of water in Guwahati that has a population of around 12 lakh needing 200 MLD (millions of litre per day) water? At present government agencies can cater to around 25 per cent of water demand in the city (50.25 MLD). This water caters to the need of only three lakh consumers in the city.

Owing to the inadequacies of piped water supply, many areas within Guwahati city depend on ground water from ring wells and tube wells for drinking purposes.

Drinking-water supply agencies are usually required to verify that the quality of water supplied to the consumers meets specific numerical standards. Yet, by the time, water quality analysis is completed and results indicate that the water is not safe to drink; thousands of people may have consumed that water putting them on risk. Moreover, even with frequent monitoring, the vast majority of water distributed to consumers will never be tested. Reliance on only end-of-pipe monitoring is inadequate to address the problem in totality. Under such circumstances, it is imperative to have a water safety plan in place to consistently ensure the safety and acceptability of a drinking-water supply.

The Assam Urban Infrastructure Investment Program (AUIIP), the Program, funded by Asian Development Bank (ADB), is a key urban infrastructure initiative of the Government of Assam (GoA), which aims to improve the urban environment and quality of life in the cities of Guwahati and Dibrugarh and is executing the Water Supply project in the South-Eastern region of Guwahati.

In above context, it is relevant to quote some sentences from Guidelines for Drinking-water Quality, Fourth Edition, published by the World Health Organization (WHO) which states that "***The most effective means of consistently ensuring the safety of a drinking-water supply is through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer." in 2011.***

Major sources of water pollution in Guwahati

(i) Domestic sewage and lack of sewage treatment plant
(ii) Industrialization
(iii) Population growth
(iv) Pesticides and fertilizer
(v) Plastic and polythene bags
(vi) Urbanization and
(vii) Inadequate waste management

Water Pollution

Water pollution is the contamination of water bodies (like lakes, rivers, groundwater etc.) usually caused due to human activities. Water pollution is any change in the physical, chemical or biological properties of water that have a detrimental consequence on any living organism.

Drinking water, also known as potable water is the water that is considered secured enough for human and animal consumption.

Potable water is generally used for drinking, cooking, washing, crop irrigation etc. Water pollution occurs when unwanted materials enter into water system and changes the quality of water in a way that the water becomes harmful to environment and human health. Water is an important natural resource used for drinking and other developmental purposes in our lives. Safe drinking water is necessary for human health all over the world. Being a universal solvent, water is a major source of infection. According to world health organization (WHO) 80% diseases are water borne. Drinking water in various countries does not meet WHO standards. 3.1% deaths occur due to the unhygienic and poor quality of water.

Today acute pollution prevails in many rivers and one of those rivers is Brahmaputra. During its journey Brahmaputra River passes through the city of Guwahati. As the river flows along the city it receives huge amount of domestic sewage and industrial effluent.

As required quality of water varies with type of usage, there are different definitions of water quality. On similar notes, an attempt has been made to assess the ground water quality and water of Brahmaputra, Guwahati, Assam, India.

Some of the water pollution that is caused is by Direct Sources, such as factories, waste management facilities, refineries etc, that directly release waste and harmful by-products into the nearest water source without treating them. Indirect sources include pollutants that enter the water bodies via groundwater or soil or via the atmosphere as acid rain.

The photo shows the severe contamination in the River Brahmaputra caused due to lack of sewage treatment plants in the city. Source: Gplus article by Avishek Sengupta published on December 26, 2017.

Effects of Pollution on Water

i) In humans, drinking or consuming polluted water in any way has many disastrous effects on our health. It causes typhoid, cholera, hepatitis and various other diseases.

ii) Ecosystems are extremely dynamic and respond to even small changes in the environment. Water pollution can cause an entire ecosystem to collapse if left unchecked.

iii) Chemicals in a water body encourage the growth of algae. These algae form a layer on top of the pond or lake. Bacteria feed on this algae and this decreases the amount of oxygen in the water body, severely affecting the aquatic life there.

iv) Disruption in food chains happens when toxins and pollutants in the water are consumed by aquatic animals (fish, shellfish etc) which are then consumed by aquatic animals (fish, shellfish etc) which are then consumed by humans.

Water supply & its sources in Guwahati

Water supply is one of the most important natural resource bases that are inevitable for sustainability of human and environment health (Marobhe et al. 2007). There is a strong and direct link between people's health and improvement and the development of communities (Gleick 2002; WHO 2003). Due to an exponential increase in the population of the city, there is an enormous pressure on land and water over the past few decades. The current water availability and water supply do not match with the demands in terms of quality and quantity.

In Guwahati, the main source of drinking water is groundwater followed by water supplied by various agencies. The city of Guwahati is served by piped water supply in some specific areas which is not sufficient to meet the requirement of the people. The different organizations which supply water to the different parts of the city are Guwahati municipal Corporation (GMC), Public Health Engineering (PHE) Department (Govt, of Assam), Urban Water Supply and Sewarage Board (UWSSB), NF Railway and Guwahati Refinery. Guwahati Municipal Corporation has three water supply treatment plants at Panbazar, Satpukhuri and Kamakhya.

Water is pumped from river Brahmaputra to these plants and after processing in the plant water is pumped to different reservoirs located at hill tops and then distributed to the consumers by gravity main. Some areas are supplied through direct pumping also. As per the 2011 census, Kamrup (Metro) district has only 56% households equipped with an improved source of drinking water. A comparative table is presented below on Urban Sector Drinking Water Sources in Assam.

Importance of Drinking Water Quality Monitoring

Water for human consumption must be free from pathogenic micro-organisms and other substances which are hazardous to health. A water sample is normally rejected for drinking purposes if it is highly turbid, highly colored or has an objectionable taste, but the absence of these adverse sensory effects does not guarantee the safety of water for drinking. The enormous pressures exerted by rapidly increasing population, massive industrial activities, modern agricultural practices have resulted in discharge of a very large amount of pollutants to the water bodies.

The Department of Water Resources & PHED measures the quality of groundwater and surface water (including sediment quality) across the city. This information helps us to manage the city's water resources now and into the future. Water quality can be measured by collecting water samples for laboratory analysis or by using probes which can record data at a single point in time, or logged at regular intervals over an extended period.

Table 1: Comparative table on Urban Sector Drinking Water Sources in Assam

Sl. No.	Sources of Water	India fig. in census 2011 (Fig. in census 2001)	Assam fig. in census 2011 (Fig. in census 2001)
1	Tap Water	70.6% (68.7%)	30.2% (31.4%)
2	Wells	6.2% (7.71%)	17.8% (24.6%)
3	Hand Pumps/Tube wells	20.8% (11.8%)	48% (35.9%)
4	Other Sources	2.55% (2.3%)	4% (5.1%)
5	Treated Water	62%	29.4%
6	Covered Sources	—	4.5%
7	Uncovered sources	—	13.1%

Census report 2011, GoI.

Water quality has a direct relationship with water quantity - the flow in a waterway or the volume in a water body – hence the related department assesses these characteristics together.

Bureau of Indian Standards (BIS) has specified drinking water quality standards in India to provide safe drinking water to the people. It is necessary that drinking water sources should be tested regularly to know whether water is meeting the prescribed standards for drinking or not and, if not, then, the extent of contamination/ unacceptability and the follow-up required. Apart from BIS specification for drinking water, there is one more guideline for water quality, brought out by Ministry of Water Resources, Government of India in 2005.

A Study-Water Quality in Guwahati

As part of water quality study, AUIIP conducted water quality monitoring at three wards i.e. ward no. 25, 30 and 31 located in South Eastern part of Guwahati with assistance from PHED.

Three locations were selected at each ward and five samples were drawn out of each location. The samples were basically collected from deep tube wells and ring wells. A total of 45 samples were collected and were tested for parameters iron, alkalinity, turbidity, calcium hardness, total dissolved solids, sulphate, chloride, fluoride, total hardness, residual chlorine, nitrate, pH, arsenic, manganese and magnesium.

Sample collection for water quality monitoring conducted by PHED as part of AUIIP's water quality study.

The monitoring results indicate that most parameters for the collected samples except flouride, iron and manganese were under the maximum permissible limit as per drinking water standerds.

In areas like Borbari and Bakrapara, the levels of fluoride was above the maximum permissible level whereas the levels of iron was found to be above the maximum permissible limit in areas of Borbari, Ushanagar, Chandannagar, Nabajyotinagar, Krishnapur, A.G office-Beltola, Bakrapara, Basistha and Jonaki nagar. Excess Iron imparts colour and can cause stickiness of hair, loose motion and accelerates the growth of Iron bacteria whereas excess Fluoride can cause dental fluorosis, skeletal fluorosis and non skeletal fluorosis like constpation, gas formation, nausea, headache, sudden loose motion, vomiting,cramps etc.

Manganese was found to be higher than the maximum permissible limit in areas of Borbari, Bormotoria, Chandannagar, Nabajyotinagar, Bakrapara. Excess Manganese can imparts blackish colour and can cause neurological problems, tremors, facial muscle spasm and difficulty in walking.

The results suggest that in many areas of Guwahati drinking water quality when sourced from wells are not as per the Drinking Water quality standards as per IS 10500:2012.

In such situations, it is often difficult for people to manage clean drinking water when there is no availability of alternate drinking water sources.

Conclusion

The major ground water related problems in the city are-

a. Water logging;
b. Pollution from sewerage and garbage dumping;
c. Unplanned ground water abstraction;
d. High iron content in ground water; and
e. Sporadic high fluoride, iron and manganese content.

All the problems, except the high Fe and F content of ground water are anthropogenic and can be related with rapid urbanization process.

It could be concluded that water quality in Guwahati city in the recent times deteriorated tremendously due to various factors. As the city continues to expand at a frenetic pace, so does the demand for water. The city of Guwahati is facing water shortage but the situation is uncalled- for in Guwahati because we have a huge reservoir of surface water in the form of the Brahmaputra. An environment friendly city is one that minimizes waste and economizes to the maximum.

Guidelines would be set out progressively to reduce waste in all its forms, to avoid the accumulation of problems and to make full use of existing structures. The Government needs to take up new water supply schemes in the fluoride affected districts and the contaminated groundwater sources should be discarded. The authorities with the help of experts should evolve low cost technologies to minimize the presence of fluoride in potable water in the affected areas.

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Assam Urban Infrastructure Investment Program(AUIIP)'s contribution to the problem of drinking water scarcity in the city

Laying of D.I pipe at North Jyoti Nagar Site

Construction of water storage reservoir located in Gopalnagar.

Construction of water storage reservoir located in Kenduguri.

The Assam Urban Infrastructure Investment Program is a key urban infrastructure initiative of the Government of Assam), and aims to improve the urban environment and quality of life in the cities of Guwahati and Dibrugarh through the delivery of improved water supply, sanitation, solid waste management (SWM), drainage infrastructure.

In context of the existing situation, AUIIP aims to provide potable drinking water to the residents of South-East Guwahati by constructing a water treatment plant where the intake source of water will be the River Brahmaputra, which can also be termed as the lifeline of Guwahati city and six water storage reservoirs. This first phase of the project will cater to the need of a population of 510185 people. The areas to be covered by AUIIP's project include Gopalnagar, Hengrabari, Noonmati, Northjyotinagar, Nabajyotinagar, Basistha, Panjabari etc. Currently the construction of the water reservoirs and transmission lines mains are under progress.

Presently, the ongoing packages for Guwahati are "Construction of Storage Reservoirs of Various Capacities at Three Locations (Gopalnagar, North Jyoti Nagar and Kenduguri) Approach Road and Allied Works in South East Guwahati Water Supply Project (Package 2A)" and "Construction of Water Supply Transmission Main Pipelines and Allied Works (Package 01)". The contract amounts after variation for Package 2A and Package 01 are 38.04 crores and 105 crores respectively and currently the total loan amount used for Package 2A is 18.44 crores and for Package 01 is 82.40 crores. The Program uses a Multi-tranche Financing Facility (MFF) modality and is going to be closed on 29th June 2021.

Assam Urban Infrastructure Investment Program aims to improve the drinking water quality of the South east Guwahati and to improve the quality of life.

AUIIP

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