

CHAPTER-8

WATER AND WASTEWATER AUDIT

2016-2021





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Water is a precious natural national resource available with a fixed quantum. The availability of water is decreasing due to the nation's increasing population, as per capita availability of utilizable water is going down. Due to people's ever-rising standard of living, industrialization, urbanization, and the demand for fresh water are increasing day by day. The unabated discharge of industrial effluent in the available water bodies is continuously reducing the quality of these ample water sources. Hence, the national mission on water conservation was declared by the then Hon. Prime Minister Narendra Modi as '*Jal Shakti Abhiyan*' and appealed to all citizens to collectively address the water shortage problem by conserving every drop of water and suggested conducting a water audit for all water use sectors.

Water audit can be defined as a qualitative and quantitative analysis of water consumption to identify means of reducing, reusing, and recycling water. Water Audit is nothing but an effective measure for minimizing losses, optimizing various uses, and thus, enabling considerable conservation of water in the irrigation sector, domestic, power, and industrial. A water audit is a technique or method that makes it possible to identify ways of conserving water by determining any inefficiency in water distribution. Measuring water losses due to different uses in the system or any utility is essential to implement water conservation measures in such an establishment.

Importance of Water audit

- Helps proper documentation of water distribution system in any establishment.
- Determines the problems and risk areas to understand water happenings better when it leaves the source point.
- Water audit is an effective management tool for minimizing losses
- Optimizing various uses and thus enabling considerable consumption of water
- Efficient use of existing supplier

It is observed that several factors like climate, culture, food habits, work and working conditions, level and type of development, and physiology determine the requirement of water. A community with a population between 20,000 to 1,00,000 requires 100 to 150 litres per person (capita) per day. The communities with a population that can consume over 1, 00,000 requires 150 to 200 litres per person (capita) per day. As per the standards provided by WHO regional office for South-East Asia Schools require 2 litres per student; 10-15 litres per student if water-flushed toilets, Administration requires (Staff accommodation not included) 50 litres per person per day, Staff accommodation requires 30 litres per person per day, and for sanitation purposes, it depends on technology.

**Water Audit:**

Water audit can be defined as water used for all activities carried out on campus from different water sources. This includes usage in all residential halls, academic buildings, on-campus and on grounds. Wastewater is referred as the water which is transported off the campus. The wastewater includes sewerage, residence, hall water used in cooking, showering, clothes washing, and wastewater from chemical and biological laboratories, which ultimately goes down in sink or drainage systems.

Water consumption in the University:

From the data collected for the water audit of Dr. Harisingh Gour Vishwavidyalaya, Sagar, the water distribution and water consumption pattern is noticed as follows.

- Study area - Total built-up area - 175000 Sqm.
- Study area -33208 Sqm.
- Water supply – Nagar Palika Nigam Sagar & own source (Tube bore & Dug well)
- Distribution system – Water Pipeline
- Transmission of water - N. A.

Water Consumption

- Metering to water supply - Available at Source
- Identify the leakage and losses – No
- Storage of water tank – 32 Lakh Litre/ day
- Total consumption of water – 18 Lakh Litre / day

Water user profile

- Water users include students , staff, visitors etc.
- Total number of water users – 8500 No.
- Number of employee – 700 No.
- Number of students – 6800 No.
- Rain water system available – Yes/No – Yes
- Is rain water harvesting system working ? Yes / No –Yes

Total water consumption in Units from 2016 to 2021

Details	2016-17	2017-2018	2018-2019	2019-2020	2020-2021
Water consumption	5760	6120	6540	7776	7776

Note: 100 cubic Feet of water = 1 Unit



Fig-8: Raj Ghat Dam



Fig-9: Overhead tank



Fig-10: Water box and supply system

**Precautionary measures:**

University should consider following precautionary measures for improving campus environment.

- Non-teaching staff or peons in the concerned section should take responsibility of monitoring the overflow of water tanks.
- A large amount of water is wasted during the practical process in Science laboratories. Designs of small water recycling systems help to reuse water.
- Producing distilled water in the laboratories required a large amount of water to distillate. To produce 1 litre of distilled water required more than 33 litres of water. To avoid more wastage university should design a common distillation plant for Science Department.
- Reduce chemical waste formation in Chemistry laboratory, adopt the principles of green chemistry to reduce chemical waste.
- Pipes, overhead tanks and plumbing systems should be appropriately maintained to reduce leakages and wastages of water.
- Water harvesting system must be install in each building of the university, which will help to store water for routine use