

Investigating water efficiency for Institutional Building

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Abstract-Water is basic to our quality of life, to economic growth and to the environment. Water use across various sectors in India is on the rise. Different evaluations and projections show an expanding pattern in water interest for horticulture, mechanical and local uses in the coming decades. India is likewise anticipated to move into the class of water focused on country by 2020. Populace development, changes in land utilize, and environmental change are putting weight on existing water Resources worldwide and it is not sure that provisions are sufficient to take care of the expanding demand for water.

Key Words: Water Audit, End use, Appliances, Survey, Usage.

1. INTRODUCTION

Water is critical for creating countries, for example, India. Water is a fundamental asset which underpins financial development and keeps up everyday life. India has just eight percent of the world's new water to meet the requests of twenty-two percent of the world's kin (World watch Institute, 2006). India should have the capacity to utilize water economically and this gives the nation a major test. A lot of the aggregate water utilization is for private utilize. The expansion interest for water has put weight on water supply framework, which has prompt ecological issues, for example, overexploitation of water assets, and breaks in a critical position of the biological system. The expansion in the interest for water has made more wastewater. It puts a weight on wastewater plants. Enhancements in family unit water effectiveness could decrease the weight upon water supply and waste water treatment. Water proficiency does not mean controlling the water supply but rather its reasonable water utilize, which will decrease wastage.

Expanding water productivity benefits singular clients and additionally the group, locale, and condition. Singular advantages incorporate lower water and sewer charges, bring down vitality costs for warming and pumping water, and decreased synthetic utilize. On the nearby and local levels, diminishing water request expands the accessible supply to bolster new financial development without the time or cost of growing new

water sources. Expanded water utilize effectiveness additionally underpins ecological reclamation and assurance. Lessened request diminishes the opposition for water among urban, horticultural, and natural needs. Water spared through proficiency measures can be utilized to address new issues, as a result extending flow water supplies while ensuring the earth by decreasing both spillover and the requirement for wastewater transfer. Water connects nature, economy, and personal satisfaction for India. Similarly as inexhaustible water offers imperativeness to our district, the absence of water can strain common assets, smother financial development, and disturb our day by day schedules. While this guide can be valuable almost anyplace, certain angles concentrate on India.

A water review (otherwise called an evaluation) is a precise overview of all water-utilizing installations, machines, gear, and practices at an office or grounds. An intensive water utilize review is the premise of a water utilize proficiency change plan and sets the establishment for the whole exertion. A water review is an on location study and evaluation of water-utilizing equipment, installations, gear, arrive checking, and administration practices to decide the effectiveness of water utilize and to create suggestions for enhancing water-utilize productivity. In straightforward words, a water review is a deliberate audit of a site that recognizes the amounts and qualities of all the water employments. The site may change from an open water utility, office (institutional or business properties like shopping centers, office, schools and so on.) or a family unit.

2. METHODOLOGY

2.1 End use analysis method:

End Use Analysis (EUA) is the initial step to understand the components of school building water use. It has been used for water demand management in Australia.

2.2 Basic principle:

End Use Analysis (EUA) is one of various strategies that can help water utilities to comprehend the interest for water, to empower projections of water request and to plan powerful request administration programs (White and Milne, 2004).

"EUA includes the disaggregation of water request by client segment and at last by end use inside every area. It concentrates on the components and advances that influence water utilize, including rising patterns, so authentic examples are less important" (Turner and Campbell, 2003). A regular urban group would ordinarily be disaggregated into private, business/modern and institutional clients. The business part could be further disaggregated into single and multi-private clients and into particular end uses, for example, toilets, gives, showers and clothes washers for the indoor segment (going to sewer) and garden water system and auto washing for the open air segment. By disaggregation of water use along these lines could a point by point comprehension of water interest for each end utilize.

The key segments in the water review strategy embraced for the SGI building included

i. Pre Audit Information

- Preliminary writing survey of ideas and strategies identified with water review for utility, offices and family units.
- Walk through the whole working to comprehend the way of water uses and the frameworks introduced in the building.
- Discussion with the managerial officers, housekeeping and kitchen representatives on the different water utilizes amid the day and the wellspring of water.
- Regular discourses with the managerial division including the circuit tester, housekeeping and container Incharge were led all through the activity on ebb and flow circumstance and the past patterns in water utilization, ebb and flow sources, supply sum, source metering, circulation, stockpiling, wastewater era and so on.

ii. Base-lining and benchmarking

The water review for CSE included both essential and optional information accumulation for different recognized water employments. Essential information gathering incorporated the accompanying parts

- Development of survey configuration for individual water utilize, cleaning, cultivating and so on.
- Sample review of SGI staff to gauge singular water utilization on clean and drinking purposes in light of poll organization. Of the 157 workers, 34 embraced seven days in length perception of their own water use in toilets and for drinking. Accordingly the per capita normal of individual water utilize was figured for the review in light of this 20% delegate test.
- For other water utilizes as a part of kitchen, water system, wiping and so forth essential information on time, examples and recurrence of water utilize was recorded

over a changing timeframe.

- Flow rate count from the taps stream rates and number of all water utilizing installations/hardware was additionally attempted.
- Secondary information accumulation included gathering of number of guests going to SGI over a time of 7 days.
- Collating records of water pumped to the overhead tanks, normal bore well withdrawals, DJB water bills and so forth to evaluate real supply.

iii. Conducting a water review at the building level

- The information gathering and preparing for individual water utilize including drinking, flushing and confront/hand washing, cleaning, water system, utensil washing and so forth was done on the premise of real utilization.
- One liter jug and 10 liters basin strategy was utilized to gauge the stream rate from different taps utilized for an assortment of purposes. This was then computed with the recurrence of utilization to decide the genuine water utilize.
- As some portion of the review, staff individuals recorded the quantity of day by day visits to, flushes in toilets and urinals, alongside day by day recurrence of hand washing and normal time of water spill out of the taps.
- The information for all the above utilizations was ascertained for fluctuating day and age for e.g. individual water utilize review depended on seven days in length perception by the SGI staff to ascertain per capita utilize

3. RESULTS

Table 3.1 Activity wise water use composition

Sr. No.	Activity	Total water use in lit/day
1.	Drinking	1493
2.	Toilet flushing	1222
3.	Hand and face washing	2291
4.	Mopping and cleaning	5970
5.	Lab	300
6.	Gardening	2692
7.	Total	13968

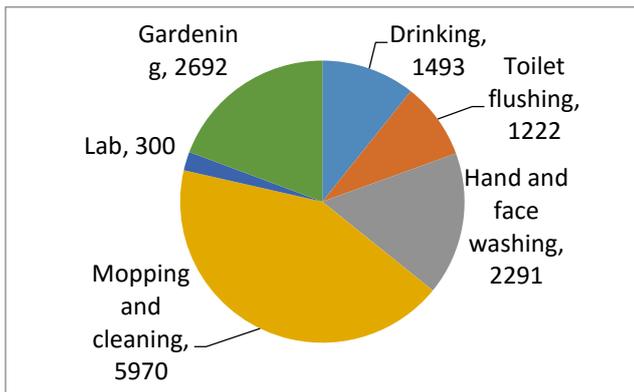


Figure 3.1 Activity wise water use composition

Table 3.2 Total water supply

Sr.No.	Heads	Total water use in lit/day
1.	Average daily water used from overhead water tanks	11450
2.	Total calculated water consumption from the water audit	11576
3.	Difference	126

There were no visible leakages that were observed during the audit exercise at SGI. The difference between average daily water used from overhead water tanks and total calculated water consumption from the water audit is due to some assumptions are made during the calculation.

4. CONCLUSION

Based on the information collected and observations, the following can be recommended to reduce water use and increase its efficiency.

- Replacement of single flush cisterns with dual flush cisterns, in both men and women’s toilets. At present the toilet commodes have 7 later flush which can be replaced with 2/5 litres or 2/4 litres dual flush cisterns. Dual flush WCs operate on a split button with the user having the option of which one to use. Normally the littler catch works the shorter flush of 2 liters which is sufficient for

flushing fluid waste, while the bigger catch is for 5 litres flush for more generous waste. This can reduce water use by around 30-40% and save 3000 litres per day.

- The urinals in the men’s toilets, which at present use about 0.2 litres of water per flush could be, replaced with water-efficient urinals use 0.1 litres per flush, then 150 liters water is saved per day. Waterless urinals could also be installed in the toilets, but there are some concerns with its maintenance and effectiveness.
- It is recommended that flushing should be avoided for disposing toilet paper, uses a rubbish bin and averts unnecessary flushing.
- Installations of water meter on the bore well, open well to measure daily withdrawal and on the motor drawing water from the Panchganga river line. Now days on the water pumped to the overhead tank is metered. Metering the bore, open well and Panchganga river line would ensure records of the supply balance from bore well/ open well/ Panchganga River pipe to the storage tank and overhead tanks thereafter.
- Sometimes problems in toilet and urinal flushes due to not proper maintenance or any other problems in fixtures like locking of flushes so more water is used in toilets to reduce this water loss periodically checking and maintenance of fixtures are important.
- One monitor should place to fill the water coolers because of many of times water coolers get overflow. To avoid these losses sensors must be installed.
- From our survey most of the water is used in toilet cleaning i.e. 23880 lit/day. Toilet cleaning is done two times in a day by using water taps directly. To avoid these maximum water use we should cleaning the toilet one time in a day in proper way this save the water up to 11000 lit/day.
- In a break period of lectures no of users increase in gents toilet so some boys use toilets instead of urinals and more water is used in that period. To avoid these water use boys must use urinals.
- Everyday water is filled in overhead water tanks sometimes water is overflow to avoid these water loss sensors or proper monitoring must be done.
- To reduce flow rate of water from taps, taps with air devices are provided. Introduction of air bubbles into the water, increasing flow water volume with reduce flow but producing the same effect. It reduces flow rate volume by 50%.

5. REFERENCES

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