

Sustainable Urban Drainage System Monitoring for River Shipra

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Abstract: *In this paper we will emphasis on Water Monitoring by SUDS i. e. taking care of both quality and quantity requirements and that all under the environment protection act 2021. Here we will discuss various problems that come under the monitoring networks by SUDS. The Environment Protection Act 2021 emphasis on monitoring requirements and that too in real time, the time lapse will be less than an hour. Various streams are been seen across the country, one of the most important is River Shipra as in Puranas it is also known as “Mokshadayini” meaning “giver of liberation for Nirvana” [1]. This is the reason every 12 years Singhastha is been organized on the river where Lakhs of pilgrims came to Ujjain to take a Holy dip in river Shipra on mainly Ram Ghat [2, 3]. The Ram Ghat is the place where Lord Ram did the Tarpan of his father King Dashratha [4], this is why this place is marked Holy from years and it increases our duty to keep the river clean as much as we can [6]. Here in this paper monitoring requirements of environment protection act 2021 i. e. SUDS are been taken, concerned and a proposal for sustainable development of River Shipra is been taken in consideration for SUDS (Sustainable Urban Drainage System).*

Keywords: Sustainable Urban Drainage System, Water Monitoring, Environment Protection Act 2021, Monitoring Networks, River Shipra, Puranas, Nirvana, Ram Ghat, Monitoring, Sustainable Urban Development

1. Introduction

An Environment Management Plan was last approved more than 25 years ago in 1996 [5, 13]. At that time the whole world pledged for clean air and pure water for use, [7] also to protect most of the species as they balance the food chain and nature. [8] The water at that time for drinking was in abundance so no hard steps need to be taken for clean and safe water, [9] but recently in Sun City South Africa what happened? [10, 12]

Yes, we all know that Sun City is now free from water. Why? [11]

I don't think anyone don't know, what exploitation of water we have done there. The river water is affected mostly by storm overflows, drain overflows with various factors including industrial and agricultural waste. [14] The present situation become hazardous as the existing treatment plants are not able to cope with the volume of waste generated daily. [16] So if we talk of high rainfall overflow it is most horrifying situation to face. [15]

In the new methods of monitoring the drains have Sustainable Urban Drainage System (SUDS) monitoring and Natural Flood Management (NFM) monitoring systems, these include data and efforts form agencies as local government, highways, Local Nagar Nigam, drainage board, Public Health Engineering department, Pollution control Boards, agriculture equipment developers, industries etc. each of the agencies have to take part of its own in the development of making the river water pure and pollution free. [17, 21]

Recently Government of India implemented Environment Protection Act 2021 for helping environmental legislations imposing major penalties on the defaulters. This act aim to improve air and water quality, practices to be made more

clear, tackle waste efficiently, increased the process of recycling, stop the declination of various species on Earth, etc. [18] This act provides the Government more powers to set new quality measures imposing more heavy targets and the act helps the government to establish the office of Environment Protection at a high level, which will be holed by government but will be a public sector unit and here public can help in analyzing data's and post various binding targets for the polluting industries. [19]

2. Material & Methods

At the same when Indian Government is trying to impose an Environment Management bill an Environment Audit committee submit a report of various rivers in India, which looks horrifying as because many outlets of urban areas as well as industries dump directly in various rivers polluting them. [20] Now due to new regulations various water and sewerage companies have to install EDM i. e. (Event Duration Monitor), for the event time that can be a week at the minimum and a month at maximum. This will be continuously monitored by local authorities for the event time. The act also helps in monitoring of river water upstream and downstream of the event area so to maintain the quality of discharge, by implementing this method we can help many people to regulate the environment management plan of the river. [22] By implementation we can observe a dip of 91% in the pollution and the water becomes good for usage.

Another big problem is heavy rain discharges as these cannot be controlled easily and they run off to meet the river at a brisk rate leaving us helpless. [21] There are regulations of heavy discharges in section 81 (5) and 81 (6) of Environment Protection Act 2021. The water and sewerage companies have to report the heavy discharges areas to local authorities within one hour so as to control the disaster as soon as possible that is why we have to build a core Nation

wise disaster team to help NDRF i. e. (National Disaster Response Force). This section advances to 82 which states that the overflows have to be analyzed in real time both upstream and downstream monitoring of Shipra River.

The Proposal – The sections of the most promising Environment Protection Act 2021 are very good for the flood or overflow but there are many areas where the quality monitoring issues come some are –

- 1) **Timing** – We are talking of the real time monitoring but it needs many installations and networks. Recently the waste and sewerage companies were told to conduct a pilot plant monitoring to various locations but this is basic problem as the division of the river by location in a single urban structure is not so easy and the running of a pilot plant is very expensive so the most important question arises that **Who will bear the cost?**
- 2) **Measurement Equipment:** The big power mains and various communication towers are not present everywhere, which needs long time to get installed. Secondly the monitoring can be done in two different ways as –
 - a) Directly in River i. e. the equipment is attached to the structure and the electricals and electronics of the equipment are well sealed and protected.
 - b) The river is been allowed to flow in a chamber where the testing is been done i. e. we pump the river water to equipment installed in facility.

The both cases needs various amount of build up's and both are not so easy. Secondly the pilot project is working of different points so the real time continuous monitoring cannot be done easily which is a big backlog to the monitoring and analysis method.

- 3) **Data Logging and Loss in Communications:** Most of the equipment after long time of installation suffers internal data logging so that data can be installed easily but many of them don't share the data which has to be handwritten from equipment or have to purchase particular app from the company to get data. The app can destroy the data or mislead that we don't know also the communication needs heavy internet and that too without loss in communications. This is the most difficult point in various areas of the span of river. Various data and their transmission differs site to site making it more difficult to compile. So, in remote areas we need satellite communications for data transfer, still the changes in the site data makes it difficult to combine.
- 4) **Data Display and Management** – In the data display the various sewerage companies can analyze the data which is rarely seen such as –
 - Baseline Data over Seasonal Differences.
 - Level of harm from different outfalls.
 - Introduction of various pollution sources.
 - High Pollution alerts.
 - Waste water treatment site data.
 - Protection of drinking water plants.
 - Requirement of new plants.
 - Areas for emphasis and urgent breaks.

Aquifers water management data is most important as it is the one who will tell that the water from the river is drinkable, usable or not.

5) Regular servicing and calibration of equipment and

6) Site Location in urban atmosphere

Are also very important points we have to look forward and should mark them very important.

3. Conclusion

The complexity, nature and size of river effects the monitoring equipments and sites very much so we impose the requirement of various potential suppliers to meet the requirements. The key issues were also analyzed such as –

- Natural Flood Management
- Sustainable Drainage
- Limitation of urban drainage
- Limitation of public toilet waste to minimum
- Reducing the peaks in heavy rains
- Identify the root causes of particular River Pollution

We know improvement in the water quality requires a lot of money but it is essential. The new monitoring networks will give the clear picture of water quality from surface to bottom so it will be easy to take decisions in favor of environment as quickly as possible to let the rivers **Re - Birth**.

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