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Smart water management system in tier II cities in India in achieving the SDGs

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***Abstract*---**The water crisis is raging in almost every part of the country or in heavy rains, cities are flooding. No city has ever been wise enough to offer an effective water management system. However, future smart cities could be a role model for other cities where they can take the lead and develop themselves accordingly. In every city the water crisis reached a critical level as it experienced the worst drought. Several other states are fighting droughts, dehydration, loss of leaking water and adequate rehabilitation services. Smart cities can only be called smart if they wisely develop sustainable resources through the integration of new jobs and social responsibility. Water management and harvesting rainwater are very important. Therefore, it is important to speed up the process of implementing water conservation measures by all means to do everything possible to conserve and reuse water. A matter of current concern is that water management in these cities is limited to wastewater treatment, quality monitoring and the conversion of wastewater treatment plants into recycling centers, including power generation and design of a water supply network. However, there are no plans to build new reservoirs or access to old water dams. Smart Water Management became an area of great attention as governments from around the globe incorporate smart policies into their regional, urban and national policies. Possible use of good water management system is extensive and includes explanation for water quality, amount of water, effective irrigation, leakage, flow and pressure, droughts, floods and a lot more. This paper based on secondary data and try to focus on the need of smart water management in tier II cities and what steps government is taking for the betterment of water system in these cities.

***Keywords*---**smart water management, rainwater harvesting, social responsibility, smart cities, water supply networks.

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Introduction

Water is one of the basic necessities of life. The ever-increasing demand for water from economic and population development in the world requires the continued pursuit of water management activities, ensuring rational development and utilization of water resources, but also the construction of equipment and networks needed to maximize water supply and quality. As the most important factor for efficient water and wastewater operations, the operation of water and sanitation companies should be considered. Its effectiveness is determined by a number of factors, including: pressure from external stakeholders on the cost of water supply and reception systems, municipal sewage management, depletion of drinking water resources and the need to diversify supply resources, or search for prudent resource management practices in case of scarcity, the size of the distribution of water supply systems especially in urban areas with various details of the field, structure, social features etc.

Smart Water Management utilize Communication and Information Technology (ICT) as well as immediate data and responses as an essential part of the answer to water management challenges. SWM became an area of huge interest as governments from around the globe incorporate smart policies into their regional, urban and national policies. Possible use of good scheme in water management is extensive and consist of solutions for quality of water quality, amount of water, effective irrigation, leakage, flow and pressure, droughts, floods and many more. By using infrastructure of smart water management like smart meters, sensors, monitors, satellite mapping and GIS and other information distribution tools in water management, real-time answer can be developed and wider networks can work together to reduce current water management challenges. To support continued growth of smart water management, IWRA has partnered with Korea Water Resources Corporation to understand better and promote the benefits of solutions of SWM via projects of SWM. A major outcome of this teamwork will be the Smart Water Management which aim to encourage the sustained implementation of SWM by distribution the knowledge and understanding increase by SWM model project from whole world.

The smaller cities are basically, with 10 Lakhs population and are usually regional areas such as state capitals or industrial center. Other examples include Cochin, Pune, Dehradun and Mangalore. The smart water management marketplace was estimated at 7.73 billion dollar by 2020 and predictable to reach 15.12 billion dollar by 2026, with a CAGR registration of 13%, from 2021 to 2026. The rising population, urban sprawl, and the requirement to address the charge of sustaining aging infrastructure, are some of the main factors in the enlargement of an intelligent water administration market. Similarly, with the growth of IoT, the smart cities in various areas are expected to stimulate the growth of the study market. Technological advances related to the technological meters and their addition with communication solutions (SCADA, GIS, etc.) have altered water management systems, addressing the challenges facing water resources, citizens, and industry to fail to charge and water management.

Review of Literature

Dr Sheetal Agrawal 2021 conducted a study on water management in the agricultural sector. Aamir Khambati 2021 proposes an effective solution to the critical problem of water resource management. With the growing awareness of the need for water conservation, the world is preparing to adopt and use modern technology to make better use of dried dams. Tanuja Patgar 2021 proposes a realistic rate of use, leak monitoring, the ability to control water availability in the event of a leak, a fully automated community platform, and apartment buildings to set up their payment system. US Chandran 2021 conducted a study on an integrated urban resource management strategy for a smart city in India. Shital Chaudhari 2021 researched Smart Distribution Control System for Smart Building. Manish Kumar 2021 introduces new insights and recommendations for future water sustainability directly in the country and applies to numerous countries in southern Asia. S.P.Tucker 2021 explores looks at when participatory groundwater management initiatives in Andhra Pradesh over the past three decades have bring prosperity to informal and small farmers while addressing climate and environmental harms. Safali Surabhi Rout 2020 uses the seasonal limit on water distribution which saves a large amount of water loss over the same supply per year by looking at changes in end-of-season consumer behavior. Sushmita Chakraborty 2020 talks about empowering Smart Cities that contain Internet of Things technology and evidence of a variety of Smart Cities global applications. The leading part of the article shows the necessary considerations "How to set up 100 New Smart Cities in India. SG Taji 2020 various parts of the smart city, the significance of water sustainability in the smart cities, the role of climate change, and smart water management in smart cities were talk about. Khushboo Gupta 2020 shows that although the high standards of proposed SCs in India are similar to those of existing SCs in developed countries, the basic objectives and strategies vary and are shaped by the urban challenges facing Indian cities. Smart and water management research and its impact on improving access to and access to water for all.

Need and Significance of the Study

Water is one of the world's most valuable resources. According to the United Nations, one in four children worldwide will be living in areas with limited water resources by the year 2040. In addition, water pressure is directly related to areas of greatest need, such as those experiencing rapid, uncontrolled urban sprawl or those that are naturally water-scarce. Over the next two decades, more than 300 million people in India are expected to move to cities. Overseeing the country's population and the influx of people from all over India through various educational and employment opportunities puts great pressure on public authorities to provide basic services such as sanitation and clean water. When we say that the next world war will be fought by water, we will still find a clue in it and not do our homework to save water. This is not a city-related but national issue. This paper basically try to focus the need of smart water management in 2 tier cities and how the smart water management is done by the government in these cities to make them smart cities.

Objectives of the Study

- To study need of Smart Water Management in Tier II Cities.
- To analyze the impact of Smart Water Management on the cities.
- To find out the steps taken by the government for enhancing water management system in these cities.

Research Methodology

This paper basically depends on qualitative research and secondary data has been taken into consideration for the study. The data is collected through various sources like newspapers, magazines, various government websites of water management, various companies profiles dealing in this sector, journals, papers etc.

Findings

Nagpur is the first city of India to provide private operator water under the PPP type and make sure to the citizens to have access to safe drinking water for 24 hours For the past 14 years, Rajasthan using trains to supply water to its regions. This year from January, the Department of Public Health Engineering (PHED were operating a 50-car train from Bilwara to Ajmer daily for carrying 25 liters of lakh. Although these measures are essential, those measures were not initially required for these cities to manage their water systems effectively. And with the announcement of a list of smart cities, it is time for these cities to take a better look at their management of water plans.

The first metropolis to lead is Nagpur. It is now incorporated in the list of smart cities with a populace of over 2.5 million and is the first largest city in the country to deliver water to a private person for 25 years. Under this program the main objective was to offer 24% safe drinking water to 100 percent of people including slum dwellers within five years. The second objective was to decrease toll-free water (50% of unregistered, unrecorded and unpaid urban water supply) to less than 25% in ten years. The scheme involves the management of the whole water cycle from production, transportation and treatment storage and release to customer taps. It included the installation of more than three housing service links, the treatment of facilities, utility pipelines and dams.

Every home now has taps and meters, whether jhuggi, apartment or bungalow. There is accountability for each water supply provided for the first time. The plan of the project was to solve water problems that are exhausted and toll free. The city provided 570 million liters per day of treated water and only 175 million liters was charged. Many meters be missing or inactive and the city received water for six to ten hours or more days. On the sewage side the city was producing 555 million liters per day sewage and has a ability of only 100 million per liter sewage. unprocessed sewage polluted the water bodies that supply water to the whole city.

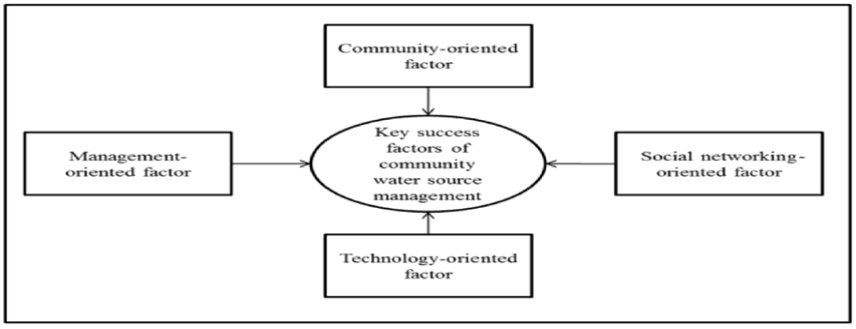
38,000 million per liter wastewater is produced by the cities of Tier I and Tier II in India and For this project, a private company has spend 30% of the predictable project costs, 70% of which is as of the JNNURM program, allocated by

government. The project was started by Nagpur Municipal Corporation. The project emerged as an example of the case of other cities in the start up of Atal Mission for transformation and Urban alteration (AMRUT) and Smart City. The company has also launched a wastewater treatment project where the National Thermal Power Corporation will recycle 200 million liter per day water held by STP through its Mauda machine. By this the city will get another 200 million liters a day of water which is sufficient for 200 lakh people.

The industrial sector is one of the largest water users which is provided with clean drinking water. They can effortlessly use treated wastewater up to second level. 85% of the water is supplied to the cities there. It merely needs treatment and industry supply. Industrial drinking water can be exchanged for accommodation and drinking. Of the 1,000 ml per day transferred to the city, about 800 mld returns as waste. In this case about 500 mld can be take care of and given to companies work for commercial purpose, water city parks and thermal power stations. This could resolve water shortages in almost each city. Faridabad is ready for this type of project as the trading platform is vast. Providing industrial and industrial clean water will assist the city to manage its water needs. It can also create a city that falls into subsidized consuming water for its people.

Water production capacity of Gurugram is around 320 million liter of water per day. With a populace of 15 lakh, water utilization should not exceed 200 liters per day per person, but the region is dehydrated. The cause is that there is no response to the supply of water, no plumbing repairs, no idea what is being used and what is being provided and the amount exhausted. Haryana Power Generation Corporation Limited is work on about how to use clean water in the wild for all vegetation. Negotiations are ongoing with the Ghaziabad municipality and the NTPC, Dadri, for the supply of sewage used to the Dadri water plant.

The company as well applied for the NDMC 24 hours whole week water distribution system. As for dealing with the Dwarka water system, integrated STPs with the capacity to supply 10 lakh liters per day in Dwarka is the most excellent solution. The capability can be set up within two weeks and can deal with sewage from a suburb. It also provided irrigation solutions for cricket stadiums and stadiums where STP was set up on site for waste disposal and re-use of treated water.



In India, a recent study estimated that more than half of all groundwater is currently overused. And, of course, the fact that much of India by 2030 is yet to be built on a model of smart cities, provides an opportunity to ensure that water management systems are integrated into all design, construction and management of building and development measures. . This is especially true in the case of formal urban assemblies - either in the development of fertile areas, or in brown areas (which require a system that emphasizes water management). Experts are of the view that as India moves closer to its goal of intelligent and sustainable urban development, a comprehensive plan for water management will be the key to combating current water scarcity rates. Harvesting rainwater is an integral part of this strategy. In simple terms, it includes the collection of water in areas where rainfall enters and eventually this water is used later.

Significant demographics make it even more important for urban planners and developers, as well as to integrate smart urban planning solutions, sustainable energy, and water and waste management. Of these, water identifies them as the most critical needs and therefore developers should focus on integrating water solutions at the level of understanding. Even the government should encourage and encourage developers across the country to ensure that water management is done effectively. In addition, there should be a clear plan on how cities should be connected to their water resources to ensure a sustainable water supply. More clarity is also needed in the treatment of wastewater, domestic and industrial water. In smart cities or anywhere else, water management should be free of floods or floods due to heavy rains and rainwater should be turned on for reuse and re-use for various purposes. Also, a proper drainage system should be part of the infrastructure so that water can flow into the ground and maintain a proper water table.

Using the terrace as a holding (roof harvesting), and installing filters and water treatment facilities leads to an increase in water supply to ensure that our residents have access to water without additional load on the groundwater table. It will lead to less flooding on roads and low-lying areas, which also benefit residents. some effective strategies such as the Sewage Treatment Plant (STP) that can be put in advance to construction projects can serve as an additional water source that takes care of land planning needs. This not only ensures that existing fresh water sources are left untouched, but projects keep it green and our water tables remain more healthy. There will have a permanent water shortage in the next 20 years. It is important to recycle water regardless of the size of the piece. It is necessary to have plants to clean the sewage and water, the water needs to be

reused in the flush, in the gardens. Nowadays, drinking water can be produced from these medicinal plants. Water management should not be restricted to smart cities.

The water industry in the present context operates in multifaceted treatment, maintenance, and sharing systems to protect health of the people and the environment. Allowing the Internet of Things and the water sector encourage better treatment, storage and allocation of water in different sectors. Estimates suggest that by 2025, 50% of the population will be living in areas with high pressure of water. According to a Vision report on world water Vision report, there is a water crisis. But the problem is not about have too little water to meet our wants. It is a problem of mismanaging water and billions of people and the environment will suffer shoddily.

Water is to be sure a basic need for human use various industrial needs etc. But most importantly, use it properly. With the arrival of industrial 4.0, Internet of Things is a most important technology with a wide range of solution in our water matter. Regular meter reading, leak recognition, and water excellence monitoring are just a a small number of the IoT application that work with a variety of water businesses with 100 percent correct results. A smart IoT enabled water meter solution has the ability to keep a strong track on quality of water, pressure, and temperatures inside the pipes. Therefore, the idea of Internet of Water encourage better communication of water supply together with green water, medicinal plants, plumbing, consumers, relief firms, etc. It also allow the authorities with important information about the machines to be used on the site. IT is a exclusive technology with many application in the water sector such as:

- Invisible dispensation in the water supply chain.
- Pipeline ground checking with real-time alert.
- Automatic meter interpretation for correctness.
- Better water use and administration as a resource.
- Monitoring of quality of water.
- Essential measures for a sustainable outlook and reduced waste.
- Water conservation strategy using data analytics and predicting algorithms.

The Internet of Things gave birth to the efficient and smart operation of the water sector. Its intellect continues to transform the water division through more applications and enhanced water management.

Water intelligence programs rebuild the water industry

IoT is the most excellent measures to conquer this situation and have few ideas that can be combined with the water businesses to effectively establish a smart water system.

Smart Irrigation Regulator

Smart irrigation is a piece of elegant farming that helps farmers to check moisture and soil moisture data. This irrigation controller uses this data for its

performance. It gives the farms automatic advantages that lead to less avoidable water wastage.

Smart Water gauge

IoT Smart water meters can be utilize for any purpose whether industrial or commercial. These meters are capable of monitoring the quality, pressure, and quantity consumed at home or in the industry.

IoT water flow gauge

It is very hard to control the quantity of water flow between the many sharing lines. With the assist of a smart IoT flow meter can get the status of each pipe in real time. These guages allow to administer levels of water between allocation lines very quickly and make correct decisions regarding supply of water. The great advantage of using an IoT flow meter is to save water by understanding how much water is needed for a exact distribution line. It also helps in preventing loss of unused water which is caused by inaccuracies of meter and assist to bring in correct charges.

IoT Water control device

Many water supply lines have been fitted in remote areas, and it is very hard for water authorities to send staff to the site immediately to repair the pipelines. IoT powered water control device makes it easy to operate remotely to allow or stop water supply.

Making a smart water management system need the concern and focus about excessive water use. A smart water system not only assist in saving water but also offer a clever thinking process for the future prospect. IoT means great benefits and improvements in the water sector, it is a business obligation that wants to be commensurate with its level. An unambiguous, accurate, and intuitive IoT solution assist to examine data collected from IoT sensors and offer an intelligent billing system that perform more accurately than any old water meter. These smart water system offer your customers huge benefits and great potential. Applying a smart IoT solution to water business which can assist drive the step towards success and growth.

Conclusion

By prioritizing the management and development of urban water, SWM allow cities to make stronger institutional capacity, while determined to get better sustainability of its natural resource particularly ecosystem and water. Careful plan and correct communication between all pertinent sectors from the early stages of project construction to the early implementation and evaluation is important to identify these chances and developing countries become smarter and more stable cities (SSCs), if sufficient policies, broad stakeholder and strong governance involvement are included in its implementation and planning. By real-time monitoring, efficiency, enhanced decision-making, and improved performance and repair delivery, Smart Water Management can make sure that

the growth of the city is not attained by destroying its resources of water. Additional benefits such as improved revenue for services, compact operating costs as well. The increase in public participation has made SWM a viable, sustainable result to the challenges of urban water. The smart water management market is estimated to be 7.73 billion dollar by 2020, and is expected to reach 15.12 billion dollar by 2026, CAGR registered 12.3 percent from 2021 to 2026. The demand for water around the world, due to the rising population, urban sprawl, and the require to address the expenditure of upholding aging infrastructure, are some of the main factors in the enlargement of an intelligent water administration market. Likewise, with the expansion of IoT, smart cities in different areas are predictable to stimulate market growth. IoT helps the water industry achieve its goals more easily and integrates all systems including green water, treatment plants, utility companies, etc. IoT technology is state-of-the-art and still, no other technology has taken its place. This is given to clarity, real-time monitoring, default power, etc.

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