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Wastewater Generation in Rural Areas of District Budgam, India

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ABSTRACT- The aim of this study was to study the waste-water generation through various sources and to suggest the necessary remedial measures so that it generation can be lowered as well as the generated waste-water can be re-used .Industrial and municipal sources both contribute to wastewater creation. Initially, as growth and industrialization progressed, industrial wastewater generated a substantial amount of wastewater, whereas municipal wastewater generated a smaller amount. Wastewater generated by the industrial sector has been captured, treated, and recycled throughout time as a result of rising environmental activism, making it sustainable by its use in the majority of sectors. Due to the exponential growth of urbanisation, municipal sewage has increased throughout time, leaving an inextricable impact on urban perennial water sources such as surface riverine and ground water treatment. According to census data from 2011, Jammu and Kashmir has a population of 1.25 million people, up from 1.01 million in 2001.

After 2012, the population began to fall, and calculations relating to population growth beginning in 2012 resulted in an average population growth rate of 2.02% each year. According to estimates from the Central Pollution Control Board (CPCB), 85 litres per capita per day (LPCD) of wastewater delivered to each household is returned in the form of sewage. It's estimated that with an increase in population consuming water and decreasing waste water recycling and reuse in the municipal sector, this might rise to 121 LPCD by 2030.

Based on the CPCB estimates, approximately 62 percent of total daily water supply, or 187 MLD of water, is created as city sewage or urban sewage. According to CPCB records, Class I cities received a total water supply of 267.42 MLD in 2010, while Class II cities received a total water supply of 34.24 MLD. This brings the total amount of water supplied to its residents to 301 MLD.

KEYWORDS- Population Growth, Waste-Water, Treatment Methods, Ground Water, Valley

I. INTRODUCTION

Water is a natural resource that is immensely beneficial to all living things on the planet. It is used for agricultural, industrial, residential, and environmental purposes. Because water resources are depleting at an alarming rate around the world, the water resources present in a given location must first be preserved against pollution before being used for various reasons. Surface water is a vital supply of water; but, when wastewater pollutants are mixed with it, it becomes unusable. As a result, a number of health-related complications arise. Jaundice, a frequent human ailment, is an example of a water-borne sickness that arises when people consume contaminated water. Sewage is released into rivers and canals in villages and towns.

This occurs solely as a result of poor wastewater management. As a result, surface water should be safeguarded from wastewater pollution for the benefit of the people and, as a result, for the growth of the country. Rural areas are experiencing faster population growth. This could be attributed to a lack of education and backwardness. Lack of infrastructure can also contribute to an unhealthy atmosphere.

It is becoming more difficult to deliver significant amounts of clean water as the population grows at such a rapid rate. Because sewage is poured into it, the fresh water becomes polluted. The most effective way to address this issue is to reuse wastewater by correctly managing it.

II. OBJECTIVES OF THE STUDY

The objectives of the study are as follows;

- To analyse the waste-water trends in Budgam India
- To analyse the effect of waste water on daily lives of people.

III. LITERATURE REVIEW

This section provides a summary of the literature review, which covers research papers on the relationship between Waste- Water management in Budgam India.. It discusses the variables studied, as well as the methodology and econometric models employed to back up the claim of a link between variables.

Bowman, J.J., Lough Ree: 1996 [1] an investigation of eutrophication and its causes, *Environmental Protection Agency*.

Cooper, P, Day, M., Thomas, V 1994. [2] Process options for phosphorus and nitrogen removal from waste water,

J.IWEM, 8, 1, 84-92 Foot, R.J., Robinson, M.S., Forster, C.F. 1993 [3] Operational aspects of three 'selectors' in relation to aeration tank ecology and stable foam formation. *J.IWEM*, 7, 304-309.

Ground water information book let Budgam district, Jammu and Kashmir, north western Himalayan region

Jammu, November 2009 [4] provides information about the groundwater present in various areas of district Budgam. It contains information about various Water Sources such as Suk nag which has total length of 54 Kms (Nallah), Shaliganga, Magam Nallah that are the main sources of water in the district.
Muthukumaran N. and Dr. N.K. Ambujam [5] Tiruchirappalli City Water Planning – A Case study – Proceedings of the International symposium on Challenges of water resources management in the developing countries in the21 century at Andhra University, Visakapatnam, 2001.
National onsite Wastewater Recycling Association. [6]
Model Code Framework for the Decentralized Wastewater Infrastructure [7]

IV. RESEARCH METHODOLOGY AND DATA SOURCES

The information for this study was gathered from secondary sources. The secondary data was used to explore the waste water generation and management in Budgam India. The following sources were used to compile the data for this study:

- Books and journals
- Government Websites

V. DATA ANALYSIS AND RESULTS

As it is evident from the table 1, the population is increasing every year which in turn also leads to increase in Average Per Capita Waste Water supply per day as well as total waste water /sewage per day per capita . As the population is increasing water usage as well as sewage production is increasing but the water resources are decreasing day to day. Thus there is an immediate need of reducing waste water as well as increasing the waste water treatment capacity.

Table 1: Population, growth rate, total water supply and total waste water generation

Year	Total population	Annual Growth Rate	Total Water supply for J&K State at Average Per capita Waste Water Supply @135 Liter per capita day	Total Wastewater /sewage Generation/day in J&K state@80% of total water supply or 108 Liter per capita day
		Percentage	MLD	MLD
2012	12,837,551	2.20	1733	1386.4
2013	13,125,956	2.15	1770	1416
2014	13,414,647	2.11	1807	1445
2015	13,703,350	2.06	1844	1475
2016	13,991,468	2.02	1881	1504

Against the, present, J&K total sewage treatment capacity, which includes present operational and proposed STP’s is provided in below table 2.

Table 2: Total capacity of sewage treatment at present in various sewage treatment plants (STP’ s) as well as forecasts for next 5 Years

S.N	Parameter	Srinagar		Jammu	Anantnag
		JKLAWDA	UEED		
3	Total capacity of sewage treatment in present.	▪ 16.1 MLD Brari Nambal. ▪ 7.5 MLD Hazratbal. ▪ 4.5 Lam Nishat MLD. ▪ 3.2 Habak MLD	▪ 17.08MLD at Brari Numbal	▪ 27 MLD at Bhagwati Nagar (Completed but network not connected) ▪ 30MLD (Non-functional ▪ 10 MLD (unfunctional)	▪ 4MLD at Mehndikadal
4	Planned for 5 years (Scheme)	▪ Z1 =69MLD ▪ Z11=53MLD	▪ 164 KLD at Aloochi Bagh ▪ 130KLD at Achan	▪ 164 KLD at Bhagwati Nagar ▪ 4KLD at Raipur Satwari,	▪ 5MLD MCDSTP and sewerage pipe line

Table 2 is showing the total capacity of sewage treatment at present in J&K at various locations Srinagar, Jammu and Anantnag and proposed capacity for next 5 years.
The results show that there will be an upward trend in waste water generation hence there are various proposals that will be having increased capacity.

In addition to increase in capacity of these Sewage treatment plants , other new sewage treatment plants need to be installed .

VI. IMPLEMENTATION OF WASTEWATER RECYCLING PROJECTS IN J&K STATE

One of the most critical, and possibly volatile, parts of a successful recycled water project deployment is public support. More attention may be focused on applications, potential contact with humans or other plants or animals that humans come into contact with or ingest as the public becomes more aware of the use and role of recycled water, and potential health concerns related to recycled water as the public becomes more aware of its use and role (particularly in non-industrial uses). As testing tools develop and possible health consequences of pollutants (or mixtures of pollutants) are found, new contaminants emerge and will continue to emerge.

Endocrine disruptors, medicines, and personal care items are all current examples (PPCPs). Due to low pollutant concentration levels, detection constraints, statistical error, complexity of the pollutants, limitations in treatment methods, and a lack of long-term epidemiological data, there will be limited scientific information about these contaminants at first. Agencies, the public, and politicians will have to balance relative risks against real and perceived costs, rising water demands, and, in many cases, dwindling raw water supplies.

Education, research, developments in water treatment technology, O&M practises, and public outreach will all be necessary for the successful promotion and implementation of recycled water initiatives.

VII. STEP-BY-STEP APPROACH TO IMPLEMENTATION

This subsection discusses a minimum number of actions that must be followed for successful wastewater recycling.

A. Identification of Project

This step examines the 'big picture' to determine how water recycling may (or must) fit into an area's overall water supply and management framework.

B. Needs and Project Drivers

The goal of this step is to implement the recycled water project in the short term. Water recycling should be integrated into short and long-term water usage and supply in the long run, according to long-term planning**.**

C. Project Planning

The goal of this stage is to identify all relevant qualities of recycled water and its sources in order to match available water to acceptable uses and users. If the supply characteristics do not meet the stated uses, this stage also serves as a baseline for assessing what additional treatment or facilities may be necessary (e.g., a plant upgrade to tertiary treatment or beyond, or storage reservoir to augment lower night-time treatment flows and deliver more consistent supply to users).

D. Identification and Characterization of Recycled Water Sources

Public outreach has emerged as one of the most volatile and potentially unpredictable aspects of some water recycling projects. The purpose of this step is to obtain public participation and support in the planning and implementation of a proposed recycled water project, or to understand the opposition and develop alternatives to gain public support.

E. Public Involvement and Public Information and Education

One of the most variable and potentially unpredictable aspects of some water recycling programmes is public engagement. The goal of this step is to get public input and support in the development and implementation of a planned recycled water project, or to learn about the objections and devise alternatives to garner public support.

F. Market and Infrastructure Assessments

The purpose of this step is to identify a water reuse market and assess the infrastructure requirements. Once a market is identified and demands quantified then a comparison between the cost of infrastructure development and the revenue or benefits can be performed.

G. Environmental Issues and Approval

The goal of this step is to figure out what kind of environmental evaluation will be necessary, as well as what kind of approvals and permits (besides those from the PHED and the UEED) will be required.

H. Economic and Financial Review

The goal of this step is to find potential funding sources for design, construction, and operations and maintenance, as well as to develop internal finance solutions (e.g., rate structures, taxation options, debt repayment, etc.)

I. Project Outline Submission to State Government Agencies

The goal of this phase is to give an outline of the proposed project to the two state agencies that are mainly involved in the approval and regulation of recycled water projects in order to get a conceptual review and direction on formal regulatory review submission requirements.

J. Project Design and Report

The objective of this method is to finish the engineering design and finalise the implementation details such that UEED, PHED, and other permitting/approving bodies are satisfied.

K. Construction

The objective of this step is to construct or modify the infrastructure so that the users' identified recycled water requirements can be met. Informing the public and getting understanding for the difficulties and disruptions to daily duties that may occur during construction is an important part of this approach.

VIII. GROUND WATER MANAGEMENT STRATEGY

A. Ground Water Development

Because the district is mostly flat and valley, it is drained by the big river Jhelum and its tributaries. Groundwater resources provide plenty of room for development. Ground water was previously developed mostly by drilled wells and percolation wells along riverbeds, nallas, and the formation of some springs. These are also the only sources of water in certain areas at the moment.

However, in recent years, sophisticated groundwater development techniques have been used.

For large-scale water supplies, Public Health Engineering is building a number of hand pumps and tube wells.

B. Water Conservation And Artificial Recharge

Ground water extraction via dug wells, hand pumps, tube wells, and springs is the primary source of water for both rural and urban regions, but water availability during the summer is limited, particularly in drought-prone areas, necessitating rapid effort to supplement these resources. A suitable structure for rain water collection and artificial recharge to ground water is required based on the climatic conditions, topography, and hydrogeology of the location. In water-scarce places, roof-top rainwater gathering must be utilised, and suitable scientific intervention for spring development and revival is essential. Roof top rainwater gathering structures such as storage tanks are suitable in hilly places, while check dams and roof tap rainwater harvesting structures can be adopted in low hill ranges.

C. Ground Water Related Issues And Problems

The Karewa strata, which lie beneath the district, were formed by fluvio-glacial and lacustrine processes. The occurrence of methane gas is a regular event in several parts of the district due to deposition under the lacustrine environment. The lateral and vertical extent of the Karewa formation deposits varies, indicating distinct hydrogeological settings. Aquifers in hard rock locations are discontinuous and localised, with a variety of hydrogeological configurations.

The occurrence of methane gas and associated silt, quality related challenges, particularly for 'Fe,' and the occurrence of silty aquifers and boulders for ground water development are some of the frequent issues. These ground water difficulties and challenges are confined, and micro level researches in a specific area are required to focus on them.

IX. CONCLUSION

In valley locations, shallow to medium depth tube wells can be built to develop ground water resources in addition to traditional ground water infrastructure such as dug wells and springs. Infiltration galleries can also be used to develop groundwater resources (Percolation wells).

The main sources of water in high terrain are springs and perennial nallas. Bore holes that are medium to shallow in depth, as well as hand pumps, are suitable ground water structures for servicing home demands.

Monitoring of water levels and chemical quality in representative areas is essential to keep an eye on any potential negative consequences of future groundwater development.

Traditional resources such as springs must be revitalised, developed, and safeguarded on a scientific basis for a variety of purposes.

Construction of modest check dams or subsurface dykes across the nallas / tributaries in the downstream at favourable sites can maintain the outflow of such springs.

Recharging ground water can be done with small ponds or tanks. These structures can be built to collect water and used for recharging as well as serving domestic needs.

Because the district receives precipitation in the form of snow and rain, roof top rainwater collection measures must be implemented in steep places.

Rainwater harvesting in general, and RTRWH in particular, is an excellent way to supplement water supplies, especially in sloppy hilly and chronically water-scarce locations.

As a result, there is a need to raise knowledge about water conservation and augmentation, as well as correct waste disposal, in order to protect water supplies.

Any form of developmental activity requires people's participation. As a result, they should be educated on the proper use and conservation of limited water resources. In addition, efficient implementation of a development programme necessitates micro-level initiatives.

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