

Impact of Namami Gange Programme on Kanpur City Sanitation

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Abstract: *The river Ganga, particularly in the city of Kanpur, is facing severe pollution and degradation due to rapid urbanization, industrialization, and inadequate sanitation practices. The city's population growth and industrial activities have put tremendous pressure on the river, leading to the contamination of its water and degradation of its ecosystem. The pollution is primarily caused by the discharge of untreated municipal sewage and industrial effluents into the river. The lack of proper sanitation infrastructure and practices has further exacerbated the problem. The existing water bodies and natural habitats in Kanpur have been adversely affected, posing significant challenges to the sustainability of the city's environment and public health. The pollution levels in the Ganga River, especially in Kanpur, have reached alarming levels, leading to a decline in water quality and biodiversity. To address these issues and restore the purity and ecological balance of the Ganga River, the Indian government has launched the Namami Gange Programme. The program aims to effectively abate pollution, conserve, and rejuvenate the river through various initiatives, including the implementation of sewage treatment plants (STPs), ghat development, surface cleaning, afforestation, sanitation, and public awareness campaigns. This study focuses on assessing the impact of the sanitation schemes implemented under the Namami Gange mission in Kanpur city. It aims to evaluate the effectiveness of the projects in improving sanitation practices, reducing pollution levels, and contributing to the rejuvenation of the Ganga River. The assessment will provide insights into the progress made, identify challenges faced, and suggest potential measures to further enhance the impact of the sanitation initiatives in Kanpur.*

Keywords: Effectiveness, Structured teaching programme, Knowledge, Evidenced based nursing practice

I. INTRODUCTION

1.1 BACKGROUND STUDY

Significance of River Ganga

The background study provides information about the significance of the river Ganga in India and the challenges it faces due to pollution.

- The river Ganga is considered holy and pure, and it is of high significance for the natural environment, ecosystem, and the livelihoods of people in India. It covers 26% of India's landmass, sustains 43% of the population, and contributes to 28% of the country's water resources.
- The river Ganga supports agriculture, fishing, and irrigation activities, and it is revered by Hindu devotees. It is the habitat for rich biodiversity and hosts important religious destinations such as Gangotri, Rishikesh, Haridwar, Varanasi, and Allahabad.
- The Ganga Basin is complex and faces numerous challenges due to diverse activities along its banks. Rapid urbanization and industrialization have led to the contamination of the river with municipal sewage and industrial effluents.

B. Pollution in River Ganga

- The major sources of pollution in the Ganga are untreated waste from open drains, industrial wastewater, and tributaries carrying untreated or partially treated wastewater from industrial units.
- Pollution in the Ganga is caused by human waste, industrial waste, religious activities, construction activities, and water extraction. The discharge of untreated waste from cities and towns, including sewage, has a significant impact on the river's water quality.
- The pollution in the Ganga has various impacts on human health, the environment, and marine life. It leads to waterborne diseases, affects the ecosystem, and poses threats to marine organisms.

C. Policy Initiatives for rejuvenation of River Ganga

Several policy initiatives have been undertaken by the Indian government to rejuvenate the river Ganga and address the pollution issues it faces. Here are some key policy initiatives:

- **Ganga Action Plan (GAP):** The Ganga Action Plan was launched in 1985 as the first comprehensive program to clean the Ganga River. It focused on the interception, diversion, and treatment of domestic sewage and industrial effluents. The GAP aimed to improve the water quality of the river through the establishment of sewage treatment plants (STPs), effluent treatment plants (ETPs), and other pollution control measures.
- **National Ganga River Basin Authority (NGRBA):** The NGRBA was established in 2009 as an empowered planning, financing, and monitoring authority to oversee the conservation and rejuvenation of the Ganga River. It aimed to coordinate efforts between various stakeholders, including central and state agencies, to implement measures for pollution control, riverfront development, and sustainable use of the river's resources.
- **Namami Gange Programme:** Launched in 2015, the Namami Gange Programme is a flagship initiative of the Indian government dedicated to the comprehensive rejuvenation of the Ganga River. It integrates previous initiatives and emphasizes a holistic approach to cleaning and conserving the river. The program focuses on four key components: sewage treatment infrastructure, river surface cleaning, riverfront development, and biodiversity conservation.
- **Creation of State Ganga Committees:** To facilitate effective implementation of the rejuvenation efforts, State Ganga Committees have been formed in the five Ganga basin states: Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, and West Bengal. These committees are responsible for planning, implementing, and monitoring projects at the state level, ensuring coordination between various stakeholders.
- **Riverfront Development:** The policy initiatives also emphasize the development of riverfront areas, including the construction of ghats, river embankments, and public amenities. The aim is to enhance the cultural, recreational, and tourism potential of the riverfront while ensuring environmental sustainability.
- **Industrial Effluent Regulations:** The government has implemented stringent regulations and standards to control the discharge of industrial effluents into the Ganga River. Industries are required to treat their effluents to meet specified norms before releasing them into the river or any other water body. Efforts are made to monitor and enforce compliance with these regulations.
- **Public Awareness and Participation:** The policy initiatives recognize the importance of public awareness and community participation in the rejuvenation efforts. Public campaigns, workshops, and educational programs are conducted to create awareness about the significance of the Ganga River and the need for its conservation. Community involvement is encouraged through initiatives like Ganga Vahini (Ganga Volunteers) to actively engage citizens in cleanliness drives and pollution control activities.
- **International Collaboration:** The government has also sought international collaboration and support for the rejuvenation of the Ganga River. Collaboration with international organizations, such as the World Bank and the United Nations, has been initiated to mobilize financial resources, technical expertise, and best practices for the sustainable management of the river.

D. Demography of Kanpur City

- Population: According to the 2011 Census of India, the population of Kanpur was approximately 2.7 million. However, the city's population is expected to have grown since then.
- Growth Rate: The population growth rate of Kanpur has been relatively high due to factors like urbanization and industrial development.
- Age Distribution: Kanpur has a diverse age structure, with a significant proportion of the population falling in the working-age group (15-59 years).
- Socioeconomic Status: Kanpur has a diverse socioeconomic landscape. It has industries, businesses, and a mix of income groups. The city's economy is influenced by sectors such as textiles, leather goods, chemicals, and manufacturing.
- Migration: Kanpur attracts migrants from rural areas and other parts of the country due to economic opportunities. It experiences both internal and external migration, contributing to its population growth and diversity.

E. Sanitation System of Kanpur City

The sanitation system in Kanpur faces several issues that hinder its effectiveness and contribute to the pollution and degradation of the Ganga River. Here are some key issues:

- Inadequate Sanitation Infrastructure: Kanpur faces challenges related to inadequate sanitation infrastructure, particularly in areas with high population density, slums, and unauthorized colonies. The lack of proper sanitation facilities, including toilets and sewage connections, leads to open defecation and the discharge of untreated waste into the environment.
- Open Drains and Sewage Discharge: The city has a network of open drains that carry sewage and untreated wastewater. During heavy rainfall or when the sewerage system is overwhelmed, these drains may overflow, leading to the direct discharge of sewage into the Ganga River. This contributes to the pollution of the river and poses a risk to public health.
- Limited Coverage of Sanitation Facilities: Despite efforts to improve sanitation coverage, a significant portion of the population in Kanpur still lacks access to proper sanitation facilities. Many households, especially in slums and low-income areas, do not have individual toilets, and community toilets may not be easily accessible or sufficient in number.
- Waste Management Challenges: Solid waste management is a crucial aspect of the sanitation system. Kanpur faces challenges in waste segregation, collection, transportation, and disposal. Inadequate waste management practices result in open dumping, uncontrolled burning of waste, and improper disposal, leading to environmental pollution and health hazards.
- Industrial and Commercial Pollution: The industrial and commercial activities in Kanpur contribute to pollution, including the discharge of untreated industrial effluents and waste into the Ganga River. The pollution from these sources adds to the overall degradation of the river's water quality and poses risks to human health and the ecosystem.
- Limited Awareness and Behavioral Change: Promoting awareness and inducing behavioral change regarding proper sanitation practices and waste management is crucial for the long-term sustainability of the sanitation system. Lack of awareness among the public about the consequences of poor sanitation practices and insufficient community participation can hinder the success of sanitation initiatives.
- Enforcement and Monitoring: Effective enforcement of sanitation regulations and regular monitoring of the sanitation system are necessary to ensure compliance and address any issues promptly. Inadequate enforcement and monitoring can lead to non-compliance, improper waste disposal, and further pollution of the environment.

II. IMPACT OF NAMAMI GANGE PROGRAMME ON KANPUR CITY

The Namami Gange Programme has had a significant impact on the sanitation system in Kanpur city. Here are some key impacts of the program on Kanpur's sanitation:

- **Improvement in Sewerage System:** The Namami Gange Programme has led to significant improvements in the sewerage system in Kanpur. One of the key initiatives under the program is the diversion of sewage from open drains, such as Sisamau Nallah, to sewage treatment plants (STPs). This has helped in reducing the discharge of untreated sewage into the Ganga River, thus improving water quality.
- **Construction of Sewage Treatment Plants (STPs):** The program has facilitated the construction and upgradation of sewage treatment plants in Kanpur. These STPs are designed to treat domestic sewage and industrial effluents before their discharge into the river. The installation of STPs has helped in reducing the pollution load on the Ganga River and improving its water quality.
- **Reduction in Open Defecation:** The Namami Gange Programme has also focused on promoting sanitation practices and reducing open defecation in Kanpur. Access to individual toilets has increased in certain zones of the city, contributing to improved sanitation and hygiene. The program has emphasized the construction of toilets in slums and providing proper connections to the sewer lines.
- **Solid Waste Management:** While the primary focus of the Namami Gange Programme is on wastewater management, it also addresses solid waste management to some extent. Efforts have been made to improve the collection and disposal of solid waste in Kanpur, which contributes to overall cleanliness and sanitation in the city.
- **Public Awareness and Behavior Change:** The program has emphasized public awareness and behavior change regarding sanitation practices and the importance of a clean Ganga River. Public awareness campaigns, workshops, and community engagement programs have been conducted to educate and involve the residents of Kanpur in maintaining proper sanitation and reducing pollution.
- **Institutional Strengthening:** The Namami Gange Programme has also worked towards strengthening the institutional framework for sanitation management in Kanpur. It has aimed to improve coordination between various agencies and stakeholders involved in sanitation initiatives. This includes better integration of programs under Namami Gange, Swachh Bharat Abhiyan (Clean India Mission), Smart City Mission, and other related initiatives.

III. INFERENCES

Based on the study, here are some inferences that can be made:

Sewerage System in Kanpur:

- The implementation of the Namami Gange program has resulted in significant improvements in the sewerage system in Kanpur.
- Diversion of sewage from Sisamau Nallah to sewage treatment plants (STPs) has helped in improving the water quality.
- The remaining sewer network is expected to be completed by 2025.
- During heavy rain, there may still be instances where the nallah discharges effluent into the river.

Water Quality:

- The quality of water in the Ganga River has improved after the implementation of the Namami Gange program, but it is still not within the limits defined by the Central Pollution Control Board (CPCB).
- Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), solids, Total nitrogen (TN), Chromium, sulphide, sulphate, and chloride are identified as major pollutants from industries.

Access to Toilets:

- The percentage of households with access to individual toilets varies across different zones, ranging from 90% in Zone 1 to 55% in Zone 5 and 40% practicing open defecation.

- Community toilets are accessed by only 6% of the population in Zones 5 and 6.

Solid Waste Generation and Management:

- Municipal solid waste generation and composition are outlined, but specific details are not provided.
- The extent of door-to-door collection of household waste is highest in administrative zone-4 and considerably good in administrative zone-1, 2, and 4. However, coverage is very low in zones 3, 5, and 6.

Progress of Namami Gange Program:

- The provided graph indicates the progress of the Namami Gange program in different districts, with District 1 showing the highest progress.
- Several projects have been implemented in Kanpur under the Namami Gange program, including sewerage network development, rehabilitation of existing treatment infrastructure, and construction of sewage treatment plants.

Primary Survey Findings:

- A primary survey was conducted to understand the perception of users regarding the facilities provided by state authorities.
- The survey covered slums, middle-income group residential colonies, and high-income residential areas, with a sample size of 30 people in each category.
- The survey results revealed that the higher income group residential colonies have been improved after Namami Gange Programme.
- However, the situation in middle income is still to be improved to satisfactory level. The situation in slums is the worst and needs immediate action to achieve the goals of the mission.
- The major contributor towards sewage issue, access to toilets, solid waste collection and disposal mechanism were the slums.
- The officials survey revealed that there has been significant improvement in Ganga water post Namami Gange but there are still gaps which should be further plugged in Namami Gange phase-2

IV. RECOMMENDATIONS

Based on the identified issues, here are some recommendations:

- **Launch Public Awareness Programs:** Increase public awareness about sanitation and the importance of clean water bodies through campaigns, workshops, and community engagement programs.
- **Construct Toilets in Slums:** Focus on constructing toilets in slums and ensure proper connections to the sewer lines. Address the issue of limited space by exploring innovative toilet designs.
- **Conduct Detailed Survey:** Conduct a comprehensive survey of existing sanitation facilities to identify areas in need of improvement and prioritize upgrades accordingly.
- **Upgrade Existing Facilities:** Initiate the design and construction of new sanitation facilities in areas lacking proper infrastructure. Phasing out septic tanks and implementing systems to handle human excreta should also be prioritized.
- **Repair and Upgrade Stormwater Drains:** Address the poor stormwater drainage system in flood-prone areas by finalizing repairs and upgrades to prevent overflow into the Ganga River during heavy rains.
- **Implement Source Control Strategies:** Implement strategies to control pollution at its source, especially in industries and high-density areas, to prevent the discharge of untreated effluents into the river.
- **Construct New Drains:** Initiate the construction of new drains to divert domestic and industrial effluents away from the river and towards proper treatment facilities.
- **Procure Maintenance Equipment and Devices:** Ensure the procurement of necessary equipment and devices for the maintenance and upkeep of sanitation systems.

- Establish Storage and Collection Systems: Finalize the development of primary storage and collection systems for efficient management of solid waste.
- Implement Secondary Storage, Collection, and Transport System: Establish secondary storage, collection, and transport systems to effectively manage solid waste and ensure its proper disposal.
- Establish Sanitary Landfills and Treatment Facilities: Develop sanitary landfill sites for existing waste and establish treatment facilities to manage and treat waste before disposal.
- Consider PPP Model: Explore the adoption of Public-Private Partnership (PPP) models to overcome staffing and expertise challenges in existing agencies responsible for sanitation.
- Improve Coordination Between Agencies: Strengthen coordination and collaboration among various agencies involved in sanitation initiatives, ensuring better integration of programs under Namami Gange, Swachh Bharat, Smart City, and JNNURM.

These recommendations aim to address the identified issues and improve the sanitation and waste management systems in Kanpur, ultimately contributing to the goals of the Namami Gange program and ensuring a cleaner and healthier environment.

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