



UNLOCKING THE POTENTIAL: TRANSFORMING THE GOMTI RIVER INTO A MODEL OF RIVER HEALTH

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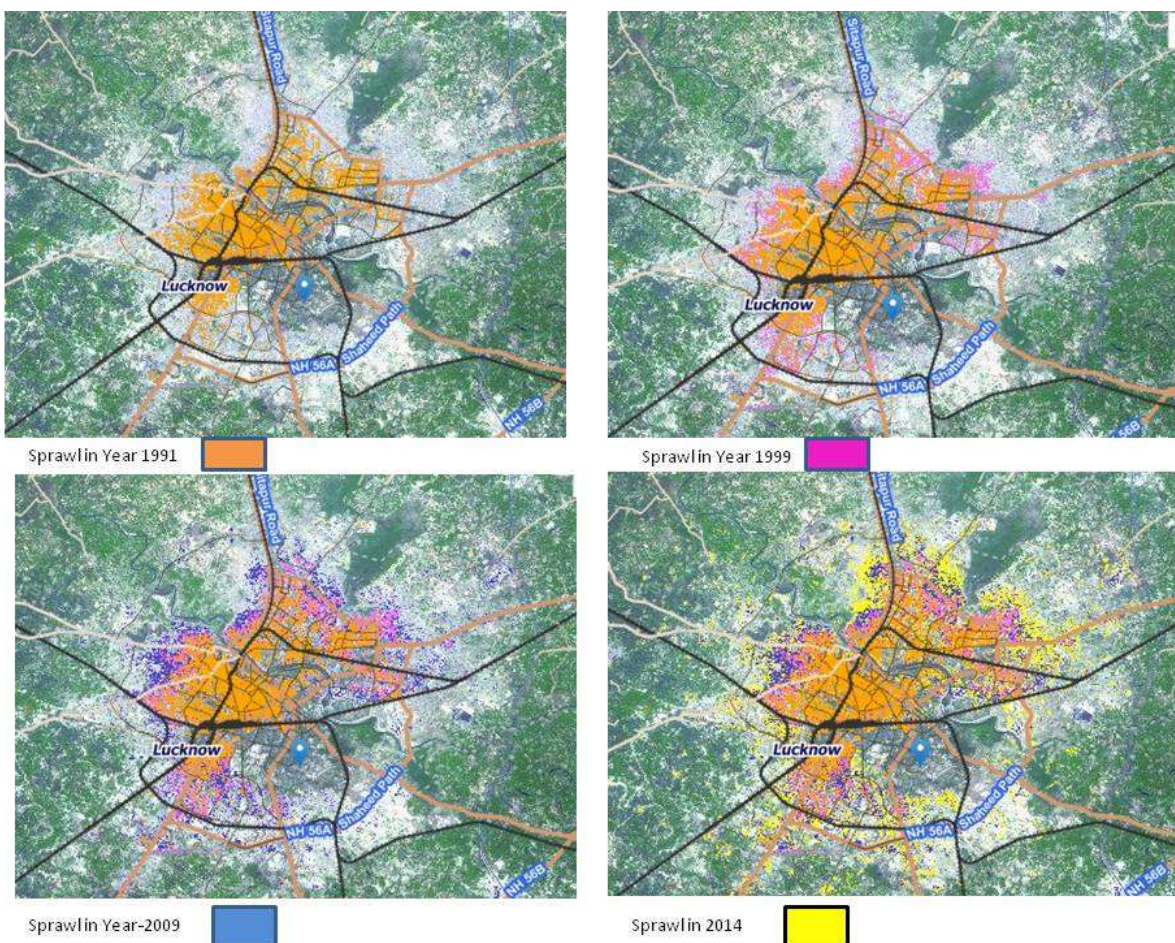
-----ABSTRACT-----

Rampant urbanization and industrialization along the river Gomti banks have led to severe degradation of its water quality and ecological health. The disposal of industrial and domestic sewage directly into the river, encroachment upon its floodplains for urban development, and ineffective waste management practices pose significant threats to its well-being. This paper examines the deteriorating condition of the Gomti River and proposes strategies for revitalizing it into a healthy river ecosystem. Drawing parallels with the Bogota River restoration project, the study identifies key challenges and opportunities for enhancing the health of the Gomti River. It suggests a holistic approach to wastewater management, including the establishment of treatment plants and the implementation of integrated waste management strategies. Additionally, the paper evaluates the impact of riverfront development projects on the river's ecological integrity and underscores the need for sustainable urban planning practices to mitigate further degradation. By analyzing case studies and best practices from around the world, the paper provides insights into effective river restoration strategies and emphasizes the importance of community engagement and stakeholder collaboration in achieving long-term sustainability goals for the Gomti River.-----

1.0 INTRODUCTION

Gomti is a perennial river. It is a part of Ganges river basin. Along the river Gomti major cities like Lakhimpur Khiri, Sultanpur and Jaunpur are in the banks of Gomti river. Total 15 towns are there along the Gomti river.

The biggest threat to Gomti is disposal of sewerage in the river. There are many manmade and natural drains merging into the river. The beginning of nineteenth century the city spread to 50 sq kilometers now it has expanded to 250 sq km. In 100 years it expanded 5 times more. The same thing happened with the population also. The land between the Ganges and Gomti was considered as the most fertile land of the world (named as *khadir* land). The river recharges groundwater and adds minerals to the soil periodically on the flood plain of the river. There is unplanned development happening in the city. To achieve the demand of the housing area and need of the population many residential and other neighborhoods like Gomti Nagar, Trivedi Nagar, are developed on the flood plain of the river which is the most fertile land for agricultural activity, the barren land has now been converted to agricultural land by using fertilizers to achieve the demand from the food industry.



2.0 METHODOLOGY

This paper employs a multi-disciplinary approach to assess the challenges facing the Gomti River and identify potential solutions for enhancing its health. The methodology includes a comprehensive review of existing literature, government reports, and scientific studies related to river ecology, urban planning, and wastewater management. Case studies, such as the Bogota River restoration project, provide valuable insights into successful river restoration initiatives and inform the development of strategies tailored to the Gomti River context. Additionally, interviews with experts in environmental science, urban planning, and policy analysis contribute to a nuanced understanding of the socio-economic and environmental factors influencing the river's health. The paper utilizes qualitative analysis techniques to synthesize information from diverse sources and develop actionable recommendations for policymakers, urban planners, and community stakeholders.

3.0 LITERATURE STUDY AND ANALYSIS

Industrial and domestic waste of the city is drained into the river. This has been practiced from the years now. The monthly report of UPPCB(Uttar Pradesh pollution control board) had published that the water quality of river either in up steam or downstream both are below satisfactory level of the Indian standard. *“There are total 37 Nalas draining into the Gomti River from Sitapur Bypass upto Shaheed Path. The peak discharge of nalas draining from Right side (sis Gomti) is 660 mld and peak discharge of nalas draining from Left side (trans Gomti) side is 513 mld. Jal Nigam and Nagar Nigam can only handle 401 mld sewage water coming from above nalas. Rest of the sewage water directly flows into the Gomti River.”*this information is mentioned in Uttar Pradesh irrigation department official government website



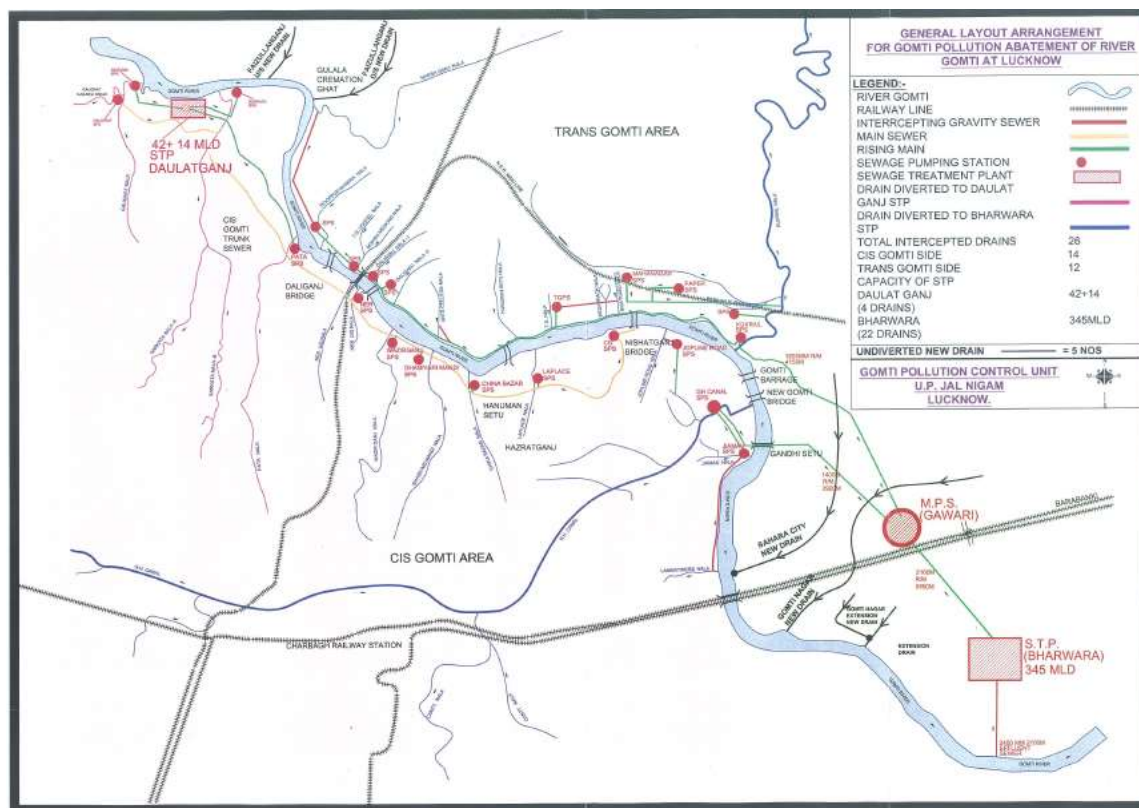
A bund or high embankment was made in 1960 to save the city from flood. As the city area is increasing day by day simultaneously construction of bund is going on. In recent year it has been seen the reclamations of river flood area was done by the municipal waste for the construction of the embankment. Above that a layer of stone is laid, but during the monsoon water get percolated through these embankment drain to the river. The construction of bund also channelized the river's natural drainage line and lot of alteration had been done . in monsoon season river spread though much more land than its regular channel. Some it also change its flow also. But due to the channelizing the route the risk of is also get increased.

By seeing the degrading condition of the river government has started many project to improve the quality of water of the river. Establishment of a large sewerage treatment plant by connecting all 23 drainage line which are draining out all sewerage of the city than it was coonect to the STP which has the capacity of treating the capacity of 345 MLD/day. the city had crossed the limit of generation of sewerage per day. so lot of un treated water is now draining to the river.

A 3000 crore rupees project was launched on the name of gomti river front. The flood plain area between both bund is now been developed as river front for different kind of activity like joggers track, cycle track, parking, recreational, etc .An analysis had been done by the Indian institute of technology, rookie. In that report it is mentioned that width of the river should not reduced below 250 meters for 6.8 kilometers. It is very unsafe to reduce the width of the river which actually happening in the river front. The retailing wall which is constructed on the edge of river will increase the speed of the river by 20% the river will cut the the river bed by 30% more than the present speed. Due to the siltation on river bed it has increased by 1.5 meter. So due to siltation and reduction of the width of the channel the river has now lesser cross section to flow. This can cause flood in monsoon season with in the city. The fragile ecosystem of reperian zone is now replaced by the retaing wall, cement and concrete.

These river front development is inspired by the the western river front development like THAMES and HUDSON. But the character of these river and the indian river are very different than each other. Both the river thames and Hudson are near estuaries, so the level of these river stays the same through out the year. The is no danger of monsoon flood also but in the case of gomti or other Indian river the level of river get increased by 10- 12 meter than average level of the river throughout the year. So we conclude that there 3 major concern regarding the gomti river are -

- 1) Drainage of industrial and domestic sewerage to the river.
- 2) Enchrocment of river's flood plain which are most fertile land used for the development and srawl of the city.
- 3) River front development along the gomti river.



Source:

Uttar Pradesh jal nigam, report

4.0 CASE STUDY: BOGOTA WASTE WATER TREATMENT OF RIVER BOGOTA

Traditional when our cities were developing then no one take into the consideration of waste treatment because the generated waste were so nominal that the impact of this was never taken into consideration. This kind of approach was also opted in the development of the city bogota. All kind of waste was dumped in the river bogota. With the help of three main tributaries of river bogota : Salitre, Fucha, and Tunjuelo the untreated water discharge into the river.

Bogota city discharge more waste water i.e 22m³/s of waste water than its average flow of the river i.e 12m³/s. and from this only 22 percentage of water is primarily treated. This treatment plant was placed at the Salitre tributary . so, because of all this the dissolved oxygen in the water are very low.

So for giving new life to the river government are floating many projects and proposal to clean the river. Boadly phasing had been done to achieve the target which are – by 2015 to solid waste or should be discharge in the river. The river should be free from any kind of human discharge in it. In the second phase that is till 2025 water can be use that portable that it can use for the irrigation purpose. After that after 2050 the bogota river and adjacent area should be to cater natural wildlife and became a rich ecological habitat.

Strategy for managing bogota’s wastewater

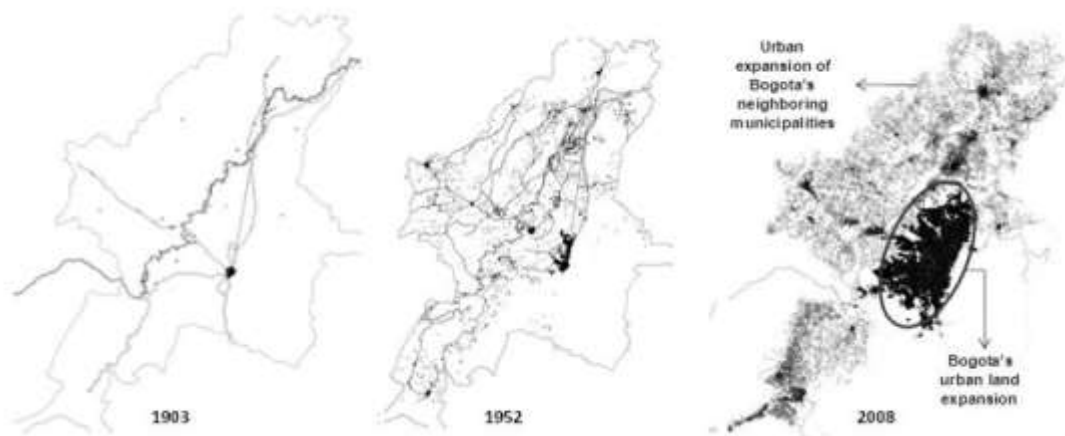
An integrated waste water management was done to improve the water quality of the river bogota. government issued a strategic planning document for the environmental management of the Bogota River, which included the following projects:

- (i) In the upper basin of the river bogota small treatment plant was proposed and optimization of the existing treatment plant was also ensured.
- (ii) A restoration on the muna reservoir was also proposed.
- (iii) Project which will help the flood in the area attached to river was also proposed.

- (iv) In the Bogota river's wastewater management program, which called for expanding Salitre Waste Water Treatment Plant to a 7 m³/s secondary treatment plant and construction of interceptors and a large plant (around 14 m³/s) downstream of Bogota in the vicinity of a site referred to as "Canoas". Salitre WWTP will treat wastewater from the northern part of Bogota and provide reclaimed water to maintain the Bogota River and supplement the water supply for the nearby La Ramada irrigation district.
- (v) Wastewater from the other two microbasins (Fucha and Tunjuelo) in Bogota will be collected and conveyed downstream to the Canoas plant which is located approximately 10 kilometers downstream of Bogota and will initially provide primary treatment, with an upgrade to secondary treatment after 2020.

URBAN SPRAWL OF BAGOTA:

Being a capital city, bogota attract migrant from all over the country in the search of better future. There is huge difference in the growth rate of bogota and nation's. bogota's growth rate is much higher than the country's growth rate. initially the expansion of city is towards north- south direction, but afterwards it expanded towards west also.



Source: Planning secretariat, department of cundinmarca(2009)

This is happening because of two reasons first as discussed above because of the migrant and the second reason is the movement of higher income group shifting towards the periphery in better designed area. And on the remaining areas in periphery lower income group are settling because the land rates are much lower comparing with the city center. The strategies which bogota had adopted to solve the urban sprawl are-

1. LOWER INCOME GROUP HOUSING

by understanding the basic need of the lower income group society and their strategic location in the city and accommodating them within city helped in retarding the growth rate in the periphery of the city.

2. CONVERSION

this means, transformation into something different use than their previous use. It is a method by which we transform the use type and enhance the utility of the area. This method focuses on the old port, military, abandoned industry, old air force station etc.

3. TRANSIT DEVELOPMENT(transmilenio)

By the development of the BRTs which is a strong public transportation of city and the fabric along the mass rapid transportation. Helped in converting the city more compact and sustainable.

4. REDENSIFICATION

By increasing the density of the existing use of the area by adding more built up area in the zone.



5. TERRITORIAL ORGANIZATION PLANS (POTs)

To trigger any kind of development in the city it needs a political will. By the help of territorial organization plan which is specially for the municipalities of the city. It was mention in their constitutional law 388.

ECOLOGICAL GREEN AREA ALONG THE RIVER BAGOTA

1950's around 50,000 land was under wetland area along the river bagota, then slowly it reduces to 20,000 acres of land. But in 2009 again when estimation was done it was only 2,500 acres of land remained under wetland. This motivates the authority to develop a comprehensive wetland management policy. This policy has same which was proposed by the ramsan convention. Project included are:

1. Improving flood control system, the flood currently returns back from 10-25 years of period.
2. Creating and enhancing wetland by protecting that area.
3. Creation of Multifunctional parks which will connect, motivate and aware public towards bogota river.
4. Enhancing waste water treatment plant and diverting tributaries which are discharging waste water to the river.

Conclusion : The Gomti River, once revered for its ecological richness and cultural significance, is now facing unprecedented threats from urbanization, industrialization, and pollution. The unregulated discharge of industrial and domestic sewage, encroachment upon its floodplains, and ineffective waste management practices have led to deteriorating water quality and loss of biodiversity along its course. However, the challenges facing the Gomti River also present opportunities for transformative change. By adopting a holistic approach to river restoration, encompassing wastewater treatment, sustainable urban planning, and community engagement, it is possible to revitalize the Gomti River into a healthy and vibrant ecosystem. Drawing inspiration from successful river restoration projects worldwide, policymakers, urban planners, and community stakeholders can collaborate to implement innovative solutions that balance ecological conservation with socio-economic development. By prioritizing the health and well-being of the Gomti River, we can safeguard the livelihoods of millions of people dependent on its waters and ensure a sustainable future for generations to come.

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