Use of river water by the encroachers and related problems: A case study of the Adi Ganga River, Kolkata, West Bengal, India

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Abstract: India is a riverine country. Many tributaries and distributaries streams criss-cross southern part of West Bengal. Bengali culture and their lifecycle highly connected with river. The Adi Ganga is a palaeodistributary of the Bhagirathi-Hugli River. According to Mediaeval Bengali literature, Adi Ganga River was an important navigational channel. During British period, many foreign ships, vessels also carried import and export of goods via Adi Ganga to Kolkata Port. Now, due to unprecedented urban growth, the river is sandwiched by the encroachers from both sides and the riverside land use patterns have been entirely modified. The river flow has been confined and diverted into a narrow channel path. Due to continuous dumping of domestic and market oriented garbage inside the channel bed and illegal encroachment, fluvio-hydraulics of the Adi Ganga totally modified. Once it was lifeline of the deltaic Bengal but at present, the Adi Ganga has almost become a sewage gutter and the entire length of the channel is now filled with abnormal smell and is thereby creating unhygienic and nuisance problem throughout its adjoining areas. Due to lack of awareness, riverside dwellers mainly illegal encroachers use river water for domestic purposes. After using highly polluted river water they suffer from heath related problems.

Keywords: encroachers, lifeline, lack of awareness, highly polluted, problems

I. Introduction

The partition of Bengal (1947) and the consequent rise in population led to an overwhelming demand for land in Kolkata and the refugees started to settle riverside. The southern part of the city experienced unprecedented population increase from the late 1960s followed by the construction of too many high-rises mainly along the rivers and canals. Many of them also came from Bihar, Jharkhand, Odisha etc. and permanently resides along the river. Due to high growth rate of the encroachers, they have reclaimed some portion of the riverside and somewhere constructed bamboo made huts inside the river bed. Polluted water coming from various sources also discharges into the river Adi Ganga. People, who are living at the vicinity of the river, are directly and indirectly suffering due to many waterborne diseases.

II. Study area

The encroachers use river water for different domestic and ritual purposes. To study the use of river water by the encroachers and related problems of the Adi Ganga and its impact on the surrounding environment, the course of Adi Ganga from its Off-take (bounded by 22°27′08″N and 22°33′03″N parallels of latitude, 88°18′59″E and 88°24′10″E meridians of longitude having an area of about 28.266 square kilometres. under Kolkata district of West Bengal) upto Garia has been selected for detailed study (Fig. 1). As the course of the Adi Ganga upto Garia is continuous and traceable for the fluvo-hydrological studies, the study has been restricted to the flood plain of Adi Ganga upto Garia only. Adi Ganga and its surrounding regions are mainly situated in the lower delta plains of Bhagirathi-Hugli system. The elevation of this area ranges between 1.50 metres and 6.10 metres above sea level. Hydrologically the area is surrounded by Adi Ganga levee formation or older levee formation, confined multiple aquifers with transmissibility about 2000 square metres per day (Biswa, A.B. 1990 and Chatterjee, G.C., Biswas, A.B., Basu, S. and Niyogi, B.N. 1964). As the area is located on the lower deltaic plain, it is covered by Quaternary sediments consisting of clay, silt, sand, gravel and occasional pebble bed etc. deposited by the river system flowing through the area (Dastidar, A.G. and Ghosh, P.K. 1967). The sub-surface geology is obscured by a blanket of recent sediments.
III. Objectives

The objectives of the study include the followings:

- To identify utilization types of the Adi Ganga River water
- To highlight the problems faced by the encroachers
- To study actual dependency scenario on the river

IV. Database and Methodology

The entire study is based on mainly primary data which was collected through random sampling among the encroachers (who are directly or indirectly depend on the river) i.e. target population from the adjoining twenty wards (ward numbers 71, 73, 74, 75, 81, 82, 83, 88, 97, 98, 100, 110, 111, 112, 113, 114, 115, 116, 117 and 121) of Kolkata Municipality along the Adi Ganga. Data for present study have been generated from the selected wards on the basis of pre-designed questionnaire following the purposive method of sampling also. The available secondary data collected from Census of India (2001, and 2011), various records, books, journals and Government publications. All the collected relevant data were analyzed using statistical techniques and relevant cartographic representations.

V. Result and Discussion

A. Encroachers along the Adi Ganga

Kolkata offer a relatively quick opportunity of income to the people of the surrounding rural areas as casual workers in the transport, trade, manufacturing, conservancy and domestic sectors. During the partition of the country and also post Bangladesh war there have been huge influxes from the border into the state. These homeless and destitute persons came to be known as “Refugees” or “Displaced person”. They came to Kolkata and started to reside along the riverside like encroachers. In case of the Adi Ganga, between Karunamayee and Garia the stretch was highly populated, and now from Khidirpur to Garia all the stretches are medium to highly populated. The maximum encroachers inhabit near Khidirpur along the Adi Ganga. The encroachers are illegal inhabitants residing on the Adi Ganga river banks (Plate 1). According to the Department of Irrigation and Waterways, Government West Bengal, the custodians of the Adi Ganga River claimed that these settlements are encroachments and they hamper the proper drainage by polluting the river.

B. Use of river water

Residents collect drinking water from the deep tube wells and underground pipeline that have been constructed by the Kolkata Municipality Corporation. There are approximately 112 number of deep tube wells in the adjacent area of Adi Ganga River; from these deep tube wells they also collect water for their domestic purposes. The resident uses the river water for domestic purposes like bathing of domestic animals and human being (32.82%), washing of clothes and utensils (23.82%), sanitation (25.47%) etc. The encroachers, resides in ward nos. 71, 73,
74, 75, 81, 82, 83 and 88 use river water for different purposes. In ward number 82, maximum 35.71% encroachers use river water for washing purpose. On the other hand, in ward number 83, maximum 53.57% encroachers use river water bathing purpose. But in ward number 73, maximum 38.12% encroachers use river water for sanitation purpose (Fig. 2). This is also one of the main reasons for the spread of water borne diseases. Along the Adi Ganga, river bath is a common picture (Plate 2). During high tide this number increases. But the encroachers, rest adjoining ward (mainly from Tollygunge to Garia) do not use river water. The Adi Ganga passes by the Kalighat Temple and visitors (for Hindu religious rituals purposes) once used to take a dip in the river before offering prayers to Goddess Kali (Plate 3). But the gathering may increase on holy days like Akshay Tritiya, Mahalaya, Dashahara or dussehra, PoilaBaisakha, etc. Dead carcasses and garbage are piled and floating into the Adi Ganga.

![Plate 1. Riverside encroachers near Khidirpur](image1)
![Plate 2. Bathing with animal at Kalighat](image2)
![Plate 3. Dip in holy river water for Hindu religious rituals purposes at Kalighat](image3)

C. Problems faced by the encroachers

From Off-take point to Kalighat section, lots of encroacher uses river water for bathing, sanitation, washing utensils etc. That's why maximum encroachers suffer from health hazard. After using polluted river water, the encroachers suffer from different water borne diseases. Above 50% population of ward number 71, 73, 74, 75, 81, 82 and 83 faced health related problem (Fig. 3).

![Figure 2. Use of river water by the encroachers along the Adi Ganga](image4)
![Figure 3. Problems faced by the encroachers along the Adi Ganga](image5)

It is very clear that, the encroachers in the northern part of the study area uses river water for different purposes. For the direct contact with the river they suffer from health hazard. From Tollygunge to Garia, the channel bathymetry changed due to Metro Railway construction, dumping etc. and river is almost in stagnant condition. Water logging and bad smell problems are very common problems from Karunamayee to Garia, southern part of the study area. Due to anthropogenic activities (channelization) the river hydraulics totally modified and during Monsoon rains the river unable to discharge excess water. The northern part of the study area is very close to the
Hugli River. Excess water of the surrounding area can be transported during ebb tide through the Adi Ganga. There are 14 pump houses in the adjacent area of Adi Ganga were constructed by Kolkata Municipal Corporation to mitigate water logging condition but their performances are very bad. There are 52 sewage outlets located along both sides along the Adi Ganga. Most of the outlets have no flap shutter arrangement. During low tide, regularly huge amount of blackish, non-transparent and polluted water discharge into the Adi Ganga River.

D. Types of disease suffered by the encroachers

During low tide huge amount of blackish-polluted water along with dead carcasses, waste materials, garbage etc. enter into the main stream of Hugli River and pollute it. Encroachers use river water for washing, bathing and sanitation purposes. After using the Adi Ganga river water, the encroachers are suffering from different types of disease. Here, the water borne diseases and pollution related diseases are prevalent. The unhygienic condition is due to stagnant water (between Garia and Tollygunge) which creates various diseases, like common cough and cold, scabies, diarrhea or dysentery, jaundice or hepatitis, asthma, encephalitis, malaria, dengue, gastroenteritis and skin diseases etc. The highest incidence of common cough and cold is 29.68% followed by malaria 28.75%, scabies 13.66 %, jaundice or hepatitis 13.25%, diarrhea or dysentery 11.37%, asthma 1.72%, and chronic defects only 1.58%. In ward number 114, maximum 51.45% encroachers suffer from malaria (Fig. 4).

E. Modes of treatment for the encroachers

The income level of the encroachers is not satisfactory and it also varies from one profession to another profession. Monthly income of the maximum encroachers (43.22%) is between ₹ 2001 - ₹ 4000. Only 3.57% population earns above ₹ 8000 monthly. From the economic structure, it is clear that maximum encroachers belong to very poor class. The imprint of malnutrition is also reflected in their body. The rich residents visit the local dispensaries but a large number of people visit the Bangur Hospital, Sammbhunath Pandit Hospital and Seth Sukhlal Karnari Memorial Hospital (S.S.K.M. Hospital). These hospitals have Out-door Departments which are used by the poor residents. According to field survey, the maximum (47.01%) encroachers compelled to prefer Hospital. On the other hand, 17.58% and 16.02% encroachers prefer to visit Dispensary and Homeopathy respectively. Few (7.37%) riverside dwellers also go to quack doctor. Due to lack of money only 8.01% are able to afford Nursing home fees. In ward number 74, maximum 61.03% encroachers visit hospital. But in ward number 75, maximum 12.55% riverside dwellers go to quack doctor (Fig. 5).

VI. Conclusion

The anthropogenic causes of degradation are dumping of garbage, sewage disposal, pollution and undue encroachment have significantly or in association degraded the river side environment. The river is presently in a deplorable state and hence their maintenance becomes imperative. The unhygienic conditions and nearly stagnant water along with the use of the Adi Ganga water have resulted in the predominance of illnesses. The decay of the
Adi Ganga is now considered to be the main cause for water logging in the southern part of Kolkata. Regarding satisfaction level of Governmental and Non-governmental activities among the encroachers, maximum are not satisfied. Within last few decades the decadal growth rate and settlement density increased at a high rate along the Adi Ganga. In few places encroachers also reclaimed some portion of the river bed. Maximum encroachers are illiterate and poor. Recently State Government provides ‘oddage grants’ and ‘unemployment bhatta’ for the poor residents. They do not have any scientific idea about how to use the river water. People are using this river water for different purposes as it is regarded as holy water. After using highly polluted holy water, they are suffering from different health related problems. Encroachers are partially accountable for different hazards like water logging, malaria, typhoid etc. Recent study highlighted that, encroachers are directly attached with the river and also maximum encroachers are residing with high risk from different kind of hazards. Here, they are using this water for different domestic and market purposes and on the other hand, people are throwing various materials (domestic and market oriented garbage) into the river bed. Mass awareness among the encroachers is necessary. Non-government Organizations are acting vital role to improve the awareness among the encroachers. Kolkata Municipal Corporation and many Non-government Organizations have tried to mitigate problems in the recent years and got good results partially.

VII. References


[26] Project Report (2011) Resuscitation of Tolly’s Nullah from 0.00 kilometre to 15.50 kilometres for improvement of drainage facility in K.M.C. and adjoining areas under Canals Division, Irrigation and Waterways Directorate, Government of West Bengal, Kolkata: p.35.


