

Impact of pollutants on the aquatic fauna discharging by Calcutta Leather complex in W.B, India

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ABSTRACT

The present study was framed to investigate the effect of industrial wastes produced by Calcutta Leather Complex (CLC) on adjacent aquatic faunal diversity that also directly or indirectly interfere human well-being. This study was conducted for one year from July 2018 to June 2019 twice in a month. Qualitative survey was done basically by interview method throughout the study area specially those people who are directly or indirectly depends on the canal water. According to local fisherman and villagers it was informed that the adequacy of economically important aquatic species was plenty decades ago, but now a days decrease in number or almost absence of these commercially valuable species indicates the effect of pollutant components drained out of CLC. CLC discharges industrial effluents wastes like Cr, Mn, Fe, Cu, Zn and Pb, which are the major consequences of water pollution throughout the canal water of study area. The present communication indicates the disruption of faunal diversity especially aquatic faunal diversity day by day. This present study suggested that CLC should adopt some advance effective technology to purify discharged polluted water and also examine the water quality on regular basis before discharge into canal to avoid adverse environmental condition that also helps to improve human well-being.

Keywords: Calcutta Leather Complex (CLC), Pollutants, Aquatic fauna, Human well-being, West Bengal.

INTRODUCTION

India has been undergoing industrial revolution in a big way during the last 3 or 4 decades, industrial pollutants create major or global problem now a days so, the situation become more threatened day by day (Kamble, 2014).

Calcutta Leather Complex (CLC) is located 14km south-east from the central business hub of Kolkata. The complex was constructed late 1990s and it started its operation from 30th July 2005. The total area of this complex is 450 hectares (4.5 square kilometers). For almost a decade, effluents from tanneries and leather industries have heavily contaminated the canal water of Bidyadhari River.

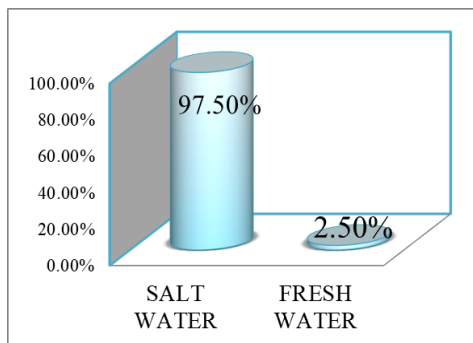


Fig. 1:

Table 1: Different Zones of CALCUTTA LEATHER COMPLEX:

Name of Zone	Area	Zonal Content
1	76.7 ha	The chemical units, raw material market, common processing zone, by-product area and the common effluent treatment plant are located in this.
2	237.8 ha	Space for all tanneries.
3	50 ha	Space for shoe and leather goods factories. Water bodies and green belts are also located in this zone.
4	23 ha	Small-scale leather goods unit.
5	43.4 ha	Space for hotels, shopping centers, housing, museum, trade mart, administrative offices and the telecommunications centre.
6	12.5 ha	Space for theme park, including a research and development centre and an exhibition area.
7	13.5 ha	Space for land between the main road and the CLC area. It will be used mainly as the transport yard and for security facilities.

Water is the source of life; it covers about 70% of earth surface, among this 97.5% of the total volume of water on the planet earth is salt water and rest 2.5% is being fresh water. According to WHO 80% disease are waterborne. To lead healthy life human require safe, clean and unpolluted water.

Gayen (2020) investigated the bioecology, possible threats and conservation of *Varuna litterata* F. in WB, India. Haseena *et al.* 2017, mentioned that industrial waste can accumulate in lakes and river, proving harmful to humans and animals. They also indicate that water pollutants are killing sea weeds, mollusks, marine birds, fishes, crustaceans and other sea organisms that serve as food for human. Kamble (2014) reported that the industrialization has produced the challenge of water pollution and it is affecting the public health or in the other words major cause of water pollution is the industrial effluent that is drained in to river without treatment. According to Desai and Vanitaben (2014) industries are taking major part to pollute water. In industry, in the production department,

so much water is required. In industry’s toxic metals and oil are produced, which has solids and phynols so that used water is not cleaned and it was applied in to the river and sea, lakes directly. So, the quality of water from the river decreases. So, this type of water pollution risks humans and animals life. 25% pollution is caused by the industries and is more harmful.

BACKGROUND:

According to United Nations Industrial Development Organization (UNIDO-2001), “Government of West Bengal had decided in as early as 1992 that the tanneries had to be relocated to a new modern complex, complete with a Common effluent treatment plant to properly treat the effluent discharged. Central Leather Research Institute, Chennai had prepared & submit a concept report in this regard in 1993, under the UNIDO-assisted National Leather Development Programme. The Government of West Bengal began to take steps towards implementation of the Calcutta Leather Complex soon after.

However when the complaints regarding the environmental pollution from these tanneries became strident, considering all related aspects, the Supreme Court of India directed the tanneries in 1996 to migrate to the new complex to be developed by the state Government.

The order of the Supreme Court gave an added impetus and speed to the implementation of the Calcutta Leather Complex already begun by the government. It was decided that this complex would accommodate all industrial and commercial activities related to leather manufacture and production of leather goods. For this purpose 438 ha land had been identified in the district South 24 Parganas, about 22 km from Kolkata on the eastern side of the E.M. Bypass, along the road from Kolkata to Basanti. Much of the land being government property, the possession of such land was taken over by the Government of West Bengal.

The State Government decided to implement the CLC project on BOT basis as it neither had the technical expertise nor the resources. The BOT contract was awarded to M.L. Dalmiya & Co. Ltd., 32, Shakespeare Sarani, Kolkata in 1997.”

OBJECTIVES OF THE STUDY:

- The present study was framed to investigate the effect of industrial wastes produced by CLC on adjacent aquatic faunal diversity.
- To discuss how pollutants of CLC affect economy of local fishermen and also other villagers.
- To analyze how it hampered the human well-being.

METHOD OF THE STUDY:

A thorough survey in and around CLC in north 24 parganas and interaction with the local people and fishermen reveal the picture about effect of pollutants of CLC on environment, economy and human economy. This study was carried out for one year from July 2016 to June 2017 on the basis of expected pollutant degradation throughout the canal and dilution due to influx and ingression of tidal water from sea. Qualitative survey was done basically by interviewing to local fishermen and villagers. Two study stations were selected along the study area. The first site was located at Ghusighata, 20 Km away from CLC and the second site was Malancha, 30 Km from CLC, where the total canal water outflows into mainstream of river Bidyadhari via Kalindi river and finally into Bay of Bengal. The present author has selected these two study station because the local fishermen and villagers of these two stations are directly depend on this canal water for fish and crop production purpose.

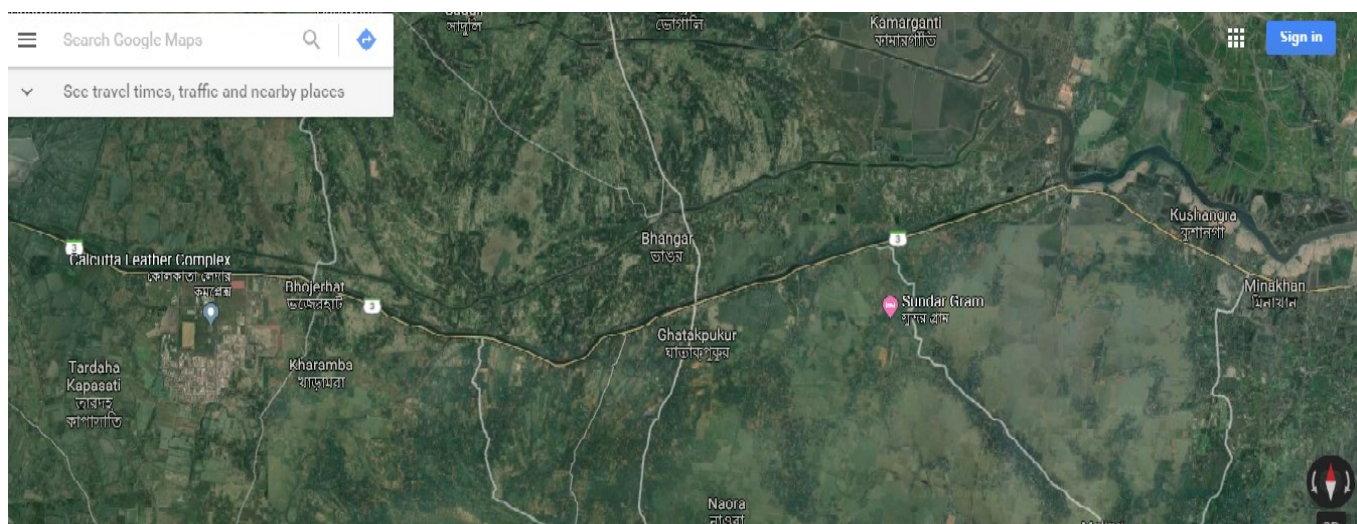


Fig: Study sites (Satellite image)

RESULT AND DISCUSSION:

The effluents of this factory are being drained through small canal or nullah and directly contaminate the canal water which is used for pisciculture. Interaction with the local people and fishermen reveal that the density of aquatic faunal diversity was not like this few decades before. The establishment of CLC in the late 1990s adversely affects the fish production in and around the river Bidyadhari. According to local fishermen the production of Bagda prawn is decrease 10 times after establishment of CLC, Galda prawn also decrease 3 times and so on. The market value of these prawns and fishes are very high. So, decrement the production of these species ultimately collapses the economy of them.

A biological organism that indicates the qualitative status of the environment of that particular area is called bio-indicator. Guerra-Garcia and Garcia-Gomez (2004) observed that Crustaceans are most sensitive to environmental pollution and they also describe crustacean community as a bioindicator of environmental variables.

According to Varadharajan *et al.*, 2013 variations in physico-chemical water qualities induce change in immune status of Crustaceans.

Gayen (2018, 2020) reported that the density and population of chiti kankra (*Varuna sp.*) decrease gradually due to high level of pollutants in the river water in 2005 onwards. The waste of the leather factory affects the growth and population abundance of chiti kankra upto Malancha. Significantly disrupt the population of prawns and crabs indicate a threatened future ahead. According to Roy *et al.* 2013, many unauthorized and illegal operations were taking place in the concerned area. Acidity and alkalinity reduced significantly over the last 10 years. Decrease in water pH over the last 10 years due to excessive loads of organic pollutants in wastewater. Significantly increase in salinity, TDS, phosphate and nitrate concentration in canal water. Mukherjee (2011) also noted that slit formation is a major problem for wastewater carrying canals in the wetland ecosystem and affects both pisciculture and agriculture.

Table: Deteriorate the rate of prawn and fish production according to fishermen

Name of some economically important species	Production scenario in 2019
Bagda prawn (<i>Penaeus sp.</i>)	1/10 th
Galda prawn (<i>Macrobrachium sp.</i>)	1/3 rd
Parshe fish (<i>Mugil sp.</i>)	1/3 rd
Tilapia fish (<i>Oreochromis sp.</i>)	1/4 th
Tangra fish (<i>Mystus sp.</i>)	1/3 rd
Vetki fish (<i>Lates sp.</i>)	1/3 rd



Fig. : Drainage outlet (Full of pollutants)

According to the restriction being placed by water act 1974; any toxic, objects of bad smell or polluted substance will not be add to the water of any rivers, wells or lakes directly or indirectly way by human beings. Do not pollute water by drainage system of cities, industries, without taking state government pre-approval and also make a proper way to clean up water from water system to recycle. So, we can reuse it.

CONCLUSION

Indian population is 18% of world population. Pollution of water is significantly interfere environmental balance and also very harmful to human health. From the studied result it can be concluded that pollution has a major role in the destruction of aquatic faunal diversity. Pollutants from CLC directly or indirectly affect environment, economy and also human well-being. The canal water containing CLC industrial wastes have intolerable smell. Pollutants devouring the crop fields because wastewater is also used as irrigation water in agriculture (mainly rice and vegetables). So, it needs conservation.

ROLE OF GOVERNMENT:

- Government should be more judicious, prudent and vigilant while giving recognition to factories which are not eco-friendly.
- Take environment protection projects, so students can learn about environmental problems in their learning period of school and colleges.
- Establishment of the environment protecting groups.
- Government should establish agencies to monitor our environment and equally to be sure that our environment is kept clean and free from refuse dumps.

ROLE OF INDUSTRIAL AUTHORITY:

- Sewage water should be treated properly before releasing in the canal.
- Implementation of advance waste management protocol.

ROLE OF LOCAL PEOPLE:

Local people can launch awareness programme emphasizing the need of protecting the growth of aquatic organisms.

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Conflicts of interest: The authors stated that no conflicts of interest.

REFERENCES

- Azom, MR., Mahmud, K., Yahya, SM., Sontu, A. and Himon, SB. (2012). Environmental impact assessment of tanneries: a case study of Hazaribag in Bangladesh. *International Journal of Environmental Science and Development*, 3(2): 152-156.
- Desai N, Smt Vanitaben. (2014) A study on the water pollution based on the environmental problem. *Indian Journal of Research.*; 3(12):95-96.
- Gayen AK. (2018). Impact of Environmental Pollutants on the Distribution of 'Chiti Kankra', *Varuna litterata* (Fabricius, 1798) in and around Calcutta Leather Complex, W.B., *International Journal of Current Research in Life Sciences*, 7, (08), 2618-2621.
- Gayen AK. (2020). Studies on the bio-ecology, possible threats and conservation of *Varuna litterata* (Fabricius, 1798) in West Bengal, India. *JASER*. 1: 145-149.
- Guerra-Garcia, JM. and Garcia-Gomez, JC. (2004). Crustacean assemblages and sediment pollution in an exceptional case study: A harbor with two opposing entrances. *Crustacean*. 77: 353-370.
- Haseena M, Malik MF, Javed A, Arshad S, Asif N, Zulfiqar S and Hanif J. (2017) Water pollution and human health. *Environ Risk Assess Remediat.*; 1(3):16-19
- Kamble SM. (2014). Water pollution and public health issues in Kolhapur city in Maharashtra. *International journal of scientific and research publications.*; 4(1):1-6.
- Mukherjee, DP. (2011). Stress of urban pollution on largest natural wetland ecosystem in East Kolkata- causes, consequences and improvement. *Archives of Applied Science Research*, 3(6): 443-461.
- Roy US, Goswami AR, Aich A, Chattopadhyay B, Datta S & Mukhopadhyay SK (2013): Changes in physicochemical characteristics of wastewater carrying canals after

relocation of Calcutta tannery agglomerates within the East Calcutta Wetland ecosystem (a Ramsar site), International Journal of Environmental Studies, DOI:10.1080/00207233.2013.774810

Varadharajan, D., Soundarapandian, P. and Pushparajan, (2013). Physico-chemical parameters on crabs biodiversity. *J marine sci.*, 3: 116.

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