

Geographical Analysis of Instream and Along Brick Kilns and Its Impact on Water Quality of River Pravara.

Assistant Professor.Mrs. Vaishali S. Raut^{1*} & Dr. Ashali C. Kharake^{2*}

1. Department of Chemistry
 2. Department of Geography
- *K.V.N. Naik College, Nashik, Maharashtra, India
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Introduction-

River plays an essential role in human life. Rivers nourishes every living organisms on the earth so they are also known as arteries of our planet. Rivers are the most important life supporting systems of the nature. (Sreebha S., 2008). River water is a basic natural resource for human beings because they are important carriers of water and nutrients. Rivers also provides its valuable deposits like sand and clay to the respected area. Many human activities like brick making, sand excavation, construction of bridges, vegetation destruction, diversion of channel, agricultural have been depends on the river water resource and deposited materials.

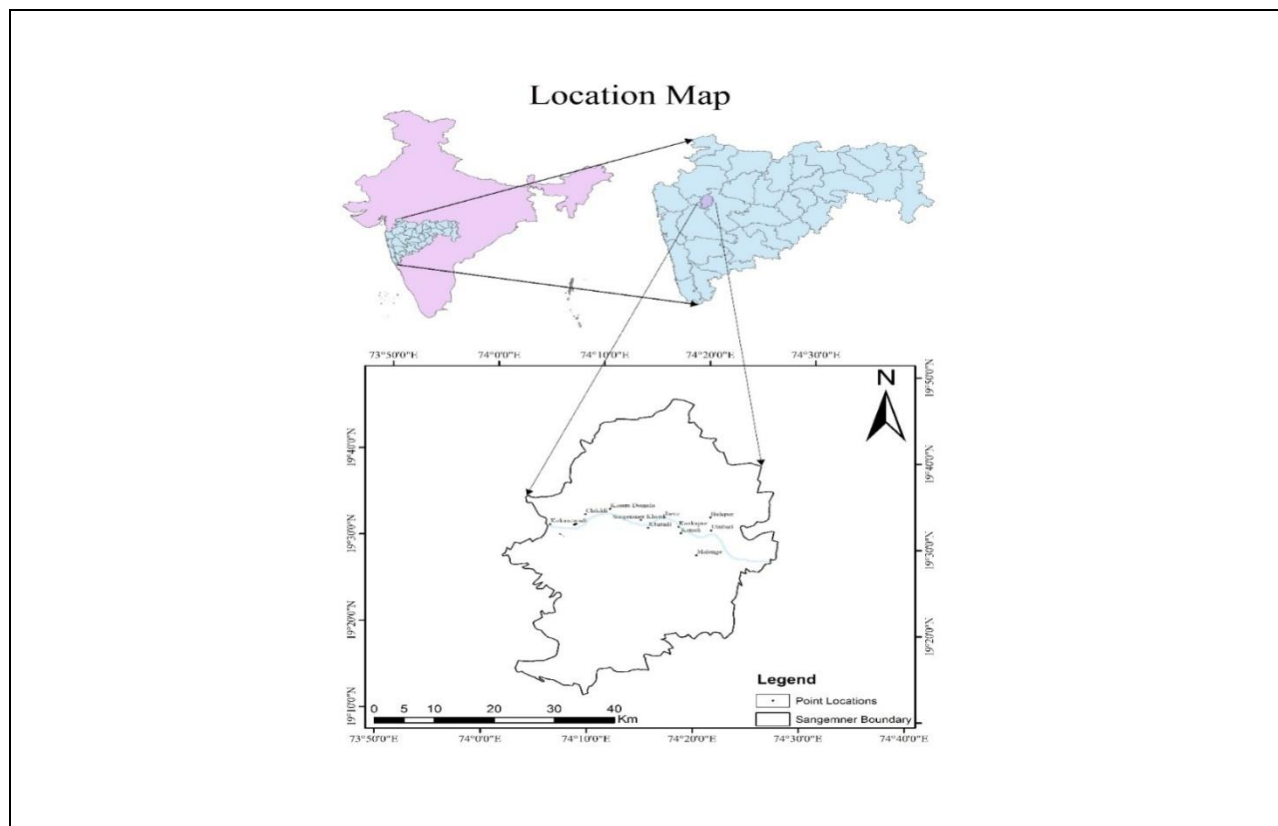
Brick industry is material provider industry to the construction sector. It is also one of the important cottage industry which provides employment to rural and unskilled population (Kumbhar A, 2007). Rivers acts a vital role in brick making industries because it is source of essential raw material like sand, clay and water. Brick industries always try to find location at a place where major raw materials like soil and water are available nearest and transportation charges are minimum. Inherently location near river is conducive for brick industries. For least transport cost of water and clay maximum brick units mostly situated in and along the river. Sangamner tehsil in Ahmednagar District is one of the developed tehsil and well known for co-operatives industries. It is also famous as an educational hub. It is also having concentration of sugar mills and allied industries which provide employment for skilled and unskilled labours of nearby villages, it leads population growth and with population growth construction sector also has been increased and to meet the need of construction sector brick kilns have been developed in small villages especially along river. Brick kiln are based of rural economy but instream and along brick kiln effects on river water quality and river environment.

Taking this view in account Pravara River in Sangamner Tehsil has been selected for further research. Pravara River is an important drainage pattern of Sangamner tehsil. River Pravara prove as a boon for tehsil for drinking, irrigation and industrial and tourism purpose. Many human activities along river badly affects on quality of the water as well as Geo-environmental effects in the area specially brick kilns. To understand inappropriate locality of brick kilns and its impact on water quality of Pravara River is the main objective of the paper, Furture research will helpful to minimize such interventions in future and also enhanced water quality .

Study Area-

Pravara River is an important drainage pattern of Ahmednagar district. The northern part of district is drained by Pravara. For further study Pravara river in Sangamner Tehsil has been selected. The total length of River is about 230 Km the River Pravara rises at an elevation of 1080 meters near Ratanvadi village in Akole Tehsil. Sangamner Tehsil is the one of the developed Tehsil in the district which located about 58 km. downstream from the origin of Pravara River. Sangamner city in tehsil is situated on the confluence (*sangam*) of river Pravara, Mahlungi and river Nataki that's why city got its name Sangamner. Sangamner Tehsil is located at 19°57'north and 72° 22' east. Sangamner Tehsil has an average elevation of 549 meters from mean sea level. After 1967 establishment of co-operative sugar mill at Sangamner, the agriculture in the area has witnessed rapid changes. Sugarcane has become dominant commercial crop in the area. River Pravara is a major irrigation source for the agriculture.

Figure No. 1 Location map of the study area



Material and methods-

Study include systematic observation of entire channel through SOI Topographical maps (47/I/1,2,3,6,7,10,11,14,15 and 47/E/10,11,12,13,14,15, on 1:50000 scale). It can help to understand the morphology, physiography and general observation of the study area. Field observation also has been done for understanding instream brick kilns sites. For furture study 10 sampling stations within Sangamner Tehsil have been selected. Selection of sampling stations is based on instream brick kiln, so sites along Pravara River namely Kokanewadi, Chikhali, Kasara Dumala, Sangamner Khurd, Khardi, Jorve, Kanoli, Kankapur, Umbari Balapur and Malunje have been selected. All these sites have instream brick kilns. Various Physio-chemical parameters like Total solids (TS), Total dissolved solids (TDS), Dissolved oxygen (DO), calcium hardness and turbidity were analyzed for the evaluate the impact of instream brick kilns on water quality. For water quality analysis water samples have been collected from the surface water along river during January 2020. Temperature and pH of samples have been measured at in the field during collection. The water samples were analyzed at Water Quality Laboratory

level- II, Nashik under Hydrology Project, Water resources department, Government of Maharashtra. The analysis was carried out in the laboratory as per BIS standard methods.

Table No. 1- Physico-chemical Analysis of selected sited of Pravara River in Sangamner Tehsil

Sr No	Sampling station	Total solids (mg/l)	Dissolved Oxygen (mg/l)	Calcium Hardness (mg/l)	Total Hardness (mg/l)	Turbidity (NTU)
1	Kokanewadi	1200	5.9	252	320	45.32
2	Chikhali	465	8.5	102	124	14.02
3	Kasara Dumala	1100	6	248	318	38.7
4	Sangamner Khurd	1000	6.3	238	308	37.9
5	Khardi	720	7.8	198	235	32.4
6	Jorve	956	6.2	231	298	36.5
7	Kanoli	852	6.1	227	201	36.8
8	Kankapur	921	6.15	254	250	38.1
9	Umbari Balapur	657	7.91	125	201	39.1
10	Malunje	981	6.2	230	315	38.3

(Required desirable limits- As per standards prescribed For Drinking Water by Bureau of Indian Standards, 2002 (BIS) limits, 2012)

Result and discussion-

The effect of brick kilns on water quality of Pravara River has been studied for which total solids, dissolved oxygen, calcium hardness, and total hardness and turbidity of river water were estimated. It all information analyzed as per standards prescribed by Bureau of Indian Standards, 2002 (BIS) limits, 2012 which are as below (Table No.1)

- Total Solids- total solids is quiet higher at different places which indicates that discharge from brick industry is enriching the river with different types of solids. The highest amount of total solids were found in Kokanewadi where highest number of brick units are found in and near river.
- Dissolved oxygen- The concentration of dissolved Oxygen in the river Pravara ranged between 5.9 to 8.5 mg. /l at selected sampling sites. Within all selected sites Kokanewadi indicates lower value of DO. It may be due to organic matters dissolved in water through instream brick kilns and its wastage material.

- Calcium hardness- Calcium hardness is ranged between 102 to 205 mg/l. calcium hardness is maximum at kokanewadi it may due to dissolved alluvium soil.
- Total hardness- Total hardness in river Pravara is ranged between 124 to 320 mg. /l. Higher values of TH has been observed at kokanewadi it may due to mixing of clay and sand of brick units. Kasara Dumala and Malunje also found high TH because contamination.
- Turbidity- The values of turbidity are also affected by effluents from brick industries The turbidity values are highest at Kokanewadi, Kasara Dumala and Umbri.

Conclusion-

From above analysis it has been concluded that increased instream brick kilns deteriorates the water quality. Within sampling stations Kokanewadi, Kasara Dumala, Sangamner Khurd and Malunje are more affected by brick kilns and due to it water has been became unfit for drinking. Brick making activities contaminates the clay and sand in the water which increased hardness of water. Raw material used in bricks kilns may be affecting the water quality. In addition to this more studies are needed to know the types of pollutants. Brick industries also increase air pollution, which may be due to open burning of bricks therefore, Vertical Shaft Brick Kiln (VSBK) process is an alternative method, which is energy efficient method of firing. It produces better bricks and reduces pollution. Efforts should be made to convince brick industry owners to adopt process so that environmental pollution is reduced and step is taken towards sustainable development. Also calcium carbonate and calcium hydroxide can also be used asd in coal briquettes which could also be an efficient and economical way to control the pollution.

Photo I- Instream sand excavation for brick making at Sangamner

Photo II- Deposited instream waste material at Kokanewadi



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