

INTRODUCTION:

Erai River is a main tributary of Wardha River in Chandrapur District and **Zarpat River is a tributary of Erai River**. Total length of Erai River from origin to meeting point at Wardha River is 25 km approx. and length of Zarpat River from its origin to confluence point with Erai River is 15 km approx. Zarpat river flows between the dense populations of Chandrapur City that includes slum area. Zarpat River originated from the natural spring near Lohara village and meets into Erai River near Mana village.

Erai River supplies water to Chandrapur city and M/s CSTPS, Chandrapur from Erai Dam and 30 % water supply of Chandrapur City is drawn from Erai River, Datala Road, intake belt. Chandrapur City lifts about 54 MLD water and M/s CSTPS lifts around 304 MLD water from Erai River. In peak summer, sometimes water level at Erai Dam reaches at dead level and water intake for industrial consumption has to restrict by District Authority to ensure water supply for drinking purpose. The water quality of Erai River and Zarpat River is deteriorated due to discharging of domestic sewage from rural and urban population in the vicinity of river basin. These two river become sewer carrying drains of Chandrapur city.

ERAI RIVER

Origin – Near Kasarbodi / khadsangi, Tal. Chimur, Dist. Chandrapur

Total Length – Approx. 78 km (from origin to Erai Dam – 45 Km approx. & from Erai dam to confluence point to Wardha River at Village Hadasti - 33 km approx.)

Depth – 3 meter to 8 meter

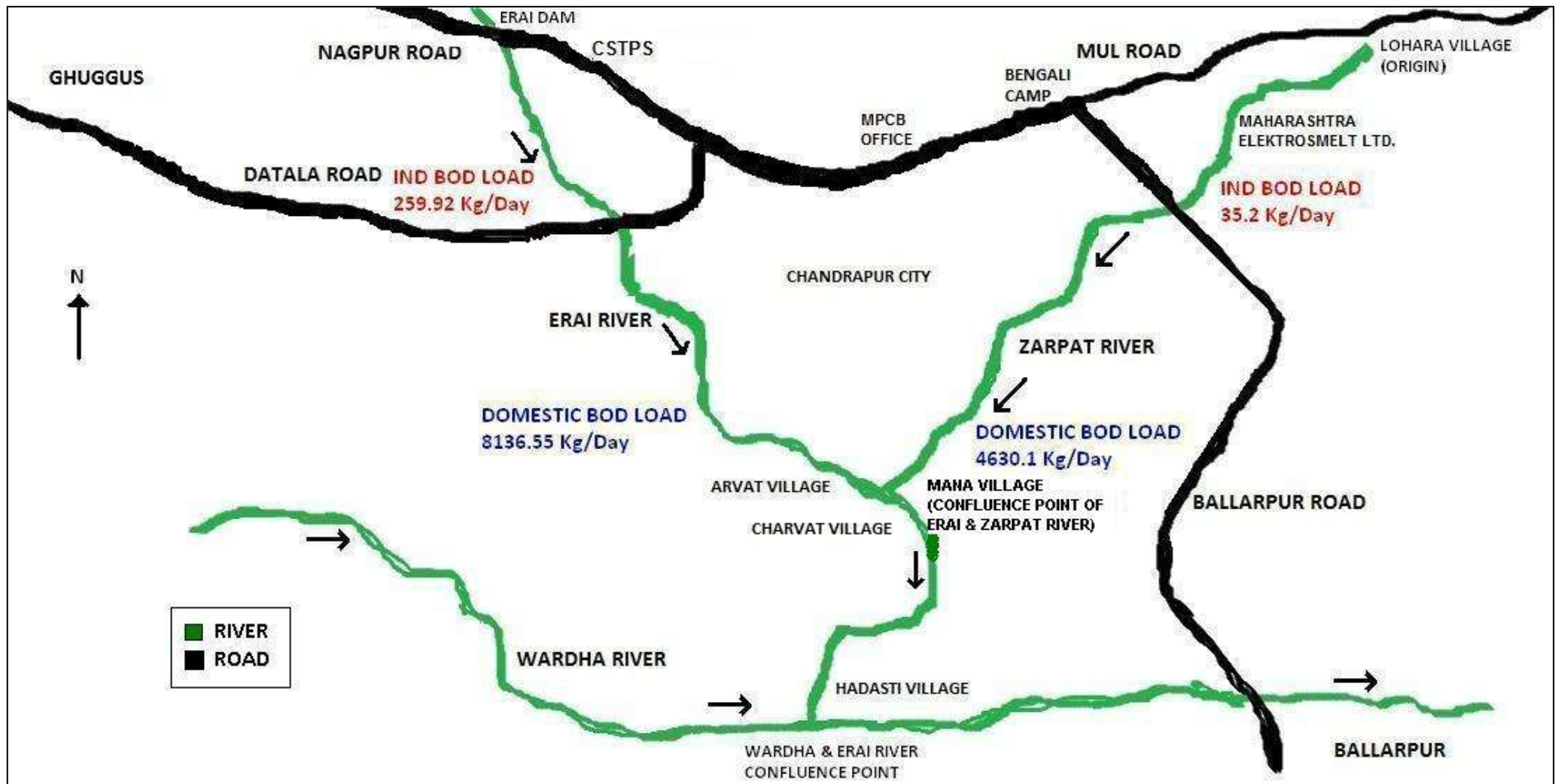


Figure 1: Tree Diagram of Erai, Zarpat and Wardha River

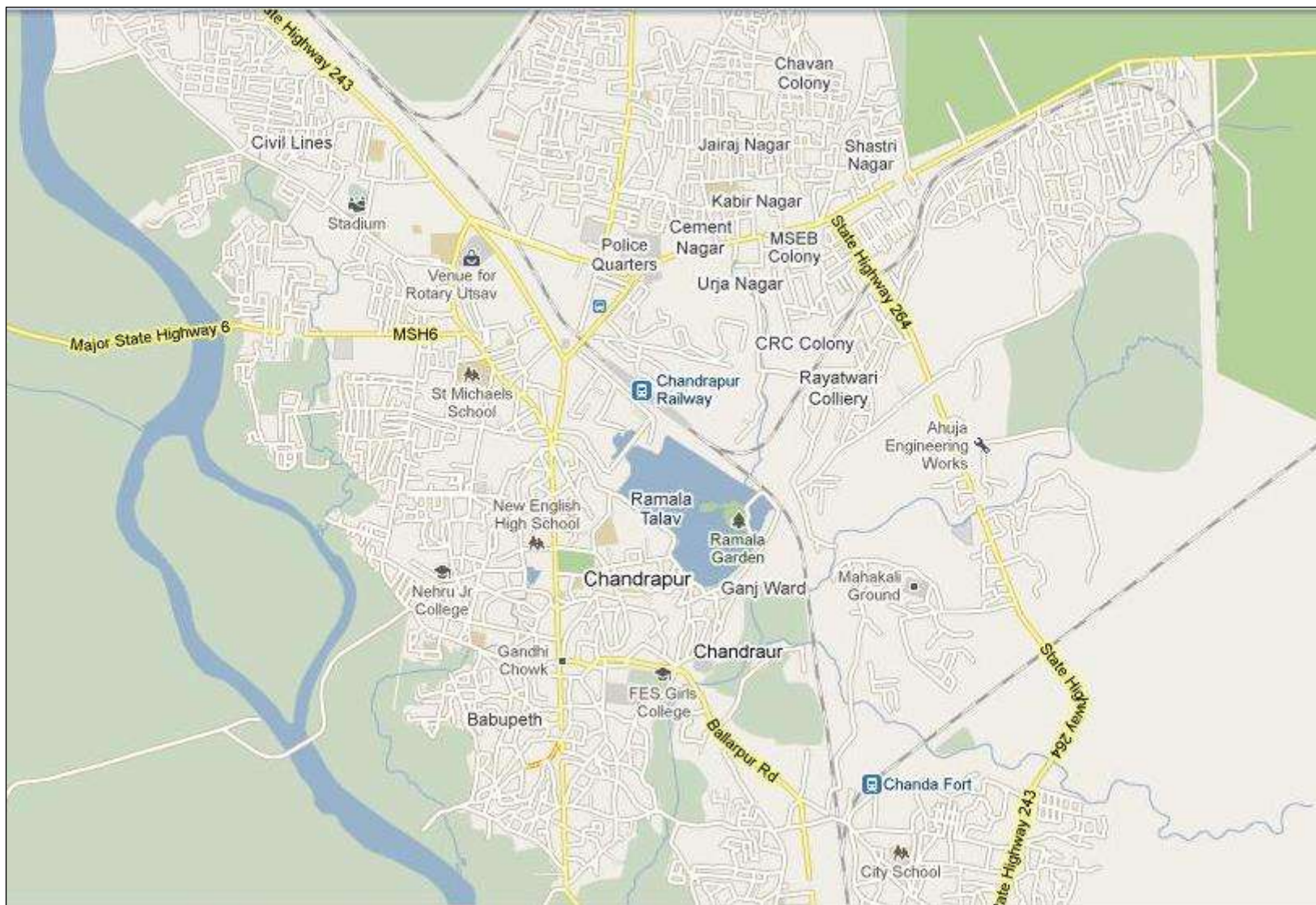


Figure 2: Map of Chandrapur city



Figure 3: Erai River Dam (Water source of Chandrapur city and M/s CSTPS)

The Erai River is having self-origination nearby Chimur and meets to Wardha River near Ballarpur. The MSEB has constructed Dam on this river for their own water supply for thermal power station and their colony and the Chandrapur Municipal council pumps the water for Chandrapur Town and lifts about 54,0,30 CMD of water and generated 37,800 CMD of sewage. The Chandrapur town does not have sewage treatment plant and also there is no underground sewerage system and part of sewage is treated in septic tanks and all the sewage through various nallas discharges into Era River. The treated effluent of CSTPS is partly discharged into the Erai River and part of it consumed by the power station for different purposes within their premises. The total length of Erai River is 25 km from origin to confluence into Wardha River near Hadasti Village.

Major sources of pollution to Erai River: Domestic and Industrial Pollution

Domestic pollution – There are human settlement/local bodies/municipal council located in the vicinity of Erai River and the domestic effluent discharged by these settlements is directly meeting into Erai River at various location without treatment that includes partly sewage of Chandrapur City and treated sewage of M/s CSTPS.

DOMESTIC POLLUTION LOAD

Sr. No	Name of Town / Village	Population	Water consumption Ltr/day	Water consumption CMD	Domestic effluent generation CMD	BOD Load Kg/day
1	Bhatadi	1599	127920	127.93	102.34	25.58
2	Sinala	1452	116160	116.16	92.93	23.23
3	Lakhampur	3500	280000	280.00	224.00	56.00
4	Ranvendali	2500	200000	200.00	160.00	40.00
5	Urjanagar	6456	516480	516.48	413.18	103.30
6	Padmapur	932	74560	74.569	60	15
7	Kolsa	499	39920	39.920	32	8
8	Datala	1988	159040	159.04	127.23	31.81
9	Padoli	5017	401360	401.36	321.09	80.27
10	Chinchala	3229	258320	258.32	206.66	51.66
11	Chandrapur	289450	34734000	34734.0	27787.2	6946.0
12	Mhasala	275	22000	22.0	17.6	4.4
	Total Domestic Load from Rural /Urban Population	Total BOD load from urban/rural habitation				7385.25

DOMESTIC POLLUTION LOAD FROM INDUSTRIES

Sr. No.	Name of industry	Domestic effluent generation CMD	Permissible BOD in mg/lit	BOD Load Kg/day
1	M/s CSTPS, Chandrapur	7000	100 .0	700
2	WCL Chandrapur Area (Bhatadi, Padmapur, Durgapur, HOCL)	513	100.0	51.3
	Total BOD load from domestic pollution of industries			751.3



Figure 4: Erai River near Datala Road, Chandrapur (30 % water source of Chandrapur City)

INDUSTRIAL EFFLUENT POLLUTION LOAD:

M/s CSTPS and WCL are the contributor of industrial pollution load. The treated effluent from M/s CSTPS are utilized by industry but still some seepages / over-flow discharging into Erai River through Randvendali nalla. Mine discharge from M/s WCL Bhatadi, M/s WCL Padmapur, M/s WCL Durgapur, M/s WCL Bhatadi & M/s WCL Hindustan Lalpeth Opencast Mine. These mine effluent actually diluting the pollution load of Erai River. WCL mines have provided sedimentation tank for the primary treatment of mine discharge. These mine discharge are utilized for drinking water/ dust suppression / fire fighting and excess is discharging into river.

Sr. No.	Name of industry	Industrial effluent generation CMD	Permissible BOD in 30 mg/lit	BOD Load Kg/day
1	M/s WCL Hindustan Lalpeth Opencast Mine	1353	30	40.59
2	M/s WCL Bhatadi Opencast Mine	4750	30	142.5
3	M/s WCL Padmapur Opencast Mine	2506	30	75.18
4	M/s WCL Durgapur Opencast Mine	55	30	1.65
Total BOD load from industrial effluent				259.92



Figure 5: Confluence point of Erai & Wardha River at Village Hadasti

ZARPAT RIVER

Origin – Natural spring near Lohara village, Tal. & Dist. Chandrapur

Total length – 15 km (from origin to meeting point Erai River)

Depth – 2 meter to 6 meter

Width – 3 meter to 30 meter

Zarpat River originated from natural spring near Lohara village towards eastside of Chandrapur city approx. 10 km from Chandrapur city. It further flow through slum area near M/s Maharashtra Elektros melt Ltd., Mul Road, Chandrapur i.e. Sanjay Nagar, Krishna Nagar, Indira Nagar afterwards enter into the city, Anchleswar Ward, Pathanpura and meets into Erai River near Mana village. The stretch from M/s Maharashtra Elektros melt Ltd. and up to Pathanpura Gate is deteriorated due to discharging of untreated domestic effluent from slum area and urban areas of Chandrapur old city. The entire Zarpat River near Anchleswar Temple and up to confluence with Erai River is suffocated due to growth of Ecornia plants.



Figure 6: Zarpat River origin from natural spring near Lohara Village

MAJOR SOURCES OF ZARPAT RIVER: DOMESTIC AND INDUSTRIAL POLLUTION

Domestic pollution – There are human settlement/local bodies/municipal council located in the vicinity of Zarpat River and the domestic effluent discharged by these settlements is directly meeting into Zarpat River at various location without treatment that includes partly sewage of Chandrapur City including seepages from soak pit of M/s MEL (Maharashtra Elektros melt Ltd.). Zarpat River flows diagonally from Chandrapur city and 60 to 70 % of Chandrapur untreated sewer is discharging into the Zarpat River at various location.



Figure 7: Zarpat River near Anchaleshwar Gate, Chandrapur



Figure 8: Zarpat River near Pathanpura Gate (downstream)

DOMESTIC POLLUTION LOAD

Sr. No	Name of Town / Village/industry	Population	Water consumption Liter/day	Water consumption CMD	Domestic effluent generation CMD	BOD Load Kg/day
1	Chandrapur	289450	34734000	34734.0	27787.2	65 % of 6946.0 is 4514
2	Lohara village	1411	112880	112.880	90.309	22.5
3	Mana	600	48000	48.0	38.4	9.6
4	M/s Maharashtra Elektros melt Ltd.	1400	140000	140	112	28
5	M/s WCL underground mine (Chanda Rayatwari Colliery, Hindustan Lalpeth Colliery)		700000	700	560	56
Total BOD from domestic effluent						4630.1

INDUSTRIAL EFFLUENT POLLUTION LOAD:

M/s MEL and WCL underground mine are the contributor for industrial pollution load of Zarpat River. Around 730 m³ of industrial effluent is being discharged by M/s MEL and after primary treatment. Industry is utilizing 200 CMD effluents for dust suppression / fire fighting / jiggling operation. About 530 CMD of industrial effluent is being discharged into Zarpat River. The BOD level of treated effluent is in between 18 to 46 mg/l. Mine discharge from underground mine is diluting the BOD load of river. The average BOD from mine discharge is found 4.0 to 8.0 mg/l

S No	Name of industry	Industrial effluent generation CMD	Permissible BOD (30 mg/lit)	BOD Load Kg/day
1	M/s Maharashtra Elektros melt Ltd.	530	30	15.9
2	WCL underground mine (Chanda Rayatwari colliery, Hindustan Lalpeth Colliery & Mana incline)	3217	4.0 to 8.0 mg/l	19.3
				Total BOD = 35.2



Figure 9: Confluence point of Zarpat & Erai River near village Mana (Zarpat River is suffocated by E-cornia vegetation)

CONCLUSION:

- 1) Erai River and Zarpal River is deteriorated due to rural / urban settlements near river basin.
- 2) Erai River and Zarpal River quality are suffocated due to unwanted growth of Ecornia plant.
- 3) Contribution of domestic effluent pollution load i.e. discharge of untreated sewage into Zarpal River is 97.7% and remaining 2.3% contribution from industrial effluent.

Sr. No.	Pollution Load(Erai &Zarpal)	BOD Load in Kg/Day
1	Domestic pollution Load	12766.65
2	Industrial pollution Load	295.12
Total % of domestic effluent pollution Load is 97.7 %		

- 4) Zarpal River is more deteriorated than Erai River due to dense population around Zarpal River.

Action plan for restoration of Erai & Zarpal River

- 1) Regular cleaning of River Bed for removal of Ecornia Vegetation.
- 2) Removal of encroachment (Slum areas) & restriction on Bathing /washing activity all along the river Bed.
- 3) Construction of wall to avoid dumping of solid waste in the River Bed.
- 4) Provision of sanitation facility (Such as Sulabh Sawchalaya) near slum area & dense populated area such as Sanjay Nagar, Krishana Nagar, Indira Nagar Anchaleshwar ward,Pathanpura etc to avoid open defecation. Provision of STP for Chandrapur City. Treated sewage of the city will have to be utilized for irrigation / gardening purpose. The treated sewage after disinfection shall be used for gardening or could be commercially sold to Industries.
- 5) Chandrapur Municipal Council can undertake the river front beautification activities and rainwater harvesting project along the stretch of the river. Rainwater harvesting can help in attaining the minimum flow in the river water for scouring the sediments and dilution water availability.
- 6) Scavenging of river beds will have to be undertaken before onset of monsoon.

7) **For Zilha Parishad:** Joint action need to take by Zilha Parishad, Irrigation & Agriculture Departments. Agriculture Department shall undertake public awareness program to convey that agriculture / horticulture by untreated river water is unhygienic. Instead bulk sewage / sullage flowing in the rivers, nallas will have to be treated by artificial wet land systems. Such systems rely on natural purification by photosynthesis and subsequent aeration by “emergent macrophytes”. Pathogens are destroyed during the process. Textbook on wastewater treatment by Metcaff and Eddy can be referred for designing. Such systems will be suitable for small villages also. Effluent of artificial wet land system can be safely used for agriculture because it will be free from pathogens. Zilla Parishad should pass a resolution that it will spare appropriate land for artificial wet land system.

8) **For Grampanchayats:** A resolution has to be passed by each Grampanchayat of banks of river that, they will not allow sewage / sullage from their respective villages to enter the river. Further they should also provide *sulabh shauchalay* in villages to avoid open defecation.

Narrow-bore sewerage has been recommended in CPHEEO manual for wastewater treatment. Water supply and sanitation department of Govt. of Maharashtra should provide proto type designs for narrow-bore sewerage followed by a stabilization pond.

