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EXPLORING HURDLES FACED BY INDUSTRY ASSOCIATIONS TO MITIGATE WATER POLLUTION: STUDY OF CETP FACILITIES

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Abstract

In Gujarat most of the Common Effluent Treatment Plants (CETP) is set up and administered by Industry Association. These are working for a non-for-profit motive. They installed common Effluent Treatment Plant for treatment and proper disposal of effluent discharged by member industrial units. The members share capital for the installation of CETP. The CETPs are governed by office bearers elected by representative units. This study analysed the quality of pollutant Chemical Oxygen Demand (COD)[1] and Biological Oxygen Demand (BOD)[2] discharged by CETPs via mega pipe line into the Sabarmati river and analysed the level of BOD in Sabarmati river. The study is based on the secondary data. Analytical review shows that CETP facilities are overburdened most of the time so that final effluents are not adhered to by CETP institutions. The study suggests the non-compliance to standard norms by effluent treatment plants are posing a serious threat to the ecological sustainability and health of human beings in the State as they cannot treat industrial effluent. Our policy makers and Industry Associations should concentrate on such an innovative policy, which can lessen industrial pollution in the Gujarat.

Key Words: *Common Effluent Treatment Plants, Industry Associations, Ecological sustainability, CETP Institution,* JEL Classification: L32, L33, Q50, Q52, L51, L59, L65

INTRODUCTION

Micro Small and Medium Enterprises have a very significant role in industrial development in India. Since 2006, the Government encourage the growth of MSMEs for balanced economic growth. In Ahmedabad Gujarat Industrial Development Corporation has established Vatva, Odhav, Naroda, and Narol Industrial estates. There are 1500 Units generate industrial effluent and have potential to cause water pollution. These numbers are as per the government's record, but the actual numbers are higher than the government records. These units include manufacturing, pharmaceutical, dye and dye intermediary, pigments, fine chemicals, textile, rolling mills, and other non-chemical process units. Micro Small and Medium Enterprises find it difficult to establish individual effluent treatment Plants therefore, Common Effluent Treatment Plants were started established from the year 1990s. For operation and maintenance of CETP, small scale tanners formed a Co-operative

[1] COD: Chemical Oxygen Demand is the total measurement of all chemicals (organics & in-organics) in the water / waste water. The chemical oxygen demand is a measure of water and wastewater quality. High level of COD in wastewater indicates higher risk to water bodies (Baboo, 2018).

[2] BOD: Biological oxygen demand is a measure of the amount of oxygen that require for the bacteria to degrade the organic components present in water / waste water. Large quantities of organic matter (microbes and decaying organic waste) in water are a potential risk to aquatic ecosystems and human health. The reduction in the amount of dissolved oxygen as a result of the decomposition of organic matter can endanger aquatic life through asphyxiation and disrupt the ecological balance of the water. Organic matter can also pollute drinking water and bathing water. High levels of BOD can indicate such organic pollution.

Society. (Pathe, Suresh Kumar, Kharwade, & Kaul, 2004) The expenses for operation and maintenance of CETP are being shared by participating tanneries (Nidheesh et al., 2020; Pathe et al., 2004). The Common Effluent Treatment Plants are established by members of Industrial Estate. These are working for a non-for-profit motive. Common Effluent Treatment Plants was installed for treatment and proper disposal of effluent released by member industrial units. The members contribute capital for the establishment of CETP. The CETPs are maintained by office bearers appointed by member units. It includes chairmen, Vice chairmen, Hon Secretary and Hon Treasurer. The treatment charges are levied from the member units according to their per kg of All Organic Carbon. In Ahmedabad, there are 10 CETPs. Out of 10 CETPs 6 are providing services to the Textile, Chemical and Dye, Pharmaceutical Industry. The CETPs are located in Odhav, Vatva, Narol and Naroda. These CETPs are established under Cooperative societies act and working as non-for-profit organisations.

The study is conducted to analyse the results of CETP Institution in the management of industrial Effluent of Micro Small and Medium Enterprises in Ahmedabad. This intensifies the role of CETP in accumulating with the standard norm stated by the GPCB. The study also analyses the monitoring of Indian National Aquatic Resources System project statistics with special reference to Sabarmati River. The unplanned industrialization, urbanization and recycling waste have seriously harmed the water environment in India. There is a proper system of evaluation of Groundwater resources, then also it is highly exploited. The reason behind this exploitation is the lack of implementation of existing government policies and the enactment of new laws. Governments need to enact policies to overcome the problem of water pollution (Chaudhary, Jacks, & Gustafsson, 2002). We should learn from the best practices of countries like Australia, China and The United States of America. They have developed tradeable Water Permits Rights. These countries have successfully implemented TWPR system and reduced the water pollution (Deshpande, 2020). So, can't we reduce water pollution like these countries? We can do it, but for this, our country should also adopt such policy that can succeed in our country.

(Kathuria, 2006) has surveyed the design criteria and operational stability of Kundli CETP in Haryana. The analysis shows that the Kundli CETP found failure in both maintaining the organization's sustainability criteria and the discharge of the final effluent standard prescribed by the Central Pollution Control Board. The industry association should perceive that if they cannot treat the effluent, then they should hand over the management of CETP be to a private company. Because private CETP plants will inform the details of polluting industries to GPCB and GIDC.

Textile and chemical industries are the most polluting industries. Both industries are facing environmental challenges. researcher has focused on functioning of CETP and measures have been adopted by polluting industries in complying with the regulations. Researcher found that increase in the production without taking care of environment is dangerous for ecological sustainability (Ghatak, 2019).

Several studies projected that CETP failed to meet the quality of effluent as per the standard norms (Kathuria, 2006; Padalkar & Chaudhary, Jacks, & Gustafsson, 2002). However, the impact of CETP on the Sabarmati river seems to be missing in the literature. To fill this gap, this paper aims to examine the impact of CETP on the Sabarmati river.

The present paper is based on the analytical review of the CETP. The study is based on the secondary data, collected from the Gujarat Pollution Control Board, Central Pollution Control Board, GIDC and various published papers. Data covers a period from April 2016 to January 2020. The CETP data has measurements of pollutants Chemical Oxygen Demand (COD) and Biological Oxygen Demand (BOD) which were rationalized by the researcher for a brief view.

Chemical Oxygen Demand is the total measurement of all chemicals (organics & in-organics) in the water / waste water. The chemical oxygen demand is a measure of water and wastewater quality. High level of COD in wastewater indicates higher risk to water bodies (Baboo, 2018). Biochemical oxygen demand (BOD) is the amount of dissolved oxygen used by microorganisms in the biological process. The health of a river and the efficiency of the water treatment are classified based on BOD. The greater the BOD, the lower is the amount of dissolved oxygen available for marine animals. The greater the BOD and the higher threat water bodies possess to the environment. To examine the impact of CETP on the environment, Secondary data on Monitoring of Indian National Aquatic Resources System (MINARS) was collected from Gujarat Pollution Control Board. Data covers BOD level of various sampling places for a period from 2007 to 2018. The researcher has analysed the data with the help of graph and trend analysis.

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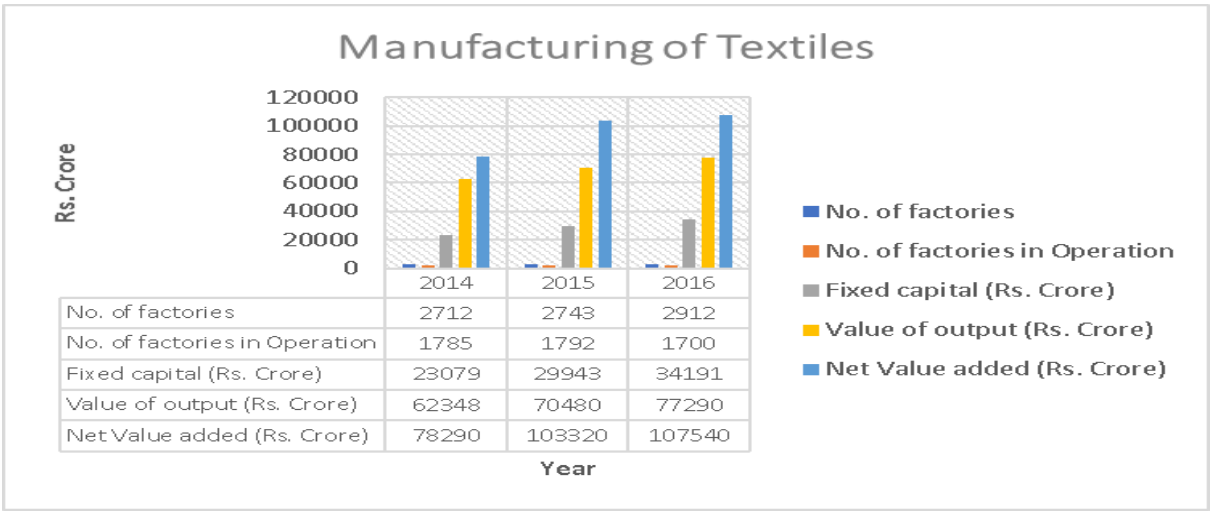
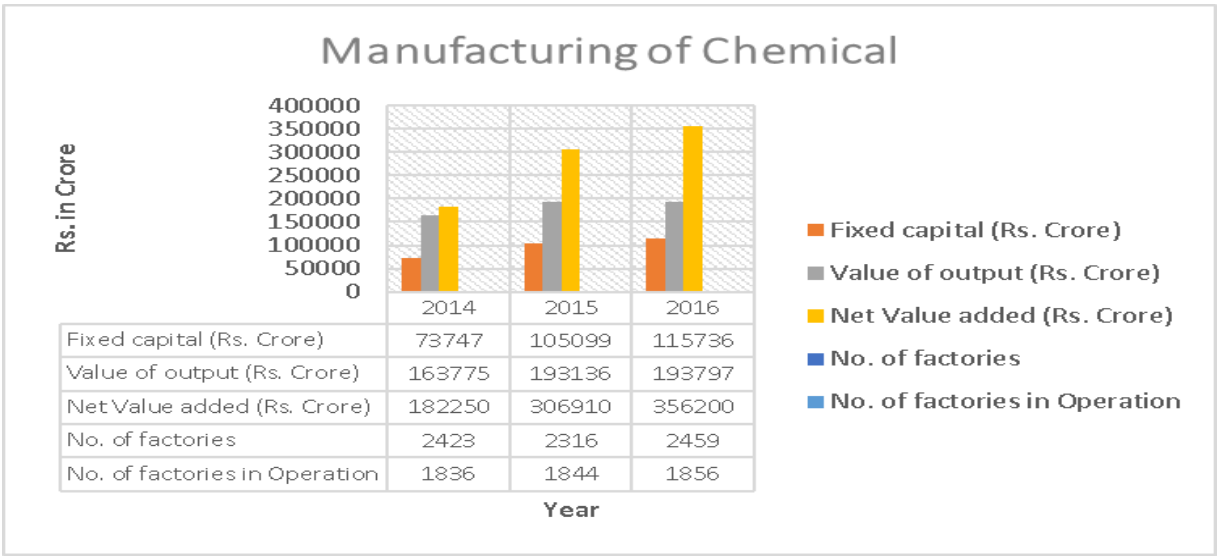
RESULTS AND DISCUSSIONS

The chemical and textile industries in Gujarat have developed very well in the last few years, the government has been putting a lot of emphasis on industrial development. The Vibrant Gujarat Global Summit has also been established by the Government of Gujarat to attract more capital to get enormous investment in Gujarat. Due to foreign investment, the chemical and textile industry in Gujarat has increased its production appreciably compared to previous years. The government keeps pushing industries to increase production and increasing exports. And the industry that exports are too getting financial related aid from the Government. This leads to an increase in hazardous waste products by industries. These drains are dumped in CETP, which is much higher than the treatment capacity of CETP. These inlets industrial wastes have high toxic levels, resulting in untreated waste and because of poor industrial water and excessive overload on CETP, the quality of the final discharge of the CETP may not comply with standard criteria.



	2014	2015	2016
No. of factories	2712	2743	2912
No. of factories in Operation	1785	1792	1700
Fixed capital (Rs. Crore)	23079	29943	34191
Value of output (Rs. Crore)	62348	70480	77290
Net Value added (Rs. Crore)	78290	103320	107540



	2014	2015	2016
Fixed capital (Rs. Crore)	73747	105099	115736
Value of output (Rs. Crore)	163775	193136	193797
Net Value added (Rs. Crore)	182250	306910	356200
No. of factories	2423	2316	2459
No. of factories in Operation	1836	1844	1856

While studying the textile and chemical industry, I found it that in the last three years, both the industry's output, net value-added and employment have increased. According to an analysis of the textile industry of Gujarat that 927 units in 2014-15, 951 units in 2015-16 and 2016-17 around 1212 units were non-operational. It may be possible that for the government don't give consent for expansion to polluting industries and because of various reasons, 25 to 30 percent industry were non-operational in 2016-17. It comes into notice that in 1997 the Gujarat high court ordered to close the 756 polluting industries in Vatva Cluster. There can be many

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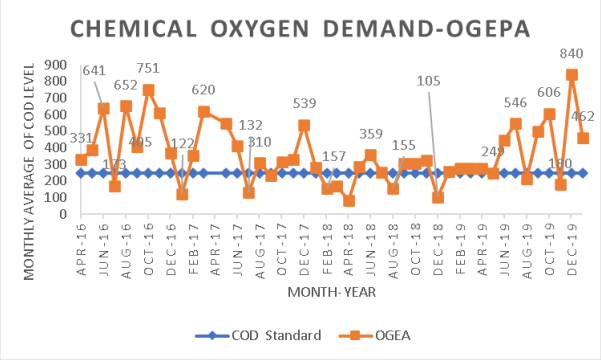
reasons for the closure of such units. According to the vice president of the Federation of Industries and Associations the high level of water pollution by such industrial units those most polluting industries who do not comply with the standards set by GPCB they haven't been permitted expansion in the existing unit or issued an order for the closer of the units.

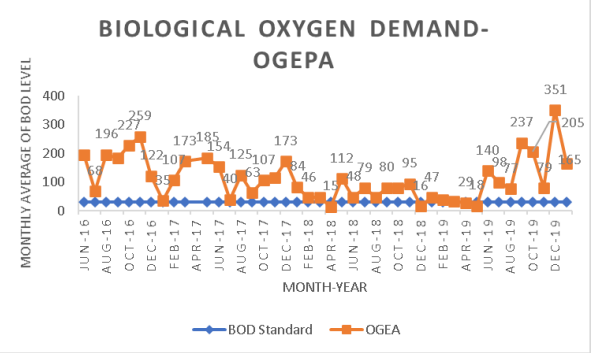
ESTABLISHMENT OF CETPS

For the sustainable and inclusive growth of industries, the Gujarat Government has launched a program called a scheme for support for common environment infrastructure. The focus was to help encourage compliance with the environment and standards. In the scheme, the eligible institutes for management of CETP can be Any Industry association/Enterprise (Except captive use) or firm which is registered under societies act or under the company act or GIDC/Board PSU/ Corporation/ Municipal corporation/ urban development authority (Industry Commissionerate, "Assistance for Common Effluent Treatment Plant (CETP)", 2013).

ODHAV GREEN ENVIRONMENT ASSOCIATION

Odhav Green Enviro Projects Association (OGEPA), is registered under the cooperative society act. The OGEA is CETP institution. It has 56 members and the designed capacity of CETP is 1.6 MLD per day.

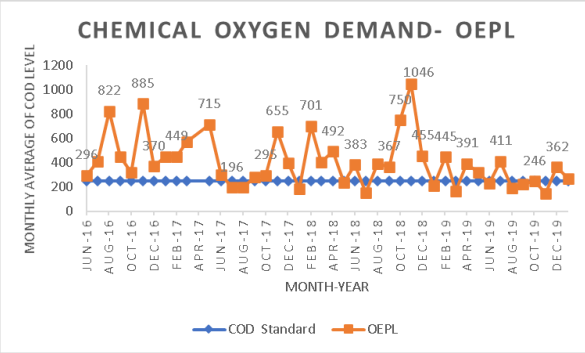


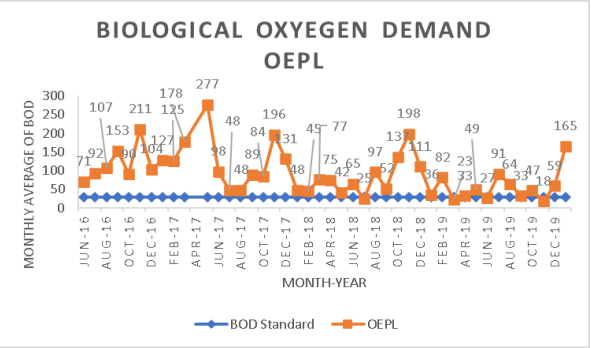


- COD: Out of 45 months in 33 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 83 mg / L and the maximum was 840 mg / L.
- BOD: Out of 45 months in 41 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 15 mg / L and the maximum was 351 mg / L.

ODHAV ENVIRO PROJECTS LIMITED

Odhav Enviro Projects Ltd. Is (OEPL) is operating CETP for collection, conveyance, treatment and disposal of effluent generated by the industrial units at Odhav GIDC. It has two members named as M/s Neptune Textiles Mills, P. Ltd. and M/s. Samir Synthetic Mills. The designed capacity of CETP is 1 MLD per day.





- COD: Out of 45 months in 33 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 147 mg / L, and the maximum was 1046 mg / L.
- BOD: Out of 45 months in 41 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 18 mg / L, and the maximum was 277 mg / L.

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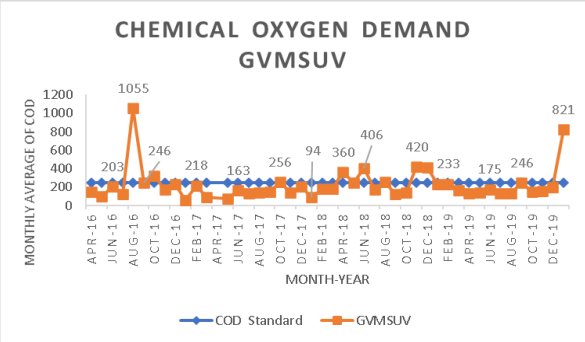
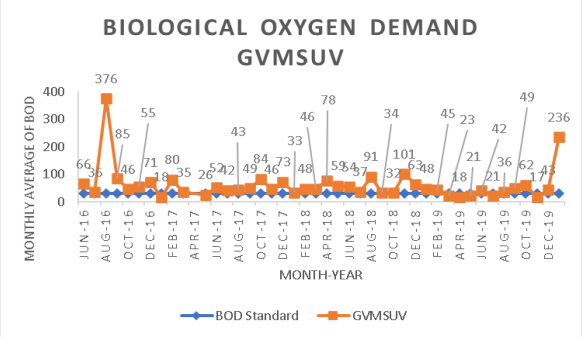
GUJARAT VEPARI MAHAMANDAL SAHAKARI AUDHYOGIK VASAHAT

M/s. Gujarat Vepari Mahamandal Sahakari Audyogik Vasahat Ltd. (GVMMSAVL) is a cooperative society incorporated in October 1961 under the Bombay Co-operative Society Act, 1961 at Odhav, Ahmedabad. The CETP commenced its operation in 1986. It has 264 members and the designed capacity of CETP is 1 MLD per day.

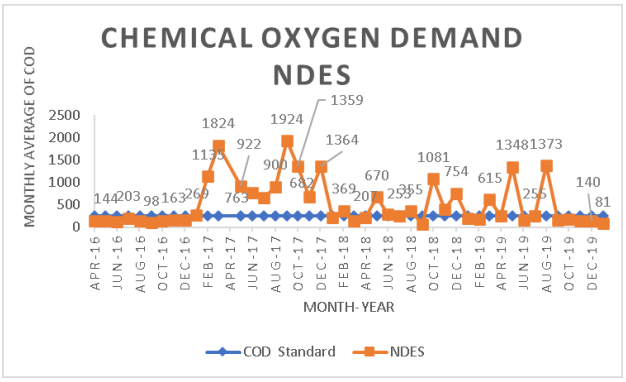


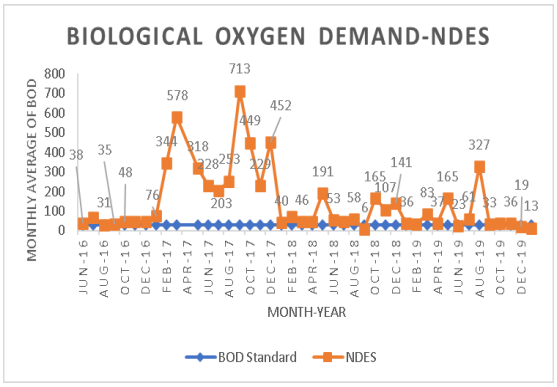


- COD: Out of 45 months in 9 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 59 mg / L, and the maximum was 1055 mg / L.
- BOD: Out of 45 months in 37 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 17 mg / L, and the maximum was 376 mg / L.

NAROL DYESTUFF ENVIRO SOCIETY

The Narol Dyestuff Enviro Society (NDES) is an Association of Micro Small and Medium Enterprises. The Society was established in the year 1997. This Society is promoted by and for MSMEs. Currently, the CETP has the design capacity of 100 KLD per day and it has 20 members.





- COD: Out of 45 months in 23 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 58 mg / L, and the maximum was 1924 mg / L.
- BOD: Out of 45 months in 40 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 6 mg / L, and the maximum was 713 mg / L.

THE GREEN ENVIRONMENT SERVICES CO-OP SOCIETY LTD:

Green Environment Services Co-operative Society Limited' (GESCSL) was formed with the support of Vatva Industries Association and Gujarat Dyestuff Manufacturers' Association. It a Cooperative society located in Vatva. It has 673 members, and the designed capacity of CETP is 16 MLD.

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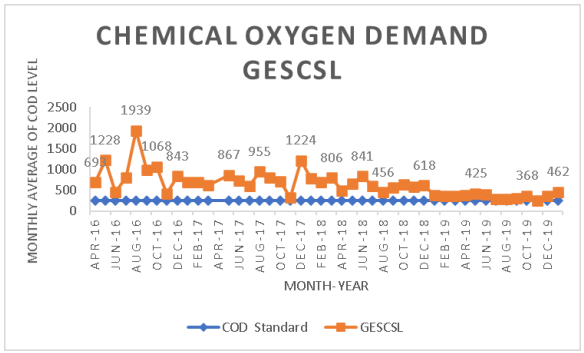
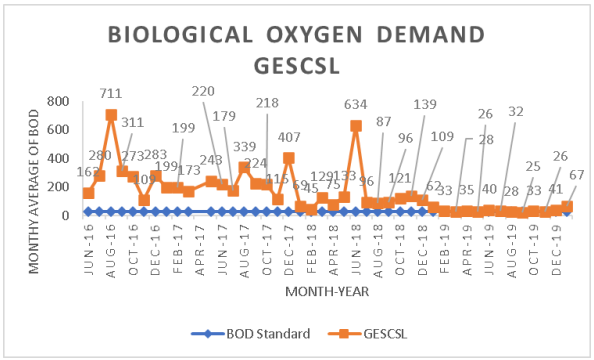
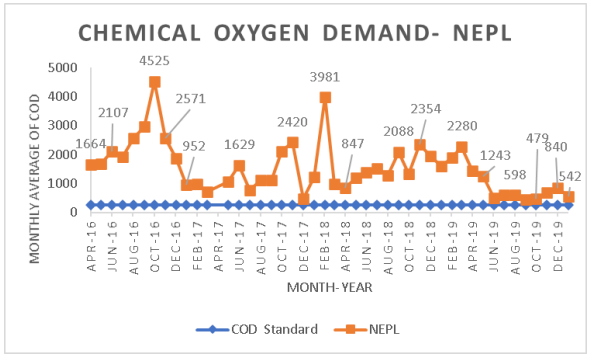


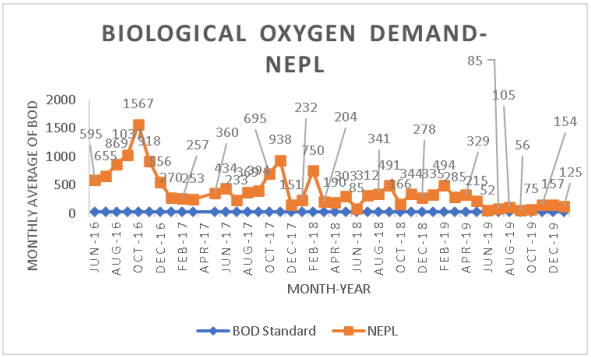


- COD: Out of 45 months in all 45 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 264 mg / L, and the maximum was 1939 mg / L.
- BOD: Out of 45 months in 40 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 25 mg / L, and the maximum was 711 mg / L.

NARODA ENVIRO PROJECTS LTD

Naroda Enviro Projects Limited was established in 1995 as a, not for profit organisation for the management of the Common Effluent Treatment Plant. The main objective of setting up NEPL is to purify the industrial waste of 255 MSMEs of dyes and chemical clusters as per the standard set by the government and discharge it into river or lake. NEPL's hydraulic capacity is 3 Million per litre per day. It has 255 members.





- COD: Out of 45 months in all 45 months, the CETP has failed to meet the prescribed standard 250 Mg/L. The minimum level in the pollutant COD was 459 mg / L, and the maximum was 4525 mg / L.
- BOD: Out of 45 months in all 45 months, the CETP has failed to meet the prescribed standard 30 Mg/L. The minimum level in the pollutant BOD was 52 mg / L, and the maximum was 1567 mg / L.

From the above analysis, it is clear that not all CETP are following the norms. CETPs that do not comply with the standard norms most often include The Green Environment Services Co-op Society Ltd and Naroda Enviro Projects Ltd. The reasons for failure of CETPs are as follows.

REASONS FOR POOR PERFORMANCE OF COMMON EFFLUENT TREATMENT PLANTS

The following points shows the reasons for the failure of CETP plants in Ahmedabad.

- Non-adherence to inlet norms by member industrial units.
- Overloading status of CETP Plants.
- lack of innovative and cost-effective technologies.
- lack of coordination between Municipal Corporation and Industrial Development Corporation about how to reduce the pollution load (Ghatak, 2020).
- Under-design of the CETPs (Kathuria, 2006).
- Lack of regularly receipt of the charges from the members.
- Wear and tear of machineries and lack of regular maintenance of CETPs.

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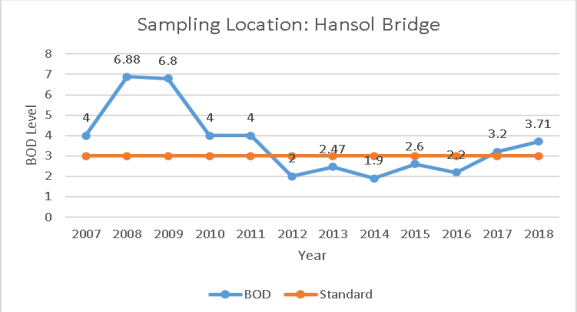
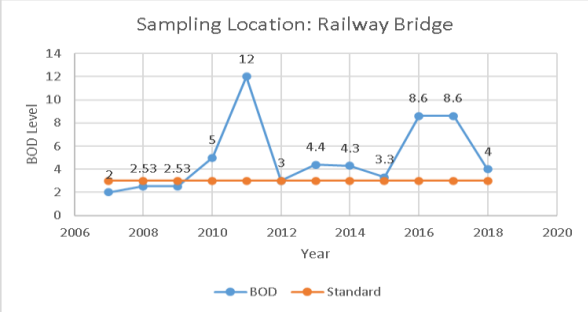
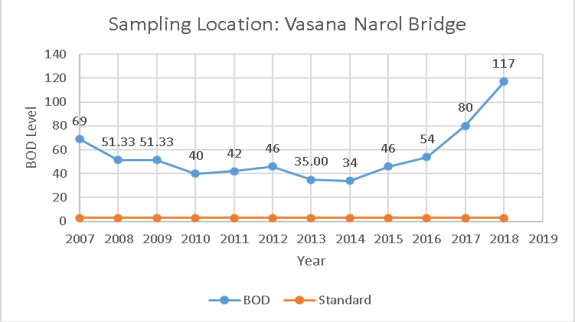
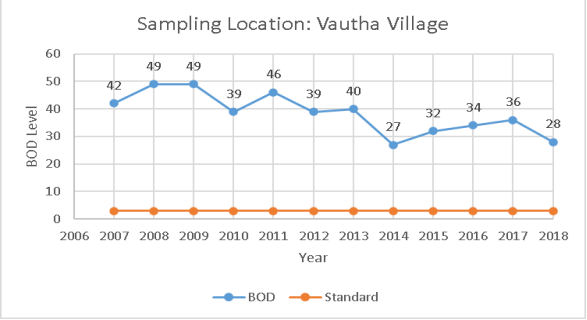
ANALYSIS OF (MONITORING OF INDIAN NATIONAL AQUATIC RESOURCES SYSTEM) PROJECT OF SABARMATI RIVER

"On account of various discharges of wastewater in the river, the quality is likely to be affected. It is, therefore, necessary to monitor the quality of the various river waters. This is a continuous project of previous years as approved by the CPCB and known as MINARS (Monitoring of Indian National Aquatic Resources System) Project. (GPCB, "MINARS Project")"









Under MINARS project, they study the result of pollution in the water of all main rivers of Gujarat. Under this project, samples are tested at different starches in Ahmedabad from where the Sabarmati River flows, such as Hansol Bridge, Railway Bridge, Vasna Narol Bridge and Vautha Village. Hansol Bridge is the place where the Sabarmati River enters the city of Ahmedabad. Vasna - Narol Bridge and Vautha Village are places where the Suez water and industrial wastewater is released through the mega pipeline. Understanding the MINARS project's report from 2007 to 2018, it appeared to light that when the Sabarmati river enters Hansol Bridge, the pollution of the water was lesser than Vasna- Narol and Vautha village. Most of the effluent is discharged near Vasna- Narol and Vautha village. Any river is called a good river only when the BOD level in the water is less than 3 mg/L. Near Hansol and railway bridge the BOD level is near to 3 but in Vasna-Narol Bridge and Vautha village, the BOD level is 117 and 28 mg/L in 2018. The excessive amount of pollutants possesses a threat to the ecological sustainability of the Sabarmati River. From a decade the Sabarmati River and nearby regions have witnessed considerable changes in Borwell water quality, deteriorating Soil quality for agriculture and reduce movement of migratory birds. According to an assessment conducted by CPCB (Central Pollution Control Board) on Indian rivers during 2018, the BOD level of 4.0-147 mg/L was found for Sabarmati River, categorizing river as priority five river and declared as the third most polluted river in India. (Koshy, 2018; ForumIAS, 2018). With the help of the above analysis, we can say that effluent treatment plants are posing a serious risk to the health of human beings in the State as they cannot deal with industrial effluent (CAG, 2012).

CONCLUSION

Gujarat is an industrial state. The progress of industries raises major issues of pollution. For the control of water pollution, Industrial organisations have set up Common Effluent Treatment Plants in Ahmedabad. The primary role of CETPs is to reduce the toxins in the final effluent of member industries. In this paper, the researcher has examined the level of toxins in the final effluent released by the common effluent treatment plants. It recommends all the six common effluent treatment plants are not capable to treat the effluent of industries as per the standard norms recommended by the Gujarat Pollution Control Board. The reasons behind the poor performance of CETPs are Non-adherence to inlet norms, Overloading of CETP Plants, lack of innovative practices, Lack of coordination between Municipal Corporations and CETPs, lack of regular maintenance of machinery and late receipts of the charges recovered from the member industries. The key reason behind the poor performance is all CETPs are non-profit organisations and managed by industry organizations. The president and other committee members provide honorary services to the association. They

wish to maintain relationships with the members so that many a time they do not complain to the pollution control board. As a result, groundwater is polluted by the fields around which industrial wastewater is disposed of. Poor quality water can impair the health of both humans and cattle. As a result, NGO and local societies tell GPCB about polluted water and many a time a writ petition has been registered by the Paryavaran Suraksha Samiti in the High Court concerning the surrounding areas and natural conservation. So that legitimate action can be taken against all the units in the cluster. The GPCB has taken reaction against the whole cluster and it may include polluting units and the non-polluting units. Units are imposed with fines for pollution or are directed to close in the cluster for production. The administration of CETP handed over to an independent enterprise will communicate the Industrial Development Corporation or regulatory bodies about offenders. Regulatory offices will take steps on offenders those who appear not to comply with the rules. This of strict procedures will lead to fear in the violating enterprises and it can cut down industrial pollution.

LIMITATION OF THE STUDY

The actual results of the CETP may be different because the researcher has collected data from secondary sources.

SUGGESTION FOR THE POLICY MAKERS

Policymakers should focus on the incentive-based system to reduce industrial water pollution in Gujarat. In the incentive-based system, polluters can be motivated by an incentive-based regulatory approach. Incentive-based policy mechanisms have long been suggested by economists to be a further efficient technique of carrying out environmental objectives such as contractions in polluting emissions and fostering the delivery of ecosystem functions. (Hanley, Shogren, & White, 2009, Vries & Hanley, 2016)"

REFERENCES

[1] MINARS Project. (n.d.). Retrieved April 15, 2020, from https://gpcb.gujarat.gov.in/webcontroller/viewpage/minars-project
[2] Deshpande, S. (2020, March). WORKING OF POLLUTION-TAX AND TRADABLE-PERMITS TO CONTROL ENVIRONMENTAL POLLUTION. A GLOBAL JOURNAL OF SOCIAL SCIENCES, 3(1), 55-58. Retrieved from https://www.gapgyan.org/view-articles.php?iid=21
[3] ForumIAS. (2018, October 23). Retrieved from https://blog.forumias.com/article/more-river-stretches-are-now-critically-polluted-cpcb
[4] Koshy, J. (2018, September 17). More river stretches are critically polluted: Central Pollution Control Board. The Hindu. Retrieved from https://www.thehindu.com/news/national/more-river-stretches-critically-polluted-cpcb/article24962440.ece
[5] Baboo, P. (2018, August 1). What is a relationship between TOC and COD? Retrieved January 11, 2020, from https://www.researchgate.net/post/What_is_a_relationship_between_TOC_and_COD
[6] Marie Löf, R. (2018, June 18). Ecological sustainability. Retrieved from https://www.hig.se/Ext/En/University-of-Gavle/About-the-University/Environmental-Work/What-is-sustainable-development-at-HiG/Ecological-sustainability.html
[7] Talwar, S. (2018, January 1). Origins and dynamics of industrial symbiosis networks in India. Retrieved April 20, 2020, from https://www.semanticscholar.org/paper/Origins-and-dynamics-of-industrial-symbiosis-in-Talwar/c4a612684a59d475b83fff1767e1e88bf94b795a
[8] Assistance for Common Effluent Treatment Plant (CETP). (n.d.). Retrieved from https://ic.gujarat.gov.in/assistance-for-common-effluent-treatment-plant-cetp.aspx
[9] Chaudhary, V., Jacks, G., & Gustafsson, J. E. (2002). An analysis of groundwater vulnerability and water policy reform in India. Environmental Management and Health, 13(2), 175–193. doi: 10.1108/09566160210424608
[10] Comptroller and Auditor General (CAG), (2012), "Water pollution in India", Report No. 21 of 2011-12, Government of India.
[11] Garrett, B., Shorofsky, B., & Radcliffe, R. (2016). Evaluation of Textile Treatment and Treatment Alternatives for the Village of Jasol in Rajasthan, India. 1–56. Retrieved from http://www.civil.northwestern.edu/EHE/HTML_KAG/Kimweb/files/FINAL Report for JBF.pdf
[12] Ghatak, A. (2019). Environmental Regulations and Compliance in the Textile Dyes Sector of Gujarat: Case of Ahmedabad Cluster. Ahmedabad: South Asian Network for Development and Environmental Economics.

Retrieved April 13, 2020, from https://www.researchgate.net/publication/335772000_Environmental_Regulations_and_Compliance_in_the_Textile_Dyes_Sector_of_Gujarat_Case_of_Ahmedabad_Cluster

[13] GPCB Status of CETPs in Gujarat. (n.d.). Retrieved from https://www.gpcb.gov.in/status-of-cepts-in-gujarat.htm

[14] Gujarat Pollution Control Board CETP Results. (n.d.). Retrieved from https://gpcb.gujarat.gov.in/webcontroller/page/cetp-results

[15] Hanley, N., Shogren, J. F., & White, B. (2009). Environmental economics: in theory and practice. New York: Palgrave Macmillan.

[16] Implementation of the Order of High Court. (n.d.). Retrieved from http://paryavaranmitra.org.in/implementation-of-the-order-of-high-court/

[17] Kathuria, V. (2006). Managing Pollution from SSIs – Designing for a Sustainable Institution. Environment, Development and Sustainability, 9(2), 107–130. doi: 10.1007/s10668-005-9007-2

[18] Nidheesh, P. v., Kumar, A., Syam Babu, D., Scaria, J., & Suresh Kumar, M. (2020). Treatment of mixed industrial wastewater by electrocoagulation and indirect electrochemical oxidation. Chemosphere, 251. https://doi.org/10.1016/j.chemosphere.2020.126437

[19] Pathak, M., & Tnn. (n.d.). NGT threat: Gujarat readies action plan: Ahmedabad News - Times of India. Retrieved April 20, 2020, from https://timesofindia.indiatimes.com/city/ahmedabad/ngt-threat-gujarat-readies-action-plan/articleshow/73933113.cms.

[20] Pathe, P. P., Suresh Kumar, M., Kharwade, M. R., & Kaul, S. N. (2004). Common Effluent Treatment Plant (CEPT) for wastewater management from a cluster of small-scale tanneries. Environmental Technology, 25(5), 555–563. https://doi.org/10.1080/09593332608618562c

[21] Vries, F. P. D., & Hanley, N. (2016). Incentive-Based Policy Design for Pollution Control and Biodiversity Conservation: A Review. Environmental and Resource Economics, 63(4), 687–702. doi: 10.1007/s10640-015-9996-8