

Study on Coastal Pollution By Anthropogenic Activities Along The South –West Coast of Mangalore: A Review

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Abstract- Mangalore is on Arabian Sea port and a major commercial centre in the Indian state of Karnataka .Mangalore coast is stretch of about 22Km. This area receives large quantity of pollution due to major industries and other Anthropogenic which are located nearby .This pollution is discharged into sea either directly or indirectly through major rivers of the area Nethravathi and Gurupura. The pollutants includes wastes from oil refineries, chemicals from pharmaceutical industry, pesticides, Individual house hold waste and also municipal sewage or sewage wastes. The local human population which is mainly dependent on fishing activity for their lively wood is much worried about the speed of spread of this population load .The quality of water is getting deteriorated due to unscientific waste disposal and careless towards protecting the environment. Increased manmade activities in and around water bodies damage the aquatic systems and ultimately the physio-chemical properties of water by this we can know the extent of pollution in coastal areas due to anthropogenic activities.

Keywords- Anthropogenic activity ,Coastal pollution ,Mangalore, Physico-chemical and Biological properties.

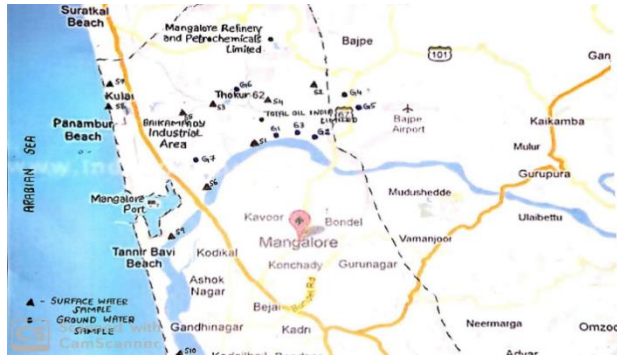
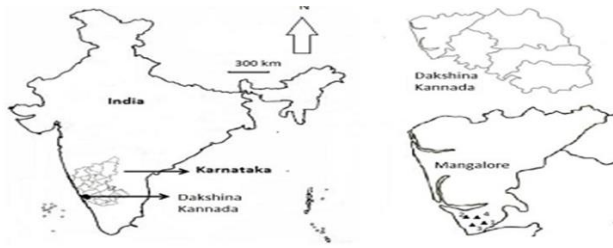
I. INTRODUCTION

Water is a vital for all known forms of Life, which covers about 71% of earth's surface mostly in seas and oceans. Many industrial processes rely on reactions using chemicals dissolved in water, suspension of Soilds in water slurries and to wash products or process equipment. Such as chemical pulping, bleaching, dying, paper manufacturing, LPG storage, fertilizer plant, pharmaceutical industry, brewery, edible oil processing units, lead refining unit, paint and dispersion unit cause significant water pollution. Coastal waters are one of the nation's greatest assets, yet they are being bombarded with pollution from all directions. The heavy concentration of activity in coastal areas, combined with pollutants flowing from Streams far inland and others carried through the air great distances from their source, are the primary cause of nutrient enrichment, sedimentation harmful algal blooms,

toxic contamination and other problems that plague coastal waters. Individual house hold waste is the secondary cause for the pollution. Study is on Mangalore coastal region which is located in south west coast of India and has operating industries mentioned above which leave their effluents to small drains which join Major Rivers Gurupura, Nethravathi. They will finally meet Arabian Sea causing water pollution.

II. ABOUT STUDY AREA

The study area includes Baikampady industrial area which is at Nethravathi-Gurupura river mouth and areas in its vicinity. It extends from 12^o 51' 34" N, 74^o48' 33" E to 12^o 48' 31" N, 74^o 50' 30" E covering an area of about 25Km². Rainfall is the most important cyclic phenomenon in tropical countries as it brings important changes in the hydrological characteristic of the estuarine environment. In the present study area peak values of rainfall were recorded during monsoon months from June to September. This area receives an average rainfall of about 4000mm per annum .Surface water temperature varied from 28^oc 34.75^oc with minimum value in winter and maximum value in summer .The geology of the city is characterised by hard laterite in hilly tracts and sandy soil along sea shore. The cluster is surrounded on the west by Arabian Sea, east by Kunjathbail, south by Mangalore city and north by Surathkal.The major rivers Gurupura is located adjacent to the boundary of Baikampady industrial cluster and Nethravathi is located at a distance of 20Km from the Baikampady industrial cluster towards south. The major source of water to the Baikampady industrial cluster is from Nethravathi River and bore wells.



SAMPLING LOCATIONS

- 1.G1- near Total oil India private limited -1 (TOIL)
- 2.G2- near Total oil India private limited -2
- 3.G3-near Total oil India private limited -3
- 4.G4 –near Thokur , Jokatte -1
- 5.G5-Thokur, Jokatte-2
- 6.G6-near as Mangalore refineries and petrochemical limited(MRPL)
- 7.G7-near Chitrapura
- 8.S1-near TOIL
- 9.S2-near Adani
- 10.S3-near Thokur bridge
- 11.S4-Jokatte lake near MRPL
- 12.S5-near Hindustan petroleum corporation limited(HPCL)
- 13.S6-Gurupura river 1
- 14.S7-near Chitrapura
- 15.S8-near Chitrapura beach side
- 16.S9-near Gurupura river 2
- 17.S10-meet point of Gurupura and Nethavathi river

CAUSES FOR COASTAL POLLUTION

The main reasons behind the coastal pollution that mainly depends on the position, the extent of pollution varies, and pollution by humans on the soil and water.

- Surface water was polluted by discharge of untreated sewage.
- Surface Water is being polluted by the fertilizers used in agricultural fields which increases the level of nitrate, phosphates in water, which causes eutrophication as a threat for marine life.
- Three major storm-water drains joining the Phalguni near Dambel, Kudroli and Hoige Bazar deposes

large amount of rich sewage nutrients, animal wastes into the river which causes harmful effects on aquatic life.

- Sea water intrusion into ground water table is also a one of the concerns in the coastal area.
- Oil leakage from pipe lines carrying crude oil to refineries causes soil pollution and ultimately contaminates ground water table
- Due to the various man made activities, Vegetation, aquatic life were damaged severely in the study area.

III. LITERATURE STUDIES

S.Y Tenjin¹⁵(2017), Etal., they analysed heavy metals present in Donax Faba at Panambur and Padukere . In this study Mn and Zn metals were found in the body of Donax Faba samples. When compared to earlier studies from other different geographical regions significant variability in the environmental parameters and heavy metals was observed. Finally they concluded that concentration of Mn and Zn were higher in Panambur than that of Padukere.

K.J. Sylus, H. Ramesh⁹(2015), they studied on sea water intrusion in coastal aquifer by electrical conductivity and total dissolved solid method in Gurupur and Nethravathi river basin. Ground water samples of Gurupur and Netravathi river of Dakshina Kannada has been considered for the study. This ground water samples were analysed for two chemical parameters such as Electrical conductivity and total dissolved solids. The result of the study showed that in post monsoon period the water level gets lowered which reduce the water quality, this is due to reduction in rainfall during summer period .In monsoon period water level gets rises up due to excess rainfall which automatically increases the ground water recharge and water quality.

P.V Shirodkar¹²(2009), etal., they analysed water quality parameters such as temperature, pH, salinity, DO, BOD, suspended solids, nutrients, trace metals-Pb, Cd, Hg , Phaeo pigments. Sediment quality parameters like total phosphorous, total nitrogen, organic carbon and trace metals along coastal region of Mangalore. The results showed higher concentration of Ammonia at suratkal, high nitrite and nitrate in shore waters of Kulai. Similarly high PHc values were observed near harbour and Phenols at shore waters of Kulai and Suratkal. Significant concentration of Cd and Hg with respect to earlier studies were observed at Kulai and Harbour respectively.

Francis Andrade⁷ (2011)etal., studied on Mangalore coastal water pollution and its sources. Pollution load is discharged into the sea either directly or through the major west flowing rivers of the region, Nethravathi and Gurupura. The pollution

load includes runoff of the sediments, waste from oil refineries, nutrients and pesticides, iron ore residues from the near by iron ore company and chemicals from chemical factory from the point source. Water quality is also altered due to the addition of municipal and sewage waste discharged in to the sea. The samples analysed for the various Physicochemical parameters revealed the alkaline condition and low in dissolved oxygen concentration. The concentration of these components were compared with WHO standards and found to be highly deviated.

Ateeth Shetty³ (2015)etal., studied long term shoreline changes as well as erosion or deposition patters due to anthropogenic and natural activities along the south west coast of Mangalore. They studied multi-temporal satellite images using remote sensing and GIS techniques to show shoreline positions and accesses the impact of hydrological factors and anthropogenic activities on costal morphology of coastal region. An integrative approach of GIS and remote sensing techniques as well as seasonal field studies clearly illustrates the reason for shoreline and beach morphological changes. Construction of sea walls as resulted in shifting of erosion sites from one place to another adjacent place, whereas break waters have been acting as barriers for littoral drift. Overall, area subjected to erosion are higher compare to those subjected to accretion in the study area. Applications of remote sensing and GIS have led to understanding shoreline and beach morphological changes.

D.A Kiran, H.K Ramaraju⁵ (2019) have studied on seawater intrusion using chemical indicators in the coastal region of Mangaluru. They have concluded that saltwater intrusion is a major concern commonly found in coastal aquifers around the world, Sea water intrusion is the induced flow of seawater into freshwater aquifers primarily caused by groundwater development near the coast. The physicochemical parameters of about 10 open well water samples were analysed. Chemical indicators like Ca/Mg, Cl/[HCO₃+CO₃], Na/Cl and Cl/[HCO₃+SO₄] were selected to identify the sea water intrusion areas. Based on results, Samples 2,4,6,9 and 10 showed more the contamination than the other samples. They have also studied on Assessment of water and soil quality along the coastal region of Mangalore. They have concluded in their study that Majority of the Industries in the Mangalore coastal region, discharge their waste directly or indirectly into the Arabian sea through the west flowing rivers of the region and also, due to the addition of municipal and sewage wastes the physicochemical characteristics were altered. 10 surface water samples and six soil samples were collected from selected locations of the study area and analysed for various parameters by adopting standard methods. High values of hardness, BOD and COD were found

in the surface waters near Baikampady industrial area with respect to soil samples, most of samples were acidic in nature and not met the sufficient range for agricultural activities.

A.C.Eapen and S.KJain¹(2009),Studied on dilution of effluent discharged through a sea outfall near Mangalore using radiotracer technique. In this paper radiotracer techniques have been successfully used to study the change in concentration of effluents while being mixed with larger water bodies. In this technique a known concentration of radioactive tracer added into the effluent stream and measure the dilutions at different locations near the effluent discharge point with radiation detectors. They used radiotracers Br-82 as ammonium bromide solution and tritium were employed for the study, the effluent mainly contained 40-50ppm as pollutant.

N.C Tharavathy¹¹(2010), have studied on ground water quality in Mangalore city. She collected 9 ground water samples to analyse pH, dissolved oxygen, alkalinity, solids, hardness, chloride, phosphate, sulphate, calcium, magnesium and iron contents by adopting standard methods. The results revealed according with the WHO and BSI standards. The pH value was more when compared with the values of 20 years back. Colour, odour and taste of ground water samples did not report any objectionable features. The values of DO, alkalinity solids, hardness, chloride, phosphate, calcium and iron in the present study was below the BSI and WHO drinking water standards.

IV. PRELIMINARY STUDIES

Result and discussions: Ten surface water samples, seven ground water samples and Three soil samples were collected randomly from selected locations of study area (S1-S10,and G1 to G7) respectively during the month of February 2020.The samples were collected morning hours and samples were protected from direct sunlight during transportation. Samples are collected in cleaned polythene bottles and polythene covers respectively. The bottles were tightly closed and brought to the laboratory for analysis. The Physico-chemical parameters of about 7 groundwater sample ,10 surface water sample were analysed. The based on the analysis turbidity, Electrical conductivity, chlorides, COD, Potassium ion, calcium ion are more in surface water. Dissolved oxygen is more in ground water except G7(near MRPL). Based on the result surface water S4(Jokatte lake near MRPL), S5(Near HPCL), S6(Gurupura river), S7(near chithrapura) and ground water G1(near TOIL), G3(Near TOIL) are more contaminated than the other water.

V. CONCLUSION

The present study was carried out to know the pollution status of Mangalore coastal region, it is evident that surface waters and ground waters were contaminated by the untreated sewage discharges by various industries located such as Mangalore refineries and petrochemical limited(MRPL), Kudremukh Iron Ore Company limited (KIOCL), Baden Aniline and soda Factory(BASF), Total oil India private limited (TOIL) etc., pollution load on water is also due to individual house hold sewage. It may effects on health status of the living organisms. The quality and strength behaviour of soil were also altered due to the oil leakages from the pipe lines and vehicles. So a careful attention should be given to control the environmental pollution in the study area which includes installation of reveres osmosis system ,condensate Recovery Plant ,Ultrafiltration(UF), UV filtration ,activated carbon filter to reduce the fresh water consumption and leading to zero discharge.

VI. ACKNOWLEDGEMENT

The research work was funded by ministry of Earth science(MOES),New Delhi. Authors are thankful to them. We also thank “Dayananda Sager college of Engineering” for permitting us to carry out the research work. We also Thankful Mr. D .A Kiran (research fellow MOES project) for helping us during field visits and analysis of work.

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