

ENVIRONMENTAL REGENERATION: -ITS LIMITATIONS

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Abstract:

An Eco-system is in its harmony and balance in Natural settings, it works in tandem within its settings and with Eco-systems existing adjacent to it. Each Eco-system maintains its balance as well as corrects disturbances up to limited level. The components of Eco-System deplete and regenerate on its own depending on various natural forces acting on it such as Climatic conditions, Geological disturbances, affect of flora and fauna, Invasive species within the Eco-system, etc and supplies and receives eco-services to all living and non-living organism. Thus, the Eco-system being resilient, balances back on its own through ages. Some High Impact Natural changes may also change the components of the Eco-system, but these change in components continue to exist in the Eco-system and its new component usually ensures Eco-system is in harmony. With the advent of human intervention in the Eco-system, this resilient feature of Eco-system has subsided to such an extent that the capacity of Eco-system to regenerate culminates and that revival is beyond accomplishment. Complete regeneration of the Eco-system under such circumstances then irreversible and leads to permanent Environmental Degradation.

Keywords: Eco-System, Harmony, Resilient, Human intervention, Environmental Degradation

Introduction:

Environmental Degradation and Regeneration is the buzz of today. The Topic is dealt at all levels as Human beings have realised that their very existence is threatened due to Environmental Changes. Humans due their interventions have endangered the very existence of the Globe by their activities. The thirst for more is likely to end the basic eco-services derived from nature. This issue we shall deal in detail in this paper hereafter. The rampant changes and intervention induce by human being for higher yields and more profits with less efforts are the basic cause of degradation. In the past century human being have been adopting to large scale non-natural materials like Plastic, Polystyrenes, PVC Nylons, etc which are not in analogy with nature and have a very drastic effect on Biosphere. Earlier, Centuries saw industrialisation which lead to much proliferation of Natural resources. This paper shall try to analyse how these issues have impacted on Eco-systems. Human Being is self-centred creature and now the fear of his existence has led him to take steps towards Environmental Regeneration and application of Sustainability Standards in various walks of life. It now established fact that any further damage to the Eco-systems is seriously going to jeopardize the interest of Human being. The State level as well as World level Organisations have now taken up the cause and even Individuals and NGO's are acting in the direction of Environmental Protection. Various studies are being done in the direction and few Organisations viewing it as their profession.

The realisation of Degradation of environment even though is high, yet the attempts made for regeneration are very basic such as afforestation's, recycling, use of eco-friendly material at individual level while reducing Carbon Footprint, reserving eco-sensitive zones at State and world

level. There are huge loopholes in these attempts also. One of the basic reasons of these loopholes in the systems is due stiff competition and financial survival as the overheads are bound to increase due to adaptation of the environmental norms. The Governments are reluctant to stress on major Corporate Houses and MNC's for their interests. Yet, there is quite a major awareness brought about by Social networks in individual level which is leading to pressure on all to adopt Environmental norms.

The regenerative techniques applied to reduce environmental degradation even though have good effect in nature seem to be superficial as the intense and deep-rooted degrading effects environmental degradation are not revamped by such attempts. It is necessary to study Eco-systems and each of its components in details to understand its degradation and then attempt to refurbish them. There are minute living organisms that take part in maintaining the Eco-system balance. Elimination or large-scale reduction of any such component would result in permanent loss or change in eco-system cycle. This is why extinction of Flora and Fauna is hazardous as one of the components of ECO-system cycle is eliminated leading to multiple changes in eco-system. Similarly, pumping on unnatural materials such as plastic causes serious issues and may even choke the entire eco-system cycle circulation.

In this paper we shall try to understand the cause and effect of such changes induced in the Eco-system. It is an attempt to understand what is the level of interventions required to reduce or eliminate Environmental Degradation. An exercise to collect more knowledge about facts that affect the Eco-system but is not realised superficially and yet may affect the Eco-system in long run.

Methodology:

The methodology consisted of gathering the first-hand information of through Literature study already available from various research works that have been conducted at National and International level by Individuals and Organisation about environmental degradation, its causes and effects. It is proposed understand through few examples how interventions of human being have deep rooted impact on environment which are some times irreversible and results in permanent loss to nature. The research may also help in identifying certain cursors which may lead to identifying and adopting better environmental regenerative options. This work would just indicate that better understanding of Eco-systems in necessary before adopting interventions of regenerative methodology even though few measures may be repetitive.

Study & Observations:

A literature study of few Eco-system components is carried out to examine how environmental degradation has been happening throughout ages. It is observed that from early days the major loss has been happening due to transformation of various terrains of land in to agricultural land. It is pertinent to mention here that any terrestrial or aquatic terrain has an eco-system, which keeps it in equilibrium whether it be forest, grassland, plains, desert, rivers, sea shore or deep sea. Every Eco-system is in equilibrium under given conditions, it functions in tandem within itself and Eco-systems adjacent to it, to maintain the equilibrium. Eco-services are delivered and food chain is under this equilibrium under these circumstances. A study of various research articles from various

sources is presented below to understand facts of degradation of Eco-system and it is tried to understand these degradations vis-a vis the efforts made for regeneration: -

1. Spread of Chemical Contamination through Air, Water & Land: The unrestrained use of chemicals by humans in all walks of life has created a deep impact on Eco-systems. Such type of contamination is prime concern of Environmental degradation. The chemical contamination is beyond human control once activated even the entity responsible for contamination is unable to exercise control over such contamination. Further, such contamination spreads its tentacles and reaches region far beyond then imaginable. Consider, Oil-spill in an ocean, Gas-leak from an industry, release of chemical in a water body, use of pesticide or chemical fertilizers, all these have outreaching long lasting and extensive effect on all land forms even though the intensity goes on decreasing with the distance from point of induction of pollution. This type of contaminations also affects natural habitats which are not encroached by humans physically yet falls prey to environmental degradation. Such multiple activities will affect even reserved or protected forest or sanctuary. The regenerative techniques have never considered techniques to control such environmental degradation

2. Pollution caused by Non-degradable material: This type of pollutants are more detrimental than chemical pollutants. The risk originates from its basic quality of being Non-Degradable. Thus, the spread of environment degradation is directly dependant on Quantum of pollutant disposed or disperse. This material does not degrade chemically but disintegrates physically, and more the disintegration and finer the size of this disintegrated pollutant deep is the impact of it on environmental degradation. It gains access in to food chain and turns in harmful ingredients which may cause multiple issues to all living beings. It may affect to such an extent that it may induce metabolic changes leading to multiple problems. Recent studies have shown that micro particles of these non-degradable material are penetrating and moving in subsoil which can lead to environmental hazards.

3. Elimination of Components of Eco-system: A study of biological factors such as Biological Oxygen Demand (B.O.D) and Dissolved Oxygen (DO) levels in certain creeks have reached to such a critical level that micro-organism which are base of food chain cannot survive at all in such conditions due discharge of sewage and industrial waste. Further, the Faecal Coliform also have reached to such levels that the conditions are hazardous for any living organism to survive. This induce complete disturbance in the ecosystem leading to failure other elements of ecosystem and ultimately failure of Ecosystem. In case, stringent action against is taken against pollutants and all such discharge of waste is stopped, it is difficult to revive the Eco-system as certain element of ecosystem have been completely eliminated which are necessary to replenish the system and bring it back to its original conditions. Further, each element has certain mechanism for adaption to change. The modified element may not be effective in revival or may have adverse effect on the Eco-system. A similar example is also found in agricultural sector. It is often observed that forest lands are cleared for plantations, these plantations may boom in the initial stages but with eradication of forest completely, the produces from these plantation may drastically reduce, this is

due the fact that certain flora and funa in these forest act as host plants which supply nutrient required by the plantation or complete the ecosystem services delivery which is necessary for plantation. Thus, elimination of certain elements of ecosystem may lead to complete collapse of ecosystem services delivery.

Please refer this research Paper for basics of point 3

Source: WATER QUALITY ASSESSMENT OF CREEKS AND COAST IN MUMBAI, INDIA: A SPATIAL AND TEMPORAL ANALYSIS” Paper by Swapnil R Kamble, Ritesh Vijay and R A Sohony from NEERI for 11th ESRI India User Conference 2010 & **MARINE POLLUTION - A PERSPECTIVE, MONITORING AND CONTROL IN INDIA a report by Dr. N.V.Vinithkumar from NIOT**

The Secondary data study results referred from another Experts Domain: -

The results of study conducted for obtaining environmental parameters in and around Island of Mumbai and all its major creeks are depicted below. The Parameters such as Dissolved Oxygen, Bio-Chemical Oxygen Demand (BOD), Faecal Coliform Concentration were studied and their level shown on Maps. The following Basic Norms may be noted: -

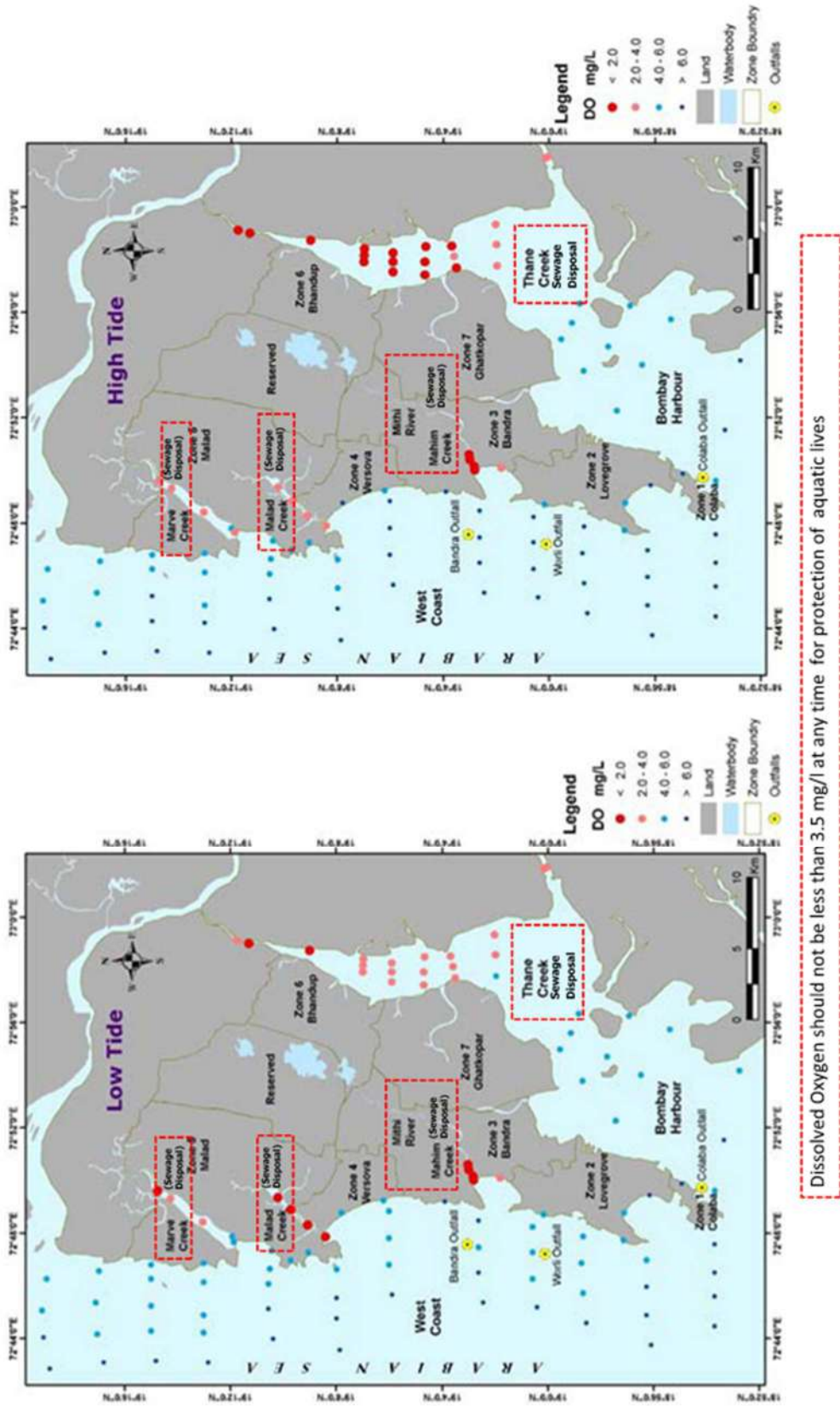
The Level of **Dissolved Oxygen** should not be less than 3.5 mg/l at any time for protection of aquatic lives.

Increase in **Biochemical Oxygen Demand** indicate Higher level of Biological activity, the levels should be 5 mg/L to maintain water relatively free from pollution caused by sewage and other decomposable wastes

The average value of **Faecal Coliform** should not exceed 200/100 ml (MPN) for Bathing etc & 1000/100ml for all other purposes in 20 percent of samples in the year and in 3 consecutive samples in monsoon months

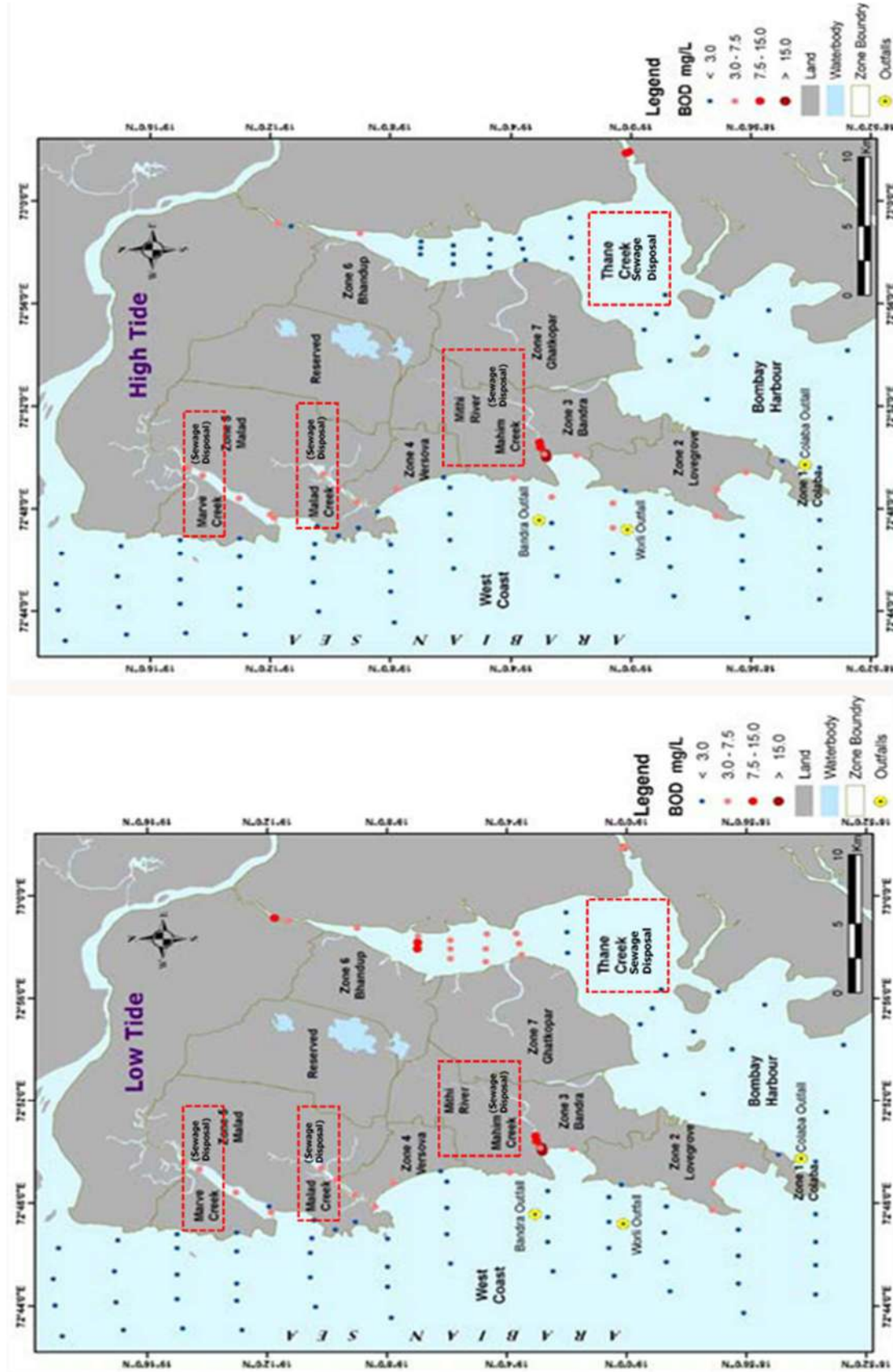
The facts present under points 5 &6 about Untreated Discharge from Chemical Factories and Untreated Discharge from Sewage Plants are evident from this study. The depictions show how badly Coastal Eco-system has degraded in and around Metros like Mumbai.

Spatio-temporal distribution of Dissolved Oxygen

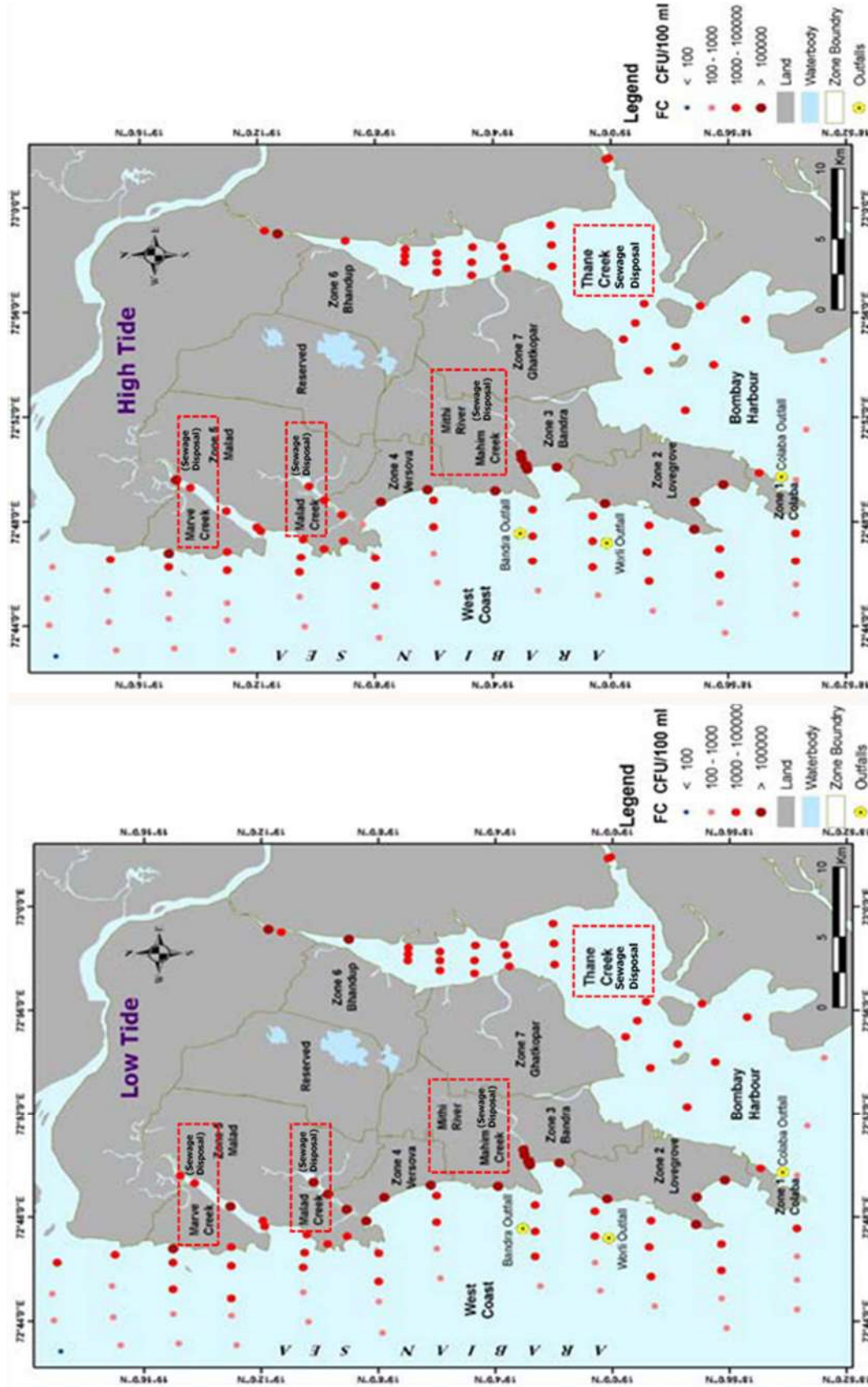


Source: WATER QUALITY ASSESSMENT OF CREEKS AND COAST IN MUMBAI, INDIA: A SPATIAL AND TEMPORAL ANALYSIS* Paper by Swapnil R. Kamble, Ritosh Vijay and R. A. Sohony from NEERI for 11th ESRI India User Conference, 2010 & MARINE POLLUTION - A PERSPECTIVE, MONITORING AND CONTROL IN INDIA a report by Dr. N.V.Vinithkumar from NIOT

Spatio-temporal distribution of Biochemical Oxygen Demand



Spatio-temporal distribution of Faecal Coliform



4. Disturbances in Landforms: Human beings for their consumptions and benefits has been the inducing changes in landforms. Such changes seem miniscule when projects are implemented. Just imagine a road in hilly terrain, Mining for Ores, Coal etc, Construction of Dam in a valley, Construction of Coastal road or even development of New Urban centre in dessert. All of these are seriously jeopardising Eco-system in the area where they implemented as well as in the area from raw material is mined for implantation of the project. There is huge impact on the Landforms itself. The impacts may range from physical instability of landform due additional burden or induction of unstable condition of its physical stability. The failure of landform when exposed to extreme conditions will not harm the living organism including human beings but will expose ecosystem to further changes. The Eco-system may with its own mechanism to adapt to endure till certain optimum level there after the entire ecosystem will fail leading to hazard. The North eastern states of India such as Uttarakhand are already experiencing such failures. This is such a failure of that cannot be regenerated by herculean efforts also. The land forms once modified cannot be reinstated by human efforts, nature may through its catastrophic transformation entirely change the land form.

5. Genetic Modifications: Human being for betterment of its race tried to modify Naturally existing flora and fauna. The studies are carried out to deliver higher yields and sizes, earlier yields, etc. The results when yielding better results are implemented on fields based on short terms results of testing of these genetically modified produces/cross breeds. These genetically modified/cross breeds produce are often unable to regenerate, have very less immunity towards disease and deliver lower nutritional value as well as health stimulus to the consumer. Most of these genetically modified produces are brought in markets by MNC with promises to farmers/producers of better & higher yield in lower period, but do not refer to the draw backs of these genetically modified products. These modifications of particular element of Eco-system will have an adverse effect on Ecosystem. Its role is running the ecosystem will be modified and will create a threatening effect on ecosystem. It may lead to interruption of assembly of Ecosystem and its other elements. Once the Ecosystem modifies its self with regards to these changes, it will not revive to its original set up.

6. Change in characteristics of Existing terrain: This is very similar to land form changes, but modifications are less. It often happens that to suit human requirements, the physical character of the terrain is changed. Such changes may like cultivation on arid land, rejuvenation of marshy areas, or sometimes even laying of hard surface by paving it with asphalt or concrete which may be considered as very miniscule modification of physical character will lead to severe effect on Ecosystem. This may happen due cut-off of supplies of certain nutrients to elements of ecosystem. The element may be retained either in original form or modified form if able transform or get eliminated from ecosystem. Thus, depending the behaviour of the element, the ecosystem shall either not revive to its original set up or modify or perish.

7. Depletion of Ground Water resources: The ground water resources basically are two type one is aquifers and other Natural Ground water level. Human being earlier used water ground resource for their uses. It is observed that Ground water levels have depleted considerably and their rejuvenation is a major problem. The main reasons being drawing of excessive water clearing of native species of plants in vicinity which possess the quality of upholding the Ground water levels. Similarly, with the advent of Borings the water preserved in aquifers between various strata layers started to be consumed. These aquifers are usually replenishable and non-replenishable. The Water once consumed from non-replenishable strata will modify the strata's natural composition. The loss of Water levels shall modify the habitat of elements of Ecosystem and may even destroy ecosystem.

8. Threats to Native Wild species plant which were used to breed food crops (adapted from Study by IUCN co-authored study at the IUCN World Conservation Congress in Marseille) The study illustrates that breeding of crops was assisted by genetic resources of wild relative plants. These wild native plants had greater resilience towards pest and diseases and climate changes, with extinction of such wild native plants it would be difficult to manage the threats of Climate change as well as enhancement of harvest production. These native plants have endured various climatic conditions that threatened their existence and evolved to present forms and have greater resilience quality than those of crops breed from them. *The local people have been instrumental in preservation of these native species for their medicinal value and as food.* Extinction of these plants may cause issues of livelihood and food security as these native plants were used for domestication of crops.

Observations:

The Study of facts of degradations by Author highlight the following: -

- a) It is imperative to control pollution through Air, Water and Land as these pollutants are reaching even the Eco-reserves and endangering all living organisms.
- b) The Non-degradable pollution is the prime enemy of environment, which is choking Ecosystems and its living and non-living organism to slow death. At least with known technology till date, this pollutant is an irreversible act of human being and control over it in near future seems uphill task.
- c) The Ecosystem and its contributing elements should be dealt with judiciously. Elimination of any one element of an Ecosystem is directly going to affect the Ecosystem. The regenerative techniques should encompass a methodology to regenerate each element so that the ecosystem bounces back to its original form.
- d) The sectors of mining and construction have deeply impacted on environment, it is necessary that these sectors formulate a better way to deal with environmental norms. The change in natural land forms is going to be one of the most sensitive issue in future. The signs of impact due change inland forms are now getting evident may they be landslides and splash rains, earthquakes instigated by dams, increase/ reduction flow of perennial rivers, etc. The most important feature of this degradation is that it cannot be regenerated, hence need to be seriously reviewed while planning or implementation of any infrastructure or mining..

- e) While adopting genetic modifications for higher yield proper study of its impact is necessary, further challenges to conserve Original species and maintain its minimum number is necessary. Also, all information of the original species should be conserved.
- f) The change in characteristics of existing terrain even though seems to be trivial affect destroys the ecosystem in a long run. The transformation of characteristics to suit the use modifies the elements of ecosystem. Usually, the Environment Impact Assessment reports are superficial, and sometimes even though there are passing remarks about certain aspect of ecosystem, there is no reference of its impact or how it would be taken care off. One such example may be study of Flora and Fauna, with no reference about how it would be rehabilitated.
- g) Depletion of Ground Water has become a major challenge in Urban as well as rural are due excessive and non-judicious consumption. Even though over consumption is seen as major problem, the under lying issue of destruction of native vegetation which holds these reserves is never given proper thought of.
- h) The aspect of preservation of native species was already brought to light earlier, but the context was with reference to ecosystem preservation. The new study enlightens about how native species are need of the hour to rejuvenate crops already breed from them and the importance of their resilient nature to endure changes induced in surroundings.

Discussion:

From the observations stated above following issues of regeneration have come to light: -

- I. It is utmost necessary to understand in detail the process of degradation of Environment before adapting the regenerative practices. The native people are key to success as they know their environment much better than any experts in the field. The Expert are aware of the process but natives are aware of how that process is actually happening in their environment.
- II. Certain causes of Environmental degradation need to be nipped in the bud itself as regenerative techniques may not be easy and viable solutions.
- III. It is necessary to minutely study the physical, chemical, biological and other aspect of existing ecosystem before implementing any project and suggesting any preventive measures for well-being of the environment.
- IV. It must be always remembered that any act of human has a consequential effect on the environment, hence regenerative techniques and its implementation is necessary for all actions of human beings.
- V. Certain human acts have such an imperious impact on environment that revival of the environmental degradation is beyond control of human.
- VI. It is necessary that certain human activities should divulge from contemporary ways and find alternative methodologies and techniques for doing things.
- VII. The most important aspect is general awareness about degradation and its direct effect on individual and society. Human beings are self-centred and their action is warranted only a direct consequential affect is established with them.

Conclusion:

The present regenerative acts are very preliminary and shall have negligible impact on regeneration. Planting trees without understanding the existing Ecosystem in cities, hill tops would

induce more negative impact on ecosystem rather than improving it, planting high water demand plants would deplete ground water rather than holding it. Hence the importance of native species. Strict regulations and general awareness is necessary to reduce Chemical pollution of Air, Water and Land similar action is necessary with regards to non-degradable pollutants like plastic. Recycling is one of the best solutions, but is negligibly adopted presently and stringent norms of recycle and reuse need to be adopted to.

It is necessary that, various domains of engineering such as Civil / Environment / Medical /Chemical should work in tandem to achieve best results. There is always financial aspect to all actions, but if financial implications of natural resources and eco-services are accounted for, all efforts will fall in line with long term financial viability being achieved for human race.

The efforts of nations and states are very important at present. Even though carbon footprint and other environmentally beneficial terms are now coined a strict adherence is necessary. These efforts should also take in to considerations all aspects highlighted in this research paper. After all what ends good is always advisable.

Acknowledgements & References

- 1) Source: WATER QUALITY ASSESSMENT OF CREEKS AND COAST IN MUMBAI, INDIA: A SPATIAL AND TEMPORAL ANALYSIS” Paper by Swapnil R Kamble, Ritesh Vijay and R A Sohony from NEERI for 11th ESRI India User Conference 2010 & **MARINE POLLUTION - A PERSPECTIVE, MONITORING AND CONTROL IN INDIA a report by Dr. N.V.Vinithkumar from NIOT**
- 2) Source: **International Union for Conservation of Nature’s Red List of Threatened Species** <https://www.iucn.org/news/species/202109/threats-crop-wild-relatives-compromising-food-security-and-livelihoods>