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Research Article

Preventive Measures of Environmental Degradation

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Abstract: The term environment means the circumstances or surroundings in which everything exists. Everything external to the organism is included in it. The organism may be a human, animal, plant, as well as surroundings. Also these organisms are dependent on each other for their sustenance and absence of any may lead to an imbalance in environment. This imbalance gives rise to various problems such as Water Pollution, Air Pollution, Noise Pollution, and Careless use of Natural resources. Further associated or resultant issues could be landslides, desertification, deforestation, water logging, urban flood and unfortunately change in ecosystem.

Environment & Development both act opposite to each other. This paper is related to the social aspect of environment because of which topic has gained importance in the recent past. For development to occur large scale industrialization is must which leads to concentration of population in an area, over exploitation of resources, improper waste management, demand for efficient transportation system all acting as the contributor to environment degradation. Evidently there remains a conflict between environment and development but with rise in urbanization, development cannot be stopped so an effort to strike a balance between the two is essential. Protection of environment thus becomes the responsibility of every individual, group, organization, Non Government Organizations in order to strike the balance between nature and humans. There are several laws relating to the environmental protection and conservation which already exists in India and have been enacted by the central government like the Environment Protection Act 1986.

The study has tried to firstly, discuss the aspects of degrading environment and secondly, highlight practices that can be adopted in order to suggest preventive measures for the same. These measures range from raising awareness on environmental issues to rain water harvesting and waste segregation at house hold level.

Keywords: Environmental Pollution, Urban Development, Sanitation

INTRODUCTION

Anything in the surroundings of a living organism, including natural forces which conditions for development and provide growth as well as of damage is known as Environment. It has the physical, biological and social aspect. While physical is with geographical location, connected climatic conditions and terrain, water air etc. biological is connected with non living organic matter, plants and animals. The social aspect of environment has gained extraordinary importance as it includes the impacts of increasing population and development pressures on natural resources. Humans have once lived in an environment which was stable and serene. Initially life in settlements with less population and limited requirements, people had least interference with Nature. However, with development of agricultural activities followed by industrial revolution, there has been tremendous change in the population size along with rise in quality and standards of living.



Figure 1: Increase Population Trend

Today cities are urbanizing at fast pace and with increase in urban population desiring high social and physical infrastructure setup, development has taken its toll over the Environment. Across the globe one can see the urge for economic growth leading to development related activities. This has been killing the sensitivity of people towards the environment resulting in issues of water & air pollution, land and soil degradation etc. & it was then the term environment and its protection gained momentum since its evident degradation has caused harm to natural resources and public health.

UNDERSTANDING DEGRADATION

Water Pollution: As the term suggests it is the contamination of Water bodies by introduction of pollutants in water. The sources of pollution could be untreated effluents from the Industries, sewage and solid waste from households (Municipal Waste), mixing of sewage with storm water, draining directly into rivers, washed off chemicals and fertilizers used in agriculture, infiltration of leachate polluting ground water etc. The degrading quality of river water may also be due to declining flows in rivers & thus the reduced water levels needed for dilution of waste led to increase BOD and Coliform levels. On the other hand large population of the poor in India does not have access to sanitation facilities and pollute the environment in the process.

Despite all these known causes which can be prevented the status of water bodies is further deteriorating India. This may be due to the inefficiency of burdened Urban Local Bodies which are unequipped in terms of financial and organizational capacity. Even after 74rth Amendment Act 1992 in most of the states the state governments continue to hold responsibilities over urban water supply and sanitation through state level departments & para-statal agencies & the role of ULB remained limited to handling Operation and Maintenance of capital projects. As a result accountability of WS and Sanitation remained diffused between different tiers of Government.

> Distribution of Households by Location of Drinking Water Source in Urban India, 2011



Figure: 2 Water, Household Level in Urban India

To cope up with the increased unsustainable consumption of water for irrigation, industrial, municipal purpose its quality management is one of the important environmental issues in India. Adding to the problem are the challenges related to the temporal and spatial variation of rainfall, uneven geographic distribution of surface water resources, droughts, exploitation of ground water reserves and contamination. The water quality monitoring results from 2500 WQM Stations located on all important rivers, lakes, ground water obtained during 2011 under National Water Quality Monitoring Programme reflects that organic matter & bacterial population of faecal origin continue to dominate the water pollution problem in India.

Also according to Status of Water Quality India-2011 report prepared by Central Pollution control board CPCB (MOEF) currently the availability of freshwater resources is declining in India on per capita basis due to increase in population decades from 345 million during 1947 to 1130 million during 2007 in six decades and with the given projected increase in per capita availability is likely to drop below 1000 cubic meters a situation labeled as Water Scarcity. Air Pollution: Air is a prime resource for sustenance of life. It is the common name given to the atmospheric gases used in breathing and photosynthesis. Urbanization and industrialization has added other elements/compounds to the atmosphere and has therefore increased pollution. As per Section 2(a) of Air (Prevention and control of pollution) Act,1981 "Air Pollutants" have been defined as 'any solid, liquid or gaseous substance (including noise) present in the atmosphere in such concentration as may be or tend to be injurious to human beings or other living creatures or plants or property or environment. Therefore, ambient air quality standard is developed as a policy guideline by Central Public Control Board (CPCB) and SPCB that regulates the effect of human activity upon the environment so that pollutant emission into the air can be regulated. The well known causes of air pollution in the India are vehicular exhaust emissions (GHG), burning of fossil fuels, industries, thermal power plants, cement plants, booming construction industry, agricultural practices apart from shipping and aviation. The known 12 notified parameters in ambient air are Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂), Respirable Suspended Particulate Matter (RSPM/PM₁₀), Particulate Matter (Particle size <2.5), Ammonia (NH₃), Toxic or Heavy Metals Arsenic, Lead & Nickel (As, Pb, Ni),Ozone, CO.

As per National Ambient Air Quality Status and Trends (NAAQ) 2012 report CPCB implements the National Ambient Air Quality Monitoring Programme (NAQMP) through a network comprising 544 operating ambient air quality stations covering 224 cities/towns in states and Union territories of the country in compliance with the mandate under the Air (Prevention and Control of Pollution) Act, 1981 to collect compile and disseminate the information on ambient air

quality. The network got strengthened by increase in number of monitoring stations from 28 to 456 during 1985 – 2011. These reports the AAQ analysis of million plus cities of the India every year and status has been described in terms of Low, Moderate, High and Critical category in vis-à-vis the notified ambient air quality standards. It shows the analysis of three pollutants (SO2, NO2, PM10) done in 203 cities of residential / industrial/commercial/rural and other areas.



Figure: 5 Percentage of cities showing low, moderate, high and critical level of PM₁₀

The study revealed that cities like

Ulhasnagar (Maharashtra), Ko	dlapur,	dlapur,
e masmagai (manarasina), ma	Kolkata	Kolkata

(West Bengal) are critical with respect to both NO_2 and PM_{10}

- •State capital cities like Patna, Delhi, Ranchi, Bhopal, Jaipur, Lucknow, Dehradun and Kolkata are critical with respect to PM_{10}
- •Industrial cities like Bhilai, Faridabad, Jamshedpur, Jharia, Sindri, Indore, Ludhiana, Moradabad, Rourkela, Kota, Kanpur are critical with respect to PM₁₀

As evident from the analyzed data PM_{10} Respirable Suspended Particulate Matter (size </=10 micron metre) is the critical pollutant and its sources are the Road traffic emissions particularly from diesel vehicles, Industrial combustion plants, power generation, CO₂& GHG. The growing GHG emission is linked to increased motorization and therefore increased air pollution.

India itself today is the fourth largest GHG emitter in the world, with its transport sector being the second largest contributor of CO_2 emissions (Urban Transportation in Indian Cities, PEARL). Analysis of thirteen year air quality data in Delhi shows an increasing trend for PM₁₀ till 2010, a decrease in 2011 and again a slight increase in 2012. NO₂ shows a slight increasing trend and SO2 a slight decreasing trend. This increasing trend for PM₁₀ may be attributed to the increasing number of vehicles and re-suspension of natural dust.



Figure: 6 Ambient Air Quality Trend in Delhi

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The report, "Diagnostic Assessment of Select Environmental Challenges in India" by the World Bank's is first national economic assessment of environmentrelated degradation in India. It states "The annual cost of environmental degradation in India amounts to about Rs 3.75 trillion (\$80 billion) equivalent to 5.7% of GDP ". Among the highest to blame was air pollution, mainly outdoor pollution arising from PM₁₀ that was largely due to the burning of fossil fuels followed by losses due to the lack of access to clean water supply, sanitation.

Land Pollution: India has very fertile soil therefore land has an extraordinary capacity to produce, but at the same time nearly onethird of it is fast becoming unproductive.¹ This is so because of the excessive use of chemical manures, saltiness of land due to water logging created by canal water .There is no environmental problem in the world that affects people, especially poor people, as extensively as land degradation or desertification. Land Degradation is destruction of the biological potential of land, led by human induced processes which can ultimately lead to the desert-like conditions. It has many contributing factors like Deforestation, Change in Agriculture Landuse as urban area or forestry or forests being cleared to be used as agriculture land, Pressures of Solid Waste and Leachate production on Landfill sites, diverted attention from Brown field's developments etc.

The need for agricultural land, increased demand for fuel and commercial wood, dam construction, large-scale ranching and mining along with growing industrialization and urbanization have ruthlessly exploited the forests and led to soil degradation & severe environmental imbalances. Therefore development should be proposed with respect to Land characteristics and a Land Suitability Analysis should be carried out with the help of spatial analytic tools like GIS .This would enable optimum use of land.

On the other hand introduction to Sanitary landfill facility in few Indian cities has reduced infiltration of leachate to ground water reserves & has thus reduced chances of contamination. Along with this one of the suggested practices at grass root level is to manage waste produced so that there is less pressure on landfill sites. This can be done by waste segregation at source into biodegradable & non biodegradable so that the compostable and recyclable waste is taken care off before waste is disposed off on landfill site.

Solid waste needs to be treated as an opportunity to generate value from waste. It could be source to valuable materials that can be recycled. Resources can be recovered from waste if they are separated at the source and treated properly. Reducing the production of wastes and by maximizing the use of reusable & recyclable materials, a city can achieve greater resource efficiency and would further reduce fiscal burden on ULB's.

PREVENTIVE MEASURES A. People Participation

The challenge is firstly to communicate with people about environment, its constituents, and causes of degradation and invite participation. This can be accomplished by

- (i)Simplifying scientific information for active public participation.
- (ii)Conduct workshops & educate via problem mapping area exercises and evoke the sense of ownership and belonging in people.

B. ICT

Use of GIS and remote sensing in development planning, including infrastructure, land-use and environmental

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studies; use of ICT in service delivery to ensure quality has gained momentum on a large scale to enhance access to information to improve decision-making, such that unnecessary consumption of resources is curtailed and wastages & leakages are plugged. This in turn reduces our dependence on our already stressed out environment resources, thus reducing environmental degradation. These virtual tools reduce the need for actual movement of people, i.e. reduces transport need, thus reducing air pollution and fuel demand. For examples, E- Sampark Programme in Chandigarh, is the example of an effort toward e-governance, which brings together the services of all the departments under one and give citizens of single umbrella "multi-service"-"single-Chandigarh а window" experience. In another example, Germany has made extensive use of GIS application for optimizing the potential of solar energy in power generation, thus reducing its need for conventional sources of energy.

C.Emerging Technologies

Water Management: Today the very well known approaches for water management Improving efficiencies are (i) and minimizing losses(NRW) (ii) Recharging groundwater aquifers (iii) Natural and Artificial methods of treating water pollution (iv) Reuse and Recycling of wastewater. In each of these approaches, appropriate policy, institutional and technological advancements be mav adopted. Most of these tools are implemented on small and medium scales at urban and rural level in India and International but the prospect for improvement is dependent on the capacity of co-ordination individuals, between institutions, departments and country.

Apart from conventional technologies used waste water treatment are mainly cesspool,

septic tanks, waste water stabilization ponds, root zone treatment system, trickling filters etc emerging technologies are–Dewats Systems, Soil Aquifer Treatment, Upflow sludge blanket reactor, rotatry activated sludge package plants etc.

Floating Island, Shipra river, Ujjain, M.P.: An elevated structure made up of bamboo frame is constructed .The structure is loaded by grid of plastic pipes as float. This practice is done on site for the treatment of fresh water bodies, including artificial ponds, tanks, lakes reservoirs golf courses and rivers.



Figure 6: Floating Bed Island

This cost effective zero emission. zero energy, zero chemical and eco friendly process results in reduction of 40-55 % of pollutants comprising nitrates, ammonia, organic nitrate, BOD, COD, and solids .

Reed Bed System, IIT Delhi: This process is used for treating waste water from drains and grey water from individual houses.



Figure 7: Red Bed System for treating waste water from drains

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After a typical retention time of 8 to 10 hours the COD of inlet water was in the range of 100-120mg/l and BOD was almost 1/3rd of COD which suggests its another effective primary treatment. This is also cost effective since 1cum domestic unit cost around Rs.1000 and O& M cost is negligible. The treated effluent can be then used for irrigation purposes.

Low Carbon Transportation System

Developing countries should aim to make their transport infrastructure low carbon & sustainable which may include more measures to avoid or reduce need to travel as in the case of Transit oriented Development active in Paris, Shanghai etc. Encouraging modal shift from improved user friendly public transportation network while discouraging use of private vehicles. This would enable fuel efficient transportation and increase occupant load per trip and could be done through collecting heavy parking charges. This measure could be accompanied by improved efficiency of motorized modes of transport like increase CNG operating vehicles. One of the translated projects is the Delhi Metro which saves energy and 4, 57,615 tones of CO₂ annually (Urban Transportation in Indian Cities, PEARL).

3 R's and Brown Field Development

In simple terms, it implies reducing our resource consumption, reusing a single object for multiple activities to lower the need for new things; and recycling the waste to minimize the waste that goes to dumps. Important method is the scientific disposal of the solid waste which begins with segregation of waste at source. It reduces waste reaching dumping grounds, thereby easing out the need for land. Similar mechanism is initiated in Cuffe Parade Area by Brihan Mumbai Municipal Corporation in Mumbai to ease out its burden on Landfill. Other means is Brownfield development instead of the Greenfield development, which helps in offsetting the pressure for new land. In general terms, it implies redeveloping a given land or reviving an outdated precinct, which is otherwise unutilized, for some another activity which helps in realizing its true worth. The revival Harbour precinct into a of Sydney residential. retail and commercial neighborhood across a quarter of the 20hectare site comprising of a hotel. convention. exhibition and entertainment centers, is an example of brown field development.

Conclusion: Environmental degradation due to growing population and unsustainable consumption production. and disposal activities raises risks reduces and opportunities for advancement of holistic development. А sustainable approach addressing environmental, economic and social concerns of the respective country recognizing its diverse settings. organisational structure and institutional capacity are critical to generate adequate responses environmental to address challenges. Any measures to reduce environmental degradation will have a cost as development effects environment and any effort to reduce degradation might as well lower GDP. Now to achieve acceptable balance in development as planners and researchers we must encourage participatory planning or public participation at the grass root level in every sector. This would enable the more informed citizens through access to information at right time right to communicate issues to the government. This should be the basis of policy formation in developing countries and technology can then be used as medium to address those issues rightfully.

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