

Factors Affecting Nature Ecosystem & Biodiversity in The State of Gujarat and its Conservation Initiatives

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Abstract

Urbanization and Industrialisation development has led to deteriorating environmental conditions of cities in India. In a survey by Central Pollution Control Board around the country, two cities of Gujarat are found to be amongst the 10 most polluted cities. Gujarat Industrial Development Cooperation shall take initiatives for this critical problem. Other cities like Ahmedabad, Vadodara, and Surat are also on the verge of these adverse effects of pollution in near future. It is to be taken note of the effects on climate, environment & health and both personal & Social wealth of the habitats in the city. Central Statistical Organisation (CSO) under Ministry of Statistics conducted an Annual Survey of Industry the Industrial Sector at present comprises of over 1200 large Industries and over 312000 micro small & Medium Industries from amongst 100000 Industries also 9000 industries are polluting the environment in some or the other form. If it is not taken seriously then it will create adverse effects on the health of biotic and abiotic beings in the ecosystem. This will ultimately lead to violation of the constitutional rights and in turn the Human Rights shall also be violated, this will result into deteriorating decent standard of living of all beings. In this article will also discuss about the polluted cities in the state of Gujarat and the initiatives by the state of Gujarat to restore and maintain the environment and the constitutional and legal frameworks constituted to maintain a sustainable environment for the state and ensure the existence worthy of all beings.

Keywords: conservation, ecosystem, nature, environment, pollution, restore, contamination.

Introduction

India is committed to implement the Paris Agreement with all its vitality and resources. For India, climate change is a development challenge and Paris Agreement is a commitment to its own citizen. As a result, many states in India have taken numerous steps to reduce emission and improve as well as scale-up successful adaptation. Gujarat is leading the way among the different states of India to implement innovative climate change initiatives.

Types of Pollution Prevalent in Gujarat

a) Air Pollution

The Air is essential ingredient for survival and in order to have a healthy life, clean air is a necessity. But due to development in the in the name of

industrialization and urbanization the environmental quality, Air specifically is deteriorating. The development has taken place so rapidly that the corresponding growth in the pollution control mechanism and other civic facilities was not kept abreast. The Air which is polluted contains hazardous substance pollutant and is contaminated which is fatal to general health of all living beings. Air pollution in cities causes serious ill effects like shorter life span and lung diseases among city dwellers and animals too. Over and above released smoke from industries the other cause of air pollution are tobacco smoke, combustion of solid fuels for heating cooking, cleaning agents, insecticides, pesticides, automobiles, power generation and poor environmental regulation, less efficient technology, the natural sources of Air pollution include Forests and Agricultural fires.

b) Water and Water Pollution

The Water that we consume is one of the most important ingredients for development of human body. Hence pure and healthy water is basic necessity. Still water is the most polluted water bodies in India, due to urbanization and industrialization the waste water is discharged randomly by the factories. Hence effluents mix with water also, the sewage water and rain water pollution polluted by agricultural or domestic activities cause damage to environment ultimately to human health. The Government have taken initiative to treat the waste water. But these efforts are not adequate, therefore only 10% of water is treated and untreated water is released into water bodies. Due to this the life under water at risk and at times the highly contaminated water is supplied for domestic use.

c) Noise Pollution

Noise Pollution can be Industrial and Non-Industrial. The Industrial source include the noise from big machines working at a very high momentum and high noise intensity. Other than industrial noise produced are by transport, vehicular traffic and road traffic, aircraft, rail road's construction industry, noise in building etc.

d) Land/Solid Waste Pollution

Solid Waste is one of the major factors for environmental pollution. Soil pollution is one of the major issue countries is facing today. Disposal from Industries be it solid waste or waste in form of effluents have ruined the quality of soil and ultimately the fertile land / soil is very rare view

Effects of Pollution on Citizen

Urbanization and over exploitation of Earth's Resources be it Air, water or land/soil has resulted in environmental degradation. Today one of the most fatal problems faced by humanity and other forms of life is environmental pollution. Internal economic migration to the urban areas and the existing 1.3 billion people and more, the cities are getting over crowded.

A Comprehensive environmental assessment of industrial clusters in India, undertaken by IIT Delhi and the CPCB, found that the environmental

pollution levels in 10 major industrial areas had reached a "very alarmingly high" level. This list includes Ankleshwar and Vapi from Gujarat.

The Air has become barren devoid of birds & the land is also slaughtered due to pollution. The only reason being due to pollution be it air, water, land/soil and unwelcomed sound everywhere, the living creatures find it difficult to sustain a comfortable habitat. Also the pollution, plastic wastes loitered by humans in national parks & wild life sanctuaries due to expanded tourism has lead the earth's natural environment unfit for the creatures be it biotic or abiotic. The emission of CO(Carbon Monoxide), CO₂ (Carbon Dioxide), SO_x (Sulphur Oxides), NO_x (Nitrogen oxides) are polluting agents which mix with environment being released from vehicles and industries which has resulted to health problems like irritation in eyes, lung cancer, heart related diseases and has disturbed the ecosystem.

It is very important to consider the fact that human insensitivity to nature and the psychology towards nature is simultaneous cause of environmental pollution.

Scenario in Vapi, Gujarat

Vapi is one of the largest industrial complexes in Gujarat, developed by Gujarat Industrial Development Corporation (GIDC). Spread over 11.4 km², it is home to over 1500 industries. About 70% of the industries in Vapi are engaged in the manufacturing of chemicals, dyes & dye intermediates, pigments, pesticides, and pharmaceuticals. Out of these, 600 units are manufacturing a wide range of chemicals for industrial and agriculture sectors. It represents an investment of Rs 2000 crore and exports goods worth Rs 200 crore per annum. Vapi together with Daman, Sarigam and Silvassa form the largest cluster of SMEs in Asia.

Vapi GIDC was established in 1967, and other chemical/pulp-paper mills in the district. There are about 832 industries out of which around 759 are the polluting ones. Of these 653 are in the red-category list of Central Pollution Control Board (CPCB). The Vapi chemical cluster manufactures a variety of chemical products like pesticides, dyes, dye intermediaries, paints, organic & inorganic pigments and textile chemicals. Now the district is well known for its industrial development, heavy

pollution and diminishing agricultural produce. The air pollution wakes up people from their sleep at night and the trains are routinely delayed during the evenings/nights due to low visibility.

Due to the pollution activities in Kolak and Daman Ganga rivers, the riverine and estuarine fish have been vanished severely affecting the income of the poorest of the fishing community. These fishing communities mainly reside in Kolak and Daman villages. The officials of Vapi and Valsad chapter of Indian Medical Association also had a meeting with the expert's panel. They concluded that over half of all patients coming to the doctors in Vapi were there for respiratory diseases and incidence of other illnesses like skin diseases, etc. were very high.

Recent knowledge about air pollution depicts that there are no real safe limits for air pollution. The air in Vapi city and around many industries in Valsad is so polluted that productivity of fruits has gone down by over 50%. Some of the measures suggested to mitigate the situation include:

- Involving affected populations (farmers, fishing community) in monitoring and regulation.
- Moratorium on expansion of these estates/industries.
- Modernization in technologies to achieve zero effluent and solid waste.
- Assessment should be done for regional environmental impacts instead of individual industrial impacts.
- Pollution cess and banning of certain products/chemicals are required.

Physico-chemical analysis of industrial effluents has shown that EC, TDS, Chlorides, Sulphates, BOD, COD, Sodium and Calcium are in very high concentration as compared to the standards prescribed by WHO. Such effluent should not be permitted to be discharged in the nearby water bodies or soil without treatment. They are unfit for agriculture/irrigation. The high level of pollution of the industrial effluents causes environmental problems which will affect whole ecosystem.

Ankleshwar

Ankleshwar the city also known as "Golden Corridor" has hundreds of small and medium factories manufacturing chemicals, dyes, paints,

fertilizer, plastics, pulp and paper; spew untreated waste into the air and waters. Ankleshwar town has a population around 78,000 whereas the slum-like colonies here sprouted on the periphery of the industrial estate. Around 25,000 people living without basic amenities such as water, sanitation, health set-up etc. Around 60,000-70,000 people get their daily bread by working in the estate. A cursory look at Ankleshwar would leave one in doubt whether any environmental regulations exist in this state or not. Industries here generate over 40,000 tonnes of hazardous waste and discharge more than 32 million liters of toxic effluent through open channels into river Narmada. Not only the surface water is highly polluted but the contamination of ground water is even more serious problem. A preliminary survey of a part of the slum colonies showed that 55 out of 65 hand pumps and bore wells had yellow to red coloured water and some of which were either acidic or smelt of unknown chemicals. Hazardous solid waste has been dumped on open spaces, around water bodies without any treatment or any concern about their impact on the local water soil or living organisms. There has been no known investigation for traces of toxic residues in agricultural produce or in the milk of cattle grazing in the area.

The solutions given by industries, such as Common Effluent Treatment Plant (CETP) or hazardous waste landfill either hide or transfer the problem but didn't eliminate it. In any case they are not effective solutions, e.g. CETPs only deal with only the barest basic parameters whereas the chemical composition of effluents is highly complex. Or the landfills' stated life is at the most a couple of decades whereas the toxicity of chemicals can persist much longer.

Vadodara

Vadodara formerly known as (Baroda) is the 3rd largest city in the Western Indian State of Gujarat, after Ahmedabad and Surat. It is located on the bank of the Vishwamitri River. The river frequently dries up in the summer season, leaving only a small stream of water. Over the period of years, there has been a continuous increase in human population, road transportation, vehicular traffic and industrial growth in Vadodara which has resulted in rapid increase in the concentration of gaseous and particulate.

In Vadodara various large-scale industries such as Indian Oil Corporation (IOCL), Gujarat State

Fertilizers & Chemicals (GSFC), Indian Petrochemicals Corporation Limited (IPCL, now owned by Reliance Industries Limited) and Gujarat Alkalis and Chemicals Limited (GACL) have emerged in the vicinity of Gujarat Refinery and all of them are dependent on it for their fuel and feedstock. Other large-scale public sector units are Heavy Water Project, Gujarat Industries Power Company Limited (GIPCL), Oil and Natural Gas Corporation (ONGC) & Gas Authority of India Limited (GAIL). In our environment, Plants exhibit many physiological changes in response to pollution. Plants can be used effectively by planners/engineers and green belt developers in controlling the urban air pollution.

A study has been conducted for identifying tolerance level of plants by calculating the Air pollution tolerance index (APTI) based on 4 parameters. The 4 parameters are: Chlorophyll, Ascorbic acid, pH, and Relative water content (RWC). The aim of this study is therefore to calculating the seasonal APTI values of commonly growing plant species in the heavily trafficked area of Vadodara city, Gujarat. And recommend most suitable plants for afforestation.

GIDC area and Nandesari are dominated with industrial activities in city while, other sites like Alkapuri, Dandia Bazaar Nyay Mandir, Mandvi, Railway Station, Fatehgunj, Raopura are mainly commercial areas and are exposed to heavy traffic. Leaf samples of selected plant species were collected from all the sites around city.

Since bio monitoring is a crucial tool to evaluate the effect of air pollution on plants, *Peltophorum pterocarpum*, *Acacia arabica* is a solution as bio monitors of vehicular pollution stress. Among the other plant species, *Polyalthia longifolia*, *Azadirachta indica*, *Mangifera indica* have shown high APTI value compare to other species, hence these species work as sink of air pollutants.

Anand

Anand popularly known as the "Milk Capital" of India. It has become famous for Amul dairy and its milk revolution in our country. It hosts the Head Office of Gujarat Cooperative Milk Marketing Federation Ltd (AMUL), National Dairy Development Board of India. It lies between Ahmedabad and Vadodara on the Western

Railways. Economy of the city is very vibrant which ranges from agriculture, farming to big scale industries. Many famous big industries including Elecon Engineering, Vulcan Industrial Engineering Co. Ltd, Warm Steam, The Charotar Iron Factory (est.1938), Milcent and Atlanta Electrics are located in this industrial belt.

During last few years this city had gone through rapid urbanization as well as industrialization. As a result of which both private and mass transportation vehicles are also increasing day by day. It also APTI values are calculated for plants. Its calculation is based on four parameters viz. chlorophyll, Ascorbic acid, pH, Relative water content.

Apart from the survey site 10 sampling locations were chosen on the basis that the sampling stations were in the vicinity of free atmosphere that is without interferences from stagnant spaces and large buildings.

SPM values were found high in all the sites approx. value of 100 $\mu\text{g}/\text{m}^3$. Low relative humidity and semiarid climate is also another reason for high SPM load. All the plant species behaved as sensitive towards air pollution.

Initiatives of State Government in Environmental Field

1. Gujarat only State to have Solar Policy: Solar Power Generation is considered as one of the renewable and clean energy sources. Therefore, the State of Gujarat has identified the potential of large solar power generation within the State. To capitalize the potential and to encourage solar power generation, the State Government has introduced Solar Power Policy in June 2009, the main objectives are as under:
 - Promoting generation of green and clean power in the State using solar energy
 - To put in place an appropriate investment climate, that could leverage the Clean Development Mechanism (CDM).
 - Productive use of the wastelands, thereby engineering a socio-economic transportation.
 - Employment generation and Skill Enhancement of local youth.
 - Promotion of R&D and facilitation of technology transfer.

- Establish core technical competence in professionals in the State to initiate and sustain use and effective management of newer applications.
 - Promotion of local manufacturing activities.
 - Creation of environmental consciousness among citizens.
2. Gujarat only State in path of Biofuel Policy: The salient feature of draft Biofuel Policy is as under:
- Discourage the food items to be used for production of bio-fuels and rely upon the non-food food items.
 - No agriculture land would be promoted or permitted to be diverted for production of the bio-fuel raw materials.
 - The pilot project on bio-fuel production using algae for CO₂ sequestration is recommended and on the final outcome, if found encouraging, it will be replicated on big scale in the State. Since this project will be capturing CO₂, it will be useful for control of air pollution and would also be a CDM project.
3. Incentives to Common Environmental Infrastructure an integral part of Industrial Policy:
- The Industrial Policy- 2009 of State Government lays emphasis on inculcating systematic approach among the industries for holistic development that includes environment management as infrastructure. The earlier schemes for assistance to Environmental Protection Measures and Infrastructure have emphasised upon setting up of Common environmental infrastructure plants viz. CETP'S and TSDF'S. Also, the Policy provides for development of new industrial estates on Public Private Partnership (PPP) basis.
- The State capital, Gandhinagar is made cleaner/ green/ solar city.
 - Pipe lighting is a unique way of lighting which works on solar energy.
 - Home for next revolution in transport Solar Planes components to be made in Gujarat.
 - Demarcation of different zones Industrial area, Commercial area, Residential area and Silence zone as per the Noise (Regulation & Control) Rules.
 - Establishment of housing complexes around CETP/ TSDF. As per CPCB guidelines, a zone of 500 met around a landfill site should be declared buffer zone after the landfill location is finalized.

Conclusion

Anything that is over and above tolerance limit causes negative impact. State of Gujarat, India has woke up to considerable extent. High values of Sulphate indicate increased decomposing of plant and animal material done by autotrophic plants and incorporated into amino acids. During summer season temperature was very high so, DO values were low in summer because oxygen holding capacity of plants was decreased at high temperature. But alkalinity was found high that was generally due to the presence of carbonate, bicarbonate and hydroxide. It is certain that these increasing values will make adverse effects on climate, environment and health, and both personal and social wealth of the citizens. So, it can be concluded that a strict implementation of adequate abatement measures and environmental regulations is urgently necessary.

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