1. INTRODUCTION

Since the Vedic times the Nature and Man is known for form an inseparable bond of the life, to support system. Among them, Water is one of the important resources. In economic terms, a resource has utility, that is, it can satisfy a need, and at the same time is not available without efforts. To meet this need during any process of development, the quality and accessibility of water tends to diminish, rendering it comparatively scarce. Of all liquids known to man, none can take the place of water in the great variety of life processes.

All living organisms have their specific environment with which they continuously interact and remain adapted. The environment embraces all abiotic and biotic conditions influencing the organisms. Abiotic environment of all organisms on the earth includes atmosphere, lithosphere, hydrosphere and physical factors like light, temperature, pH, etc. Communities of living organisms interact among themselves. The physical components of the environment experience increasing impacts from human activities. Every organism alters environment in some ways but men are unique in inducing both the extent and rate of changes. The ecosystem can be terrestrial and aquatic. Terrestrial biomes are plants and animals combined with relatively few common features of climate, soil, vegetation type and structure. The climate and soil interact to determine the types of species that can survive. It is worth mentioning that soil mostly acts as nutrient reservoirs, allowing them to be recycled within the system. Water of an aquatic ecosystem is vital in environment and covers about 70% of the earth’s surface. It occurs in all spheres of the environment—in the oceans as salt water, on land as surface water in lakes and rivers, underground as ground water, in the atmosphere as water vapour, solid ice and as in municipal water distribution systems as described in chart. Water is an essential part of all living systems and is the medium from which life evolved and exists. Aquatic ecosystem e.g., pond, lake, river etc. interacts with organisms and their environment for nutrients and shelter. This also includes areas such as flood plains, wet lands with water for all or part of the year, thermal springs, ice fields and some highly polluted water that can support large populations of bacteria.

Water is very useful for human life. Life is impossible without water plays a key role in control of climatic conditions. Everything originated in the water and everything is sustained by water. Water is the versatile inorganic liquid on this planet occurring as universal solvent and indispensable component of nature, holding both biotic and abiotic entities, in a complex dynamic and delicate ecological balance by virtue of its unique capacity of existing in solid,
liquid and gaseous state. The surface of water and land form an important substratum for organism. The water and the layer of lithosphere, whether covered by water, air, furnish important mechanical substrator for plants and animals at the surface and some distance below it. The extent to which these surfaces are occupied by organisms depend on other parameters and their interactions. The interphase between the atmosphere, hydrosphere and lithosphere also form important habitats for the biota. Some authors suggest that these interphase, such as the surface properties of solid materials in contact with water were of great importance in the origin of early development of life. The water in the seas absorbs or releases heat and help to maintain the atmospheric temperature by keeping it cool or warm. All life and peripheral activities are ceased without water. Water used in additional to drinking and personal hygiene water is needed for agriculture, industrial and manufacturing process hydroelectric power generation and production of electricity recreation and wild life etc. all peripheral and totally life cycle are ceased without water plays a key hole in a control of climatic condition\textsuperscript{1}. Climatic factor is physical forces and material factors related to a real environment. Usually man depends upon fresh water and ground water is fresh water. The earth depends mainly on rain to maintain the quantity of fresh water irregularities in rainfall to either floods or drought causing disaster. Fresh water is a key factor in lives on man and other living organisms. When a resource used for so many diverse purpose it is important that it be developed and used rationally and efficiently\textsuperscript{2}.

Unfortunately, pollution of the environment is one of the most horrible ecological crises to which we are subjected today. Water has several properties to support life and yet they are disadvantageous to organisms in facilitating absorption and accumulation of pollutants. Non conservative components such as dissolved gases (e.g., O2, CO2, H2S, N2), nutrients (phosphates and nitrates), silica, trace metals, colloids and particulate matters are generally the limiting factors in growth of organisms. However, aquatic ecosystems are home to a rich collection of flora and fauna. The dominance of human being is mainly because of their ability to modify environment around them. The three basic amenities for living organism are air, water and soil or land. Some times in the past, these amenities were pure, virgin, undisturbed, uncontaminated and basically most hospitable for living organisms but the situation is just the reverse today because progress in science and technology is also leading to pollution of environment and serious ecological imbalance which in the long run, may prove disastrous for mankind. The root cause of the environmental pollution has been the man’s misbehaviour with the nature under the false ego that he is the master of nature. These
undesirable situations are created by man himself and other living biota on the earth. Today the cry of “pollution” is heard from all the nooks and corners of the globe and the pollution has become a major threat to the very existence of mankind on this earth. “Pollution” can be defined as the changes in the environmental condition brought about by those substances termed pollutants lead to the phenomenon known as “pollution”. The term pollution is defined in various ways by many scientists, workers and legislators from different parts of the world. Pollution can be defined as an introduction of a substance to the environment which may be detrimental to the indigenous organism. Growth of industries is a vital link factor for improving the quality of human life. However, there has been a growing concern in last few years over the environmental degradation due to ecologically unplanned industrialization and urbanization. Wastes with toxic chemicals, released constantly into water bodies from industries are polluting surface and ground water source. Pollution is thus the price paid towards development through scientific achievements to improve human life style. In simple words pollution is an anthropogenic contribution to nature through evolved technologies for the human welfare. Natural ingredients are replaced or damaged by dangerous unnatural ones. These may be gases, solids or liquids which cause imbalance to the system and to create numerous health hazards to animals and man by damaging the ecosystem, e.g., industries polluting air have set imbalance in composition of air and made it unworthy to breathe - causing problems to human and animal life while extensive use of pesticides on crops has set imbalance in ecosystems of lands besides causing water pollution.

A vast array of industries can cause pollution. The high concentration of chemicals is acutely toxic to aquatic organisms and causes damage to aquatic environment and fish kill. Due to current promising environmental alarm resulting in pollution control and remedial measures, surface waters are relatively clean though the water pollution continues to be an on going concern. A classified list of industries causing different types of pollution is Textile industries, Petroleum based industries, Pesticide / fertilizer industries, Detergent industries. All other industries cause moderately less pollution and are less harmful. Most of these industries are established for the progress of human society. Hence, it is undisputable to have them for human existence. The only requirement is to make them pollution free. The cause of pollution is not the industry itself, but also the technology adopted. Pollution causing agents (pollutants) may be gases, liquids, solids having different chemical composition and are the byproducts of manufacturing processes. All other industries cause moderately less pollution and are less harmful. Most of these industries are established for the progress of human
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India is a country of rivers and surrounded by oceans. Life, Prosperity and civilization revolve around water in the India. Some parts of our country have good resource of water while in other parts. There is a shortage of water the regions having good availability of water and flourishing because they have good crops but the regions having shortage of water are facing poverty because poor crop growth. It is therefore necessary to have a proper management system so that there is a uniform distribution of water to all the regions. There are three source of fresh water.

I. The rain fall
II. River streams
III. Ground water

Rain water is available in monsoon only. As monsoon lasts for a few months most of the rain water lasts for a few months only. This rain water fills lakes and ponds and also flows into rivers some rain water also percolates into ground water became available as ground water. Rain water is stored in lakes for use our long period of time. There are many natural lakes in our country but in order to meet the increasing demand of fresh water many artificial lakes are made.

Rivers are another important of sources of water. In our country rivers flow across diverse regions. Some of these rivers are large and are permanently filled with water. Rivers get their water supply from the melting of snow lying on the peaks of Snow Mountains. Rivers are currently degraded by both natural and anthropogenic activities, which deteriote their quality, and made it as sewage channel and push them to the brink of extinction in the process of unplanned development. Unfortunately, over the years, less attention has been given to river losses world over. The major anthropogenic activities noticed were disposal of dead bodies, cattle wading, bathing, open defecation in open places, clothes washing, disposal of the wastes and ashes.
The water inside the soil is called groundwater. This water which has percolated deep into the ground is clean. We are at present utilizing nearly 25% ground water. Most of it is used in agriculture. The availability of this water is decreasing due to its overuse and deposition of salts and pollutants in it. 71% of the earth’s surface is covered by water earth’s surface water is held in two different kinds of water bodies salt water bodies and fresh water bodies. Fresh water is defined as water that contains less than 0.5 ppt of dissolved salt. (NATA 2006) The addition of various kinds of pollutants and nutrients through the agency sewage, industrial, effluents, agriculture run of etc. into the water bodies bring about a series of change in the physic-chemical and characteristics of water which have been the subject of several investigation.

Ground water is one of the sources in drinking water supply in our country. India in urban and rural area are mostly depends of the source of ground drinking water. Water irrigation facilities are city area not a rural area is used for drinking water is source of the well and tube well. And clean and free from pollution than surface water.

Clean and fresh water quality is good health in human body. Safe and good water only one of source in ground water. But ground water is very dissolve solvent and elements heavy trace and any way parameters in present and very impure water drinking is dangerous to human health and cause disease such as various cancers, paralysis, neurological, disorder, nerve damage, thyroid problems, liver damage, kidney problems, cardio-vascular disorder finger nail loss, diarrhoea, hair loss, mottle teeth, lung irritation and so many diseases are human body. With the development of global economies, many environmental problems have arisen. For coastal waters, eutrophication, which is caused by organic enrichment, has become a global concern in the marine environment since 1950's. The increase of anthropogenic nutrient loading over the last decades has been recognized as a major threat to most coastal marine ecosystems around the world. The anthropogenic activities, such as industry, agriculture and sewage run-off, are the main sources of organic matter currently in coastal water. Particularly sewage discharge is the most important source for organic pollution. Estuary is considered as a transition zone between the inland world of freshwater and the seawater lying off-shore. Characteristically, the estuary is define as a body of water in which river water mixes with and measurably dilute seawater. There exists many definitions for an estuary but the often quoted definition is that of Pritchard (1967). He defines, “An estuary is a semi enclosed coastal body of water which has a free connection with the open sea and within which the seawater is measurably diluted with freshwater derived from the
land drainage.” The estuarine environment is characterized by a changing mixture of salt and freshwater and is typically dominated by fine sedimentary materials carries into the estuary from the sea and the rivers, which accumulates in the estuary to form mudflats. Fine sedimentary deposits, or mud’s are a highly characteristic feature of estuaries. In case of freshwater, rivers and streams carry silt particles in suspension. When these suspended particles reach and mix with sea water in the estuary, the presence of various ions in the sea water causes the silt particles to flocculate, thus creating larger, heavier particles, and settle out, forming the characteristics mud bottom. Sea water also carries a considerable amount of suspended material, when it enters in an estuary, the sheltered condition reduce the water motion that has been responsible for keeping the various particles in suspension. Muddy shores are located in various partially enclosed bays, lagoons, harbours and especially estuaries.

Classification of water pollution depending upon the utility and location of water is an important consideration for environmental problem. Drinking water pollution is caused by source and its route of flow. Thus, the ground and river water pollution may lead to drinking water pollution. It is observed that sea water is significantly polluted, although no pollutant is directly added to sea (except accidental ship leakage, oil spill or sinking of ship etc). This is because all polluted rivers carry the pollutants to sea and due to continuous accumulation, the concentration in sea water increases with time. Water pollution can be point source or non-point source, i.e. it can be caused near the source of pollution or pollutants are far away from the water bodies. Besides human activities, Nature also contributes to water pollution. The concentration of pollutants generally decreases as water moves to longer distances/depths and as the time passes. Not all pollutants are immediately harmful, but they may cause ill effects with time. Some pollutants like DDT and sanitary wastes in water can be extremely dangerous even in minute quantity. However, pollutants like cadmium, copper or ammonia compounds can be harmful in high concentration. Some other pollutants (nuclear wastes) have long term effects though no short term effects are noticed. However, the sensitivity to pollutants in drinking water is more connected to physiology of human/animal body than concentration of pollutant within safe range. Water pollution in special perspective to understand the causes can be classified as Main source of pollution - where pure water is mixed with pollutant for the first time and Secondary source of pollution - where polluted water is further polluted when water is traversing on the surface or below the surface of soil. When the same pollutant is added to water two or more times from main and secondary
source, the concentration of pollutant increases, but with distance traversed the pollutant concentration decreases.

Because of tidally influenced nutrient trapping and recycling, remove of metabolic wastes, circulation of detritus, transfer of energy from primary producers to various levels of consumers and moderation of temperature fluctuations, the estuarine ecosystem is considered as the most dynamic and biologically productive ecosystem in the world, which performs several important functions. Its hydrological regime with the combination of rapid salinity fluctuations, high water energy and the pattern of sediment suspension and deposition, are major factors in the geo-chemical fluxes of many elements in the system. Through their action substances, not only contaminants such as heavy metals but also nutrients like nitrogen and phosphorous, are both removed from and renewed into the system. The sediment in particular tends to act as a sink for many materials, and through the decomposition of organic matter plays a major role in the energy flow through the system both directly and indirectly with the release of nutrients for primary production. Estuaries are highly dynamic biologically, and are areas of naturally high productivity. This is due in part to hydrodynamic factors, including freshwater input of nutrients but principally to the system ability’s to trap and re-release nutrients. Transformation and speciation are largely biologically mediated: the rate at which nutrients are made available depends on degree and type of microbial activity in the sediments. As a consequence of all this activity, the estuary assumes an importance to the marine environment out of all proportion to its physical dimensions. It also acts as a focus for many of the coastal processes including geo-chemical cycling, energy flow and stock recruitment. The physiological adaptations of individual animals and species determine the ability, or otherwise, of an animal to tolerate and thrive in the estuarine environment under particular temperature, salinity or substrate conditions. The rate of decrease of species is generally more marked in estuaries than in brackish seas. It thus appears that the fluctuation of salinity within estuaries enhance the rate of decrease of species. The concentration of dissolved gases varies with the salinity, with fresh water containing more oxygen than sea water at the same temperature. The intertidal areas in estuaries are often the main areas for the deposition of muddy sediments. And usually develop rich fauna living in the mud. The river flow, tidal range and sediment distribution in estuaries are continually changing and consequently estuaries probably never achieve a true steady state. The salinity at any particular point of an estuary depends on the relationship between the volume of tidal water.
and the volume of freshwater entering, as well as tidal amplitude, the topography of the estuary and the climate of the locality.

Aquatic animals are often particularly affected due to elevated exposures arising from their living immersed in the surface water. They show very serious changes like having highly permeable skin and gills and other inherent sensitivities. Fish are the sole vertebrates with anamniotic eggs that undergo development in surface waters and therefore the embryonic stages of these animals are also highly sensitive to chemical pollutants. These issues contribute to the lower water quality guidelines to protect aquatic life and human health.

Fish occupies a prominent position in the study of toxicology mainly concerning both human and ecological health. There are several reasons to select fish as a model animal. Fish belongs to the most diverse class of vertebrates; whose species identified till date is greater than the combined number of other classes. It also reflects the great diversity of aquatic systems that inhabit from fresh water to hyper saline waters, with temperatures ranging from below freezing to > 45°C, with pressures ranging from 1 to 1000 atm, other variabilities in solar radiation, oxygen concentrations, ionic-organic matter compositions, bottom environments etc. This habitat diversity has long driven the use of fishes for scientific inquiries into influences of environmental variables on the evolution, genetics, and adaptations of organisms. Aquatic systems, due to their tendency to accumulate relatively high concentrations of chemicals discharging from surrounding terrestrial systems, are highly vulnerable. Thus, they are often time repositories for a large array of stressor chemicals. In discussing exposure sites for toxicants, it is useful to consider the major routes and sites of exposure, distribution and introduction of toxicants in the body.