



NEED OF A MULTI-SECTARIAN APPROACH TO TACKLE ENVIRONMENTAL PROBLEMS

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ABSTRACT

Human survival on earth depends upon protection of environment. In spite of India's rapid economic development, the country is facing the health risks arising out of the traditional environmental hazards such as unsafe water supply, sanitation, air pollution etc. Modern environmental hazards arising due to burgeoning population and unplanned urbanization, air, water, noise and soil pollutions, industrial waste, solid waste, chemicals, fertilizers and pesticides used in agriculture etc have together compounded the health problems. A cooperative and collaborative multi-sectarian approach is vital to tackle environmental hazards and to ensure health. Mainstreaming for sustainable development at all levels is necessary to achieve a common goal of human development. The assimilated knowledge and skills can then be worked out on national, state and local levels. This would require democratic decision making, good governance and implementation of rule of the law, along with an enabling environment at national and international levels.

KEYWORDS: survival, environmental hazards, multi-sectarian approach, common goal, knowledge.

INTRODUCTION

India is now a country of more than one billion people representing 16 percent of the world's population and 3.4 percent of the global land area. If the current trend of population growth continuous unabated, no doubt India may surpass China in 2040 to become the most populous country in the world. However, significant achievements of man in this age of science and technology have lead to an upsurge of industrialization, urbanization, population growth, proliferation of consumer goods and many big projects, which are considered to be the hallmarks of progress and development. On the other hand we are facing with colossal problems like depletion of natural resources contamination of water resources, pollution of environment etc. The world has now come to realize that development has exerted such a great pressure on nature that the growth process itself has begun to slow down. Environmental deterioration, which we see today, is the result of rapid population growth, industrialization, urbanization and unsustainable developmental projects. The increased population has obvious impacts on health, sanitation and environment. In India, almost all surface water sources are unfit for direct human consumption. The WHO report reveals that 21 percent of all

communicable diseases in India are waterrelated (WHO, 1993). In all the big cities number of vehicles on the roads has increased phenomenally thus increasing the incidence of respiratory diseases. Our current relationship with environment is not sustainable. The sustainable development is a harmonization between economic growth and environmental preservation (Pillai, 2014). Sustainable development means ensuring that present development meets the needs of the present without compromising the ability of the future generations to meet their own needs. But our actions are leading to depletion and degradation, which, if continued, could ultimately result in an environment that is no longer competent of supporting life. Therefore, we must make a change from our present day throw-away society approach to a sustainable society approach by bringing about a sharp reduction in the rate of population growth and abolishing unnecessary use and waste of resources. If sustainable development has to be achieved, an attempt has to be made to work out a rate of development that the environment can sustain without any stress. Environment protection does not only involve prevention of pollution and of natural resource

degradation, but has to be integrated with the overall development process and the well being of the people.

Changes in the Environment

Everything that influences an organism and its living process from outside are collectively called its environment. The environment which makes life possible and sustains life on the Earth is made up of atmosphere, soil and water. The living creatures including man derive all their requirements of respiratory gases, food and other matter from the environment. Prevalence of certain conditions in the environment is essential for the survival and continuance of life on the earth. For sustaining environment the diurnal, seasonal and annual changes are inevitable. But in recent times, changes in the environmental components and factors have been brought about by human activities. These changes have become so detrimental that unless immediate remedial measures are taken the threat of annihilation looms large in the place of human civilization. Human activities like increasing population, fast natural resource depletion, deforestation, and environmental pollutions etc are now considered as serious threats to the survival of mankind and biodiversity on the earth.

Impact of Population growth

The population of some industrially developed countries like Sweden and USA is not increasing as rapidly as those of developing countries like China and India. The high population growth is associated with lack of educational opportunities and prevalence of poverty. Increasing population gives rise to greater requirement of cloth, food, house and other facilities. Hence the increasing population creates strain on the resources of the world. The land area of the world and any country is finite and the per capita land area is decreasing as population is increasing. All the human requirements are to be raised from the land hence, the pressure to produce more and it exerts immense pressure on the ecosystem. More than that, we mine the non renewable resources viz. coal, petroleum, iron, copper etc from the Earth and thus, all of these materials will be exhausted within a limited number of years. The resource depletion time will be reduced with the increasing population and consequently the demand on these resources will increase. A non renewable resource exists in a limited amount on the Earth and is either not replenished or more slowly replenished than it is used. The renewable resources such as forest, grasses in grassland, fish, fresh water, fresh air etc are replaced through natural process but if it is used rapidly it may not always remain renewable. The renewable resource can be used without damaging its capacity to be fully renewed is called its sustained yield. A perpetual resource is one that comes from an essentially inexhaustible source and thus will always be available in a relatively constant supply regardless of the use. Solar energy, wind energy, tidal energy and flowing water are some examples of perpetual resources.

Over population and over use of resources by the technological societies are the root causes of environmental degradation and pollution. The WHO estimates that a quarter of diseases facing mankind today occur due to prolonged exposure to environmental pollution (Kimani, nd). Therefore, our first task should be to put an immediate halt to our ever increasing population. Family planning must be made compulsory and every couple must spontaneously offer for sterilization after second child (Pillai, 2014). Maintenance of biodiversity is the key to the survival of human civilization. Plants and animals are interdependent on each other. The maintenance of an ecological order and balance of nature depends upon food chain relationships, matter recycling and sustainable productivity in the ecological systems and biotic interactions.

Family planning

Family planning programs provide educational and medical services which helps couples to choose their family size how many children to have and when to have the children. Such programs vary from society to society but it primarily includes sex education, information on methods of birth control, distribution of contraceptives and information on sterilization and abortion. Success of family planning programs depends on committed leadership, wide availability of contraceptives, easy availability of family planning services and local implementation methods and use of media to spread sex education. Common methods of birth control in human populations are: (1) Preventing unwanted pregnancy by sterilizing females and males if they do not want any more children. (2) The use of oral contraceptives, known as pills or use of intrauterine device by females. (3) Use of condoms by males is a good method for prevention of pregnancy (Goyal, 2013). (4) Breast-feeding is also considered important in controlling fertility and reducing infant mortality. (5) Abortion is another method of terminating pregnancy.

Quality of Environment

Planning and management of resources utilization is essential to make the limited resources last longer and to see that the bio-resources do not become extinct and simultaneously go on providing benefits to mankind. Hence, management is required to conserve plants, animals, microbes and unique ecosystems for national development. Resource management also helps to maintain quality environment with regard to clean air, water and soil. Migration of people from the rural areas to towns and cities occurs in search of job, higher education, medical facility, and many other purposes. The conditions of life in cities deteriorate due to increased population. More vehicles bring about more pollution. The poor and labor class, unable to afford high cost of living, live in unhygienic slums. Problems of sewage disposal and water supply become acute and the quality of environment becomes unhygienic. Making provisions for better facilities at village level will reduce

migration to urban areas. Establishment of rural industries, agro-based industries and providing good education and health facility will definitely reduce migration of people. It will help to maintain quality of the environment both at the village level and urban level.

Resource Management

For the resource survey and management, help of new scientific technologies like remote sensing techniques, satellite imageries, waste recycling techniques etc. are to be adopted. Used materials and scrapes can be re-melted and recycled (Pillai, 2015b). We should treat the water with chemicals like chlorine to kill the harmful pathogens. Municipal and domestic waste and waste water can be recycled after processing for irrigation. Fly ash can be used in preparing bricks and cementing materials and in very low doses it can be used in agriculture as a nutrient source. Solid wastes can serve as resources for our industries. With the help of science and technology, many ways can be employed to manage the resources for the benefit of mankind.

Soil Pollution

Soil pollution can be defined as, addition of substances to soil, which adversely affect physical, chemical and biological properties of soil and reduce its productivity (Rajput, 2006). Soil pollution usually results from the disposal of solid and semi solid wastes in agricultural practices, insanitary habits and fall outs from atmospheric pollution. The problem of land pollution differs from water and air pollutions in the way that the pollutants remain in place for relatively longer periods. Year-by-year solid wastes are increasing considerably from country to country depending up on their living standards. Main reason is that rapid urbanization with consequent increase in buildings has resulted in the reduction of land for the wastes to be disposed. Discharge of these wastes into water course increase water pollution and improper incineration cause severe air pollution. Industrial and municipal wastes dump caused toxic materials to be leached and to seep in to the soil which affect the ground water course. Agricultural practices introduce pesticides, fertilizers and manures to land resulting in biological and chemical contamination. The soil gets heavily polluted day- by-day by hazardous materials and micro organisms enter the food chain, water or air consequently ingested by man.

Bacteria transmitted from soil to man causing many diseases like dysentery, cholera, typhoid and paratyphoid fever. Soil pollution effects causes cancer including leukemia and it is danger for young children as it can cause developmental damage to the brain furthermore the mercury in soil increases the risk of neuromuscular blockage, causes headaches, kidney failure, depression of the central nervous system, eye irritation and skin rash, nausea and fatigue (Khan and Gouri, 2011).

Soil Pollution Control with Waste Management: Land is polluted largely by solid wastes from homes, farms

and industries. Hence, control measures include primary disposal of solid wastes which is not easy since the economy involved is very high. To make the disposal of waste economical, recycling of materials is necessary. Wastes can be disposed by collection, disposal and recovery of wastes.

Wastes after collection are carried from various places by trucks to the disposal area. To save time and money, transfer stations must be constructed at various points in a city so that more refuse is brought to the nearest station from where it is taken away for ultimate disposal after cramming. A popular and inexpensive means of solid waste disposal is dumping. But there are many disadvantages in dumping of wastes hence, land-fill and incineration are some of the best possible and cheapest means of disposal of wastes. Recovery of resources also known as recycling of wastes is the most desirable means of solid waste management (Pillai, 2015b). It has two advantages, conservation of existing natural resources and sufficient reduction in the volume of refuse to be disposed. The amount of solid wastes can also be controlled by other means, for example, reduction at the source. But it can be done only by legislation and with cooperation of the public.

Global warming and Climate Change

Climate is the result of a series of complex interactions between the atmosphere, the ocean and the land. The earth's atmosphere absorbs short-wave energy from the sun. Some of this energy is reflected back into space, while some is absorbed by the earth surface and clouds, reradiated as heat. This warming or "Green House Effect" is essential for life on earth. Green house effect results when the earth's atmosphere traps the heat radiated from the sun. Without this effect the average surface temperature on earth would be very low Celsius. Earth's surface send the heat energy back in to the atmosphere as infrared radiation. Much of this radiation does not pass freely in to the space, because certain gases in the atmosphere absorb it. These gasses include carbon dioxide, ozone, water vapor and methane etc. These gases then send the infrared radiation back towards the earth, adding to the warming of the earth. The most significant changes brought by human activities increase in the concentration of carbon dioxide and other greenhouse gases in the atmosphere. Burning of fossil fuels and destruction of forest is adding the carbon dioxide level in the atmosphere. Historically, the responsibility for greenhouse gas emissions' increase lies largely with the industrialized world, through the developing countries are likely to be the source of an increasing population of future emissions (Sathaye, 2006). Due to the green house effect the average temperature of the earth and atmosphere is increasing is called global warming. It is poses the great challenge to mankind.

The rise in the sea level as a result of global warming would immediately threaten a large fraction of the

human population living at sea level. Poor developing countries particularly small island nation states will be the worst hit. Moreover, poor countries are least prepared to face the wrath of flood and hurricanes. Plants and animals around the world will be drastically affected due to changing weather and some may even become extinct. The atmosphere is a common property resource to which every human being has an equal right. The people of industrialized countries have more than used up their share of the absorptive capacity of this atmosphere and pollute through their high emission levels in the past and in the present. For instance the occurrence and extensions of droughts, flooding, smog-formation, and fast melting of snow in mountain areas could substantially increase the risks to human health as well as societal infrastructures and the vitality of ecosystems (Wiman, nd).

Preventing climate change is not just an economic or ecological issue. Above all it is a moral and ethical issue. Climate change has become global cooperative enterprise in which all big and small, rich and poor, powerful and powerless must cooperate to achieve a global objective for the global good. The only way to escape from the disastrous consequences associated with climate change is to reduce emissions. The climate convention has to encourage a shift to renewable energy system. This is the only way to fight climate change (Pillai, 2014). A shift to renewable energy like solar, wind, hydrogen, biomass, will bring zero carbon economy. Among biomass, sustaining existing forest cover, new plantations and better land management bring down global warming.

Water Management

Although 70% of the Earth's surface is covered by ocean, less than 3% of this fresh and more than that three quarters of this fresh water is frozen. Ninety eight per cent of the remaining fresh water is underground (Goyal, 2013). Thus, about a hundredth of one percent of the total world water is easily available to all terrestrial life including man. In India 90% of the total rain falls between June and September from which most of it cannot be captured and used. Contamination of drinking water is a most common hazard to people in major portions of the world. Many areas of the world are already facing severe water shortages and other water resources problems like in Jilin City, China experienced a series of explosions over a period of one hour resulted 80 km long toxic slick of benzene and nitrobenzene, in the Songhua River, and through Amur River during the following weeks (Man Made Disaster, nd). Within the next 20-30 years, these problems are expected to intensify and spread to other area. Although it is not possible to increase the Earth's water supply, it is possible to manage the water resources effectively to reduce the impact and spread of water resources problems.

There are two major approaches to water resource management – increase the usable supply and decrease the unnecessary loss and wastage of water. Most of the water resources experts believe that any effective plan for water management should be rely on a combination of these approaches.

Reserve and Control of Wasting Water

Rain water from melting snow can be captured by dams and reservoirs for use during dry seasons. Dams also control the flow and reduce the danger of flooding, provide irrigation and generate relatively cheap electricity. However the benefit of dams and reservoirs must be weighed against their costs.

Reducing waste offers much more potential for conserving water. Only a few portion of the water used in irrigation actually helps in crops growth, the rest is wasted. Improving the flow of irrigation channels can cut wastage and using sprinklers to spray the water over the crops can prevent a great portion of wastage of water. To avoid water loss by evaporation deep irrigation is helpful in which water reaches the plant roots by way of pipes along the ground. Since irrigation accounts for the largest fraction of water use and waste, more efficient use of even a small amount will be enough to meet the water demand. For reducing water waste manufacturing factories can use recycled water. Even in the domestic front, loss of water from leaks in pipes. Toilet, etc is to the extent of a major percent. The use of untreated domestic sewage should be minimized (Pillai, 2015b). Therefore, preventing waste from irrigation, industry and domestic use is a sound management of water resources.

Water reuse

Direct water reuse refers to treated water that is piped directly to the next user i.e. for industrial or agricultural activities. A planned endeavor through wastewater reclamation cycle is the raw sewage from household and industries is transported to the treatment plants for primary and secondary treatment and after a soil filtration for natural filtration take care of tertiary treatment. This water may be collected in networks of drains for final disposal to rivers. The water may also be used in forests and wastelands for irrigation.

Air Pollution

History of air pollution could be traced back to the Industrial Revolution and discovery of steam engines in the eighteenth century. Increased use of coal and smoke and sulphur oxides emitted from it, began to contaminate the environment. Perhaps one of the first laws attempting to control air pollution was enacted in 1723 when the King of England convinced Parliament to pass an act prohibiting the burning of coal in London (Singh, 2010). Exposure to air pollution is largely beyond the control of individuals and requires action by public authorities at the national, regional and international level. A multi-sartorial approach engaging such relevant sectors as transport, housing, energy production and industry is

needed to develop and effectively implement long term policies that reduce the risk of air pollution to health (WHO, 2013).

Two major accidents in the recent history were the TCDD (Trichlorophenoxy) accident at Seveso, Italy during July 1976 due to explosion in the herbicide manufacturing plant and we cannot forget the tragic industrial calamity at Bhopal in the night of 2nd/3rd Dec. 1984, when the mixture of deadly gases (mainly methyl isocyanate) from the chemical plant operated by Union Carbide escaped in to the atmosphere killing over 16000 and more than 520,000 local residents exposed. (Eckerman, (2005). Similarly on 28 April 1986, a nuclear reactor exploded at the Chernobyl nuclear power station in USSR, resulting in the death of 2,000 people near the plant due to the initial blast and lethal radiation. Radioactive gases and particles had spread over a vast section of the Soviet Union and water supplies for more than 6 million inhabitants of the area were threatened with contamination (Wikimedia). These catastrophic incidents have helped to focus attention on environmental issues and the Union government enacted a comprehensive Environment (Protection) Act, 1986 to safeguard and protect the environment. But not only in Seveso or Bhopal or Chernobyl but now every city, every town, every corner of the earth is facing such a danger. All these episodes are of concern as they provide significant evidences by which we can evaluate the effects of air pollution on health. There is significant inequality in exposure to air pollution and related health risks: air pollution combines with other aspects of the social and physical environment to create a disproportionate disease burden in less affluent part of society (WHO, 2013). Many studies have found associations between daily changes in ambient particulate air pollution and increased cardio-respiratory hospital admission along with cardio-respiratory mortality (Ren ang Tong, 2008).

The combustion of fossil fuels to provide a source of energy is the major means by which man pollutes the atmosphere. Carbon monoxide (CO) and Carbon dioxide (CO₂) are the gaseous pollutants produced in largest quantities from natural and atmospheric sources. They originate from oxidation processes such as decomposition of organic materials, oxidation of methane, burning of fossil fuels or other materials such as wood. Consumption of transport fuels are the principal source of carbon monoxide and carbon dioxide. Seventy per cent of the total annual carbon monoxide pollution originates from vehicular emission. All important processes involving atmospheric carbon dioxide occur at the Earth surface, which are intimately connected with the biosphere. The two major influence man has on the carbon cycle are to increase the amount of carbon dioxide in the air by combustion of fossil fuels, and alter the plant biosphere significantly by removing tracts of forest.

Prevention and Control

Prevention of air pollution is not as simple as explained in words. It is impracticable to provide at reasonable cost all the growing needs and amenities of modern life without causing some pollution of the air. However, much of the pollution could be prevented without undue cost by careful planning on site of industries, better designed equipments and better operation of the equipments. Smoke, grit and sulphur dioxide are the major pollutants from the combustion of coal and oil. Though the combustion of both coal and oil can be controlled to prevent smoke, control is generally easier with oil than with coal. Moreover, danger of emitting smoke is greater with smaller installations than with larger ones when coal is used as fuel. To eliminate these effects, oil can be used instead of coal (Pillai, 2015b). The electronic precipitator is considered to be the most effective device for preventing emission of dust from fuel gases and is the standard equipment for large power stations.

Cleaning of air is possible by the legal application of technical knowledge only. As suggested by the World Health organization (WHO) administrative control of atmospheric pollution can be most effectively developed in to appropriate laws at national level through the formation of the committee representing public health administration, Industrial hygiene, fuel usage, agriculture, science, industry and town planning. Such a committee recommends the necessary legal instruments, may suiting to its unique country problem (WHO, 2013).

Radio-active Pollution

Among the hazardous substances, radioactive substances are most toxic. As compared to organic pollution injuries due to the effect of radio nuclides are exceedingly high. Natural sources of radio activities are cosmic radiation received from the space, and naturally occurring radioisotopes present in the environment and those contained within the body of the organisms. Manmade sources are nuclear war materials, test explosions, power plants and use of radioisotopes in medicine, industry and research are the main source of radioactive pollution that could threaten our environmental security. Nuclear Power is a modern means of generating electricity (Pillai, 2015c).

Radio-active pollutants are not like other pollutants which are sooner or later converted in to harmless material and degraded in to similar constituents to be recycled in the ecosystems and use again. It is not the element itself, but the instability of its nuclei which is responsible for damages caused by these pollutants. As long as radiations continue, these wastes are dangerous for the living beings. After the emission of radiations nuclei attain stable state and behave like any other element in the environment or the biosphere. Life on earth's crust could evolve only when the nuclear activity caused, atoms acquired stable state and radiations were

reduced to the level which could be tolerated by living beings.

When the radiation has large dose, it destroy the central nervous system and the red and white blood cells, leave the victim unable to fight infections.(Wikimedia,Pillai , 2014). Radiation caused cancer takes decades to develop. In 1986 Chernobyl Disaster, the worst nuclear accident of 20th century, and estimated 4,000 to 9000 deaths could eventually resulted from radiation.(Wikipedia the Encyclopedia – the Chernobyl Nuclear Disaster) To these days, several small towns and the city of Chernobyl remain abandoned and uninhabitable due to fallout. (Wikipedia the Encyclopedia) Nuclear exposure can impact for long, both in currently exposed people or to next generation as genetic impact factors (Wide Effect from Japan's Disaster).

Control of Radioactive pollution

Control of natural radioactive pollution may not be possible. Out of all sources only artificial radioactivity is the scope of intervention. Radioactive pollution can be controlled by strict enforcement of the safety measures. All low or high level radio-active wastes have tremendous capacity to pollute the environment. As low level wastes are often produced in large quantities, their containment is not possible. They are visually subjected to a treatment for removal of radioactivity and then discharged in the water bodies or on land in usual way. High level wastes, on the other hand, cannot be disposed of freely in the environment, but have to be concentrated, contained and stored out of the reach of human's environment.

Noise Pollution

The human ear is constantly being assailed by manmade sounds from all sides. Noise has become a permanent part of our lives in these days because of the development of machinery, industry, technology and improved living facilities. Moreover, due population explosion triggered with heavy traffic, urban crowd and electric equipments are the sources of noise nuisance in environment. In India besides these two, other factors are religious and social functions, the sound of the loudspeakers increase the gravity of the situations. Noise harms the body and mind. Noise not only causes irritation or annoyance but it also constricts the arteries, increase the flow of adrenaline and forces heart to work faster (Khan and Gouri, 2011).

Control of Noise Pollution

In our country there have been several legislative measures both at State and Central Government levels to prevent and control different components of the environment. But the movement against noise pollution is very weak in India. The main reason is that most of us do not consider that noise pollution creates health problems. Public must be made aware and educated about noise nuisance through adequate news media,

lectures and other programs. Noise level can be reduced effectively by replacement of noisy and rattling parts, providing better cushioning to cheek the vibrations, proper oiling and greasing to ensure smooth running and using effective silencers etc (Mishra, 2000). Silence zones must be created near schools, hospitals and indiscriminate use of loudspeakers at public places may be banned by law and adequate restrictions must be put on unnecessary use of horns and vehicles plying without silencers.

Bioremediation

Bioremediation is a promising Biotechnology for pollution cleanup. Bioremediation has emerged during recent past as most ideal alternative, environment friendly and ecologically sound technology for removing pollutants from the environment, restoring contaminated sites and preventing further pollution. The process is the use of living organisms (primary micro organisms) for removal of a pollutant from the biosphere. The microorganisms have the abilities to degrade, detoxify and even accumulate the harmful organic as well as inorganic compounds. The objective of bioremediation is to exploit naturally occurring biodegradation processes for cleanup of the polluted environment.

Contaminant amenable to bioremediation include crude oils and refined petroleum products, halogenated solvents, pesticides, herbicides, military chemicals and mine wastes, and they can be treated in air soil and water. The most successful application of bioremediation, such as the treatment of the shorelines contaminated by oil spills have relied on indigenous microorganisms and simple environmental modifications such as nutrient applications and aeration. A change to hydrogen fuel produced by microbes would be a major new use of bioremediation for pollution prevention that would revolutionize not only the petrochemical and automotive industries but the worldwide economy.

CONCLUSION

At present the polluted environment is a global issue and world community is the worst sufferer to it. Education, research and advocacy are lacking in the region and so as the pollution preventive strategy especially in developing countries. Policymakers in developing countries need to design programs, set standards and take action to mitigate adverse health effect of various pollutions.

On the basis of existing knowledge considerable pollution of the atmosphere can be avoided without undue capital expenditure. Intensified research is needed to obtain more information on methods of significantly reducing the quantity of pollutants discharged from special processes.

As radioactive pollutants are most harmful agents it is necessary to prevent its pollution. A rigorous monitoring system is necessary by which the nature and level of

radioactive pollutants can be determined. Preventive and control measures can be taken accordingly.

It is necessary to implement of policies for resources like forests must be treated as national resources of individual country and their use can be determined only by the country concerned (Pillai, 2014). Environmental degradation control, eco-regeneration including forestation and other employment generation programs need more global support. Still time is left to the global institutions, governments, local authorities and community to act and use the advance resources to balance the environment for making it living.

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