

Chakkaravarthy, Q. Ashoka "Human Survival And Environmental Pollution" in Martin J. Bunch, V. Madha Suresh and T. Vasantha Kumaran, eds., *Proceedings of the Third International Conference on Environment and Health, Chennai, India, 15-17 December, 2003*. Chennai: Department of Geography, University of Madras and Faculty of Environmental Studies, York University. Pages 66 – 74.

HUMAN SURVIVAL AND ENVIRONMENTAL POLLUTION

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Abstract

Environmental health is that aspect of public health that is concerned with those forms of life substances, forces and conditions in the surroundings of man that may exert an influence on man's health and well-being. Health is a state of complete physical, mental and social well-being as well as the absence of disease or infirmity. Man's concern for his environment as it relates to his health, maintenance, efficiency, comfort and the enjoyments of life were much prevalent in the middle-ages. However, there began a change in social organization that initiated the rise of many cities, and subsequently increased the number of diseases that were more easily communicable from one person to another. Such diseases came to be associated with pollution.

The term malaria was the name applied to a disease thought to be associated with bad air. Eventually, that the female anopheles mosquito attacks man and transmits the causative organism and that the status of man's health represents the result of complex interactions between his internal biological system and the external environmental system, were scientifically proclaimed.

Man is subjected to a variety of environmental hazards. Sometimes, man-made hazards are direct in their impact and the following factors can be used in categorizing environmental hazards: 1) biological, 2) chemical, 3) physical, 4) psychological, and 5) sociological.

Besides the above, diseases are also transmitted from person to person or from animals, for example, rabies, rat bite fever, parrot fever or psittacosis, malaria, yellow fever, murine typhus fever and bubonic plague. The mosquito is involved in the transmission of malaria, dengue, and filariasis. High concentrations of nitrates result in methemoglobinemia "blue babies syndrome" and thyroid (mottled tooth enamel).

There are other biological hazards in the environment besides communicable diseases. Some gases are irritating at low concentrations but at higher concentrations, gases like hydrogen sulfide may be fatal.

Physical hazards in the environment may cause death, disease or disability. Reduced metabolic rate, oxygen consumption, respiration, heartbeat, and blood pressure are affected by temperature, which keeps oscillating because of excessive environmental pollution. The quality

of life is directly related to the quality of the environment. The Concepts of pure water, pure food, clean air and clean neighbourhoods, reflect the newer concepts of health as meaning more than just the absence of disease. Bare survival includes control from major epidemics or disease; control of disease, injury and accidental injury; maintenance of environment for efficient use of manpower, comfortable, stimulating environment, and the likes have to be given a fresh thought.

The very basis of human survival hinges on the sustainable inter-linkages with the environment. The present day scenario however, tells a different story. The ever-increasing problems due to pollution are leading to various environmental hazards that are detrimental to our survival. In this context, this paper aims to address the various problems vis-à-vis human survival and the steps to be taken up in a concerted fashion towards sustainable development. In future years the population increase will require that the environment of the world be reviewed as a closed system. Consequently, it is necessary to take an ecological approach to environmental quality and consider the totality of the environment with man as part of an ecosystem.

Introduction

Environmental health is that aspect public health that is Concerned with those forms of life substances, forces and conditions in the surroundings of man that may exert an influence on man's health and well-being, Health is a state of complete physical, mental and social well-being as well as the absence of disease or infirmity.

Man is subjected to a variety of environmental hazards. Sometimes, man-made hazards are direct in their impact. The following factors can be used in categorizing environmental hazards: 1) biological; 2) chemical; 3) physical; 4) psychological; and 5) sociological.

A. Biological:

Biological hazards are concerned primarily with the entry of disease producing infectious agents into man's body. Diseases are also transmitted from person to person or from animals to humans by biological agents or some other means. In such cases, these agents are disease vectors. Among such disease vectors are flies, mosquitos, fleas, ticks, mites, cockroaches, etc.

There are other diseases which generally involve close person-to-person contact. Among these are infections of the upper respiratory tract, such as pneumonia, tuberculosis, and common colds.

Since many of the Water-borne illnesses are of human rather than animal origin, the improper disposal or human waste is the chief cause of contamination of water. Water-borne illnesses including typhoid and paratyphoid fevers, cholera, bacillary dysentery, amoebic dysentery, and infectious hepatitis.

Food borne infections include such diseases as diphtheria and tuberculosis, as well as intestinal diseases like typhoid fever and salmonellosis, dysentery and late fever, Q fever,

infectious hepatitis, leptospirosis and botulism. Salmonella increase in such numbers after contamination of the food that gastrointestinal symptoms start appearing following ingestion-

- 1) Food infection – Such food borne infections are sometimes referred to as food poisoning.
- 2) Parasitic infections - may be transmitted by foods, which have been contaminated. Diseased animals may be the source of such infections if the meat is not thoroughly cooked, e.g., tapeworm and trichinosis.

There are a number of diseases from animals which may be transmitted to man such as: rabies (animal bites), bovine tuberculosis, various tapeworms (beef, pork, fish), parrot fever (or psittacosis), anthrax, plague, murine typhus, fever, relapsing fever, and tularemia.

Vector-borne diseases constitute threats throughout the World. Examples are malaria, murine typhus fever, yellow fever, and bubonic plague, dengue and filariasis.

There are other biological hazards in the environment besides communicable diseases. There are the creatures whose venom is poisonous, e.g., certain snakes, scorpions, blackwidow spiders, and bees. Various plants, berries, nuts and roots, such as horse chestnuts; toad stools and castor beans are poisonous to man.

B. Chemical:

Chemical hazards are not new to mankind. Man's reaction to a chemical depends upon its toxicity and the individual's susceptibility, the duration of exposure, and the concentration of the chemical. The effect may be related to body weight and the form (solid, liquid, gas) of the chemical at the time of exposure. There are hundreds of new chemicals developed each year. For many of these, the toxicity may not be known in the development stages or production, resulting in occupational hazards.

For example, High concentrations of nitrates may cause methemoglobinemia – “blue babies”, and fluoride may cause mottled teeth enamel.

An association between the occurrence of lung cancer and cigarette smoking has been observed, but it has also been noted that urban inhabitants have lung cancer more frequently than rural residents.

The World Health Organization (WHO) has observed that over 70 percent of all human ailments are influenced by environmental deterioration. Industries are the sources of hazardous emissions and effluents. The use of chemical insecticides and pesticides in agro-management also leaves dangerous residues. Transportation, whether land, water or air, does contaminate the environment. Public health infrastructure, salvage, garbage, and drainage have a detrimental impact on the environment. The food we eat, the water we drink and the house we live in are not free from contaminants, affecting our health, and causing a spectrum of ailments.

C. Physical:

Physical hazards in the environment may cause death, disease or disability. These concerns include a wide range of factors such as dust, humidity, equipment and environmental design and radiation. Temperature and humidity are important to the efficiency of human performances. While the critical air temperature for man ranges from 1°C to 32°C, the thermo neutrality Zone varies from 24-31°C.

Metabolic rate, Oxygen Consumption, respiration, heartbeat, and blood pressure are affected by temperature. Electro magnetic radiation includes X-rays, Ultraviolet, infrared and microwaves. Prolonged exposure may induce skin burns. Mechanical Vibration and noise can cause hearing loss and produce other psychological and physical disturbances. People living in cities may suffer some hearing loss from community noise.

D. Psychological and Sociological:

Psychological and sociological parameters of environmental design are not as well delineated as biological, chemical and physical factors. A total consideration of the environment of man must consider sociological and psychological influences.

Noise, overcrowding, lack of privacy, lack of opportunity for social interaction, lack of open space, boredom, compulsory leisure, traffic, and estrangement from the conditions and natural cycles under which human evolution took place are environmental factors which have been identified as having possible social and psychological consequences.

Environmental Health problems in India:

Nearly a decade ago, environment was the exclusive preserve of sanitary engineers and health officers. However, from 1972 onwards there was rethinking and it was realized that environment has to cater to the perpetuation of all the living systems (including human kind) on this planet, which in short means conservation of the like support system.

The state of health of the people does not depend only on the number of doctors and hospitals, but also on a clean environment because if it is conducive the spreading of disease, the state of health of the people will be poor. The system has to be preventive as well as curative as both are important.

Nearly 80 per cent of the world's diseases, and more than 50 in the developing world, can be linked with water. In our country, there are 14 river systems, which account for 83 per cent of landmass, 80 per cent of local population and 85 per cent of water discharge. A detailed analysis, based on our monitoring status, shows that 90 per cent of pollution loads in the river system is on account of human waste, to be precise, faecal water. In this regard our biggest defaulters are the city Municipalities.

Clean drinking water and sanitation therefore, get equal emphasis as number of hospitals and doctors.

A simple illustration is 'kumbh' when coliform increases from 300/100ml to about 165,000/100ml, the infection persists for 335-350 kms downstream.

"*The Hindu*" -stated that on November 23, 2003 "Ganga is the most polluted river", followed by Tapi, Narmada, Indus, Mahi, and Sabarmati.

Environmental Pollution and Health Problems:

The relationship between human health and the environment is a two-way process. We improve our living conditions and increase our comforts but the alterations to the environment may be harmful to our health. The factory has increased our well being beyond calculation by the goods, which it makes so readily available, while the fumes from partly consumed oil and coal, which the factory emits from its chimneys, poison the atmosphere with sulphur dioxide and other noxious chemicals, causing chronic bronchitis and adding to the risk of lung cancer. This dynamic process can be seen at work in agriculture, when pesticides, essential to healthy plant life, build up excessively and harmfully in food, water and air, which the human ingests. Irrigation and dam building, upon which improved food supplies depend, can create favourable conditions for vectors or disease, e.g., for the mosquito carrying malaria and the snail; the intermediate host of bilharzias.

It is well known that the earth's surface and the environment surrounding it is important to human health. The nature of the soil, air, water, temperature, barometric pressure, wind, sunshine, cloud, rainfall, humidity and latitude, must all determine man's health and welfare. Health signifies a wholeness or soundness of body and mind, but we are confronted with the difficulty of determining its relationship to 'disease'. Health and disease must be intimately related, for if disease did not exist it would be irrelevant to talk of health. The two states are contrasted in our minds; as if it were the two sides or a coin - so that when one is present the other is absent.

Environmental Pollution:

Environmental pollution is the act of introduction by man, or extraneous substances or energy into the environment that induces unfavorable changes. These changes may affect man directly or indirectly by endangering his health, harming his living resources and ecosystem, or by interfering with legitimate uses of the environment.

Environmental pollution causes health problems by affecting human health and lives. Environmental deterioration by man is attributed to three major causative factors. 1) over-population 2) Urbanization 3) Industrialization

Overpopulation

Human population was about 5 million (1 million=10 lakhs) in the year 6,000 B.C. By 1,650 A.D, it was 500 million. By 1,850 A.D. it had reached one billion in 1975 and is now on the further rise. Current estimates indicate an average annual rise of world population by 2 per

cent. Indian population, according to the latest estimates, is over one billion. Such an increase in population demands more food, water and land.

Urbanization:

Growing population leads to a greater concentration of people in living areas. People move to urban areas (cities) abandoning rural settings in search of employment, comfort and facilities. As a result cities are being over-loaded with population that they can barely hold or support. Almost 40% of the population in India is concentrated in the states of Bihar, Punjab, Haryana, Uttarpradesh, and west Bengal. Population of four major cities in India - Bombay, Calcutta, Madras and New Delhi, and Aurangabad, Bangalore, Hyderabad and Kanpur account for 52% of its population.

Industrialization:

Human needs are never-ending. Discovery of new products and the production of luxuries to suit the changing life style are accomplished by the process of industrialization. It also is the key to the economic development of a nation. Industries, during the processing or manufacturing or intermediate chemicals and end-products, generate waste materials and useless by-products.

Each industry is associated with an emission of one type or another of dangerous, or potentially dangerous pollutants directly or indirectly. Not only can the industries be responsible for the pollution of air but also for the contamination of water. The quantity of water spent in producing every little thing in the world is unassumably large. For example, the production of 1 kg of sugar consumes about 1,800 liters of water. Similarly, it takes about 8,000 liters of water to produce one Kilogram of beef.

Effects of air pollution on human health:

Air pollution is one of the greatest environmental evils. The air we breathe has not only life-supporting properties but also life-damaging properties. Air constitutes about 80% of man's daily intake by weight. Human beings breathe nearly 22,000 times each day, inhaling about 16kg of oxygen. Thus pollution of air may have profound health effects and other consequences.

Health effects of pollutants:

Sulphur Dioxide:

Sulphur dioxide is an irritant gas which affects mucous membranes when inhaled. Sulphur trioxide is a very strong irritant, much stronger than sulphur dioxide, causing severe bronchiospasm at relatively low levels of concentration.

Carbon monoxide:

Carbon monoxide has a strong affinity for combining with the haemoglobin of the blood to form carboxyhaemoglobin COHB. This reduces the ability of the haemoglobin to carry

oxygen to the body tissues. Carbon monoxide also affects the central nervous system. It is also responsible for heart attacks and a high mortality rate.

Ozone:

Ozone is a gas that has an irritant action in the respiratory tract, reaching much deeper into the lungs than the oxides or sulphur.

Fluorides:

Fluorine is a cumulative poison even in sub-acute concentrations under conditions of prolonged exposure.

Lead:

Lead is a highly toxic and cumulative poison. Lead poisoning can cause severe mental retardation or death. The effects include gastro-intestinal damage, liver and kidney damage, abnormalities in fertility and pregnancy, and mental development of children.

Insecticides:

Insecticides are not only harmful for insects but also poisonous for man. e.g., DDT [Dichloro Diphenyl Trichloroethane]. They can affect the central nervous system and may attack other vital organs. In fact, DDT has been found in mother's milk in western countries and even in our own country.

Radioactive Isotopes:

Serious health effects are anaemia, leukaemia and cancer. Radioactive isotopes also cause genetic defects and sterility.

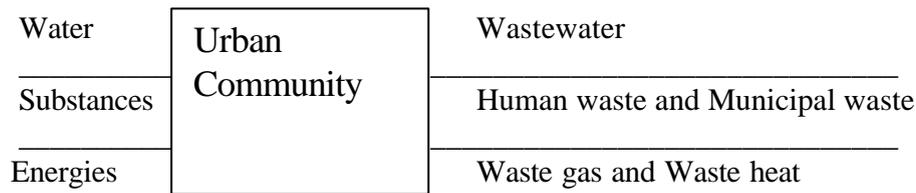
Water pollution:

Water is essential to all forms of life. Water pollution is a phenomenon that is characterized by the deterioration of the quality of land water (rivers, lakes, marshes and ground water) or seawater as a result of various human activities. Man has polluted much of this limited quantity of water with sewage, industrial waste and a wide array of synthetic chemicals.

Water pollutants are categorized into eight major types:

- 1) Oxygen-demanding waters (domestic sewage, animal manure, and some Industrial wastes).
- 2) Disease-causing agents-bacteria, parasites, and viruses.
- 3) Inorganic chemicals and minerals - acids, salts, and toxic metals)
- 4) Organic chemicals – pesticides, plastics, detergents, Industrial wastes, and oil.
- 5) Plant nutrients and phosphates
- 6) Sediments - soils, silt, and other solids from land erosion.
- 7) Radioactive substances
- 8) Heat - from industrial and power plant cooling water.

If all the urban activities of human beings related with water pollution are viewed as a metabolic system, it can be outlined as follows:



Effects of Noise Pollution:

The environmental deterioration may be caused by single or interactive effects of the several sources or environmental pollution like air, water, soil, noise, etc. Researchers have proved that loud noise during peak marketing hours creates tiredness, irritation and impairs brain activities so as to reduce thinking and working abilities.

Physiological Effects (or) Health Effects:

Noise pollution can change man's physiological state by speeding up pulse and respiratory rates. It can impair hearing either permanently or temporarily; millions of industrial workers are threatened with hearing damage.

Medical evidence suggests that noises can cause heart attacks in individuals with existing cardiac injury, and that continued exposure to long noise could cause chronic effects such as hypertension or ulcers, and of course deafness.

Audiograms of pop musicians show typical hearing loss in both the ears.

Some empirical research conducted on pregnant female mice reveals that aircraft taking off which bring in 120-to-160 decibels caused miscarriages in them. Prolonged chronic noise can also produce stomach ulcers as it may reduce the flow of gastric juice and change its acidity.

Psychological Effects:

Many behavioral changes are recorded as a result of exposure to high noise in human beings as well as in animals. Noise can cause tension in muscles, nervous irritability and strain. No doubt the noise reaction varies to a large extent in different individuals.

Conclusion:

- a) The quality of life is directly related to the quality of the environment.
- b) The concepts of "pure" water, "pure" food, "clean" air, and "clean" neighborhood reflect the newer concepts of health as meaning more than the absence of disease.
- c) The environment must satisfy not only man's physiological needs but also his psychological and sociological needs.
- d) The quality of the environment through history has been a measure of the character of a civilization - "a way of life".

Levels of concern for environmental quality have been classified roughly as follows,

- 1) Bare survival - control of major epidemics or diseases and violent death, minimum food and water.
- 2) Control of disease and injury - control of endemic and dietary disease and accidental injury.
- 3) Efficient performance - adequate and proper diet, maintenance of the environment for efficient use of manpower.
- 4) Comfort - stimulating environment, aesthetic satisfactions, comfort control.
- 5) There is an urgent need to do research on the effects of pollution on human health by medical profession and other research agencies.

Consequently, it is necessary to take an ecological approach to environment with man as part of an ecosystem. While geographical approaches have been characteristic of the past, in future years the population increase will require that the environment of the world be reviewed as a closed system. Man has the capacity, but it remains for him to exercise his will and wisdom, to modify the environment for the maximization of his physical, mental, and social well-being. Only a healthy environment provides a healthy body and a healthy mind, which is a pre-requisite for human happiness and progress.

Spread Environment Awareness Through Regional Languages:

Environmental issues should be discussed more in regional languages, which could help people to understand better the significance of protecting natural resources. Naturalists and scientists often have used only English, an alien language to most locals of India. NGO's should use the regional languages in India and other foreign countries to spread awareness among the people.

Acknowledgements:

I am highly thankful to Dr. V. Madha Suresh, Department of Geography, University of Madras, Chennai to have given me the opportunity to participate in the Third International Conference on Environment and Health.

I thank Mr. P.S. Badrinath, Chief Project Officer, and Mrs. S.P. Vijayakumari, Librarian, C.P.R. Environmental Education Centre, Chennai, for their help and encouragement during my study period.

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