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Environmental Hazards and Crisis Management for Sustainable Development

Dr. Preeti Khanduri

Department of Botany, Pt. L. M. S SDS University Campus, Rishikesh, India
khanduripreeti23[at]gmail.com

Abstract: ***The economic benefits of higher public health outlays have been overlooked. Growth alone does not improve health outcomes. India aspires to make full use of its demographic advantage, with 31 percent of its population under the age of 15. However, a key worry is the poor health status of its population. The Industrial revolution in the 19th century saw the large scale use of fossil fuels for industrial activities. These industries created jobs and over the years, people moved from rural to the cities, the trend which is continuing even today. Natural resources are being used extensively for construction, industries, transport and consumption. All this has contributed to rise in green house gases in the atmosphere thus leading to climate change, a major problem caused by the increase of human activities leading to several direct and indirect impacts on health. The atmosphere and ocean have warmed, the amounts of snow and ice are on diminishing trend, sea level has risen and the concentrations of greenhouse gases (GHGs) have increased causing detrimental effect on the distribution of precipitation. All this happened with the intervention of human activities either for survival or for the attainment of luxurious comfort. The GHGs are responsible for the depletion of stratospheric ozone resulting in higher exposure to ultra violet rays of the sun, leading to an increase in the incidents of skin cancer, spread of disease spreading insects and increase in air pollution problems. A number of toxic metals are present in the environment like Lead, Mercury cadmium etc. whose poisoning is a matter of serious concern. Thus, major environmental issues are forest and agricultural degradation of land, resource depletion (water, mineral, forest, sand, rocks etc.), environmental degradation, public health, loss of biodiversity, loss of resilience in ecosystems and livelihood security for the poor. The ever increasing population and increasing pressure on food production to meet the current demand require high agricultural productivity, concurrent with adequate protection of crops from damage by insects and pests. The use of pesticides is therefore necessary and inevitable which enter the body through intake of grains, vegetables, fruits, edible oils, dairy products and meat. Their continuous use has resulted in wide spread contamination of food commodities. The crisis caused by the impact of human activities on nature calls for governance which includes responses by international institutions, governments and citizens, who should meet this by pooling the experience and knowledge of each of the agents and institutions concerned. Global, continental, national and local governments have employed a variety of approaches to environmental governance. The fields of crisis management and sustainable development have maintained separate research paths. However, these fields are closely linked. Crisis events can deplete resources needed by future generations, ultimately hindering efforts at sustainable development. Thus only the path of sustainable development can lead us to the bright future by meeting the needs of the present without compromising the ability of future generations to meet their own needs.***

Keywords: Sustainable development, natural resources, environmental issues

1. Introduction

The rapid growing population and economic development is leading to a number of environmental issues in India because of the uncontrolled growth of urbanization and industrialization, expansion and massive intensification of agriculture, and the destruction of forests. It is estimated that the country's population will increase to about 1.26 billion by the year 2016. India having 18% of the world's population on 2.4% of world's total area has greatly increased the pressure on its natural resources. Water shortages, soil exhaustion and erosion, deforestation, air and water pollution afflicts many areas. India's water supply and sanitation issues are related to many environmental issues. Environmental health risks are common in both urban and rural environments. Sustainable development offers a vision of progress that integrates immediate and longer - term objectives, local and global action, and regards social, economic and environmental issues as inseparable and interdependent components of human progress.

2. Discussion

The Industrial revolution in the 19th century saw the large scale use of fossil fuels for industrial activities. These industries created jobs and over the years, people moved from rural to the cities, the trend which is continuing even today. More and more land that was covered with vegetation has been cleared to make way for houses and industries. Also our population has increased to an incredible extent. All this has contributed to a rise in green house gases in the atmosphere. The energy sector is responsible for about 3/4th of the carbon dioxide emissions, 1/5th of the methane emissions and a large quantity of nitrous oxide. The combustion of fossil fuels, increasing number of industries and large scale deforestation are some of the causes for the accumulation of green house gases in the atmosphere. According to IPCC, an increase in carbon dioxide and other GHGs in the atmosphere are expected to increase the average global temperature by 1.1°C to6.4°C, thus leading to change in climate. Climate change is a major problem caused by the increase of human activities leading to several direct and indirect impacts on health (Kishor and Ghosh, 2011).

Some of the most common threats to environmental health occur due to the following components in the atmosphere like Air pollutants, Dioxins, Lead**,** Mercury**,** Pesticides**,** tobacco smoke**,** Drinking water contamination etc. Dioxins are formed during combustion processes such as trash incineration and manufacturing processes such as herbicide manufacture which can lead to increased cancer rates,

emotional, and behavioural problems as well as growth hormone deficiency and allergic disorders. Dioxins are a bio accumulative toxin - they are very slow to be processed and removed from the body, causing them to build up in the blood, fat, urine, breast milk, ovaries, and sperm. They may be passed from parent to child across the placenta and through breast milk.

Common air pollutants, such as ozone, particulate matter, nitrogen oxides, and sulphur dioxides are associated with increased respiratory illnesses and symptoms, aggravation of asthma, and decreases in lung function in children. The GHGs have been responsible for the depletion of stratospheric ozone, which protects the earth from the harmful direct rays of the sun. Depletion of stratospheric ozone results in higher exposure to ultra violet rays of the sun, leading to an increase in the chances of skin cancer in light skinned people. It could also lead to an increase in eye problems like cataract. An increase in carbon dioxide and other GHGs in the atmosphere are responsible for climate change. This leads to ecological disturbances, changes in food production levels and increase in vector borne diseases. The major sources of air pollution include motor vehicles, stationary point sources - such as coal - burning power plants, refineries, industrial facilities, incinerators, and metal smelters - and consumer products.

A number of toxic metals are present in the environment. Metals of major toxological concern are Lead, Mercury and cadmium. Lead cannot be completely eliminated from our environment. Small concentrations of lead are present everywhere. In soil, lead levels range from 5 - 25 mg per Kg: in ground water from 1 - 60 µg per litre: and in air below 1 µg per $m^{3.}$ In most people, the lead intake from food is 100 - 300 µg per day. Like calcium, it is deposited in bones and during pregnancy it is slowly released from the mother's bones to the blood reaching the foetus. Lead affects virtually every system in the body and is particularly harmful to the developing brain and nervous system of foetuses and young children. For children, the primary sources of exposure to lead are old paints in homes, in dusts and soil from paint chips, leaded gasoline exhaust, industrial emissions, and in drinking water from pipes (Singh, 2005)

Mercury provokes most concern because it is toxic to the nervous system and the foetus and small babies are more sensitive to its adverse effects. A number of anthropogenic activities like coal - fired electric power plants are responsible for raising mercury levels in the environment. The coal combustion process releases large amounts of mercury into the atmosphere through smokestacks. This mercury then falls in precipitation into the lakes and rivers. Once in the water, bacteria can transform the mercury into the particularly dangerous organic form, methyl mercury which is a fat - soluble molecule that can move through cell membranes and become attached to muscle tissue. Therefore, it is easily absorbed through fish gills and hence, gets into the food chain. Methyl mercury is bio accumulative (it remains in body tissue and accumulates up the food chain) consequently, concentrations can be up to one million times greater in large predator fish tissue than in the surrounding waters. The consumer population is exposed to mercury toxicity due to food grain treated with mercury fungicide or fish contaminated with methyl mercury (10 - 40 ppm). About 90% methyl mercury is absorbed across the human gastrointestinal tract. Cases of mercury poisoning due to consumption of mercury contaminated fish have occurred throughout the world. The toxic effects of mercury are related to the nervous system whose earliest symptom is Paresthesia and at higher levels of exposure - ataxia, deafness and eventually death may occur (Clarkson, 1987). Other health effects include impaired memory, mental retardation, and reflex and visual abnormalities.

Generally environmental cadmium (Cd) levels are lower than those of lead and people ordinarily have lower exposure. The environmental levels are raised by smelting and industrial uses. Food grains and cereal products are the main sources of cadmium. Humans are also exposed to cadmium through cigarette smoking. Cadmium bio accumulates in the liver and kidney and the amount of Cd stored in kidney increases with age. Kidney damage is the most prevalent chronic effect of Cd exposure. The Cd poisoning in Japan has once resulted in itai itai disease, which was due to eating of rice produced from soil containing very high levels of Cd (Nomiyama, 1980). The acute effects of Cd toxicity result mainly from local irritation: after inhalation, the lesions include pulmonary edema and chemical pneumonitis: after ingestion the clinical effects are vomiting and abdominal pain. After long term exposure, it causes kidney lesions. Other effects of Cd exposure include hypertension and prostate cancer in occupational workers.

Other metals have also been observed to cause serious problems such as skin and lung cancer and black - foot disease (due to arsenic poisoning); hypersensitivity, renal problems and lung cancer (due to chromium exposure); berylliosus (lesions in lung alveoli due to Beryllium exposure); nasal cancer and cancers of kidney, lung and stomach (due to Nickel exposure); hair loss, nail pathology are teeth decay (due to over exposure of selenium). In animals, an overexposure of Selenium induces more severe effects including liver necrosis, anaemia, disorders of reproductive function and enlargement of pancreas. Excessive intake of Cobalt results in Polycthemia - an over production of erythrocytes. Overexposure of iron may cause liver dysfunction. Occupational exposure to Manganese results in pneumonitis and encephalopathy. Occupational exposure to zinc oxide fumes results in 'metal fume fever' (Singh, 2005).

The ever increasing population and increasing pressure on food production to meet the current demand require high agricultural productivity, concurrent with adequate protection of crops from damage by insects and pests. The use of pesticides, is therefore necessary and inevitable (Edwards, 1994). Organochlorine pesticides comprise the bulk of pesticides used in India, have an immense capacity to persist in the environment and accumulate within living bodies by virtue of their lipophilic character. Though pesticide use in India is insignificant compared to other countries, the total intake of chlorinated pesticides by Indians is the highest in the world (Kaphalia et al., 1985). Most pesticides (70%) are insecticides which are used in India whereas in the rest of the world 43.6% insecticides are

used (Wiktelius and Edwards, 1997; Inigo and Risebrough, 1989). All these pervasive organochlorine residues are causally linked to alarming deterioration of human health, wildlife and environment (Abbott et al., 1966). Chemicals with potential for wildlife damage include heavy metals, synthetic chemicals and industrial chemicals like organochlorines, organophosphates, carbamates, pyrethroids, dioxins, PAHs, PCBs etc. Organochlorines alone make up for 10 out of 12 identified persistent organic pollutants (POPs), short listed for serious threat to human health and the environment. These include aldrin, dieldrin, endrin, chlordane, DDT, heptachlor, HCH (all pesticides) and PCBs, an industrial chemical (Abott et al., 1996; Alexander, 1981). Organochlorine pesticides have been in use in India for more than half a century and currently over 143 pesticides are registered in India, with cumulative annual consumption of about 85, 000 tonnes. DDT, HCH and endosulfan are amongst most extensively used organochlorine insecticides. Pesticides enter the body through intake of grains, vegetables, fruits, edible oils, dairy products and meat. All pesticides have a waiting period - the minimum interval between the last application on a crop and harvesting. Since laws prohibiting the farmer to harvest before the waiting period are not stringent in India, pesticide residues in food items are high. In the past, organochlorine pesticides like DDT, HCH and aldrin have been popular among Indian farmers because of their simplicity in application, efficiency and good returns. Their continuous use has resulted in wide spread contamination of food commodities, which is a grave matter from the view point of both domestic use and food export. Almost all food commodities in India are contaminated with residues of pesticides, particularly DDT and HCH. Milk samples have been found to contain as much as 127 ppm DDT and 13 ppm HCH, while vegetable oils contained up to 26 ppm DDT (Rao and Salpekar, 2002). DDT is probably the best known of a class of substances called POPs. These take a long time to break down in the environment, can spread globally and accumulate in living beings (Tatsukawa et al., 1990). Organochlorine pesticides are fat soluble, intake of which results in their accumulation in body tissues. As a result, these pesticides can be transferred from mother to babies in the uterus or through mother's milk (Albert et al., 1988, 1989). According to studies, residents of India contain the highest level of DDT in the world of the order of 28 ppm (Agnihotri, 1998; Mitchell, 1997).

3. Suggestions

If greenhouse gas emissions are not reduced, the global temperature is expected to rise by 2 - 3 ^{0}C over the next few years. This would impact food production, health and the environment. The environmental protection measures taken remain insufficient. The necessary reforms require time, energy, money and diplomatic negotiations. The situation has not generated a unanimous response. Persistent divisions slow progress towards global environmental governance. The global nature of the crisis limits the effects of national or sectoral measures. Cooperation is necessary between actors and institutions in international trade, sustainable development and peace. Global, continental, national and local governments have employed a variety of approaches to environmental governance. Substantial positive and negative spillovers limit the ability of any single jurisdiction to resolve issues. Sustainable Development stands for meeting the needs of present generations without jeopardizing the ability of futures generations to meet their own needs – in other words, a better quality of life for everyone, now and for generations to come. It offers a vision of progress that integrates immediate and longer - term objectives, local and global action, and regards social, economic and environmental issues as inseparable and interdependent components of human progress.

4. Conclusion

Sustainable development is the latest expression of a long standing ethic which involves man's relationship with the environment. It is our goal to act in all three areas - finding long term development solutions that combine economic growth with environmental protection and energy efficiency in buildings while enabling us to meet our social needs. Sustainable development will not be brought about by policies only: it must be taken up by society at large as a principle guiding the many choices each citizen makes every day, as well as the big political and economic decisions that have to be taken. This requires profound changes in thinking, in economic and social structures and in consumption and production patterns.

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