



**ORIGINAL ARTICLE**

**Impact of Science and Technology on Human and Environment: A Study**

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**ABSTRACT**

*Together, advances in science, engineering, and technology can have-and indeed have have profound effects on human society, in such areas as agriculture, transportation, health care, and communication, and on the natural environment. Each system can change significantly when new technologies are introduced, with both desired effects and unexpected outcomes. From the earliest forms of agriculture to the latest technologies, all human activity has drawn on natural resources and has had both short- and long-term consequences, positive as well negative, for the health of both people and the natural environment. These consequences have grown stronger in recent human history. Society has changed dramatically, and human populations and longevity have increased, as advances in science and engineering have influenced the ways in which people interact with one another and with their surrounding natural environment.*

**Key words:** Science, Technology, Environment

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**INTRODUCTION**

The word Science comes from the Latin word "scientia" which denotes cognizance. It formulates theories and laws. Technology comes from the Greek word "technologia" which betokens the study of art and adeptness. It utilizes the science's theories and laws to make equipment and apparatus. However, science and technology work hand in hand to ameliorate the quality of human life. The development of science engendered countless revelations and inventions which give us positive and negative effects. There are lots of advantages and disadvantages in which the science and technology can give to people and its environment. Technology negatively affects the environment by compromising human health and safety, imperilling natural ecosystems and biodiversity, having a cumulative impact on ecumenical systems, and depleting natural resources. Technology positively affects the environment through the application of environmental science to solve quandaries caused by human environmental impact.

Risks to humans from environmental damage through technology include inhalation of hazardous chemicals in air pollution, contamination of water and aliment sources, and jeopardize of infections and diseases through exposure to toxic wastes. Flora and fauna risk habitat loss or disruption and extinction of species through exposure to hazardous by products of technology. Greenhouse gases affect atmosphere and weather systems, causing ecumenical warming and chlorofluorocarbons that deplete the Earth's ozone layer. Technology consumes resources which are not indispensably renewable, including living resources, such as forests and populations of fish, and inanimate resources, such as natural chemicals and minerals.

Though technology damages the environment in many ways, it additionally has the capability to circumscribe or avert the damage utilizing such environmental technologies as recycling, the exploitation of renewable-energy sources such as solar power and wind puissance, the purification of polluted air and water, the treatment of sewage and factory wastes, and the development and engenderment of contrivances that promote energy conservation.

The life support systems and non-renewable resources on the Earth are being decimated by a burgeoning population which possesses unprecedented power born of science and technology. The impact of technology on the environment has in many ways been devastating. Yet science and technology have additionally been the greatest forces for beneficent convivial transmutation in human history and will perpetuate to be needed to solve the economic and gregarious quandaries of the future. Since the future lies in the hands of our youth we must inculcate them to cope with its environmental quandaries. The damage already done to the environment is so great that all edification and especially edification in science must become imbued with an environmental ethic to invert the present trend. It is descried that the solution does not lie in integrating environmental ethics courses to the science curriculum but in finding ways to sanction ecological and environmental concerns to permeate subsisting courses and textbooks. This could have the integrated advantage of making them more pertinent and intriguing. The environmental ethic must guide all aspects of our lives and will withal have to be edified by example outside of formal inculcation.

#### **THE PROBLEM: AN EARTH CRISIS**

It has been descried that the environment is in crisis. All around us it is suffocating and crumbling under the impact of human action. The World watch Institute states: "Our generation is the first to be faced with decisions that will determine whether the Earth our children inherit will be habitable (Brown et al., 1989). Recital of the major trends has become a litany: the altering of the Earth's atmosphere by the burning of fossil fuels, the eradication of the protective ozone layer by man-made chemicals, the depletion of tropical rain forests, the extinction of plant and animal species, the spread of deserts, the acid poisoning of lakes and forests, the toxification of air, soil and water and the perpetuating nuclear threat (WCED, 1987). Concern for the Earth, which found massive expression in the first Earth Day 20 years ago, has been raised to an incipient caliber of public cognizance by the media. To cite just two examples, Time magazine recently broke from its tradition of celebrating a Man of the Year by culling instead the Earth as Planet of the Year and National Geographic devoted its last issue in 1988 to the topic of mending the Earth. Its cover was a hologram exhibiting the Earth both whole and shattered. During the past 20 years countless individuals and organizations, sizably voluminous and minute, have worked quietly and incessantly towards conservation and ecological lucidity to establish a heightened interest in and concern for a life-sustaining Earth. Our task as science educators is twofold. One is to elucidate the role that science and technology have had in disrupting the Earth's facility to sustain life and the other is to incentivize students to utilize their erudition, including that of science and technology, to renovate the Earth's environment.

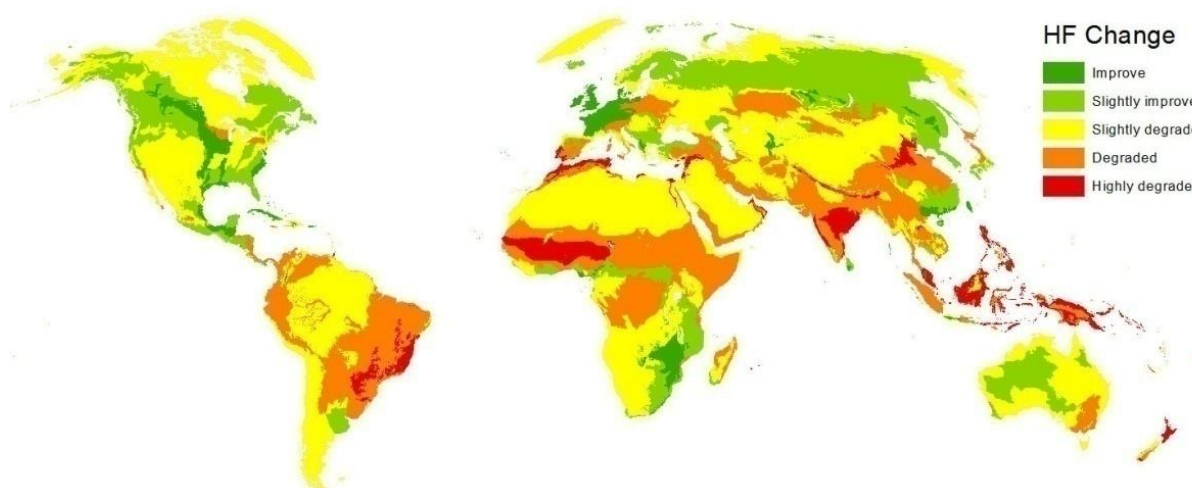
#### **FOUR RELATED PROBLEMS**

It now seems pellucid that the disruption of the ecological balance in the biosphere is due to the impact of *Homo sapiens*, the culprit species. All the trends mentioned have their inception in human activities. It is no wonder, then, that most of them are exacerbated by the explosive magnification of human populations. A child born today has 5,000 million neighbors. At age 35 they will, according to present projections, number about double and proximate to quadruple at age 70. The burgeoning population quandary is probably the most solemn of the four Ps: population, pollution, penuriousness and the proliferation of

weapons of mass eradication - chemical, biological and nuclear. A not unique example of the interaction of the first three is to be found in Mexico. The proximate to 20 million population of Mexico City, exceeding that of the entire continent of Australia, has a fossil fuel pollution quandary that often turns day into night and penuriousness which belies the fact that Mexico is affluent in natural resources; the proliferation of weapons of mass eradication additionally poses a solemn threat to the biosphere. A nuclear holocaust must, of course, be evaded at all costs in as much as it represents the ultimate environmental catastrophe but the other weapons of mass eradication - chemical and biological - withal pose massive environmental threats. It seems ironic that these weapons bear the imprint and the denominations of the three rudimental sciences: physics, chemistry and biology. Even preparations for conventional war leave ecological scars on the Earth. The list of quandaries could facily be elongated beyond the four Ps but they give us an easily recollected cumulation of environmentally cognate ecumenical woes and their prevalent characteristics: they are all interrelated, they all have an impact on the environment and they all incline to deteriorate the quality of life. In varying degrees they are the byproducts of technology.

### TECHNOLOGY AND ENVIRONMENTAL DESTRUCTION

Fig 1: Humans' growing impact on planet earth



(Image source: Google)

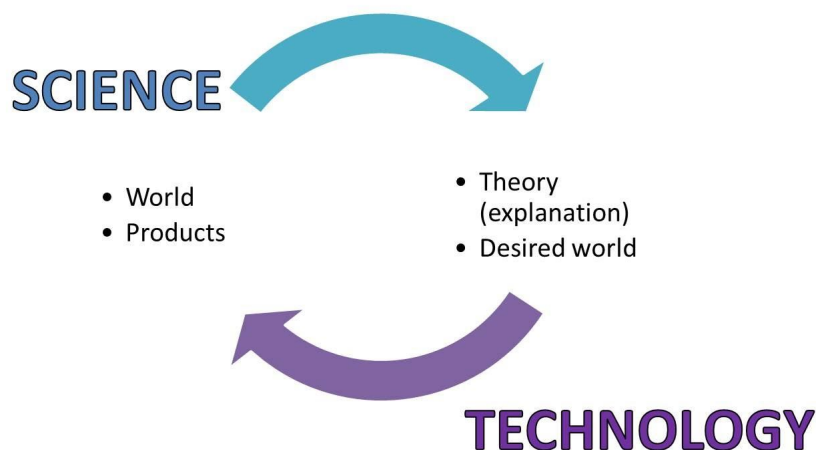
Modern technology has given humanity unheard of potency to manipulate earth, air, fire and water. With modern bulldozers and power shovels we can move masses of the Earth's surface the size of an Egyptian pyramid in weeks in lieu of years (Malone et al., 1984). The effluents of the factories can raise to perilous levels the temperature of rivers. We can darken the firmament with atmospheric pollution, engender temperatures that match those of the sun and eradicate a modern city in minutes. Such power has enabled modern man to expedite all the trends toward the environmental deterioration mentioned earlier. So, even as we acknowledge that technology has yielded benefits we are inundated by its destructive consequences. They now often are out of control and call for action.

### RELATION BETWEEN SCIENCE AND TECHNOLOGY

Scientific knowledge and methodologies themselves provide a major source of input into the development of technological practices and outcomes. They are also key tools in the establishment of explanations of why technological interventions were, or were not,

successful. In short, science can provide powerful explanations for the why and why not behind technological intervention. However, as these interventions rely on more than an understanding of the 'natural' world, they can only provide partial justification for technological practices and outcomes.

**Fig 2:** Relation between Science and Technology



Technological practices, knowledge and outcomes can provide mechanisms for science to gain a better view of its defined world, and in fact can provide serious challenges to the defining of that world. For example, the development of the technological artefacts that extend the observation capabilities of humans (such as the telescope and microscope), made 'visible' and available 'new worlds' for science to interrogate and explain.

Paul Kirkpatrick (1986), at Stanford University, once indited: "I cerebrate the human race is a hostage of its technology, which is the child of its science. I used to cerebrate we were in a noble racket (science) and that the truth should make us free. Now I have to be dubious". Science and technology have grown out of two different but equipollently paramount activities. One is the search for erudition and understanding which characterizes science. The other is the application of cognizance to satiate human needs which characterizes technology. It is often not apperceived that they are fundamentally different modes of activity with the result that the word science is sometimes used loosely and erroneously to describe both (Baez, 1976). The scientist is incentivized by a curiosity which springs from the longing to ken and understand. The outputs of scientific endeavour include hypotheses, theories and laws which explicate the observed phenomena. When the scientist can verbally express, "I understand," his task is done, at least transitorily, even though there are deeper levels of understanding to be pursued. How about technology? It has been verbalized that science explores what is and technology engendersthat which never subsisted afore. Ingeniousness is, consequently, the hallmark of technology the way curiosity is the hallmark of science. One cannot engender science without being curious and one cannot engender technology without being ingenious. Unlike science, whose outputs are explications, the outputs of technology are things, such as incipient contrivances and procedures. The aim of the technologist is to engender things that slake human wants and not obligatorily to theorize about the contrivances and techniques utilized in the process. The negative aspects of technology stem from one of its objectives which is to control the materials and the forces of nature through procedures and contrivances designed ostensibly to slake human needs but often used to proliferate human wants. The ingenious aspects of technology have sometimes been downgraded and not given ample attention in inculcation. Recent innovative trends in science inculcation have venerated and endeavored to infuse into general inculcation the spirit of science, but they have often neglected the spirit of change through design\_

which characterizes the ingenious aspects of technology as practiced by engineers. The desideratum to "mend the Earth" could to an astronomically immense extent be slaked if we applied the methodology of technology to it. The technologist tackles quandaries brought to him by his clients. He builds bridges, skyscrapers, nuclear weapons or Earth satellites for a fee. Much more seldom have technologists been inductively authorized to engender a blueprint for "mending the Earth".

### **ECOLOGY, THE NEWEST SCIENCE**

Physics, chemistry and biology, the basic sciences, grew up independently and have traditionally been taught as separate disciplines. But of late it has proven useful to recognize the interrelationships among them and to teach them in integrated ways or at least under the umbrella of an integrating concept. One such concept is that of the sciences of earth and space. Another is the new science of ecology. The concepts of ecology and environment are closely linked. Ecology is the branch of science concerned with how organisms are interrelated with one another and with the environment. The concepts of life and life support systems are, therefore, central to ecology (Hardin, 1956). Renewed interest in life and its processes currently finds expression from biological research in the structure of DNA, to concern about the destruction of life support systems and the consequent extinction of species of plants and animals. Ultimately, of course, it also leads to a consideration of the possible extinction of human life on Earth in a nuclear holocaust. Jonathan Schell (1984) speaks of this as an "awakening". He writes: "In the last few years much of the public having largely ignored the nuclear peril for almost four decades has been discovering a different faith, they have been choosing human survival. This awakening is new, and its consequences are still uncertain but it promises to be one of the great changes of heart in mankind that alter the psychological and spiritual map of the world." Ecology considers all the factors that make life possible on earth. Disciplines such as economics and the social and behavioural sciences dealing with the motivation of people to utilize natural resources are also being accounted for. Population explosion has resulted in destruction of resources which sustain life and use technology to generate non-sustainable economic development. It is destroying the biological diversity which provides a cushion for possible recovery from an ecological disaster. One has begun to realize that the survival of plants and animals, including people, may depend upon the understanding of the principles of ecology and upon general adoption of an environmental ethic. The reason ecology is so important at this particular time is that humanity is entering a critical era in which the knowledge that comes from physics, chemistry and biology, treated separately, is not sufficient to cope with the problems of human survival. It must be supplemented by and integrated with the knowledge from the other sciences and disciplines. All knowledge must be integrated and treated in the holistic way characteristic of ecology.

If we want to conserve and protect nature in general and prevent the extinction of species, we need to know how they all fit together, what their habitat requirements are, how they influence each other, what the minimum population sizes are to ensure their survival, etc. So both for managing natural areas, as well as the sustainability of agriculture and our own continuous survival as a species, ecology is important. In the end, without a good knowledge of ecology, all the other fields of study will be useless... an extinct human species will no longer do any science at all.

### **SCIENCE AND TECHNOLOGY**

#### **AS A BOON (POSITIVE IMPACTS):**

Science and technology have made human life simpler as work can be easily done using high- tech machines and equipments. Life has turned more comfortable and organised. Computer is the most important invention for the present generation and life is

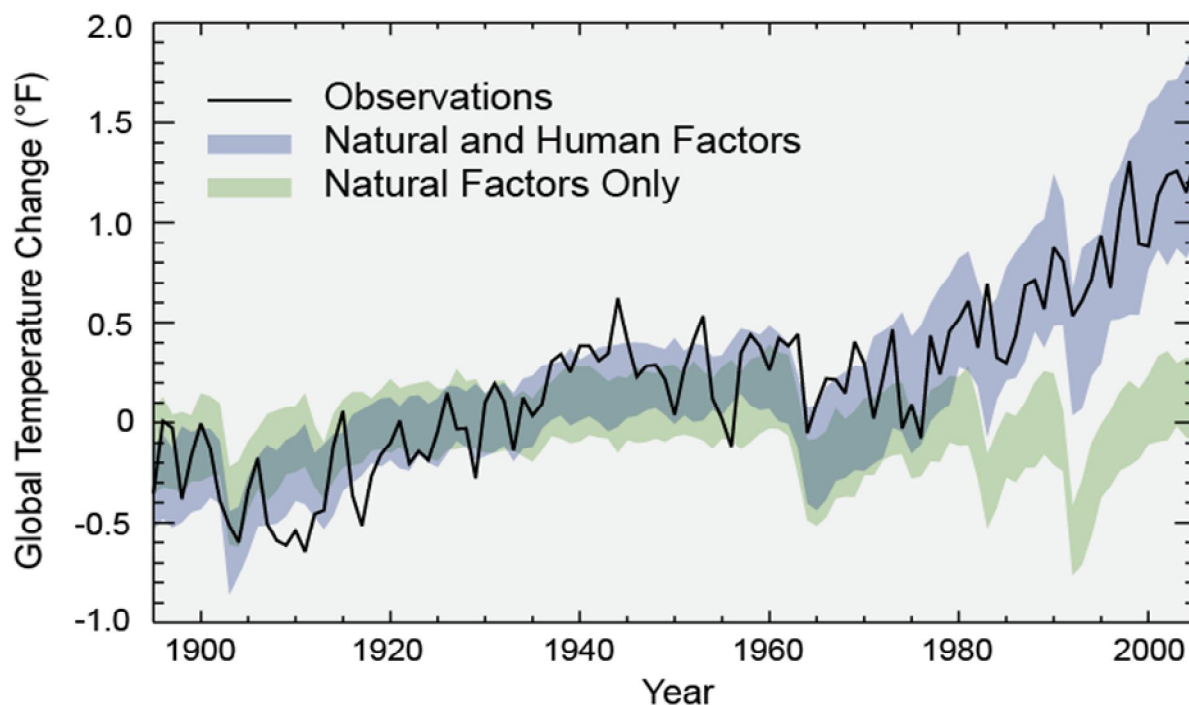
technologically impossible without its usage and it is practically true because it is now portable and one can learn and explore new things in any corner of the world. Using computer is like an adventure that provides all informations at a single click of the mouse and it is also used to solve mathematical calculations. Through science and technology, it is easier for us to communicate other people. It is also significant in the field of business because transactions and other events are done through the computer. Science and technology let every people live in an easy and modern life. It opens the door and allows people to enter into a new world which is fully developed and well civilized.

#### **AS A CURSE (NEGATIVE IMPACTS):**

Science and technology is not giving us only the positive facet, but it also has its disadvantages that truly affect human life. With the invent of modern technology our surroundings have turned crowded, polluted and damaged. Its existence totally affects our mother earth and our natural environment is replaced by new big buildings and factories that are managed by technology- based owners. Science and technology also affects our health and lifestyles. Chemicals produced by technology are hazardous to our health which in extreme cases results to diseases and death. Technology- based persons are indolent because they are too dependent on it and don't work anymore. Lifestyles of people have changed tremendously with traditional style being replaced by the modern one that destructs our culture and society. Technology manipulates living creatures whenever an attempt has been made to manipulate it. World is being ran by high- tech machines and innovated equipment that people think it would give us good effects but rather it generally changed our whole life that we now forget the simple life that our ancestors left us.

Reflecting on its advantages and disadvantages, we now realize its consequences when used by us. It is up for us if we protect ourselves from exposure of existing technologies and it is within ourselves where and what to believe among these effects.

**Graph 1:** Separating Human and Natural Influences on Climate



(Image source: Google)

### ASSOCIATIONS WORKING FOR GREEN INDIA

- Despite the challenges brought about by the development of science and technology and-
1. Delhi Greens- founded by Ravinder Bawa, Aastha Kukreti, and Govind Singh, for spreading the messages of green environment and sustainable development and working towards achieving those goals .
  2. Centre for Science and Environment- founded by Anil Agarwal. CSE works as a think tank on environment-development issues in India, poor planning, climate shifts devastating India's Sundarbans and advocates for policy changes and better implementation of the already existing policies. CSE uses knowledge-based activism to create awareness about problems and propose sustainable solution.
  3. Agency for Non-conventional Energy and Rural Technology- works on gathering and disseminating knowledge about non-conventional energy, energy conservation and rural technology.

### INKS BETWEEN PEACE AND ENVIRONMENT

It's far apparent that a nuclear holocaust could have a devastating impact on the world's environment. Even preparations for struggle are destroying components of our natural background. However the massive extinction of species that's taking place due to the rainforest deforestation, for example, can have an equally devastating impact except it is miles curbed. Broadly talking, peace has a benign effect on the environment whereas battle and preparations for struggle have negative outcomes. Benito Juarez, a Mexican president born of Zapotec Indian dad and mom, stated that "recognizing the rights of others is the basis of peace". However if we furnish that other living matters flowers, animals and the Earth itself (Lovelock, 1979) have rights, we've got, in an environmental ethic based upon "respect and affection for dwelling matters", the basis for both peace with the Earth and peace on this planet.

Fig 3: Saving or destroying earth is in the hands of human



### CONCLUSION

Our present generation needs to be educated to generate the fundamental guidelines for thought and action in order to improve the mode of present life and dependence of future generations on the environment gifted to them These basic guidelines encompass the four Cs' that are curiosity, creativity, competence and compassion. Discoveries in science are born out of curiosity and in rare cases accidentally, technology, which depends upon design cannot develop without creativity and both science and technology can never

blossom without special competencies. And it is basically the compassion in science and technology that helps us to be ethical. Caring for the Earth growing out of kindness is a requirement to prevent the destruction of the life support systems.

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