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Science and technology for human welfare and its effect on environment

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Abstract

Human beings have a natural instinct to gain more comfort in their life. They want easiest way for recovery from diseases. They want to travel maximum distance in minimum period. They want to communicate with each other without making barriers by long distance. They want good food, clothes, shelter and all other things which make life luxurious. Science and technological developments are helping human population with many ways. Here I am discussing about three helping prospective. One is health and long life, second is communication and information and third one istravel and transportation. There are many researches which are giving new technologies for good health and stretching life span. Scientists continuously trying to combat many diseases and achieving success also. But with the implement of these techniques hospital's waste is increasing. Without proper management of this waste the chance of spreading other diseases is increasing. There is many technologies for communication and information. For this purpose new techniques and equipment are continuously changing. The fast change in equipment certainly advances the human life but the waste is also increasing and producing harmful effects to human life. For travel and transportation the vehicles of new models are coming. Pollution from Automobiles is increasing. Human health is affecting from dumping waste material. All types of waste misbalancing the air and water. Polluted air and water is supplying diseases. The environmental degradation if not nullifies, must be decreasing the efforts of science and technology for human welfare.

Key words - Health, Communication, Travel, Transport, Waste

Introduction- In nature the event of human evolution is special. The brain of this last creature is remarkable. Due to the erect posture the fore limbs became free. Two hands and brain has changed the world. From the beginning human try to know about nature. Their knowledge about air, water, sun, fire was helpful for this race. In Vedic period Indians worships all these natural resources and tries to keep them pure. As their knowledge increased they started to take the advantage of nature and natural resources for their well-being and comfortable life. The development of science and technology helps mankind. Due to scientific development they are able to solve their health problems. They travelling fast, they are communicating each other with long distances is between them. Now science and technology gives so many equipment and technologies. With the use of these human beings are enjoying lives. But in the processing of technological material, in the manner of the use of technology and as by products many other substances are producing which are polluting environment. The environmental conditions are becoming worst. To maintain the sustainability of human life, of nature and of earth is a big problem.

Material and method- There are many scientific journals which are publishing work of scientist. The research papers on pollution, environmental degradation are the base of this paper. With this the developments of new techniques and their ill effects is also studied by many scientist. The comparison between advantages from science and technology with harmful effect of technology can give the way for sustainable future.

Observation and Result- We clearly observed that science and technology is working for welfare of human beings. The issues of food, health, life span, communication, entertainment, travel, transportation, war, victory, all are solved with the help of scientific technological development. Science and technology gave so many things to the society that without which no one can imagine about life. Out of many I am discussing about the following three benefits given by science and technology.

1. Health and Long life.
2. Communication and Information.
3. Travel and Transport.

Health and Long life

In any ecosystem, the components reacting and affecting each other.The environmental fluctuating conditions, activities of other organisms and certain genes are responsible for diseases. Medical science recovered from diseases by medicines, operations and other techniques. Human life span is also increasing with thecontinuouslyincreasing human population. The hospitals, medical shops, pathological centres are also growing in number. The waste material from these places becoming hazardous to human life and whole environment.

Communication and Information

Telephones area miracle in scientific technology. Today we are using mobile phones and other gadgets.Our leap towards television and internet from radio and transistors is a great advantage. Now most of the peoples have their personal computers, laptops etc. With this technological development we are communicating each other without barrier of distance. We are getting informationand enjoying life, but increasing e-waste is again degrading our environment, polluting air, water and land and increasing diseases and other health problems.

Travel and Transport

The whole world is shrunken. We can reach long distances with minimum time. We can get things of other places which are away from us. This became possible with invention of wheel and their use in different technology. Oxen-cart, Bicycle then Trains, Buses, Four wheelers, Mopeds, Helicopters, Aeroplanes, are all comes in this category. Animals, coal, fossil fuels are giving energy for the traveling and transportation. Today use of animals and coal is rare, mostly the petroleum products and electricity are in use. The generation of electricity adversely effects the environment. Petroleum-products are also increasing environmental pollution. Accidents of trains, aeroplanes, buses, trucks are destroying human life. The equipment's which are used in different technologies are of iron, steel and plastic. The iron, steel and plastic factories are throwing the polluted material in environment.

In this way if the science and technology advances, certainly give some hazards materials to the environment. The impact of these materials on human health and life must be creating problems. The technologies which can nullify the environmental change will be better forsustainable future otherwise it will very difficult, to maintain sustainability.Some precautions or conditions are necessary for sustainable future like control in human population and controlled use of equipment's. But now we want everything personal, everything fast so how we can achieve the goal of sustainable future.

Discussion

The difference between gains from the science and technology in the form of human good health, long life, comfort and their harmful effect on the environment which in turn affects human health and life span will be determining factor for the sustainability of human life and environment.

This Holocene epoch of quaternary or psychozoic era is age of man. Man has greater perfection, mental development and domination power over the animals of sea, air and water. He uses all natural resources as the lord of universe. When air, water and land became polluted, when global temperature increased, when many diseases had come, when children are affecting with those diseases previously which were old age disease, we are trying to know the way for sustainable future.

John P. Holdern was president of American Association for the Advancement of science from February 2006 to February 2007, addressed in annual meeting in San Francisco on is February 2007. He said that- The American Association for the Advancement of Science (AAAS) is not about the advancement of science just for science's sake. Rather, as indicated by the Association's motto, "Advancing Science, Serving Society," [(27)].

He also said about the wellbeing and sustainability that- Human well-being rests on foundation of three pillars, (a)Economic conditions and processes, (b) Sociopolitical conditions and processes and (c)Environmental conditions and processes. The preservation and enhancement of all three of which constitute the core responsibilities of society: He said that all the three pillars are important [(27)].

In my opinion of the above listed three pillars the most important one is third pillar that is the environmental conditions and processes. Environment is a part of ecosystem. Ecosystem functions for and regulation of water , detoxification and purification of soil, water and air, nutrient cycling, soil formation and maintenance, control on populations and distribution pests and pathogens, pollination of flowers and crops, maintenance of biodiversity and regulation of climate[(20)]. If developmental processes are initiated with the

calculation of their effect on environment should be beneficial for human life. If environmental conditions are good so food, water, air and health will be managed. And these all are the primary wants of life, all others which gives comfort are secondary.

We can't succeed in this due to human greed; everybody wants to take more and more advantage and convincing to other to live natural life. If anything creating hazardous effect their use must be checked and replaced by use of other things which are not creating hazardous effects.If the use of that things which gives hazardous effect is very necessary for human life so some compensatory initials must be taken to neutralize the ill effect. Some types of waste which are products of such material and methodology which is for good human health, beauty communication, news, travel and transportation, are degrading land, water and air.

Life expectancy increased, agricultural productivity increased by the science and techno logy. This improves nutrition, health and economic growth [41].

Efforts for health and long life and effect on environment and human health

Since 1800s scientists are developing instruments and techniques to examine and therapy of patients. Such equipment are thermometer, microscope, kymograph, stethoscope, ophthalmoscope, sphygmograph, electrotherapy machines, x-ray radiation, computed tomography, positron emission tomography, magnetic resonance imaging, ultrasound, ultrasonography, endoscopy, elastography, thermography, electron cephalography, magnetocephalography, electrocardiography etc. These are used by the physicians in hospitals.

Hospital waste

Hospital is a place to serve the patient. Since beginning, the hospitals are known for the treatment of sick persons but we are unaware about the adverse effects of the garbage and filth generated by them on human body and environment. Hospitals consume many items for delivery of medical care. All these products used in the hospital leave some unusable leftovers i. e. hospital waste. Now it is a well-established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the "Hospital waste" generated during the patient care. Hospital waste is a potential health hazard to the health care workers, public and flora and fauna of the area. Hospital acquired infection, transfusion transmitted diseases, rising incidence of Hepatitis B, and HIV, increasing land and water pollution lead to increasing possibility of catching many diseases. Air pollution due to emission of hazardous gases by incinerator such as Furan, Dioxin, Hydrochloric acid etc. is a serious problem [22].The last century witnessed the rapid mushrooming of hospital in the public and private sector, dictated by the needs of expanding population. The advent and acceptance of "disposable" has made the generation of hospital waste a significant factor in current scenario.

Hem Chandra Classified hospital waste in following manner

(1) **General waste:** Largely composed of domestic or house hold type waste. It is non-hazardous to human beings, e.g. kitchen waste, packaging material, paper, wrappers and plastics.

(2) **Pathological waste- Co**nsists of tissue, organ, body part, human fetuses, blood and body fluid. It is hazardous waste.

(3) **Infectious waste-** The wastes which contain pathogens in sufficient concentration or quantity that could cause diseases. It is hazardous e.g. culture and stocks of infectious agents from laboratories, waste from surgery, waste originating from infectious patients.

(4) **Sharps:** Waste materials which could cause the person handling it, a cut or puncture of skin e.g. needles, broken glass, saws, nail, blades, and scalpels.

(5) **Pharmaceutical waste-** This includes pharmaceutical products, drugs and chemicals that have been returned from wards, have been spilled, are outdated, or contaminated.

(6) **Chemical waste-** This comprises discarded solid, liquid, and gaseous chemicals e.g. cleaning, housekeeping and disinfecting product.

(7) **Radioactive waste-** It includes solid, liquid and gaseous waste that is contaminated with radionuclides generated from in-vitro analysis of body tissues and fluid, in-vivo body organ imaging and tumor localization and therapeutic procedures.

AMOUNT AND COMPOSITION OF HOSPITAL WASTE GENERATED

COUNTRY	QUANTITY
U.K.	2.5 kg/ bad/day
U.S.A.	4.5—"----
FRANCE	2.5 —"----
SPAIN	3.0 —"----
INDIA	1.5 —"----
(A) HAZARDOUS	15%
• (a)NON-INFECTIVE	5%
• (b)INFECTIVE	10%
(B) NON- HAZARDOUS	85%

A major issue related to current biomedical waste management in many hospitals is that the implementation of bio-waste regulation is unsatisfactory. Inadequate bio-medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms. Many lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringe and needles contaminated with human blood. The biomedical waste scattered in and around the hospitals invites flies, insects, rodents, cats and dogs that are responsible for the spread of disease like plague and rabies [(12).]

A 1990 report by the U.S. Agency for Toxic Substances and Disease Registry concluded that the general public is not likely to be adversely affected by biomedical waste generated in the traditional healthcare setting. They found, however, that biomaterial waste from those settings may pose an injury and exposure risks via occupational contact with medical waste for doctors, nurses, and janitorial, laundry and refuse workers. Further, there are opportunities for the general public to come in to contact medical waste, such as needles used illicitly outside healthcare settings, or biomedical waste generated via home health care .[(39)]

Communication and informationtechnology andeffect on environment and human health

We can name the recent decades as E-decades. With the use of electronic gadget Components of electronic equipment contains toxic substances that can have an adverse impact on human health and the environment. According to Santhanamet. al. India has generated 0.4 million tons of e-waste in 2010 which may increase to 0.5 to 0.6 million tons by 2013-2014. Electronic waste is an emerging problem in developed and developing countries worldwide [(8)].

E WASTE

The composition of e-waste is very diverse and differs in products across different categories. It contains more than 1000 different substances, which fall under 'hazardous' and 'non-hazardous' categories. Broadly, it consists of ferrous and non-ferrous metals, plastics, glass, wood and plywood, printed circuit boards (PCB), concrete and ceramics, rubber and other items. Iron and steel constitute about 50% of the E-waste followed by plastics (21%), non-ferrous metals (13%) and other constituents. Non-ferrous metal, e.g. silver (Ag), gold (Au), platinum, palladium, etc. The presence of elements like lead, mercury, arsenic, cadmium, selenium and hexavalent chromium and flame retardants beyond threshold quantities of e-waste classifies them as hazardous waste[(34, 38, and 43)]. Long term exposure to these substances can damage the nervous system, kidney and bones and the reproductive and endocrine systems and some of them are carcinogenic. These e-wastes will have long lasting effects on the environment, when improperly disposed with domestic waste, without any controls, can contaminate the soil, water and air.

Electronic waste has raised concerns because many components in these products are toxic and not biodegradable. Alarming levels of dioxin compounds linked to cancer, developmental defects and other health problems in the sample of breast milk, placenta and hairs. These compounds are linked to improper disposal of e product [(23,30, 31and 32).]

This fast growing waste stream is accelerating because the global market for personal computer is far from saturation and the average life span of a PC is decreasing rapidly. The life span of central processing unit has reduced for 4-6 years in 1997 to 2 years in 2005 [1, 2, 3, 4, and 18]. Over the past two decades, the global market of electrical and electronic equipment continues to grow exponentially, while the life span of those products becomes shorter and shorter[5, 7 and 17]. The Indian information technology (IT) industry has been one of the major drivers of change in the economy in the last decade and has contributed significantly to the digital revolution being experienced by the world. New electronic gadgets and appliances have infiltrated every aspect of our daily lives, providing our society with more comfort, health and security and with easy information acquisition and exchange. India has generated about 0.2 million tons of E-waste in 2006 and in 2010 it is about 0.4 million tons and at present the quantum is increasing rapidly. Studies so far reveal that the total e-waste generation in India from both households and corporate will reach 0.5 to 0.6 million tons by 2013-2014 [32].

In general the electric goods/gadgets are classified under three major heads:

White goods: Household appliances.

Brown goods: TVs, camcorders, cameras.

Grey Goods: Computers, Printers,faxmachines, scanners etc.

Waste from the white and brown goods is less toxic when compared to grey goods [6, 9, 13, 15, 19, 21, 29 and 37]. Even a personal computer contains highly toxic chemicals like lead, mercury, cadmium etc. [6, 9, 13, 14, 15 and 19].

Neurotoxicants in e-waste

Lead: Pb is arguably the most-studied developmental neutrotoxicants and unfortunately is also one of the major toxicant in e-waste. An old CRT television contains about 1.5-2 kgPb, and a CRT computer monitor contains about 0.5 kgPb (U.S. EPA 2007, 2008). Pd has also been used in solder in printed circuit boards and other components [35]. In 1 – to -6 year children living in a primitive e-waste recycling site, the mean blood Pd level approaches 15 ug/dL, which is 50% higher than the neighbouring control site (~10 ug/dL) [25 and 45]. Blood Pb levels > 10 ug/dL in early childhood are detrimental to neurodevelopment, and the recognised adverse effects include impaired cognitive function, behavioural disturbances, attention deficits, hyperactivity, and conduct problems (Bellinger 2004).

Mercury: Hg is used in laptop monitors, cold cathode florescent lamps, cell phones, and printed circuit boards (e.g., switches, relays), improper recycling of e-waste may release Hg in its elemental vapour form into the environment [35].

Cadmium : Cd is used in nickel-cadmium (Ni-Cd) batteries, surface mount devices chip resistors, infrared detectors, and semiconductors chips [35]. Lithium-ion batteries have replaced Ni-Compared with Pb and Hg, the adverse neurodevelopment effects of Cd are less well characterized in children but exposure to Cd pollution during pregnancy may be a risk factor of shortened placental telomere length. Spearman correlation analysis revealed that placental telomere length was negatively correlated with placental cadmium concentration [24].

PBDEs: A group of brominated flame retardants – are used in electronics products to reduce flammability, Animal studies of PBDEs strongly suggest increased risk of thyroid hormone disruption [PBDEs and thyroxin (T4) are structurally similar], hyperactivity, cognitive deficits, and impaired memory [16]. Susceptibility of children to PBDEs is a major concern, because children often have two to three time higher serum concentrations than their parents [40].

Polychlorinated biphenyls: PCBs are known development neurotoxicants, and these compounds may affect a variety of neuropsychological function in children, including general cognition, visual-spatial function, memory attention, executive functions, and motor function [10 and 36].

Guiyu, a town about 40 KM west of Shantou city, Guangdong province, China, is one of the biggest recycling centres for e-waste in the world with a 30 years history of operation. About 60-80% of the local families have engaged in the process of e-waste recycling operated in family run workshops often without the most basic safety precaution or any environmental protection measure. The techniques and facilities used in the process of e-waste recycling were primitive and uncontrolled. It has been reported that significantly high concentration of toxic heavy metals and organic pollutants were found in hair, peripheral blood, milk, placenta, umbilical cord blood and meconium of Guiyu residents. A study by Xu et al [44] reported that stillbirth rate, L B W (Low birth weight) rate and IUGR (Intrauterine Growth Retardation) rate in Guiyu were all significantly higher than that of Xiamen, a city 300 KM north of Guiyu and free of e-waste recycling.

In India only two recyclers are, one at Chennai and other in Bangalore for the whole south India and one in western India .Over 1 million poor people in India are involved in the manual recycling operations of E-waste. Most of the people working in these recycling sectors are the urban poor with very low literacy levels. They have very little awareness regarding the hazards of e-waste toxins. The women and children who are engaged in these activities are more vulnerable to the hazards of e-waste.

Efforts for travel and transportation and effect on environment and human health

In recent time petroleum products and electricity is used as fuels for travel and transportation. The huge increase in fossil fuel use over the past century and a half played a large role in expanding the impact of human kind as a global biogeochemical force [33], not only through associated emissions of CO_2, oxides of sulphur and nitrogen, trace metals and more but also through the mobilization of the other materials production of fertilizer, transport of water and transformation of land that the availability of this energy made possible [28].

Pollution due to fuels

World oil use is a huge producer of conventional air pollutant, as well as being about equal to coal burning as a contributor to the global build-up of the heat trapping gas CO_2 [42].Fine particles appear to be the most toxic of the usual air pollutants resulting from the combustion of fossil and biomass fuels, and whether emitted directly or formed in the atmosphere from gaseous precursors, they have proven difficult to control [11]).

A major regional impact of fossil-fuel combustion is wet and dry deposition of sulphur and nitrogen, much of it acidic forms. Of the sulphur oxide and nitrogen emissions that are the precursors of this fallout, the former are somewhat easier to control technologically. Global emissions of both are now increasing. However, as rapid expansion of poorly controlled surfaces in Asia, and to a lesser extent in Africa and Latin America, is now more than offsetting reductions in the industrialized countries [42].

Indeed, the problem of how to reduce the dangers from urban and regional air pollution and from overdependence on oil in the face of rising worldwide demand for personal transportation is one of the two greatest challenges at the energy-economy-environment intersection. The other one is how to provide the affordable energy needed to create and sustain prosperity everywhere without wrecking the global climate with the CO_2 emitted by fossil-fuel burning. Human caused warming of earth's surface and atmosphere has penetrates the oceans to depth of hundreds of meters, and absorption by the ocean of part of the CO_2added to the atmosphere by human activities has lowered the average pH of sea water by about 0.1 [26].

Technology is changing continuously. In place of steam engine, diesel engine now electrical engines are serving, but causalities are also increasing in train accidents.

TRAIN ACCIDENTS AND DEATHS IN BHARAT

1. FROM 1901—1910 29 DEATHS
2. FROM 1911—1920 50 DEATH
3. FROM 1921—1930 NO REC.
4. FROM 1931—1940 129 DEATH
5. FROM 1941—1950 125 DEATH
6. FROM 1951—1960 538 DEATH
7. FROM 1961—1970 784 DEATH
8. FROM 1971—1980 180 DEATH
9. FROM 1981—1990 1158 DEATH
10. FROM 1991—2000 1411 DEATH
11. FROM 2001—2010 1082 DEATH
12. FROM 2011- TILL NOW 394 DEATH

Road and air accidents are also adverse effect of fast travelling vehicles.

Pollution from iron factory

Risks caused by iron and steel industry set in the waste of various solid liquid and gases. The additional is the side effect of noise resulting from the industry, there are emissions resulting from iron and steel parts have a direct impact on the environment, safety of human health also direct cause of what is happening in the world of climate change. Global warming is increasing.

Pollution from plastic:

Plastic pollution involves the accumulation of plastic products in the environment that adversely affects wild life habitat, wild life and humans. Most plastic is made from fossil fuels like oil and natural gases. which releases toxic emissions when extracted from the earth.During production, PVC plants can release dioxins known carcinogens that bio accumulate in humans and wild life and are associated with reproductive and immune system disorders, and even production of supposedly "safe" plastic like pet requires the use of chemicals like Para xylene, a derivative of highly carcinogenic chemical benzene. Phthalates are chemicals added to some plastics to make them soft and flexible. They are endocrine disruptors creates health problems such as lower testosterone levels, decreased sperm count and poor sperm quality in males as well as obesity, reduced fertility, preterm birth and low birth weight in females.

Conclusion- There is no longer any serious doubt that most of the climate change that has been observed over the past few decades has been due to human rather than natural influences .

Climate is the envelope within which nearly all the environmental conditions and processes important to human well-being must function. Climate change directly affects the availability of water, the productivity of farms, forests and fisheries and prevalence of oppressive heat and humidity; the geography of disease; the damages to be expected from storms, floods, droughts and wildfires; the prosperity losses to be expected from sea-level rise;

We know that our each breath creates change in air. We can calculate that what action will change the environment and in which direction. Scientific researchers had proven that what is the beneficial to sustain good environment and what is harmful to the environment in turn to the human beings. There is a necessity to work according to environment; otherwise neither environment nor human future will be sustainable. Each and every step resulting in environmental change should be in a calculated manner.

The 5th International Eco Summit Congress, Eco Summit 2016 will take place from 29 August to 1 September 2016. Eco Summit 2016 will centre on the ecology of terrestrial ecosystems and all habitats that are integrated within those ecosystems, including river networks, wetlands coastlines. The discussion on fundamental topics should not be limited up to discussion. There must be implementation of outcomes of Eco Summit by all the countries.

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