

CLIMATE AND ENVIRONMENTAL CHANGE- AN ANTHROPOGENIC INTERFERENCE

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Abstract: The meeting of all the distinct sovereign bodies at global level, forming ‘a global village or hub’, constitutes ‘the process of globalization’. Globalization may be of various types, but this paper will specifically deal with the economic globalization. There are many environmental impacts of economic globalization. The transnational corporations of developed countries are moving their operations in developing nations so as to avoid their strict environmental rules at home country. It has been theoretically and empirically proved that the developed nations have contributed more than the developing nations to the environmental degradation and the climate change. In order to compete with each other, each and every nation is trying their best to groom themselves, specifically in terms of money; therefore there is a race among the nations specially the developed ones to grow at the top. In this haste of growing and leading fast these nations indulged themselves in the process of industrialization and other related processes, thus causing huge emissions of poisonous gases i.e. the greenhouse gases, which eventually is the supreme cause of climate change and the ozone layer depletion. The ozone layer which surrounds the entire atmosphere is altering as a result of these emissions from industry, transport, agriculture and consumer practices. As these gases are unable to emit, they are forming the thick blanket across the atmosphere and as a consequence the temperature gradually increases. This paper aims at discussing the two broad concepts of climate change i.e. greenhouse effect and ozone layer depletion, which is consequentially responsible for the risk to human health particularly skin impairment(cancer). The paper will analyze the impact of climate change on human health by specially referring to New Zealand and Australia who has the world’s highest rate of deadly cancer caused by UV exposure. Then the study will focus on difference between the climate and environmental change by stating MONSANTO case study in Vietnam war and nuclear bomb attacks by US in Hiroshima and Nagasaki during the end of world war II in order to describe that in spite of lot many factors effecting the climate change there are different factors too that is called as anthropogenic factors i.e. human produced interferences with the ecosystem and the environment by using different agents during war in order to compete with each other. Also, to show that there are countries that tend to portray that they are so much concern for the environment but these “idol countries” are seen many times to use different bombs and agents so as to fulfill their ends during the war. They provide illusionary promises to the world.

Keywords- Environmental degradation, climate change, developed nations, human health, anthropogenic factors, ozone layer, greenhouse effect, industrialization, war, skin cancer, human produced interferences, hazardous emissions.

1. CLIMATE, WEATHER AND THE GREEN HOUSE EFFECT

(1.1) THE CLIMATE AND CLIMATE CHANGE

By definition, climate change is a global issue. The global climate constitutes atmosphere, oceans, land surfaces, flora and fauna including, whole ecosystem. In aggregate terms, “climate” may be defined as “the organized summary of land surface, atmosphere and water system”.ⁱ Whole system of climate is driven by the energy produced by the sun that do not reflect out of the clouds and snow is absorbed by the atmosphere of the earth’s surface, when the surface becomes warm, it sends infrared radiations i.e. heat back towards the space.

In order to understand the climate change and the consequences of the greenhouse effect, it is necessary to look upon the difference between “weather” and “climate”. Weather is basically the fluctuation in the atmosphere around us, which can be characterized by temperature, clouds, precipitation and wind. On the other hand climate refers to the average weather in terms of mean and its variability in a certain area and at certain span of time.ⁱⁱ Thus, change in weather will automatically affect the climate as a whole as both are interdependent on each other. This system is dynamic and there is substantial change seen in the history of the earth called climate variability.ⁱⁱⁱ Climate variability may be due to “internal” as well as “external forcing”^{iv}. By internal influences, we mean the volcanic eruptions. And the external forcing includes “El Nino”^v phenomenon. It is important to differentiate that when the climate variability occurs due to internal forcing and when due to human behavior, as regulated by the UN FCCC.^{vi}

(1.2) THE GREENHOUSE EFFECT- CAUSES AND AGENTS

As stated above, the climate system is regulated by the radiations provided by the sun. about 1/3rd of the total energy is absorbed by the atmosphere, ocean, land surface and the biosphere and the rest is reflected back to the space. In order to keep Earth warm, greenhouse gases play the crucial role. These gases such as water vapor^{vii}, carbon dioxide, nitrous oxide, methane, ozone and chlorofluorocarbons^{viii} act as a blanket that traps radiation (heat) and thus prevents thermal radiations from outside to come in. Without these gases and without their trapping abilities the Earth would have been approx. 34 degree colder that it currently is, it

would be a “frozen wasteland”.^{ix} These gases when working naturally maintains the mean temperature on Earth to a life sustaining 14 degree Celsius.

Increasing in the quantum of greenhouse gases in the atmosphere will lead to less entering of the radiations from the outer space and less emission of rest of the gases which eventually will increase the temperature of the earth's surface. The atmospheric concentration of most of the greenhouse gases are increasing due to industrialization, fuel combustion^x and deforestation and thus causing greenhouse effect i.e. “global warming”. Hence, Due to the increase in the concentration of CO₂ in the atmosphere by anthropogenic (human produced) means results in the climate change globally, making developing and poor nations more vulnerable, eventually leading to cancerous risk to human health.

(1.3) OZONE LAYER DEPLETION- A REAL THREAT

It is well established that all the constituents forming a biosphere is driven by the energy provided by the sun. Sun, to some extent reflects ultraviolet radiations to the earth surface for the natural working of the complete ecosystem. Ozone on the other hand, is triatomic oxygen molecule (O₃) which is found mainly in the stratosphere and it is 40 – 50km above the earth's atmosphere. Those ultraviolet radiations from the sun are filtered out by the ozone layer to the extent that is useful for the organisms to survive. Now, the emissions of the chlorofluorocarbons (CFCs) and other harmful gases to the atmosphere react with the ozone molecule, causing depletion in ozone layer. Coming in contact with sun rays, CFCs broke into chlorine (Cl) molecules, eventually chlorine when gets in contact with ozone layer forms chlorine oxide, thus breaking the triatomic molecule (O₃). The following reaction occurs- Cl + O₃= ClO +O₂, process is called the ozone layer depletion. This depletion of ozone layer is now a global threat as high UV rays directly from the sun are reaching the earth's surface as the layer which protects from the harmful UV rays is depleting to a great extent and thus causing damage to human.

2. A CASE STUDY- NEW ZEALAND AND AUSTRALIA (CLIMATE CHANGE)

Climate change is, nowadays, a vast issue for research. It is to be said by the researchers that till now the extent of emission of CHGs in the atmosphere is alarmingly increased that if now the countries try to reduce the emissions, the earth is already under threat and there would be no change in the position for many years. This paper as stated above aims to analyze the extent of climate change affecting the human health especially skin cancer particularly in countries like New Zealand and Australia.

New Zealand is located in the pacific having lower socio economic population and more vulnerable to the health impacts due to climate change. Population there are fair skinned and hence more prone to the damaging of skin tissues, causing skin cancer. They are living at the latitude which receives much higher UV rays. New Zealand and Australia have a strong research in UV radiations and its impact on human health. Human caused climate change is a great threat to the human body globally as well as particularly in New Zealand. The fluctuation in climate patterns results in growth of infectious diseases, food insecurity, and malnutrition.^{xi}

In 1980s when there is advent of ozone layer depletion, there was increase in the ultraviolet radiations causing huge impact on human health. These two countries have adopted various means so as to curb or to reduce the effect of the harmful rays. Australia introduced SLIP, SLAP, SLOP program in early 1980s in which the time is decided when there is large emissions of harmful rays from the sun that will be more harmful than different times.

SLIP: into shade where possible

SLIP: put on shirts with collars, full sleeves and full trousers (not exposing body to the heat)

SLOP: apply 20 minutes before sunscreen that has sun protection factor (SPF)

SLAP: put on hat that protects head, neck and ears.

WRAP: put on sun glasses to protect eyes.

Later on , New Zealand also come up with its program “time to burn” in order to disseminate the awareness among the population, the burn times, when the human skin is more prone to get damaged. These burn times ranged from 15 minutes at noon in summer and more than 2 hours in winters at noon. This program was introduced in 1980s; this program was then altered by the new program i.e. “UV Index” where the noon level ranges from UVI >15 in summers and UVI=1 in winters. This concept was again changed in recent years giving simplified form of program, “UV Sun Protection Alert Period” means that period of the day where the UVI exceed 3.^{xiii} This program will directly provide the time in the whole day where people have to be cautious enough to protect themselves. In summer, the alert period ranges from 9:00am to 6:00pm in summers. But the threshold for UVI is considered differently in different countries like USA considered UVI=6, this may lead to confusion. But the reason behind this difference is there is so many external and internal differences between the people or geographical conditions of the countries.

New Zealand and Australia is facing the world's higher rates of skin cancer. As these countries are geographically placed in the latitude which receives direct sun heat which is harmful due to ozone layer depletion. Hence there are two problems faced by these countries because of the exposure to UV radiation:

1. In summer these countries receive *too much UV Radiations* in the north which is worst for *lighter skin types (fair)*.
2. In winter *too little UV Radiations* in south, problem to *darker skin types*.

2.1 SKIN CANCER, DEATH RATES AND REASONS

This paper focuses greatly on the countries (New Zealand and Australia) where the mortality rate is higher due to skin cancer because of the change in climate patterns. Firstly we must know the concept related to cancer. Cancer is a disease in which abnormal cells divide without control and cause damage to the other important tissues of the body by invading the tissues around them, and spread to other parts of the body, causing further damage and eventually death. There are various kinds of cancers prevalent, but the study focuses on the skin cancer. The three most common types of the cancer are: a) basal cell carcinoma (BCC); b) squamous cell carcinoma (SCC); c) malignant melanoma (MM). Almost 90% of skin cancers are BCCs and melanoma cancers. These are basically known as rodent ulcers which usually arise due to the sun rays coming in contact with the skin especially the fair skin and have the propensity to cause damage to the tissues. People with fair skin tend to burn rather than to tan in sunlight which causes these malignancies.

In 2014, there were 127,887 cases of cancer diagnosed in Australia; also in 2016 there were 45,782 deaths due to skin cancer there. Due to extreme weather events, heat waves, rising temperatures and changing rainfall patterns have contributed to the Australia's health threats. These reasons have caused more loss of life in Australia than any other natural disaster. New Zealand is also not immune from the death rates. It is to be noted that some years later, Australia is leading in cancer death rates but now New Zealand becomes the leading country in this cause. Study reveals that out of 100,000 people there are 50 cases of melanoma as compared to Australia's 48. Research shows that every year 2500 new melanoma cases are being diagnosed in New Zealand. This country spends approx. 55 million dollars every year on skin cancer. New Zealand's skin cancer rates are highest in the entire world and Australia is the most dangerous place which is directly exposed to sun.

Thus, these two countries face the high risk of skin cancer because of various reasons:

- a) Geographically placed at the latitude receiving high rays due to low ozone levels over New Zealand.
- b) Population with fair skin
- c) More outdoor lifestyle and exposure to heat
- d) High level of UV rays

Hence, through this case study it can be implicated that some countries are facing lot many problems because of the change in climate patterns, disturbing the whole ecosystem of that nation. People in these countries are deprived of basic right of health and right to have a suitable environment. Despite of spending so much on mitigating programs, awareness programs and helping cancer patients, these countries are leading in the world's higher rates of skin cancer because of the depletion in ozone blanket.

3. MONSANTO IN VIETNAM WAR (an Anthropogenic interference)- A case study (ENVIRONMENTAL CHANGE)

This study basically talks about the Monsanto Co. which is the American multinational agrochemical and biotechnological corporation headquartered in Creve, Missouri. This company first products were community additives such artificial sweetener saccharin, vanillin. In 1994 this company began manufacturing DDT (dichlorodiphenyltrichloro ethane). In 1960 and 1970s Monsanto became a major producer of rainbow pesticides for US armed forces operation in Vietnam. In 1983, this company became first to produce genetically modified crops. These manufactured products by the company are disastrous in their use.

The company came into lime light during the incident of major Vietnam War also known as second indo china war. This war was a conflict between North Vietnam and government of South Vietnam. North Vietnamese army got a major support from china and other communists allies. On the other hand, Unites states, South Korea and other anticommunist allies were on the side of South Vietnamese army. This war lasted for about 19 years. The role of Monsanto came into existence when it started making rainbow herbicides on the demand of US military. These rainbow herbicides are the group of "tactical use" chemicals used by US military in South East Asia during this particular war. The US got an inspiration by the British use of herbicides and defoliants during Malayan emergency in 1950s. This herbicidal warfare is the use of substances primarily designed to destroy the plant bases eco system of an agricultural food production or destroying foliage which provides the enemy cover.

The major pesticide use by US military was "Agent Orange" in this war as North Vietnam soldiers tend to hide themselves behind the dense forests in order to reveal their cover and destroy their agricultural land. This agent orange is the mixture of two herbicides, 2,4,5-T and 2,4-D this led to worst environmental effects as traces of dioxin found in the mixture have not only effected people or individuals but also poses a great harm to the environment.

EFFECTS: A SAGA OF SUFFERING

Up to 4 million people in Vietnam were exposed to the folliant. The government of Vietnam says that approximately 3 million people have suffered illness because of "Agent Orange". Red Cross of Vietnam estimated that approximately one million people becomes disables as well as faced major health issues. This dioxin is capable of damaging genes resulting in deformities among the off springs among the exposed victims.

A threefold increase in DHEA (dehydroepiandrosterone) in babies from dioxin hotspot compared to non contaminated regions linked to dioxins transferred from mother to baby using umbilical cord and breast milk. Even the US military troops were adversely affected by being in contact with this pesticide. Higher cases of leukemia, Hodgkin's lymphoma and various kinds of skin and respiratory cancers were reported in exposed veterans.

Effects on environment-

1. Over 31 lakhs hectares of forest were defoliated.
2. Defoliant eroded tree covers making reforestation difficult in numerous areas
3. The agricultural land was totally destroyed leading to economic crises among the veterans.
4. Various animals' species and diversities were adversely affected and reduce in contrast to the areas where the chemical was not spread.
5. Neighboring areas of Cambodia, Lao were also affected as the chemicals run through the soil and water to the neighboring areas.
6. The overall precipitation rate was also altered due to this agent.
7. The traces of this agent are seen in modern times also among women, men and children.
8. The major effect of this is the cancerous element has evolved among the human beings especially the manaroma cancer.

The consequences of use of "Agent Orange" in Vietnam War led to massive legal consequences too. The law suits filed on behalf of both US and Vietnamese sought compensation for damages. Even compensation and medical care was provided to the victims but this will not curb the impacts that have occurred to the people for ages.

This study clearly shows that in order to compete with each other, the nations do not once think about the change in the weather and environment before using these types of agents. Only to fulfill their needs and desires and to fulfill their ends nations uses these for instance in this study US military uses that harmful agent only to destroy the cover of the enemy i.e. forests.

It has stated above that the climate and weather pattern changes because of internal and external forcing both. This human interference with the environment is the clear cut example of the external forcing which anthropogenic (human produced) interferences. This case study reveals that not only the increase in concentration of CHGs and depletion of ozone layer is responsible but there are various factors too that are adding to this cause.

4. NUCLEAR ATTACKS ON HIROSHIMA AND NAGASAKI IN JAPAN-

The USA was increasingly intrigued by a brisk and simple end to the war by the utilization of nuclear weapons. They had in their grasp a weapon that was equipped for conveying the war to a quick end, thus they utilized it. The nuclear bombs accomplished their ideal impacts by causing most extreme decimation. The nuclear bombing of Japan was an enormously noteworthy last demonstration of the most damaging worldwide clash in mankind's history. At the same time, it flagged the beginning of the nuclear age, the weapons contest between the US and the Soviet Union and - before excessively long - the cold war.

On 6th August 1945, at the end of the World War II a nuclear bomb was dropped on Hiroshima by US aviation based armed forces. This was the first run through an atomic weapon had ever been utilized; the fireball made by the bomb destroyed 13 square kilometers of the city and those dead subsequently numbered up to 180,000. Statistics shows that 63% of the structures in Hiroshima were totally destroyed and a lot more were harmed. Altogether, 92% of the structures in the city were either pulverized or harmed by impact of the bomb and fire. The bomb was dropped on the downtown area, an area swarmed with wooden private structures and places of business. These components implied that the loss of life and destruction in Hiroshima was especially high.

After three days, a second nuclear bomb was dropped on the city of Nagasaki, killing somewhere in the range of 50,000 and 100,000 individuals. Because of the different geographical conditions of Nagasaki and the bombarding center being far from the downtown area, the excessive harm from the bombing was constrained to the Urakami Valley and the part of downtown Nagasaki. The focal point of Nagasaki, the harbor, and the architecturally significant area were protected from the impact by the slopes around the Urakami River. The atomic bombarding which was done by US did demonstrated obliterating, with approximately 22.7% of Nagasaki's structures being harmed by the flames. However, the loss of life and devastation was not exactly in Hiroshima.

There were many arguments which favored or disfavored the urgent use of atomic bombing by the US armed forces. The individuals who contend for the choice to drop the nuclear bombs on enemy targets accept massive losses on the two sides would have happened in Operation Downfall, the arranged Allied attack of Japan. The majority of the power attacking Japan would be American. Supporters were in view that it would be most suitable measure to speedy end of war saved lives so that it won't result into end of human society. It was also said that as a part of total war because Japan's leaders refused to surrender to the US forces as it was a major challenge to the world's biggest nuclear bombs holder nation. It was disfavored by some opponents that it was mere a militarily unnecessary action to force Japan into surrendering and a startup plan to spread state terrorism.

Reports made by various organizations had discussed about various impact on health and the surrounded environment. Atomic blasts create air-impact impacts like those delivered by conventional nuclear explosives. The stun wave can straightforwardly harm people by bursting eardrums or lungs or by flinging individuals at rapid, however most casualties happen in view of flying structures and flying debris which was simply the result of the blasts. In contrast to ordinary blasts, a solitary atomic blast can create a serious beat

of warm radiation that can begin flames and consume skin over huge areas. At times, the flames touched off by the blast can blend into a firestorm, keeping the departure of survivors. Despite the fact that hard to anticipate precisely, it is normal that warm impacts from an atomic blast would be the reason for huge casualties. Atomic explosions discharge a lot of neutron and gamma radiation. With respect to different impacts, beginning radiation is a critical reason for setbacks just for low-yield blasts. The moment when an atomic explosion happens near the ground surface, soil mixed with the profoundly radioactive splitting items from the weapon. The garbage is conveyed by the breeze and falls back to Earth over a time of minutes to hours.

There had been reported various post attack casualties after the disastrous attack. Ordinary skin wounds that cover an expansive territory much of the time result in bacterial contamination; the danger of sepsis and demise is expanded when a generally non-deadly radiation portion reasonably smothers the white platelet count. As the study of disease transmission contemplate proceeds with time, 46% of leukemia deaths which may incorporate Sadako Sasaki and 11% of solid tumors of unspecified lethality, were likely because of the radiations from the bombs or some other post-attack city impacts, with the factual abundance 1,700 strong malignant growths of undeclared lethality. The quantity of miscarriages caused by the radiation from the bombings, during this radiosensitive period, is increased.

Overall, a factually immaterial increment in birth absconds happened straightforwardly after the bombings of Nagasaki and Hiroshima when the urban areas were taken as wholes, it was noticed that in around 50 people who were of an early gestational age at the time of the bombarding was seen upon birth, with the frequency of these two specific malformations being about multiple times what was not out in the ordinary course of nature.

Hence this can be seen that risk of most cancers doubles with doubling of radiation exposure. The long term effects of radiation exposure also increased defects in birth rates among the survivors. These effects can be seen till now. Due to the bombing raids in Japan, the flora fauna of the land also get affected. The soil and the air was so much affected that result in causation of bundle of diseases. Therefore it can be seen that because of some personal interests, USA who tend to become as idol protector of the environment, without thinking about its impact on environment, bombarded two nuclear bombs that devastated the life in Japan which grossly effects the lifestyle, ecosystem and environment nearby.

5. RECOMMENDATIONS AND SUGGESTIONS (To overcome climate change)

There is the need for the time that the measures must be taken so as to curb this global threat, as directly or indirectly it is affecting the health of the humans. These dreadful diseases are growing faster and faster in almost every country. Some of the recommendations are-

1. According to the “precautionary principle”, when there is irreversible damage caused to the environment, then lack of scientific evidences should never be made a reason to postpone the measures for “cost effective action”.^{xiii}
2. States must by making different laws try to lower down the greenhouse gas emissions and other hazardous air pollutants by reducing industrialization process or by adopting measures to discharge gases accordingly in such a way that it will not risk the ecosystem.
3. The energy efficient power generation and lower vehicle miles travelled can reduce the emissions of harmful gases in comparison to the fossil fuel based power generation.
4. Preserving to the larger extent the green environment in urban settings.
5. Coming up with or exploring new technologies that decrease the greenhouse gas emissions like biofuels, electronic vehicles and solar cells.
6. Individuals at their level must take certain measures to protect themselves from the UV rays like using of sun screen lotions consisting of sun protection factor (SPF), not too much exposure to the heat, putting on full sleeves clothes, wearing a cap or sunglasses etc.
7. Less use of transports so as to reduce the transport emissions, for instance, in Canada 24% of emissions are due to transport emissions only. There people use public transport, ride a cycle, switch to an electric or hybrid vehicles etc. these changes will reduce the emissions as well as make people healthy and happy.
8. Using energy wisely also to some extent could help in the noble cause, like switching to the lights and bulbs that don't need too much energy; unplug the computers, laptops, machines, television and other electronics when not in use and hang the clothes to dry instead of using dryers as they are the energy hogs.
9. Another suggestion could be “investment in renewables”. It means that though everyone cannot afford the establishment of solar panels or wind energy but still anyone can become the co-op member of these renewable energy projects and can get return for the investment.
10. By “consuming less and wasting less”, life can be enjoyed more. We are living in a community which is a symbol of togetherness and not division. Therefore spending time in nature with loved ones provides more happiness than buying the artificial happiness and stuffs.
11. Putting price on carbon is an efficient and effective way to reduce the emissions. Though this can be sound boring but this will make polluting activities expensive and eventually green solutions more affordable. This can be one of the best policy which can be adopted by the authorities.
12. Reduce the burning of fossil fuels like eliminating the burning of coal, oil and natural gas.
13. Stop cutting down the trees which can also mitigate the risk of high emission rates of the greenhouse gases.
14. Moreover, the countries must also make some efforts so as to mitigate these global issues by not only providing illusionary promises but also by contributing to the less utilization of the nuclear bombs and other devastating elements.

6. CONCLUSION

Through the entire paper we have come across the changes in the climate pattern, the weather conditions and the reasons for the same. Later on the paper deals with the impact on human health due to these irregular patterns. Under the heading of effects of climate change, the human health is discussed most particularly “skin cancer”. These arguments are substantiated by two case studies i.e. New Zealand and Australia which are the two top leading countries in the world in terms of highly prone to cancerous diseases. This study directly signifies various reasons that why these countries are more prone to this disease. Another case study was projected that depicts the human interference clearly to the natural working of the environment. This anthropogenic interference is done at the time of Vietnam War by spreading the “agent orange” to the area which adversely affected the region with health impairments which is traceable even today also. And secondly at the time of end of the World War II in the two cities of Japan, thus affecting the two at a large scale.

Hence, it is clear from the above that climate and environmental change are two different things and phenomenon. One dependent on the other. Some measures have to be adopted at each level so as to curb this global threat as it is the high time when the programs and the declarations have to be checked and revised upon and must be strictly construed with.

References

- ⁱ Coughlan, Climate Trends and Variability, in Jager/ferguson, climate change: Science, impacts and policy: The proceedings of the second world war climate conference, 1991, 71.
- ⁱⁱ IPCC TAR WG I, 87, NOTE 59.
- ⁱⁱⁱ For example, 100 million years ago, mean temperatures were about 10 degree warmer than they are today.
- ^{iv} IPCC TAR WG I, 789, NOTE 59
- ^v It is the highly irregular climate pattern that occurs when Pacific Ocean together with global temperature causes widespread changes in the weather.
- ^{vi} Framework Convention on Climate Change.
- ^{vii} Water vapor is the most important greenhouse gas and not carbon dioxide, contrary to popular belief.
- ^{viii} These gases form only small fraction of the atmosphere, which consists nitrogen and oxygen (99%) and neither of these gases trap radiation.
- ^{ix} IPCC TAR WG I, NOTE 2.
- ^x 85% of human energy consumption originates from fossil fuels, Hoffert, Climate Sensitivity, Climate Feedbacks and policy implications, 1998, 35.
- ^{xi} New Zealand college of public health medicine policy statement (assessed 5 November, 2018)
- ^{xii} WHO recommended, UVI=3 is the level above which sun protection is needed.
- ^{xiii} The United Nations Conference on environment and development 1992. Rio Declaration on environment and development, principle 15.