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INDUSTRIALIZATION AND THE CLIMATE CHANGE

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“Nature has enough to meet the need of the people not the greed” –Mahatma Gandhi

ABSTRACT: -

Industrialization is the process of transformational change of the society and economy that transform human society from an agrarian society to an industrial society. Industrialization involves immense economic and social change such as urbanization, technology revolution, modernizations, large scale of manufacturing, and modification of natural systems, enormous energy usage etc. Climate change is linked to industrialization. Climate change is a change in the statistical distribution of weather pattern of a region or some region or the entire earth. The climate change often referred to as ‘Global Warming’, which means specific increases in the surface temperature due to anthropogenic activities. Since the Industrial Revolution in Western Europe, there has been a significant increase in the earth’s temperature and if no proactive mitigation steps are taken in time, we may experience up to 4 degree Celsius increase in temperature by the end of twenty first century. The Industry sector contribution to green house gas (GHGs) is 21 percent of total emissions. Industry consumes about 40 percent of total energy generated worldwide. There is need to promote accomplishment of efficient technology in developing countries and support the multinational firms, business and industries to use efficient eco friendly technology. Therefore there is need to develop appropriate technology for carbon management.

KEYWORDS: Industrialization, Global Warming, Sustainable development, and Environment Impact Assessment.

INTRODUCTION

Climate change is caused by various factors such as biotic process, changes in the earths position, variation in solar radiation on earth, volcanic eruptions,



mountain building and anthropogenic activities like use of fossil fuel, high energy consumption, deforestation, burning of crop residues, land use changes, construction, mining, and Industrializations. Climate change has been cause by human activities largely due to the increased level of green house gases in (GHGs) the atmosphere from the burning of fossil fuel whose origin coincided with the start of industrial revolution around 1750. The GHGs comprises carbon dioxide (Co₂), nitrous oxide, methane, hydro fluorocarbons, sulfur hexafluoride, per fluorocarbons and water vapour. The beginning of large scale industrialization, intensive commercialization of agriculture, changing food habits, deforestation, technology transformation and

increasing use of technology, growth of human population, increasing uses of coal, oil, transportation, waste disposal, factory effluents, commercial and residential activities, rise in the per capita demand of natural resources has resulted in global environmental changes with the adverse consequences for human well-being. Climate change is the cause of concern. Latest report of IPCC provides evidence that climate change poses risk for regions across the world. The adverse consequences are likely to be higher in the future for those communities and regions and ecosystems, which are already vulnerable. These include the people dependent on natural resources, fragile ecosystems, and species. Threat levels of climate change are varying region to region. Climate change has very serious consequences such as increased incidence of extreme weather conditions like droughts, snow melting, changing pattern of precipitation, sea level rising, submergence of islands, smog incidents and various types of health impacts. Both natural events and human activities are believed to be contributing to global warming but humans are leading culprits.

OBJECTIVES

1. To evaluate the impact of industrialization on the natural environment.
2. To trace out the Greenhouse Gas emission (GHGs) by various industries.
3. To find out the ways for sustainable solutions to climate change.

REVIEW OF LITERATURE

The Intergovernmental Panel on Climate Change report (1990) presents a scientific assessment of the past climate record and presently perceived climate abnormalities. Since the industrial revolution, the burning of fossil fuels and deforestation have led to an upsurge of 26% in CO₂ concentration in the atmosphere. Nitrous oxide has increased by about 8% since pre-industrial times, apparently due to an increase in agriculture activities. CO₂, CFC, and nitrous oxide are removed only slowly from the atmosphere; their atmospheric absorption takes decades to centuries to adapt fully. Even if all human-made releases of carbon dioxide were stopped in the year 1990, about half of the upsurge in carbon dioxide concentration caused by human activities would still be evident by the year 2100. The Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) observed that more than half of the detected increase in global surface temperature over the last 6 decades was caused by anthropogenic increases in greenhouse gas (GHG) emissions. Anthropogenic GHG emissions are mainly driven by economic activity, population size, energy use, lifestyle, land use patterns, and technology. In metropolitan areas, climate change is estimated to pose risks for people, assets, economies, and ecosystems, including risks from heat stress, storms, and extreme precipitation, inland and coastal flooding, landslides, air pollution, drought, water scarcity, and sea level rise. Countryside is expected to experience food scarcity, infrastructure problems, water scarcity, and floods. Transformation in economic, social, technological, and political decisions and actions can enhance adaptation and promote sustainable development. Transformation is considered most effective when it reflects a country's own vision and approach to achieving sustainable development in accordance with its national circumstances. Effective adaptation and mitigation is a need of the hour to tackle the consequences of climate change, which is possible by policies and measures at multiple levels: regional, national, and international. The Sustainable Development Goals Report (2017) states that more than 2 billion people are living in countries with huge water stress. It aims to keep the global temperature rise this century to below 2 degrees Celsius above pre-industrial levels and as close as possible to 1.5 degrees. Air quality in most cities is very hazardous. Global warming has set a new record of about 1.1 degrees Celsius above the pre-industrial period and is contributing to an increased extreme weather condition. The Paris Agreement (2016) has turned the focus towards the implementation of action for the climate and sustainable development. Many countries have adopted various measures such as shifting from conventional energy sources to non-conventional energy sources, environmental impact assessments, climate change adaptation projects and programs, and regulations on protected areas.

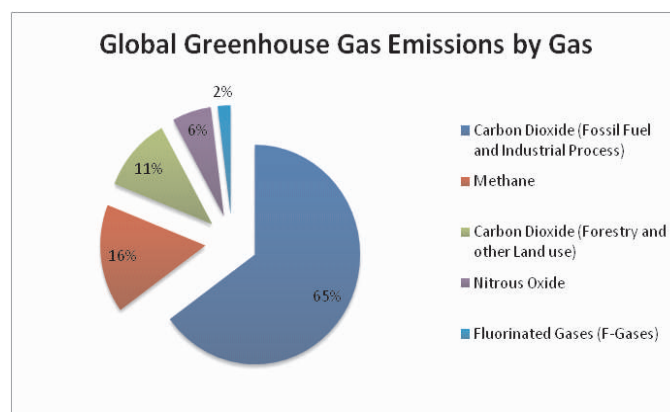
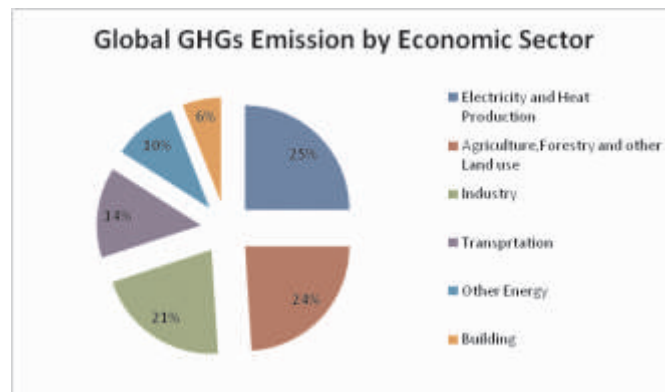
METHODOLOGY

The paper presents the sensible and thorough aspect of industrialization and the climate change. For

this study data and information has been mostly collected from magazines, research articles, newspapers, e-journals, and opinions of renowned environmentalists.

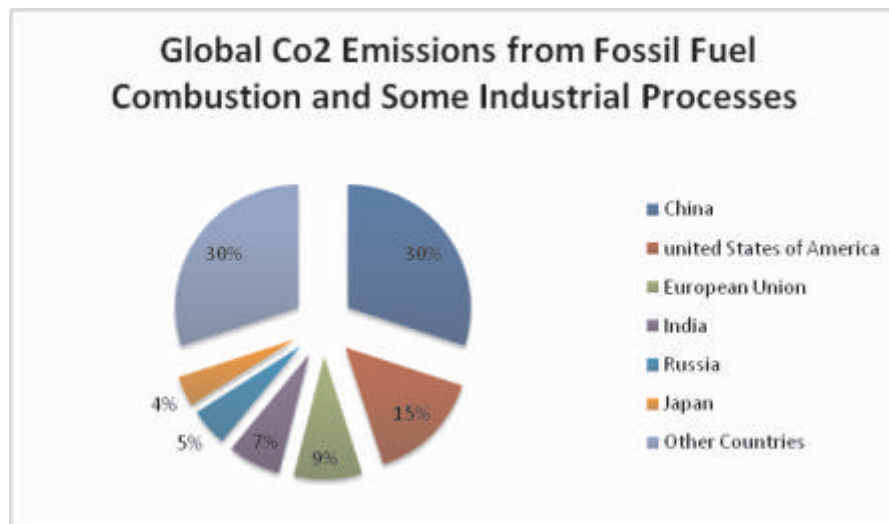
LINK BETWEEN INDUSTRIALIZATION AND CLIMATE CHANGE

Anthropogenic activities have led to increase in the concentration of GHGs and other pollutants in the atmosphere. The toxic pollutants, tiny particles, nitrogen oxide, ozone, sulphur dioxide, carbon monoxide are emitted from industries, vehicles, power plants and cooking stoves. There are several industries declared to most polluting. These include cement, dyes, caustic soda, iron and steel, fertilizers, oil refineries, paper and pulp, pesticides, pharmaceuticals, sugar, textiles, leather, thermal power plant and so on. Thermal industries releasing the solid waste in the form of fly ash dumped on the ground, which leads to soil and air pollution. Heavy metals, leads, and ions bring about a drastic change in the nature. The marine animals and plants absorb, accumulate and bio concentration the chemical waste leading to bio magnification and finally demolishing the trophic levels and food chains of ecosystems. Methane is emitted during coal mining, production, and transportation of natural gas and oil, municipal waste, wetland fills etc. Methane gas has shown to be 20 times more potent than Co2. Nitrous oxide emissions occur during industrial activities as well as combustion of solid waste and fossil fuels. Polymer industries are source of powerful green house gases such as Halocarbons (HFCs and PFCs and SF6). Cement industries, foam industries releases the GHGs. Air conditioned and refrigerators in the industries, multinational firms and domestic uses are great source of CFCs. Apart from burning fossil fuels and other ways by which human effectively contribute to Co2 emission include the release of Co2 during blast furnaces of iron ore and during smelting process. Clearing the forest for agriculture and urbanization creates disturbances in earth's ability to stabilize atmospheric Co2 concentration. Concentration of Co2 in the atmosphere cause trapping of heat.



Source: Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC), 2014: based on global emission from 2010.

Emission by Country



Source: Boden, T.A, Marland, G., and Andres, R.J. (2017). National Co2 Emission from Fossil-Fuel Burning, Cement Manufacture, and Gas Flaring: 1751-2014 Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory, U.S.Department of Energy,doi 10.3334/CDIAC/00001-V2017

SUSTAINABLE DEVELOPMENT

In 1980, the International Union for the Conservation of Nature had published a report, which introduced the term "Sustainable Development." The concept of sustainable development is the development that meets the necessities of the present without compromising the capacity of future generations to meet their own requirements. In 1992, the UN Conference on Environment and Development published the Earth Charter, which outlines the building of just sustainable development and peaceful global society in the 21st century. The action plan Agenda 21 for sustainable development and stress the need to change from old sector centered ways of doing business to new approach that involve cross sectional coordination and the integration of environmental and social concerns into all developmental process. UN has framed the 17 Sustainable Development Goals (SDGs) to be achieved over 2015-30 periods. Environmental Sustainability is the goal, which covers:

1. By 2030, achieve accessibility and sustainable management of water and sanitation for all. Eliminating dumping and abating release of hazardous chemicals and materials.
2. By 2030, ensure access to reliable, sustainable, affordable, and modern energy for all.
3. Foster sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.
4. By 2030, built and promote inclusive and sustainable infrastructure, industrialization, and encourage innovations.
5. By 2030, make cities and human settlements inclusive, safe, resilient, and sustainable.
6. Ensure sustainable consumption and production patterns.
7. Take urgent action to combat climate change and its impact. And regulate the emissions and promote developments of renewable energy.
8. Encourage and restore sustainable practice of global ecosystems, combat desertification, and reverse land degradation, manage forests and stop biodiversity loss.
9. Safeguard and sustainably use the oceans, seas, and marine resources for sustainable development.

IMPACT OF CLIMATE CHANGE

- Increasing the temperature of the earth cause change in the weather pattern and affect the rainfall

- Global warming increased the water level due to melting of snow, which cause submergence of island and coastal areas, raising the occurrence of floods.
- Crop yields decreased due to change in the weather patterns, which affect the food security.
- Extreme weather condition increased the occurrence of flood, drought, storms, hurricanes, and heat waves.
- Many Infectious diseases agents such as bacteria and viruses are influenced by change in the temperature, rainfall, and humidity.
- Climate change adversely impacts the wildlife.
- Increase in dry season length, would increase the risk of forest fires.

WAYS FORWARD

- Environment Impact Assessment (EIA) should be a key part of every plan towards industrialization.
- Industrialized nations required more commitment towards reduction of emissions.
- Engage the business to reduce carbon emissions
- Develop and adopt energy saving technologies.
- Encourage to the renewable energy usage.
- Encourage the Re-cycle or Re- use practices.
- Proper treatment of industrial wastages.
- Intensive plantation reduces the dust, smoke, and other pollutants.
- Promote sustainable industrializations and encourage innovations.

CONCLUSIONS

It is the responsibility of entire world to work in the direction of saving humanity from the effects of climate change. There is prerequisite to incorporate the principle of sustainable development into country's policies and programs and converse the damage of environmental resources. Everybody should think of sustainable solutions of climate change, which are not just temporary but also take into account the needs of future generations.

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