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RESEARCH ARTICLE

IMPACT OF GLOBAL WARMING AND CLIMATE CHANGE ON YAMUNA RIVER AT AGRA.

Raj Vir Singh Ojha.
Department of Zoology, Raja Balwant Singh College, Agra- 282002, U.P., India.

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Abstract

Yamuna, India's second longest river, rises in the Garhwal Himalayas, where climate change is affecting the availability of water. The flow in the river has become more uncertain, sometimes too much, often too little. The effects of global warming upon Yamuna river in the end largely depends on the location of the Yamuna river or stream. Some of the impact loctation such as Nizamuddin Bridge, Mathura downstream and Agra downstream shows the presence of cadmium, nickel, iron, zinc and chromium in Yamuna River. Rapid industrialization and urbanization in India are responsible for the huge increase in the demand for water. The inefficient management of the resource has led to deterioration in water quality, posing new challenges for water management and conservation. A thickening layer of carbon dioxide pollution, mostly from power plants and automobiles that traps heat in the atmosphere. Population of low latitude regions bank of Yamuna river at Agra increasing water resources are likely to become more stressed in many regions, especially as global warming intensifies. Climate change is likely to affect Yamuna river due to change in precipitation and evapo-transpiration.

Introduction:-

Climatologists believe that increasing atmospheric concentration of carbon dioxide and other "greenhouse gasses" released by human activities, such as burning of fossil fuels and deforestation are warming the Earth. The mechanism is commonly known as the "greenhouse effect" is what makes the Earth habitable. These gases in the atmosphere act like the glass of a greenhouse, letting the sunlight in and preventing heat from escaping. But the human activities have altered the chemical composition of the atmosphere through the buildup of greenhouse gases- primarily carbon dioxide, methane, and nitrous oxide. Bjorn[1] has published paper on Modeling carbon cycles and estimation of greenhouse gas emissions from organic and conventional farming systems. It gives information on carbon (C) and nitrogen (N) fluxes in the system soil–plant–animal–environment[2]. The model couples the balancing of C, N and energy fluxes with the target to estimate the climate-relevant CO_2, CH_4 and N_2O sources and sinks of farming systems. For the determination of the net greenhouse effect, calculations of C sequestration in the soil, CO_2 emissions from the use of fossil energy, CH_4 emissions from livestock keeping and N_2O emissions from the soil have been made. The results were converted into CO_2 equivalents using its specific global warming potential (GWP)[3] has published paper on (A Synopsis on the Effects of Anthropogenic Greenhouse Gases Emissions from Power Generation and Energy Consumption).Climate change is redefining earth's natural landscape by altering air and water temperature[4], runoff of water, biodiversity, changes in precipitation. All of these factors play a role in how rivers will be affected by climate change. Streams will be affected differently by where they are located and

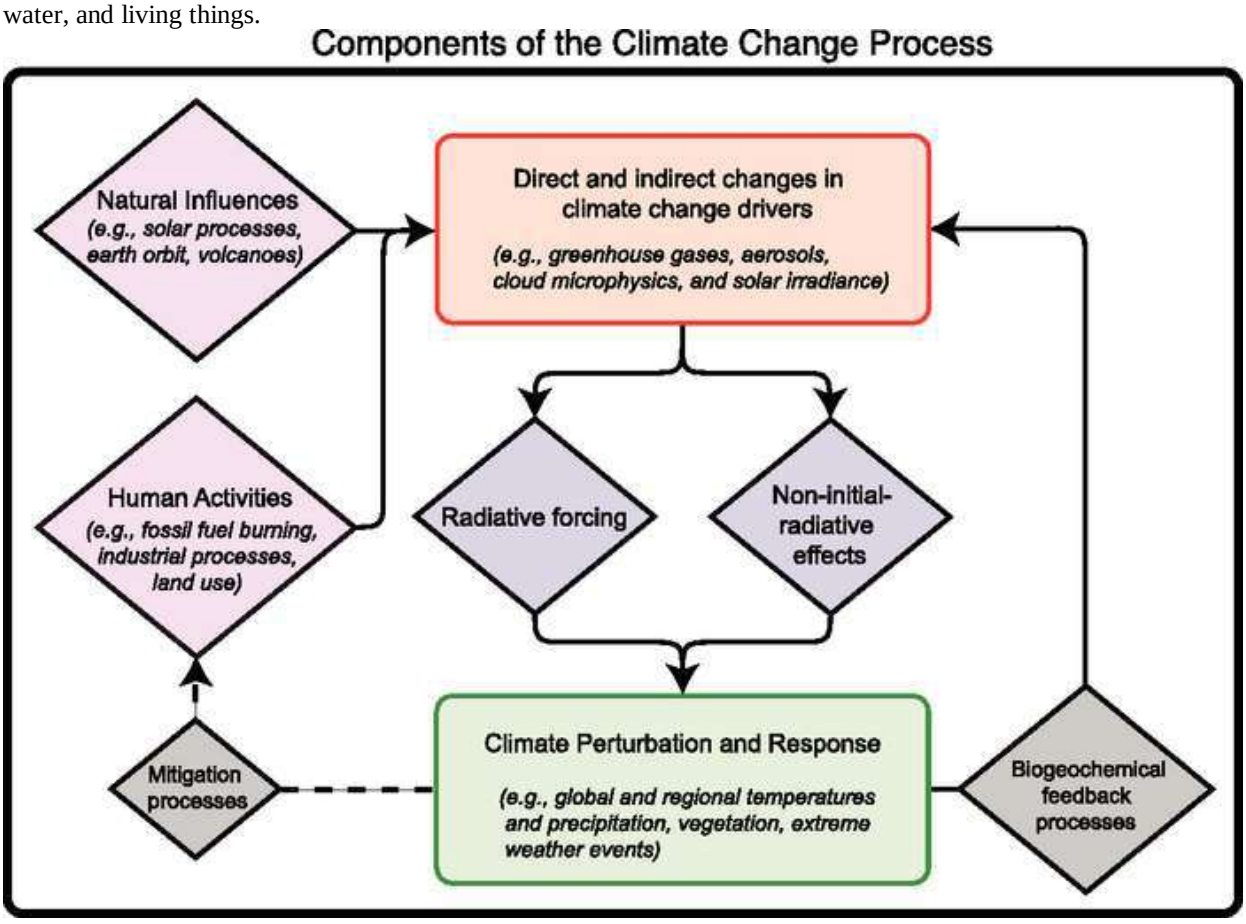
Corresponding Author:- Raj Vir Singh Ojha.
Address:- Department of Zoology, Raja Balwant Singh College, Agra- 282002, U.P., India.

what their surrounding climate is already. With temperature expected to rise 1-8 degrees Celsius by 2050, climate change will cause a varied amount of effects on rivers.

Materials and Methods:-

Climate change:

The climate is defined as' the general or average weather conditions of a certain region, including temperature, rainfall, and wind'. The earth's climate is most affected by latitude, the tilt of the Earth's axis, the movements of the Earth's wind belts, and the difference in temperature of land and sea, and topography[5]. Human activity, especially relating to actions relating to the depletion of the ozone layer, is also an important factor. The climate system is a complex, interactive system consisting of the atmosphere, land surface, snow and ice, oceans and other bodies of water, and living things.



Green house effect:-

Green House effect is the phenomenon whereby the earth's atmosphere traps solar radiation, and is mediated by the presence in the atmosphere of gases such as carbon dioxide, water vapour, and methane that allow incoming sunlight to pass through, but absorb the heat radiated back from the earth's surface. Thus the Green house gases (GHGs) provide a blanketing effect in the lower strata of the earth's atmosphere, and this blanketing effect is being enhanced because of the human activities like burning of fossil fuels etc.

Global warming:-

'Global warming is as an increase in the average temperature of the Earth's atmosphere, especially a sustained increase great enough to cause changes in the global climate'. The term global warming is synonymous with enhanced green house effect, implying an increase in the amount of green house gases in the earth's atmosphere, leading to entrapment of more and more solar radiations, and thus increasing the overall temperature of the earth. In some countries, emissions trading scheme (ETS) through carbon taxation is already implemented to control and monitor emissions.

How to reduce greenhouse effect:

- Energy conservation
- Rising the cost of fuels
- Developing new energy production
- Forest protection/ Reforestation
- Recovery of methane from garbage
- Banning of CFC production
- International conferences
- National Standards of pollutants
- Anti-pollution measures

Air/Water Temperature:-

Rising air temperature is correlated to the increase in CO_2 in the atmosphere, which are predicted to raise water temperature 3-4 degrees Celsius in the next 50 years. Atmospheric CO_2 has spiked nearly 100 ppm since the 1800s from the beginning of the Industrial Revolution due in large part to the burning of fossil fuels. Increasing air temperature is correlated to rising water temperature and has begun to force snow-melt earlier in the year in the Yamuna River. Increasing water temperature affect freshwater species more than marine species due to smaller bodies of water. The Yamuna River dolphin have increased mortality rate due to warmer water temperature.

Effects of Global warming:-

The predicted effects of global warming on the environment and for human life are numerous and varied. It is generally difficult to attribute specific natural phenomena to long-term causes, but some effects to recent climate change may already be occurring. Rising sea levels, glacier retreat, and altered patterns of agriculture are cited as direct consequences, but predictions for secondary and regional effects include extreme weather events, an expansion of tropical diseases, and drastic economic impact. Concerns have led to political activism advocating proposals to mitigate, eliminate, or adapt to it.

Results and Discussion:-

Global warming can lead to the melting of ice peaks and thereby leading to rise in the sea level. Global warming may change the rainfall pattern, which may affect the agricultural out puts in the various regions of the world. Global warming will bring about major changes in water distribution and have impact on water resources. The other effects of global warming will be the change of global wind pattern due to more energy being pumped into the atmosphere this will, in turn, cause extreme climates. The rise in the sea level and temperature is likely to pose an adverse effect on the coral reef ecosystem. The rise in temperature due to global warming my lead to the death of microorganism like phytoplankton, zooplanktons and bacteria and thus ecosystem will be disturbed. Due to climate change, the plant production will be adversely affected and thus there is danger of extinction of many important species. The global warming will have also socio economic impacts. Green house effect will also disturb the human life and human activity.

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