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ReviewArticle

FEELING THE HEAT: GLOBAL WARMING AND CLIMATE CHANGE

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ABSTRACT:
Climate change and Global warming has become a part and parcel of our lives, but the clock is ticking for us to make immediate changes or suffer grave consequences. The Earth's temperature is on the rise and there are various reasons for it such as greenhouse gases emanating from carbon dioxide (CO2) emissions, burning of fossil fuels or deforestation. The increasing prevalence of social networks provides students greater opportunities to evaluate and assess issues of social consequence like Global warming and climate change. Educational institutes play a major role in bending these young minds. Leveraging the power of education is potentially more powerful than simply increasing investments in onshore wind turbines or concentrated solar power. Therefore, motivating young students to fight climate change becomes important not just for us, but for our future generations.
Key words: Climate, Global warming, educational institutes

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INTRODUCTION

Recently, the use of the two terms 'Climate Change' and 'Global Warming' have become very visible to the students and their understanding of what is happening with respect to the climate. The student's response to all the news and publicity about climate has been a search for understanding and comprehension, leading to support or disbelief. The two terms while having similarity in meaning are used in slightly different semantic contexts. These two terms "global warming–(GW)" and "climate change–(CC)" both play a role in how the public at large views the natural world and the changes occurring in it. They are used interactively by the news agencies, without a thought towards their actual meaning. Therefore, the students are trying to identify changes in the news and their understanding of those changes looks for the meaning of those terms online.[1, 2]

"Climate change" and "global warming" are often used interchangeably but have distinct meanings. Global warming is the long-term heating of Earth's surface observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere. The term "global warming," is widely believed to have been coined in 1975 by Columbia University geochemist Wallace Broecker, according to NASA. This term is not interchangeable with the term "climate change". Since the pre-industrial period, human activities are estimated to have increased Earth's global average temperature by about 1 degree Celsius (1.8 degrees Fahrenheit), a number that is currently increasing by more than 0.2 degrees Celsius (0.36 degrees Fahrenheit) per decade. The current warming trend is unequivocally the result of human activity since the 1950s and is proceeding at an unprecedented rate over millennia.

Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects that are synonymous with the term. Global warming refers

only to the Earth's rising surface temperature, while climate change includes warming and the "side effects" of warming—like melting glaciers, heavier rainstorms, or more frequent drought. Said another way, global warming is one symptom of the much larger problem of human-caused climate change.

The Intergovernmental Panel on Climate Change (IPCC) has concluded that global warming is inevitable, and that human activity is likely to be the main cause. The National Research Council's Grand Challenges in Environmental Sciences (NRC, 2000) identified eight "grand challenges," four of which are directly linked to climate and climate change. Thus, it is vital that students learn about global warming and climate change. Teaching about global warming and climate change is essential for developing well rounded students, and for overcoming a critical deficiency in atmospheric science and climatology curricula. Furthermore, teaching about global warming and climate change provides a natural context for studying science through personal and social applications. An understanding that is essential for its future citizens who must take the responsibility for the management and policymaking decisions facing our planet. Therefore, if science education is to promote a citizenry that is knowledgeable about global warming and climate change, it is essential to determine what students' conceptions are about global warming and climate change in order to plan curriculum and design instruction that builds on students' conceptions.

EFFECTS OF GLOBAL WARMING

The World Health Organisation (WHO) expects approximately 250,000 additional deaths per year between 2030 and 2050 from extreme heat, natural disasters, and changing patterns of infections, mostly in people at risk (people living in coastal regions or mega cities, children, the elderly, people with multiple and/or severe comorbidities, and—last but not least—people living in regions with weak healthcare infrastructures).3One effect of global warming that everyone has heard about is a rise in sea levels. About half of this rise is due to thermal expansion: Ocean temperatures are rising, and as water warms it expands. Put a nearly full cup of water in a microwave and heat it, and the water will spill over the cup.[4- 6]

In addition to thermal expansion, the oceans are rising because ice is melting, and most of that water inevitably finds its way to the sea. So far, most of that water has come from mountain glaciers and ice caps. As global temperatures increase, sea level rise will mainly reflect polar ice melt. So far, ocean rise has been measured in millimetres, but there is enough water in the Greenland ice sheet alone to raise sea levels by about 7 m, West Antarctica over 5 m, and East Antarctica about 50 m. If the Earth were to lose just 8% of its ice, the consequences for some coastal regions would be dramatic. The lower part of the Florida peninsula and much of Louisiana, including New Orleans, would be submerged, and low-lying cities, including London, New York, and Shanghai, would be endangered.[7]

The effect of temperature on agriculture is linked to the availability of water and food production, which can be threatened by prolonged periods of drought or by the excessive rainfall. The agricultural sector employs 70% of water resources, representing the largest user of fresh water. During the last century, irrigated areas have risen fivefold. For 2025 forecast shows that 64% of the world's population will live in water-stressed basins.

Rising temperature is not the only cause of soil aridity; exploitation of the environment, deforestation, and loss of biodiversity are also important contributing factors. It is estimated that a 2.5 °C increase in global temperature above the pre-industrial level may produce major biodiversity losses in both endemic plants and animals; 41%–51% of endemic plants in southern Africa would be lost, and so do between 13% and 80% of various fauna in the same region. Globally, 20%–30% of all plant and animal species assessed so far would be at high risk of extinction with such a temperature rise.

STEPS TAKEN TO CURB GLOBAL WARMING

As far as Global Warming is concerned all governments of the world are taking steps to reduce the emission of greenhouse gases. Countries around the world have recognised this problem and signed a pact in Paris called The Paris Agreement in 2015. They all pledged to reduce their carbon footprints. The Intergovernmental Panel on Climate Change (IPCC) has set a target of not increasing the temperature more than around 2 degrees Celsius and in the later years around 1.5 degrees.

Although everything is not going very well with this agreement. Recently, Donald Trump – president of the United Nations of America pulled out of this agreement citing that developing nations are not doing enough to control their Carbon emission and all the money is going in vain. On the other hand, developing nations like China have argued that the developed nations like the United States of America have already developed their nations while polluting the planet. But it's now their turn to develop their country and they are doing their bit to curb the carbon emissions. India is also doing their bit to control the carbon footprint. Under the leadership of prime minister, Modi India is taking very active steps in the field of renewable energy. Many Solar panel power plants have been opened. Ujjwala scheme was launched to provide LPG connection to the poor which led to an increase in clean fuel consumption in the rural area. We have also been trying to increase our Forest area by extensively planting trees.

Controlling and reversing climate change is expected to be a major concern and undertaking for mankind in the forthcoming decades. Some provision should be

made to allow a rebate for steps that absorb or remove greenhouse gases from the atmosphere. Moreover, a modest tax, would be more easily achieved than attempts to establish quotas for different countries, industries and producers. If global warming should become a more significant problem, the tax can be raised. This would be much easier than getting agreement on more stringent quotas.[7-9]

Climate change mitigation is a technological measure aiming to reduce the amount of anthropogenic emissions of greenhouse gases (GHG), and can be divided mainly into: (i) mitigation technologies, which focus on reducing fossil-based CO2 emissions, including nuclear power, renewable energies, and carbon capture and storage; (ii) negative emissions technologies, which aim to capture and sequester atmospheric carbon to reduce carbon dioxide levels, and include approaches such as BECCS (bioenergy with carbon capture and storage), DACCS (direct air carbon capture and storage), enhanced rock weathering, and ocean fertilization; and (iii) geoengineering techniques that change the Earth's radiative energy budget to stabilize or reduce global temperatures, such as stratospheric aerosol injection, and marine cloud brightening.

ACTIONS TO BE TAKEN AT LEVEL OF EDUCATIONAL INSTITUTES

Research shows that when schools provide environmental education to students, they report 90% skills increase and 83% better environment-related behaviours. Researchers also shows that if only 16% of high school students were to receive climate change education, we could see a nearly 19 gigaton reduction of carbon dioxide by 2050. It's time for action! Our climate is changing, and we need schools to become informed and become a role model for action. The school can become informed by requesting a presentation, Hosting a Youth Conference on Climate Change. Schools can create an Eco group. Find a group of like-minded students and teachers and start talking. By calculating your school's footprint, you can see how your school can make improvements, what the most bang for your buck might be, and get a sense of your baseline emissions. Youth have a large influence on consumption. This is an area that hits home for many students. Youth can influence the car their parent buys and dictate a family's wants and needs. To get students thinking about what they buy, set up a "swap day" at your school, create a "sharing library" for items that students don't use every day, or organize an "eco-fashion fundraiser". We also recommend the inspiring video series, The Story of Stuff. Plus, you could use the activity, You Are What You Wear to get students more aware of what their purchasing. Solid waste reduction and recycling help address climate change. Manufacturing, transporting, and using the product – as well as management of the resulting waste – all generate greenhouse gas emissions. Waste prevention and recycling both reduce greenhouse gases associated with these activities by reducing methane emissions, saving energy, and increasing forest carbon sequestration. Usually schools address recycling first – more bins, additional/better signs, and education. Then schools can think about composting; purchasing policies; litter less lunches; eliminating bottled water; becoming paper free; participating in Waste Reduction Week. Trend and sentiment analysis is one method whereby students can identify changes in public perception that can be used to enhance the development of a social awareness towards this specific problem.

Sustainable development goals (SDGs) which are taught in many schools as the part of curriculum is a great initiative. Goal no. 13 focus on curbing climate change, which will have positive effects on the other goals as well. Many schools like Satpaul Mittal school, Ludhiana has provisions where in students are globally connected to classrooms through virtual tools and are part of various international Sustainable Development Goal. The school's vision is of producing leaders of tomorrow who are technologically proficient, socially aware, and sensitive to environmental and social issues especially climate change and global warming. Gamification was one of the methods which was used to engage students in fun filled activities and encouraged to find facts Earth Day and how sustainable development is the only way to save our planet.

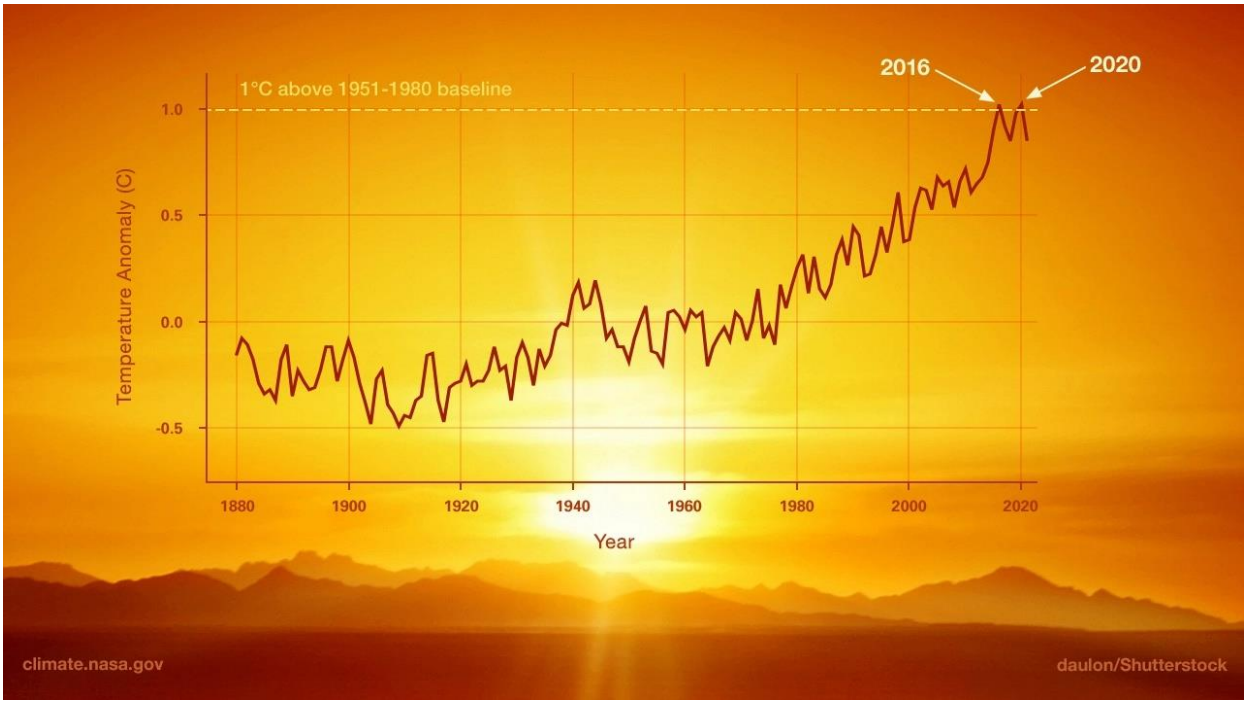
Some of the country's best schools and colleges could launch a 'Climate Change Warrior Fellowship' to create a cadre of young professionals and embed them within the state machinery like Haryana's Chief Minister's Good Governance Associates Programme. These young professionals could bring their entrepreneurial experience and thinking to support government initiative from inside the system to aid climate action. Unleashing the creativity of teachers and students to combat climate change through student-driven and student-led community-based climate action projects would be a quick win for improving the overall quality of education for a 21st century rife with crises. If done at scale across India, we could be well on our way to achieving our emission targets by 2050 and to ensuring the quality of life for future generations on this planet.

EXECUTIVE SUMMARY

Today's global warming is an unprecedented type of climate change, and it is driving a cascade of side effects in our climate system. It's these side effects, such as changes in sea level along heavily populated coastlines and the worldwide retreat of mountain glaciers that millions of people depend on for drinking water and agriculture, that are likely to have a much greater impact on society than temperature change alone. Climate is the context for life on earth. Global climate change and the ripples of that change will affect every aspect of life. Climate is already

changing, and quite rapidly. With rare unanimity, the scientific community warns of more abrupt and greater change in the future.

The impacts of climate change cross national borders and disciplinary lines and can cascade through many sectors. For this reason, we all have a stake in adapting to and slowing the rate of climate change. Education and schools play an important role in an ever more urgent global fight against climate change. It helps young people to understand and tackle the consequences of Global warming. It encourages them to change their behaviour and helps them to adapt to what is already a global emergency. Many in the business community have begun to understand the risks that lie ahead. Thus, sound policymaking demands the attention and commitment of all.[10- 13] .If we come together and take initiatives then we can save our planet.



This graph illustrates the change in global surface temperature relative to 1951-1980 average temperatures, with the year 2020 tying with 2016 for hottest on record (Source: NASA's Goddard Institute for Space Studies)

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