Climate Change: A study on people's perceptions

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Climate is the average weather of an area over a period of time. The Intergovernmental Panel on Climate Change (IPCC) defines climate as "the statistical description in terms of the mean and variability of relevant quantities (surface variables such as temperature, precipitation and wind) over a period of time, which can range from a few months to thousands or even millions of years". It also defines climate change as "a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer". Climate change includes not only increasing average temperatures but also extreme weather events: rising sea levels, glaciers melting, changing wildlife populations and habitations and a variety of other impacts.

As the Earth moved out of ice ages over the course of the past few million years, the global temperatures rose by 4℃-7℃. However, anthropogenic factors have led to an increase of 1.09℃ in the average global temperature since the pre-industrial era. As per the climate change prediction models, Earth will warm between 2℃ and 6℃ in the next century and the rate of warming is at least 20 times faster than normal.

What causes changes in climate?

Radiative forcing — also known as climate forcing — is a measure of how changes in factors that affect the climate impact the energy equilibrium of the Earth-atmosphere

system. In simple terms, it is the difference between the rate of energy received by absorption of solar radiation and the rate of energy emitted by the top of the Earth's atmosphere. The term ‘radiative’ refers to the imbalance between the incoming solar radiation and the outgoing infrared radiation and the term ‘forcing’ implies that the unnatural changes are being pushed.

Many factors influence changes in climate over long periods of time. Natural factors that exacerbate radiative forcing are solar variation, unpredictable volcanic eruptions and changes in the carbon cycle. However, the climate change that we are witnessing today is attributed largely to anthropogenic activities. Greenhouse gases, and carbon dioxide in particular, emitted in human activities such as burning of fossil fuels, agriculture, etc are a major contributor to the radiative forcing. Land use patterns also contribute to the forcing and increase the global temperature of the planet.

Impacts of climate change:

Climate change caused by the global increase in temperatures triggers multiple negative impacts on the planet, and these impacts are interconnected more often than not. Ice melting at the Earth’s poles due to warming is adding to the sea-level rise. Global sea levels are increasing 3.2 millimeters a year and the rate is only increasing with time.

The temperatures also impact the wildlife and their habitats. From migration to extinction, climate change is shrinking the biodiversity. Extreme weather events, which have become more frequent and graver than ever, are also an impact of the changing climate — floods, droughts, wildfires, cyclones are likely to become even stronger with the average temperature increase.

Inevitably, the vulnerable populations — defined by geography or socio-economic conditions — are worst-hit by these impacts.

Case Study: People’s Perception of Climate Change and its impact in the rural areas near Gandhinagar, Gujarat

A study was conducted to understand people’s perception towards climate change, its impact on their daily lives and their perception towards the responses required to overcome impacts of climate change in rural areas. This study was conducted by Ms

Shivani Raval, as a part of M. Sc. in Climate Change and Sustainable Development (2020), Central University of Gujarat, under the supervision of the author of this article.

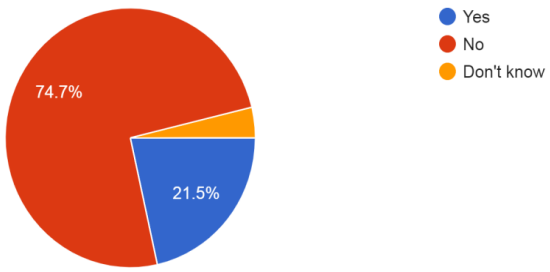
The data was gathered from 130 households in two villages - Tintoda and Kakanu Tarapur near Gandhinagar City (Capital of Gujarat) by separately interviewing individual members of each household. Separate groups for women, youth and senior citizens were made. The response of each participant against each statement was recorded. The data was collected through a structured questionnaire on climate change. The questions used for data collection included whether the respondent has noticed long-term changes in climate and/or change in the status of the area's natural resources over the years. Informal discussions were also held to understand their views, experiences, strategies and other relevant information.

The responses of participants on knowledge of climate change, its impacts and adaptive strategies, if any, was gathered through personal interviews, field observation and secondary data.

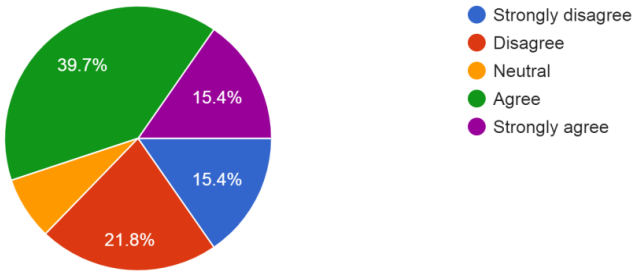
The demographic profile (age, education, gender, education, etc.) was recorded for result interpretation and correlation development. The primary occupation of the community at the selected sites was farming (local vegetable vendors), involved in dairy (milk distribution to Amul/ Madhur Dairy Cooperatives) and few of the villagers were in the government jobs with the Government of Gujarat.

Observations from the Study

- 74.7 per cent respondents across the study sites were not aware of the term climate change.

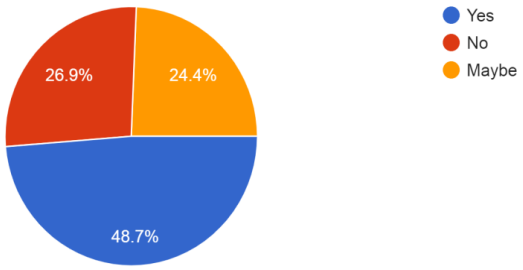


- Only 38 per cent respondents agreed on the occurrence of climate change.
- A majority of the respondents (78.2 per cent) felt that climate change will not affect them personally.
- Most of the respondents reported observing unpredictable rainfall patterns over the last 10 years.
- 56.4 per cent respondents thought that climate change cannot be tackled. On the other hand, 17.9 per cent of them thought that climate change can be tackled by controlling pollution, reducing GHG emissions and tree plantation.
- Almost 55 per cent respondents said that they would agree to reduce their energy consumption if it contributes to mitigating climate change.



- 56.4 per cent respondents believed that human activities have no significant impact on global temperatures.
- 41.8 per cent respondents reported feeling scared about climate change.
- A majority of respondents (66.7 per cent) believed that the main cause of climate change is the pollution from industries.

- 48.7 per cent respondents thought that it is too early to say if climate change is really a problem.



The study reveals that…

- The area is likely to be impacted by climate change. It was evident in the interactions that there was limited awareness, knowledge, and capacity at the local level to understand climate change scenarios, address issues, and conduct long-term planning.
- While the respondents shared their experiences of climate conditions, most of them were not aware of climate change as a global environmental issue. They understood rainfall patterns and variations in the temperature well. It can be inferred that while the respondents were aware of the environmental shifts around them as discrete changes, the linkages to the larger global problem were missing in their interactions.
- Over the last 10 years, data shows rainfall is characterised by significant annual variability with a substantial decrease in the amount of rainfall and increase in temperature. The responses reported by local people on climate variability is in line with climatic data records. The impacts observed included declining crop productivity and an increase in the outbreak of disease and pests.
- Erratic rainfall patterns contributing to soil erosion, soil fertility loss, and crop damage are having an adverse impact on livelihoods of most of these communities, thus increasing food insecurity. A few instances of climate

adaptation in agriculture were observed such as changes in cropping pattern and choices of crops as per the weather conditions.

Way Forward

- The findings highlight the need for awareness on climate change and its impact on everyday lives, thus providing the direction for sustainable strategies to empower the communities to understand climate change scenarios, address issues, and conduct long-term planning for mitigation and adaptation.
- People's perception of the issues is key to enhancing the understanding of the actual scenario of climate change and community participation.
- The collective knowledge of the community of the environmental issues could be useful for policy planning at the local scale and may even contribute at the global level.

Teacher Aide

Activity Ideas

1. Field survey and interaction with local communities to understand the vulnerabilities at the local level and the adaptation strategies devised by them
2. Laboratory experiment: Studying the impact of CO_2 increase on plant growth and yield

Project Suggestions

Analysis of meteorological data to establish changes in climate patterns such as temperature, rainfall, humidity, wind patterns and other climatic variables.

Relevant teaching resources:

1. https://www.ipcc.ch/report/sixth-assessment-report-cycle/
2. https://climate.nasa.gov/solutions/adaptation-mitigation/
3. https://www.un.org/en/climatechange/cop28

4. https://doi.org/10.1073/pnas.1717312115
5. https://www.downtoearth.org.in/weather_disasters_india/
6. https://www.cseindia.org/the-numbers-behind-climate-change-11033
7. https://www.cseindia.org/the-first-global-stocktake-11935

Syllabus tracker

This article is relevant for the following topics from the UGC syllabus for Environmental Studies:

Unit 6. Social Issues and Environment

- Climate Change- case studies

About the Author

Prof Bhawana Pathak is working in the School of Environment and Sustainable Development, Central University of Gujarat since 2011. She has more than 20 years of research and teaching experience in the specialised areas of environmental ecology, biodiversity conservation and climate change. She has published more than 70 research papers in reputed journals, 30 book chapters, and four books with international publishers, She has also contributed to innovative research work in the specialised areas for future policies. 12 doctorates and 14 M.Phil degrees have been awarded under her guidance in the thrust area of Environment and Sustainable Development. She is a recipient of the Outstanding Faculty Award in Bio Science & Technology.