International Journal of Community Medicine and Public Health
*Dey AK et al. Int J Community Med Public Health. 2026 Jan;13(1):150-155*
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: https://dx.doi.org/10.18203/2394-6040.ijcmph20254246

**Original Research Article**

# Perceptions and responses to climate change: a community-based study in Assam, India

**Ajit K. Dey[1]*, Euni Gogoi[2], Nivedita Dasgupta[3], Jyotika Sharma[3], Rajarshi Bhowal[3], N. Baishnab[3]**

[1]Department of Community Medicine, Silchar Medical College, Silchar, Assam, India
[2]Department of Environment Science, Assam University, Silchar, Assam, India
[3]MRU, Silchar Medical College, Silchar, Assam, India

**Received:** 30 November 2025
**Revised:** 08 December 2025
**Accepted:** 10 December 2025

***Correspondence:**
Dr. Ajit K. Dey,
E-mail: drajit.smc@gmail.com



## ABSTRACT

**Background:** Assam is among India's most climate-sensitive regions, facing rising temperatures, erratic rainfall, floods, and landslides. These environmental changes significantly affect health, livelihoods, agriculture, and access to essential services. Understanding community perceptions and responses is crucial for designing effective, locally appropriate climate-adaptation strategies. This study aimed to assess community awareness and perceptions of climate change, its impacts on health and livelihoods, and the coping and adaptation strategies used by households in five climate-vulnerable districts of Assam.

**Methods:** A community-based cross-sectional mixed-methods study was conducted in Cachar, Hailakandi, Karimganj, Dima Hasao, and Karbi Anglong districts between May and November 2024. Quantitative data were collected from 200 participants using a structured questionnaire covering socio-demographic characteristics, climate awareness, perceived environmental changes, climate-linked health issues, and adaptive capacity. Six focus group discussions were conducted to capture qualitative insights. Quantitative data were analysed using descriptive statistics and logistic regression; qualitative data were analysed thematically and triangulated with survey findings.

**Results:** Of the participants, 65% were aware of climate change, with education emerging as a strong predictor of awareness (aOR=2.8, 95% CI: 1.3–6.2). A large majority (88%) reported more intense heatwaves, and 90% noted an increase in summer diseases. However, only 35% perceived increased disease during the rainy season. Respondents reported significant impacts on agriculture, water availability, livelihood stability, and healthcare access during floods and landslides. Qualitative findings reinforced these perceptions and highlighted limited knowledge of early warning systems and government adaptation measures.

**Conclusions:** Climate variability significantly affects health and livelihoods in Assam. Strengthening climate-resilient health systems, improving risk communication, and integrating local knowledge into adaptation planning are essential.

**Keywords:** Climate change, Community perception, Health impacts, Adaptation, Assam, Heatwaves, Livelihood vulnerability

## INTRODUCTION

Climate change has become a major global problem, affecting vulnerable communities in developing countries the most. Assam, situated in Northeast India, faces has been experiencing frequent floods, erratic rainfall, increase in temperature, over the years, making it one of the most climate-sensitive states in the country.[1,2] Local communities, particularly those dependent on agriculture and natural resources, experience these changes. Climate change and variability is one of the major sources of risk to them.[3,4] In Assam, some studies investigate how farmers diversify their practices to deal with floods and protect themselves from flood risks.[5-8] These climatic changes not only threaten livelihoods but also have far-reaching effects on health, food security, and socio-economic stability. Communities in Assam depend on diverse source of livelihood, such as farming, fishing, and forest resources. Changing in climate directly impact these activities, affecting income, food availability, and overall wellbeing. Understanding local perception of climate change is important as they shape their ability to recognize risks, react to climate impacts take steps to deal with and adapt to challenges.

Previous studies have highlighted that climate change has significant impacts on human health, including increased prevalence of vector-borne and water-borne diseases, heat-related illnesses, malnutrition, and other health risks. Small changes in temperature or precipitation have a profound effect on the transmission of disease and the persistence of chronic illnesses.[9-12] Climatological research over the past two decades has shown that the build-up of greenhouse gases in the atmosphere is driving changes in Earth's climate. The rapid rise in temperature, approximately 0.5ºC since the mid-1970s, is largely linked to human-induced increases in greenhouse gas emissions. Our recent review synthesized the effects of climate change on human health, demonstrating that rising temperatures, altered rainfall patterns, and extreme weather events exacerbate disease burden and disrupt healthcare access.[13]

In addition to these health impacts, it is crucial to understand community perceptions of climate change, as local understanding shapes both immediate coping strategies and long-term adaptation measures. Communities' observations of changes in temperature, rainfall, and the frequency of floods or droughts influence how they respond to risks affecting their health, livelihoods, and overall well-being. Studying these perceptions helps to understand the challenges faced by the strategies they use to manage and adapt to these risks the factors that limit effective adaptation, and the kind of assistance they seek from government and other organizations.

The present study therefore aimed to document community perceptions of climate change, its impacts on health and livelihoods, and local responses in five climate-vulnerable districts of Assam. Our findings can inform climate change policies for vulnerable communities. Incorporating local perceptions and coping strategies is crucial to ensure that interventions are appropriately targeted and effectively implemented.

## METHODS

This community-based cross-sectional mixed-methods study was carried out in five districts of Assam; Cachar, Hailakandi, Karimganj, Dima-Hasao, and Karbi Anglong between May and November 2024. The districts were purposively selected because they represent highly climate-vulnerable zones; the Barak Valley districts (Cachar, Hailakandi, Karimganj) are flood-prone and frequently affected by erosion, while the hill districts (Dima-Hasao and Karbi Anglong) are characterized by landslides, and rainfall variability.

Ethical approval for the study was obtained from the Institutional Ethics Committee of Silchar Medical College and Hospital. Written informed consent was obtained from all participants prior to data collection. For participants unable to read or write, verbal consent was documented with the assistance of a witness.

### *Inclusion criteria*

Inclusion criteria included adults aged 18 years and above residing in the selected villages of the five districts (Cachar, Hailakandi, Karimganj, Dima Hasao, and Karbi Anglong). Residents who had been living in the community for at least one year, ensuring adequate exposure to local climatic conditions. Individuals willing to participate and able to provide written or verbal informed consent and participants from diverse occupational backgrounds including farmers, tea garden workers, daily wage labourers, and household workers.

### *Exclusion criteria*

Exclusion criteria included individuals below 18 years of age, temporary residents, migrants, or persons living in the village for less than one year, individuals with severe illness, cognitive impairment, or communication difficulties that interfered with their ability to respond and those unwilling or unable to provide informed consent.

A quantitative household survey was conducted using a structured questionnaire developed specifically for this study, informed by previous literature on climate change and health perception studies. The questionnaire captured information across several category, socio-demographic and household characteristics (age, sex, marital status, family structure, education, caste, religion, occupation, income, housing type, assets, landholding, livestock, access to water and sanitation, cooking fuel, and health insurance coverage); and general environmental concerns, where participants were asked to rank issues such as air pollution, flooding, poor waste management, climate change, and resource depletion; exposure, including awareness of climate change, perceived environmental changes over the last 20 years, changes in weather patterns, health problems attributed to climate variability, and access to healthcare during emergencies; sensitivity, which assessed whether participants experienced extreme weather events (heatwaves, floods, droughts), observed climate-related health issues (respiratory, cardiac, or waterborne diseases), or noted impacts on agriculture and livelihoods; and adaptive capacity, which explored preparedness measures such as early warning awareness, disease prevention strategies, and perceptions of government policies on climate change mitigation.

***Sample size and sampling technique***

*Sampling technique*

A multistage sampling approach was used.

*Stage 1 – district selection*

Five climate-vulnerable districts were purposively selected based on documented flood-, landslide-, and rainfall-variability risks.

*Stage 2 – village selection*

From each district, villages were selected purposively to represent rural, climate-exposed communities (flood-prone in Barak Valley districts and landslide-prone in hill districts).

*Stage 3 – participant selection*

Within each village, households were selected using systematic random sampling, and one eligible adult from each household was interviewed.

If two members were eligible, one was selected using the Kish grid method.

*Sample size calculation*

The sample size was calculated using the standard formula for estimating a single population proportion

Sample size $= N + Z^2 p(1-p)/d^2$

Where, Z=1.96 for 95% confidence, p=0.5(expected awareness of climate change from prior regional studies), and d=0.07 (margin of error).

Considering possible non-response, the sample size was rounded to 200.

Respondents were asked 'whether they had experienced, observed or witnessed given climate-change related indicators'. Provided options to the respondent were 'yes', 'no', and 'don't know'. Multiple-choice, and Likert-scale items. The qualitative component of the study consisted of focus group discussions (FGDs), total six FGDs conducted in each district. Each FGD included 10–15 participants drawn purposively to ensure diversity in age, gender, occupation, and socioeconomic status, including farmers, daily laborers, community leaders, and health workers. The FGD explored local perceptions of climate change, observed impacts on health and livelihoods, coping and adaptation strategies, challenges in adaptation, and expectations from government and institutions. Discussions were conducted in local languages, facilitated by trained moderators, and audio-recorded with consent. Transcripts were translated into English for analysis.

Quantitative data were entered into Excel and analyzed using descriptive and inferential statistics to summarize household characteristics and perceptions by using statistical package for the social sciences (SPSS) software version 22. Qualitative data from FGDs were analyzed thematically. Triangulation of quantitative and qualitative findings was performed to ensure validity and to provide a comprehensive understanding of community perceptions and responses to climate change. Findings from both quantitative and qualitative data were compared to make the results more reliable and to better understanding of community perception and responses to climate change.

## RESULTS

A total of 200 respondents participated in the study, including both male and female residents from rural villages. Most respondents were daily wage laborers and tea garden workers with low levels of formal education and income. Out of the total participants, 65% reported being aware of climate change and its possible impacts, while 35% were not aware. Awareness was found to vary with socioeconomic factors such as education, occupation, and income. Logistic regression was applied to examine the relationship between education and awareness of climate change (Table 1).

The analysis revealed that education was significantly associated with awareness levels. Literate respondents were four times more likely to be aware of climate change compared to illiterate respondents (OR=4.01, 95% CI: 1.77–9.08). After adjusting for age, gender, occupation, and income, education remained a significant predictor (aOR=2.8, 95% CI: 1.3–6.2), indicating that higher educational attainment independently contributed to greater awareness of climate change.

Occupational type also showed an association with awareness. Respondents engaged in government or private service were more likely to be aware than daily wage laborers (aOR=1.9, 95% CI: 1.02–3.5). However, gender and age did not show significant associations with awareness levels ($p>0.05$) (Table 2).

A large majority of respondents reported perceiving changes in the local climate and their potential health impacts (Figure 1). About 88% of respondents stated that they had experienced more intense heatwaves compared to previous years, while only 8% disagreed and 3% were uncertain.

When asked about disease occurrence across different seasons, 90% of respondents reported an increase in the number of diseases during the summer months, and 67% observed an increase during the winter season.

In contrast, only 35% believed there was an increase in disease incidence during the rainy season, while 60% disagreed.

**Table 1: Logistic regression analysis for awareness on climate change with associated factors.**

| Variables | aOR (Adjusted Odds Ratio) | 95% CI | P value |
|---|---|---|---|
| **Sex** | | | |
| Male | 1 | — | — |
| Female | 1.34 | (0.78–2.30) | 0.28 |
| **Age group (years)** | | | |
| <20 | 1 | — | — |
| 20-45 | 1.67 | (0.72–3.82) | 0.23 |
| >45 | 2.41 | (1.03–5.62) | 0.04* |
| **Education level** | | | |
| Illiterate | 1 | — | — |
| Literate (primary and above) | 1.89 | (1.02–3.51) | 0.04* |
| **Occupation** | | | |
| Daily labour | 1 | — | — |
| Tea garden worker | 0.84 | (0.41–1.72) | 0.63 |
| Agriculture | 1.95 | (0.89–4.25) | 0.09 |
| **Type of house** | | | |
| Kachha | 1 | — | — |
| Semi-pucca | 1.72 | (0.81–3.67) | 0.15 |
| Pucca | 3.24 | (1.28–8.21) | 0.01* |
| **Economic level** | | | |
| Poor | 1 | — | — |
| Mid-level | 2.1 | (1.02–4.33) | 0.04* |
| High | 3.85 | (1.20–12.31) | 0.02* |

*p<0.05, statistically significant at 95% CI

**Table 2: Logistic regression analysis of associated factors (after adjusting for age, gender, occupation, and income, education).**

| Variables | aOR (adjusted odds ratio) | 95% CI | P value |
|---|---|---|---|
| **Sex** | | | |
| Male | 1 | — | — |
| Female | 1.62 | (0.89–2.96) | 0.11 |
| **Age group (years)** | | | |
| <20 | 1 | — | — |
| 20-45 | 1.45 | (0.63–3.32) | 0.38 |
| >45 | 2.82 | (1.19–6.70) | 0.02* |
| **Education level** | | | |
| Illiterate | 1 | — | — |
| Literate (primary and above) | 1.76 | (1.01–3.09) | 0.04* |
| **Type of house** | | | |
| Kachha | 1 | — | — |
| Semi-pucca | 1.92 | (0.82–4.45) | 0.13 |
| Pucca | 3.58 | (1.31–9.80) | 0.01* |
| **Economic level** | | | |
| Poor | 1 | — | — |
| Mid-level | 2.33 | (1.02–5.31) | 0.04* |
| High | 4.42 | (1.28–15.26) | 0.02* |

*p<0.05, statistically significant at 95% CI

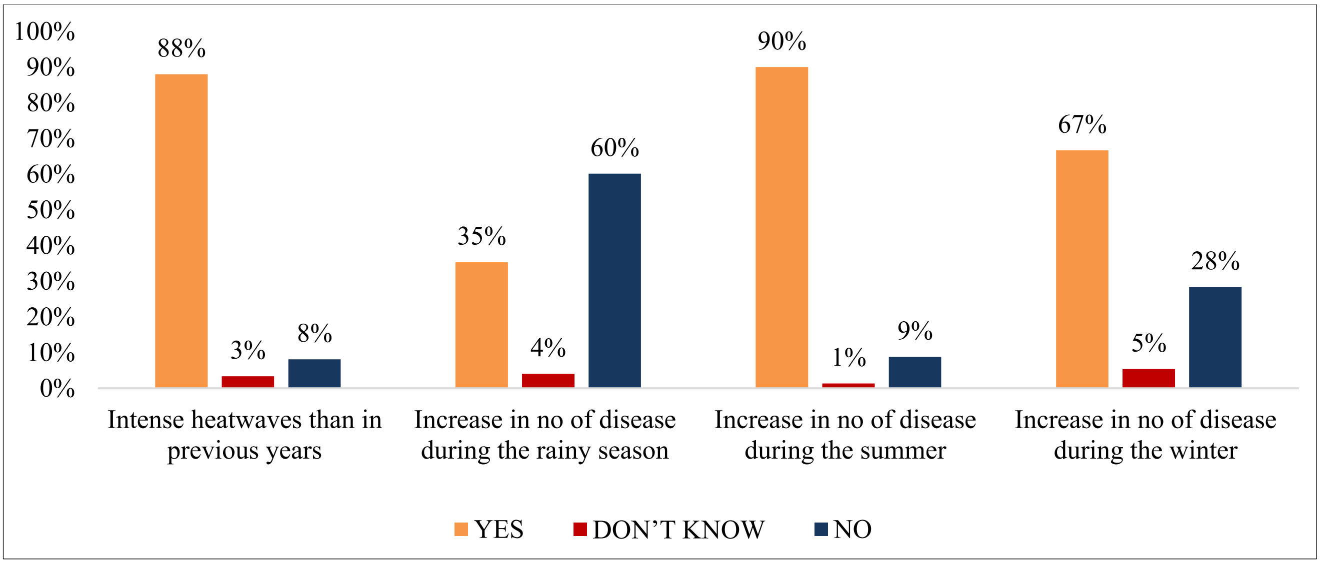


**Figure 1: Perceiving changes in the local climate and their potential health impacts.**

These findings suggest that most community members are aware of the link between rising temperatures and higher disease occurrence, particularly during hot and dry months. However, a smaller proportion recognized health risks during the rainy season, which may indicate limited understanding of vector-borne or water-related diseases associated with rainfall.

## DISCUSSION

The present community-based mixed-method study conducted in five climate-vulnerable districts of Assam highlights a high level of perceived climatic changes among local populations, with clear recognition of rising temperatures, increasing frequency of heatwaves, and related health impacts.

About 88% of respondents reported experiencing more intense heatwaves, and 90% perceived an increase in diseases during summer months, indicating strong community awareness of heat–health linkages. These observations are consistent with global evidence showing that elevated temperatures and extreme heat events significantly increase morbidity and mortality.[10] Similar findings from Portugal show substantial increases in heat-related deaths under warming scenarios reinforcing the universality of heat-health risk perceptions.[11]

A significant finding of this study is the key role of education in shaping climate awareness. Literate respondents were four times more likely to be aware of climate change compared to illiterate individuals, even after adjusting for demographic and socio-economic factors. This aligns with previous studies indicating that education enhances risk recognition, information access, and adaptive behaviour, especially in vulnerable populations. In climate-sensitive regions like Northeast India, where livelihoods are dependent on agriculture, forests, and natural resources, low education can exacerbate climate vulnerability by limiting access to knowledge-based adaptation strategies.

Community reports of increased heat, erratic rainfall, and associated livelihood disruptions closely reflect historical and recent climatic anomalies in the region. Northeast India, although known for its high rainfall, has experienced increasing rainfall variability, frequent drought-like conditions, and shifting monsoon patterns over the past decades.[14] Such climatic fluctuations have serious implications for agriculture—the primary livelihood in many study areas—and for health outcomes through malnutrition, water scarcity, and stress-related illnesses. These community narratives therefore align with both meteorological analysis and agricultural studies demonstrating the region's heightened sensitivity to extreme climatic events.

Despite high awareness of temperature-related disease risks, only 35% of participants perceived increased disease during the rainy season. This gap suggests that knowledge about vector-borne and water-borne diseases—known to increase with rainfall fluctuations—is limited. Global evidence shows that warming and altered precipitation patterns can expand the transmission window for diseases such as malaria, dengue, cholera, and diarrhoeal diseases.[10]

Community underestimation of rainy-season health risks may therefore hinder timely prevention and response, underscoring the need for targeted risk communication and health education.

Qualitative findings further emphasize that participants directly associate climatic changes with declining farm productivity, water scarcity, food insecurity, and evolving disease patterns. These perceived risks mirror broader studies documenting climate-driven challenges in agriculture, fishery, and natural ecosystems in Northeast India.[14] Many respondents also reported difficulties accessing healthcare during floods or landslides, highlighting the compound vulnerability created by environmental hazards and health system limitations.

In terms of adaptive capacity, awareness of early warning systems, government policies, and preventive strategies was limited among most respondents. Similar capacity gaps have been highlighted in global health impact assessments, which stress that while climate change awareness may be increasing, actionable adaptation remains constrained by socio-economic and infrastructural challenges.[11] Our findings reinforce the need for strengthening community-level adaptation plans, improving communication networks, and integrating climate–health messages into existing public health programs.

Overall, the study contributes valuable evidence from a region that remains underrepresented in climate–health perception research. By triangulating quantitative and qualitative findings, it offers a comprehensive understanding of how vulnerable communities perceive, interpret, and respond to climate variability. These insights are critical for designing localised, culturally appropriate adaptation strategies in Assam's climate-sensitive zones.

## CONCLUSION

This study demonstrates that communities across climate-vulnerable districts of Assam clearly recognize ongoing climatic changes, particularly rising temperatures and increased heat-related illnesses. Education emerged as a strong predictor of climate change awareness, pointing to the critical role of literacy and information access in shaping adaptive capacity.

## ACKNOWLEDGEMENTS

Authors would like to thank ICMR faculties who have contributed significantly in development of protocol for carrying out the project work. They acknowledge all community members, health functionaries and other stakeholders from all 5 districts who have offered their valuable cooperation and insights during the conduct of field work.

*Funding: The study was funded by ICMR PM-ABHIM*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Deka RL, Mahanta C, Nath KK. Trends and fluctuations of temperature regime of Northeast India. In: Impact of Climate Change on Agriculture. ISPRS Archives. 2009;XXXVIII-8/W3.
2. Begum A, Mahanta R. Adaptation to climate change and factors affecting it in Assam. Indian J Agric Econ. 2017;72(3):446-55.
3. De UK, Bodosa K. Crop diversification in Assam and use of modern inputs under changing climatic condition. J Climatol Weather Forecasting. 2015;2(2).
4. Nath KK, Deka RL. Climate change and agriculture over Assam. In: Rao GGSN, Rao GSLHV, Rao PVUM, editors. Climate Change and Agriculture over India. Eastern Economy Editions. 2010:224-43.
5. Goyari P. Flood damages and sustainability of agriculture in Assam. Econ Polit Wkly. 2005;40(26):2723-9.
6. Mandal R. Flood, cropping pattern choice and returns in agriculture: a study of Assam plains, India. Econ Anal Policy. 2014;44(3):333-44.
7. Purkayastha G. Dynamics of Indian Economy. Kalyani Publishers. 2015.
8. Chaliha S. Climate variability and farmer's vulnerability in flood prone district of Assam. Int J Climate Change Strateg Manag. 2012;2(2):179-200.
9. Singh KP, Dhiman CR. Climate change and human health: Indian context. J Vector Borne Dis. 2012;49.
10. Patz JA, Olson HS. Climate change and health: global to local influences on disease risk. Ann Trop Med Parasitol. 2006;100(5-6):535-49.
11. Casimiro E, Calheiros J, Santos FD, Kovats S. National assessment of human health effects of climate change in Portugal: approach and key findings. Environ Health Perspect. 2006;114(12):1950-6.
12. McMichael AJ, Woodruff ER, Hales S. Climate change and human health: present and future risks. Lancet. 2006;367:859-69.
13. Gogoi E, Baishnab N, Dey AK, Bhowal R, Dasgupta N, Sharma J. Impact of climate change on human health – a systematic review. Int J Res Appl Sci Eng Technol. 2024;12(7):1360-4.
14. Das A, Ghosh PK, Choudhury BU, Patel DP, Munda GC, Ngachan SV, Chowdhury P. Climate change in Northeast India: recent facts and events – worry for agricultural management. ISPRS Archives. 2010;XXXVIII-8/W3.

**Cite this article as:** Dey AK, Gogoi E, Dasgupta N, Sharma J, Bhowal R, Baishnab N. Perceptions and responses to climate change: a community -based study in Assam, India. Int J Community Med Public Health 2026;13:150-5.