THE LIVED EXPERIENCES OF VULNERABLE POPULATIONS IN THE CONTEXT OF EXTREME HEAT

Photo: Nepal Red Cross via IFRC

A COMPREHENSIVE NARRATIVE REPORT BASED ON SURVEY DATA FROM FIVE CITIES IN BANGLADESH AND NEPAL

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LIST OF ABBREVIATIONS AND ACRONYMS

ARC	American Red Cross
BDRCS	Bangladesh Red Crescent Society
BDT	Bangladeshi taka
CSO	Civil society organization
DHM	Department of Hydrology and Meteorology (Nepal)
EAP	Early Action Plan
EWS	Early Warning System
FGD	Focus group discussion
HAP	Heat Action Plan
HH	Household
KII	Key informant interview
km^2	Square kilometres
NGO	Non-governmental organization
NPR	Nepalese rupee
NRCS	Nepal Red Cross Society
ORS	Oral rehydration solution
SME	Small- and medium-sized enterprise
USD	US dollars

1 EXECUTIVE SUMMARY

In South Asia, rising temperatures due to climate change are causing stronger, more frequent and longer heatwaves. These trends are projected to continue in future, increasing the number of heat-related deaths as well as energy demand for cooling. The region's large outdoor workforce is particularly exposed and vulnerable to these dangerous conditions. This study surveyed over 2,000 respondents from five cities in Nepal and Bangladesh to understand the experiences and perceptions of residents living under extreme heat and inform inclusive, responsive and effective heat-risk policies.

The survey confirms that extreme heat is a pervasive and escalating risk, significantly degrading public health, livelihoods and well-being.

> Nearly all respondents (94 per cent) reported experiencing dangerous heat and an overwhelming majority perceived themselves as vulnerable.

Extreme heat has an impact on people's health – often mediated by factors like limited electricity supply – and their ability to work. These factors are related and create feedback loops with the heat disrupting sleep; increasing mental health issues, making it more difficult to work; reducing incomes, leading to negative coping strategies like taking out high-interest loans; and reducing people's ability to seek adequate healthcare. Amongst the most vulnerable groups, those with disabilities as well as women stood out as expressing most frequently that they had to make difficult choices between protecting their health during periods of extreme heat and carrying out their daily responsibilities, such as work and caregiving.

Perhaps the most important finding from this research is that there was a strong, positive and statistically significant effect of heat programmes on behaviour change.

> Respondents with exposure to heat interventions in Bangladesh were over *twice* as likely to have changed their behaviour as survey participants from control wards. Crucially, the positive effect was most substantial for the least educated populations, suggesting that efforts to better tailor programmes to this population can lead to the significant uptake of protective measures.

People perceived an action gap. In Bangladesh, only 14 per cent of those surveyed believed that enough was being done, with just 21 per cent feeling that decision-makers understood their needs. Positively, this research also asked people how action can be improved. In particular, early warning systems (EWSs) can be improved by tailoring them to the preferences of vulnerable groups. The study found preferences for receiving information about upcoming maximum temperatures along with protective actions, through channels such as television, social media, emergency alerts and word-of-mouth, with some differences between countries. Further, programmes should target vulnerable subgroups (disabled, sole-earning women) and outdoor

workers that are overlooked by current systems, for example, by utilizing low-literacy channels (radio, miking and visuals).

Policy-makers can take specific action to protect the health, well being and productivity of their communities from extreme heat:

1. Prioritize **financial protection** during heatwaves:
    a. Provide targeted cash/voucher assistance by implementing rapid-response cash or voucher programmes for outdoor workers, daily wage earners and households (HHs) with disabled members.
    b. Use heatwave thresholds to trigger aid distribution.
    c. Regulate predatory lending by enforcing caps on interest rates for emergency loans during heatwaves and expand access to microcredit with flexible repayment schedules to prevent debt cycles.
    d. Develop and enforce worker safety mandates that require employers to provide shaded rest areas, water and mandatory breaks during peak heat hours.
2. Expand **cooling infrastructure** such as shaded public spaces, water points and community cooling centres in markets, schools and transport hubs.
3. Scale **inclusive communication** through accessible, diversified low-literacy channels, community ambassadors and locally trusted networks.
4. Institutionalize **heat resilience** in city planning by directly linking Heat Action Plans (HAPs) to housing upgrades, health system preparedness and livelihood programmes.
    a. Set minimum budget allocations for heat resilience measures within municipal budgets.
    b. Create participatory planning pathways so vulnerable groups can meaningfully shape, implement and monitor HAPs.
5. Reach the **most vulnerable** by delivering heat support directly into people's daily routines and the spaces they already occupy. Prioritize onsite cooling, water and basic health services in high-risk workplaces and public areas, and ensure heat warnings and protective advice are timed and tailored to match daily activities.

Overall, this study provides evidence for increasing investment in heat interventions. While the evidence indicates that interventions are effective, there is also an opportunity to improve them for vulnerable populations, requiring practitioners and policy-makers to listen to and act on the lived experiences of vulnerable people. Lastly, it opens the door to more research on the effectiveness of particular interventions to better protect those most exposed and vulnerable to extreme heat.

2 INTRODUCTION: BACKGROUND AND CONTEXT

Extreme heat is increasingly recognized as one of the clearest and deadliest impacts of climate change affecting people around the world (UN, 2024). Often called the 'silent killer', extreme heat has claimed thousands of lives in recent years; yet there remains a large gap in awareness, planning and coordinated action to reduce its devastating consequences (Kotharkar & Ghosh, 2022). Many of the health impacts associated with extreme heat are preventable through timely and effective communication, the provision of preventive services such as cooling centres, and rapid treatments like first aid, oral rehydration and heatstroke care. Successfully mitigating heat-related hazards requires recognizing the inequitable distribution of heat risks and addressing the disproportionate burden extreme heat places on historically marginalized communities (Deivanayagam *et al.*, 2023).

A survey being conducted with women in Nepalgunj. Photo: NRCS

There have been significant efforts to develop heat mitigation and adaptation strategies across national, regional and local scales. Heat Action Plans (HAPs), risk and vulnerability mapping, and Early Action Protocols (EAPs) aim to protect health and reduce economic losses by integrating the preventative services and care into systematic plans and programmes. While these policy instruments have gained traction, a critical gap remains in assessing whether these interventions effectively reach and benefit vulnerable communities. Without clear insights from vulnerable populations themselves – on their experiences, perceptions and practical needs – these policy instruments risk failing to adequately address inequities or meet community needs. This study seeks to bridge that gap by exploring the lived health experiences and perceptions of people living in extreme heat to inform more inclusive, responsive and effective heat-risk policies.

This research focuses on cities in South Asia – a region where heat risk is rapidly intensifying and action has proliferated in the last ten years, with many cities developing heat-related policies including HAPs, risk maps and EAPs. Given this leadership, this study focuses on three cities in Bangladesh (Bagerhat, Dhaka South and Rajshahi) and two in Nepal (Nepalgunj and Siddharthanagar) that represent a mixture of heat-related interventions and control groups as well as cultural, socioeconomic, climatic and ecological conditions.

3 METHODS

The study was designed to capture the lived experiences and coping strategies of vulnerable urban populations facing extreme heat in South Asia. Five cities were selected across Nepal and Bangladesh, each representing different stages of preparedness and response to heat risks. Nepalgunj and Siddharthanagar in Nepal were chosen as cities with recently developed HAPs, while Dhaka South and Rajshahi in Bangladesh represent cities with varying levels of heat programming and policy tools (Table 1). Bagerhat, with no formal heat-related interventions to date, was included as a control site to allow for comparative insights (Table 1). This mixture of contexts provided a unique opportunity to study both intervention and non-intervention environments.

TABLE 1:
OVERVIEW OF SELECTED CITY CHARACTERISTICS

COUNTRY	CITY	POPULATION	AREA (km²)	INTERVENTION(S)	DURATION
Nepal	Nepalgunj	164,444	85.94	HAP developed in 2023	Actions taken in summer of 2023, 2024 and 2025
Nepal	Siddharthanagar	74,436	36.03	HAP developed in 2024	Actions taken in summer of 2025
Bangladesh	Dhaka South	4,305,063	109.2	Heat EAP	EAP triggered April 2024 with a 7-day lead time
Bangladesh	Rajshahi	555,288	46.48	Heat hotspots identified, heat EAP and HAP under development	Studies shared with municipality; ad hoc actions
Bangladesh	Bagerhat	55,086	15.90	None	None

The research instruments (survey questions, key informant interview guide, focus group discussion guide) were collaboratively developed by the research team to address five key research questions:

1) How do vulnerable populations – as identified in and targeted by existing HAPs and protocols – perceive the challenges they are facing in the context of extreme heat that affect health and economic well-being?
2) What kinds of choices do people make in terms of protective behaviours and/or health-seeking behaviours in places where governments are using policy tools?
3) Are these choices different from places where the policy tools are not deployed? If so, how?
4) What are the best approaches to reach communities with heat-related knowledge and information?
5) What, if any, differences in perception exist between decision-makers and vulnerable populations?

To generate a representative dataset, the team used a two-stage cluster sampling approach. First, municipal 'heat hotspots' were identified at the ward level and clusters were randomly selected proportional to size. Within these clusters, HHs were randomly chosen for survey participation. The target sample size was calculated using Cochran's formula, then adjusted for design effects arising from the clustered approach, resulting in a target of 720 HH responses per city. In Dhaka South and Rajshahi, the sample was further stratified into intervention wards (where heat programmes exist) and control wards (without interventions), to enable direct comparison of outcomes across groups. The final dataset comprised 3,625 HH responses across the five cities.

The survey population reflects notable socioeconomic differences across the sites. For example, Nepal's respondents had higher levels of vulnerability, including greater proportions of outdoor workers, HHs with members living with disabilities, and women as sole-income earners (Table 3, Appendix A). By contrast, Bangladesh's respondents generally reported lower exposure and fewer vulnerabilities, though important within-country differences were also observed between cities and intervention versus control groups. These differences required an analytical approach that adjusted for background characteristics when interpreting the findings.

Quantitative analysis relied on binomial logistic regression models to assess how socioeconomic factors and, in Bangladesh, exposure to heat programmes influenced HHs' experiences and responses to extreme heat. The models controlled for location-specific effects and results were presented as odds ratios for interpretability. Alongside the survey data, the study incorporated focus group discussions (FGDs) and key informant interviews (KIIs) in each city. This qualitative component enriched the findings by providing context, explanations and first-hand accounts of how people experience and adapt to heat, ensuring the analysis was both statistically robust and grounded in lived realities.

A detailed description of the research design, including the rationale for selecting the study cities, survey sample design, composition of the dataset, and methodological approach to the analysis is provided in Appendix A, along with research instruments in Appendix B.

Focus Group Discussions (FGDs) with outdoor workers (rickshaw pullers and daily wagers) in Rajshahi, Bangladesh
Photo: Climate Centre

4 RESEARCH FINDINGS

In this section, the main findings of the research are shared, integrating both the quantitative and qualitative data, across seven themes that together help to answer the research questions.

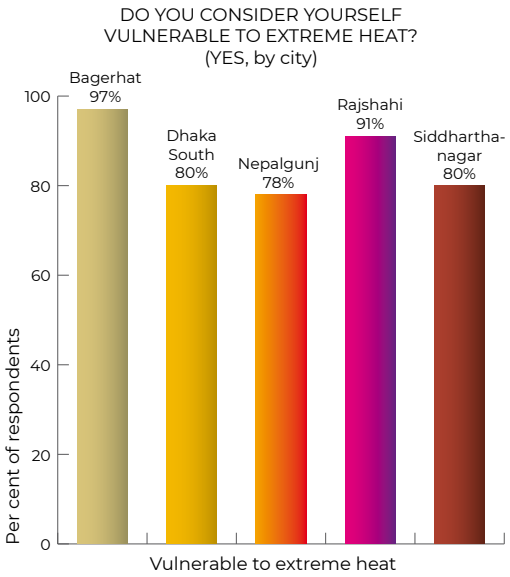
The first three sections (4.1–4.3) focus on people's experiences of extreme heat, their perception of vulnerability and how it relates to their health and economic well-being, helping to answer research question 1. Sections 4.3 and 4.4, including key findings on coping mechanisms and responses to extreme heat as well as reasons for the lack of behavioural change, provide insights for research question 2. Section 4.5 focuses on changes in behaviour linked to policy tools, providing a view into the differences between the intervention and control group, answering research question 3. Sections 4.6 and 4.7 focus on awareness of policy interventions and suggestions that respondents had on making heat-related warnings more effective, providing useful inputs to research question 4. Finally, section 4.7 focuses on policy-makers and the perception of heat as a policy priority, providing important perspectives for research question 5.

4.1 EXPERIENCE OF AND PERCEIVED VULNERABILITY TO EXTREME HEAT

KEY FINDINGS:

- Extreme heat is nearly universally experienced and recognized as a problem. Ninety-four per cent of respondents across the five cities reported experiencing unusual or uncomfortable heat, and 78–97 per cent of respondents considered themselves vulnerable to extreme heat.
- In Bangladesh, the hot season has extended from two to more than five months, with temperatures reaching 42–44°C. Respondents from both countries reported that humidity is lengthening the hot season and nighttime cooling is becoming limited.
- In Nepal, respondents attributed the rising heat to pollution, limited rainfall, a growing number of vehicles, deforestation, industrial activity – particularly in the brick and cement sectors – and dust generated from road construction.
- Vulnerable groups face compounded risks and difficult choices: the elderly, children, pregnant women, outdoor workers and low-income HHs are most at risk. In Nepal, 65 per cent of HHs with a disabled member had to choose between health and daily responsibilities during extreme heat. Female sole-income earners in Bangladesh are 122 per cent more likely to face this dilemma than other respondents.
- Heatwaves cause widespread health, economic and social impacts. Nearly 90 per cent of respondents reported health issues as the main effect of extreme heat, followed by disruptions in electricity supply and loss of income, with poorer HHs disproportionately affected.

FIGURE 1:
RESPONDENTS' PERCEIVED VULNERABILITY TO EXTREME HEAT



Across all five cities surveyed, 94 per cent or around 3,400 respondents reported having experienced periods of unusual or uncomfortable heat. Between 92–100 per cent of respondents across all five cities felt that extreme heat is a problem in their city and between 78–97 per cent believed that they were vulnerable to extreme heat, with Nepalgunj (Nepal) showing the lowest score and Bagerhat (Bangladesh) the highest (Figure 1).

Building on this, participants in the Focus Group Discussions (FGDs) and Key Informant Interviews (KIIs) from Bangladeshi cities perceived that both the intensity and duration of heat have increased. They mentioned that the hot season previously lasted for two to three months but now extends to five or six months, and the sun is harsh from morning until evening. Residents recalled that temperatures used to range from 36–38°C, but now they often reach 42–44°C – conditions they considered rare just five to ten years ago. Participants indicated that increased humidity contributes to frequent feelings of exhaustion and that temperatures typically do not cool down during the night, only beginning to drop around 03:00, limiting people's ability to recover overnight. A multi-city study in Asia (China, Japan and South Korea) found that elevated nighttime temperatures independently increase mortality – the relative mortality risk on days with hot nights could be 50 per cent higher than on days with non-hot nights, because the body never gets to recover (He, C. *et al,* 2022).

During the FGDs and KIIs in Nepal, respondents attributed their experiences of rising temperatures to several factors: pollution, limited rainfall, a growing number of vehicles, deforestation, industrial activity – particularly in the brick and cement sectors – and dust generated from road construction. Urbanization was thought to play a significant role, as homes are often built too closely together, restricting airflow. Interestingly, 84 per cent of HHs in intervention areas in Bangladeshi cities considered themselves vulnerable to extreme heat, compared to 92 per cent in control locations that had not been exposed to heat programme interventions.

> *Five to six years ago, when I was younger, I used to play cricket every day after coming home from school, even on very hot days, and I never felt tired after the game. However, nowadays, I find myself exhausted after just a few minutes of playing or any other physical activity. I believe the temperature has increased drastically and, along with it, humidity has also risen significantly. As a result, we tire more quickly, in my opinion.*
>
> — A youth during an FGD in Ward 64, Dhaka South, Bangladesh

This difference is accounted for almost entirely by respondents from Bagerhat, where 97 per cent of respondents considered themselves vulnerable to extreme heat.

In both countries, participants in the FGDs reported that the most vulnerable groups to heatwaves included elderly individuals, children, pregnant women, homemakers working in kitchens, day labourers, outdoor workers, people with chronic health conditions, rickshaw pullers, farmers, and low-income populations living in tin-roofed houses or densely populated areas. The identified groups were largely similar to the groups listed as most vulnerable in the heat policy interventions in the chosen cities, indicating positive alignment; although further research is needed to understand to what extent the interventions are truly tailored towards these particular populations and whether each population is fully addressed.

These groups are particularly at risk due to their high exposure to extreme heat, reduced ability to regulate body temperature (especially in children and the elderly), lack of rest and access to cool environments (such as cooling centres or shaded areas), inadequate access to water and medical care, and lack of awareness regarding heat-related risks. Additionally, reduced income affects poor individuals' capacity to manage their regular food and healthcare needs. Many cannot afford to stop working, and labourers and rickshaw pullers often continue working despite illness to avoid income loss. Furthermore, respondents highlighted the issue of frequent and prolonged power outages during periods of extreme heat. Residents typically experienced power outages lasting around 2–3 hours at a time during this season. The lack of electricity limited coping options, posing additional stress to their daily lives, making it especially challenging to cope on hot days.

In Bangladesh, homemakers spent prolonged periods of time in poorly ventilated, tin-roofed kitchens, increasing their exposure to high temperatures. Many women wear sarees due to cultural norms, which can add extra heat stress on hot days. Low-income HHs often reside in houses with walls and roofs made from tin in overcrowded environments with limited access to fans and clean water, all of which heightens the heat stress that they face.

Volunteers from the BDRCS are distributing water to rickshaw pullers and explaining how to protect themselves from the extreme heat. Photos: NRCS

In Nepal, respondents mentioned that school students were especially vulnerable as they lack access to cooling facilities, which poses a risk to their health and negatively impacts their education. Classrooms often accommodated 60–70 students at a time with inadequate ventilation systems which left students feeling uncomfortable and unable to concentrate on their studies. This discomfort extended to their homes as well, where the heat made it difficult for them to study.

> *In recent years, we have clearly observed a rise in temperatures. What was once tolerable heat has now become unbearable. Due to the intense sun, it is nearly impossible to go outside during the noon hour. There have been sudden cases of heatstroke occurring. The decrease in trees, filling in of ponds and rivers, and over-extraction of groundwater are all negatively impacting the environment, exacerbating the heat. Outdoor workers are falling ill, school students are afraid to go outside, and even teachers are struggling to conduct classes. Mothers are becoming exhausted while cooking. Additionally, mosquito infestations have increased, resulting in outbreaks of dengue fever, skin diseases, allergies, diarrhoea, and nausea. People are minimizing outdoor activities, bathing multiple times a day, drinking cold beverages, wearing cotton clothing and carrying umbrellas. While awareness is growing, many still do not prioritize taking precautions against the heat.*

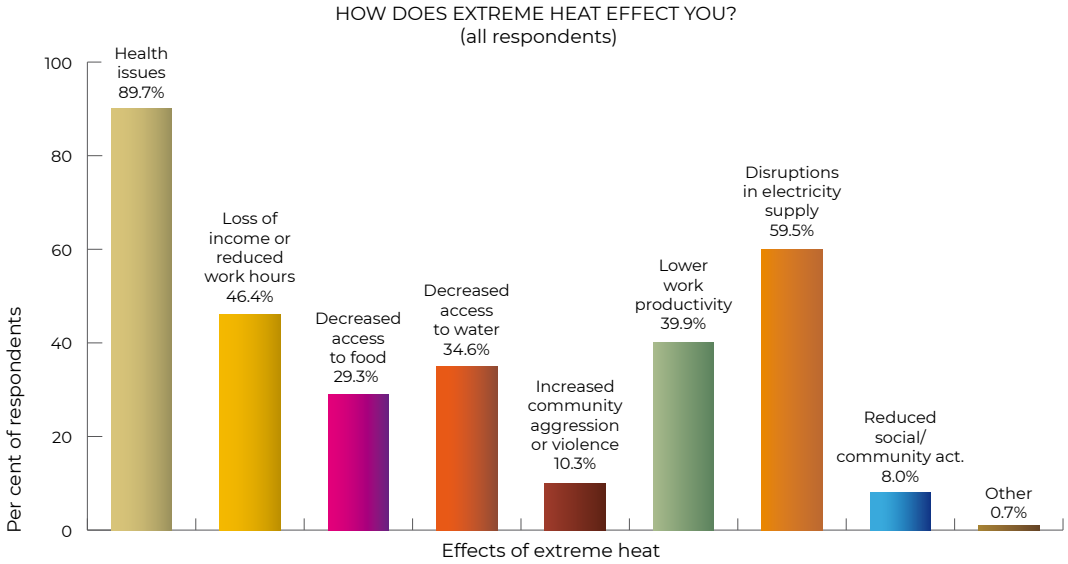
— Women's group participant during FGD in Bagerhat, BangladeshBangladesh

Volunteers from the NRCS are advising a tuk-tuk driver in Siddharthanagar on how to protect himself from the adverse impacts of extreme heat. Photo: NRCS

HOW EXTREME HEAT AFFECTS URBAN POPULATIONS

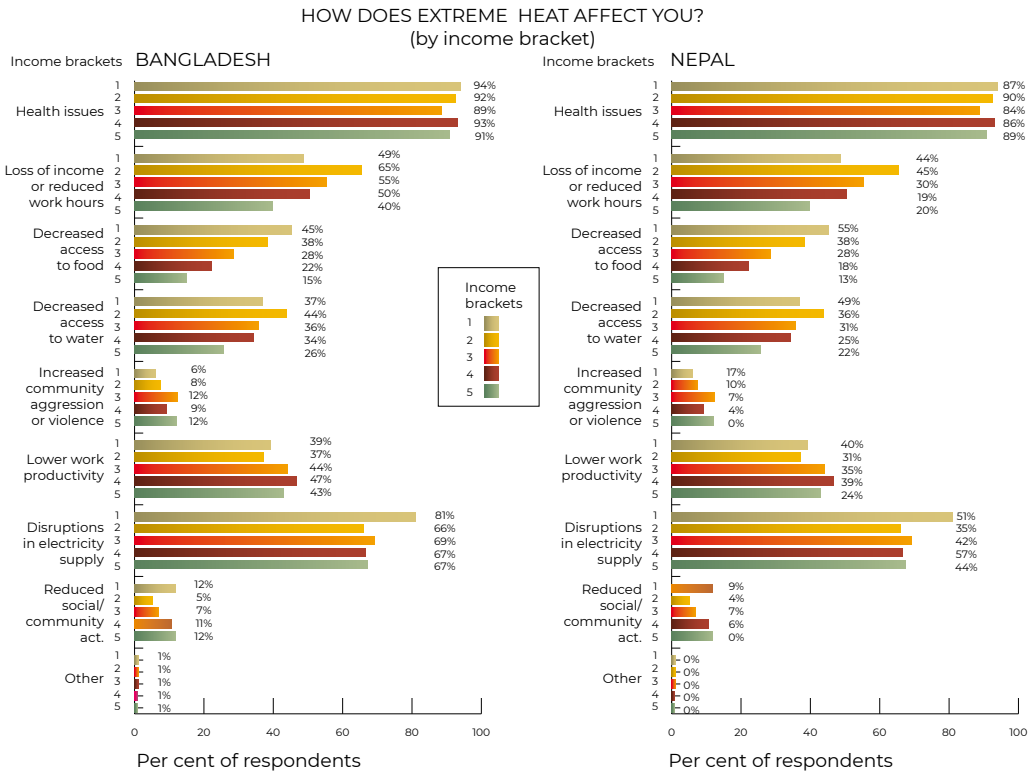
Nine-in-ten respondents (89.7 per cent) reported that health issues were the main effect of the extreme heat they experienced (Figure 2). Disruption in electricity supply (60 per cent) and loss of income or reduced work hours (46 per cent) were the next most-frequently mentioned effects of extreme heat (Figure 2). However, both issues were of greater concern in Bangladesh than in Nepal: 52 per cent of respondents in Bangladesh reported having lost income or working hours because of extreme heat, compared to 36 per cent in Nepal. Sixty-eight per cent of respondents in Bangladesh reported disruptions in electricity supply versus 43 per cent in Nepal. It's important to note that many of these effects are interrelated as the lack of electricity and options to use active cooling can increase the likelihood of health issues, for example. This is intersected by vulnerability as lower income HHs are less likely to be able to afford generators to overcome electricity cuts and are also less likely to be able to afford healthcare in the case of health impacts, highlighting the potential for compounding vulnerability.

FIGURE 2: RESPONDENTS' PERCEPTIONS OF THE IMPACTS OF EXTREME HEAT



Across all cities, a higher proportion of poorer HHs unsurprisingly reported adverse effects of extreme heat than higher income households (Figure 3). However, significant differences emerged between poorer and wealthier income groups regarding other heat-related impacts. In Bangladesh, people in the lowest income bracket (an income bracket is a range of similar incomes with a particular upper and lower limit) expressed the most concern about decreased access to food and water due to extreme heat (Figure 3). Those in Nepali cities exhibited a similar pattern, particularly in terms of decreased access to water, food and loss of income resulting from extreme heat (Figure 3).

FIGURE 3:
THE IMPACTS OF EXTREME HEAT IN EACH COUNTRY DISAGGREGATED BY INCOME BRACKET

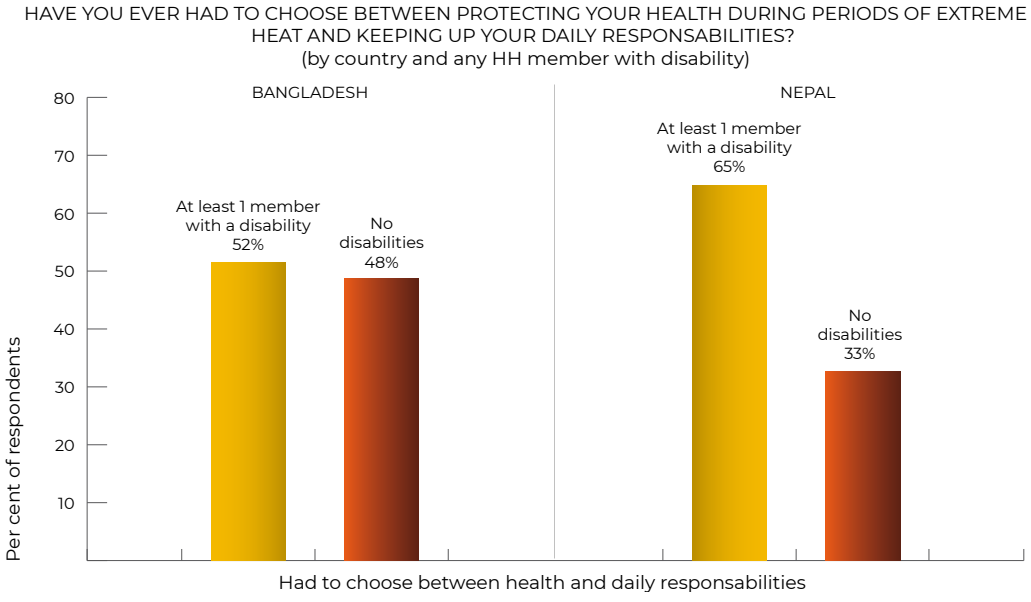


In Nepal, a significantly higher proportion of residents in Nepalgunj reported experiencing impacts of heat than residents in Siddharthanagar. In contrast, there was a less clear distinction in responses regarding heat impacts across the three cities in Bangladesh; rather, the experiences varied based on the type of adverse effects reported.

DIFFICULT CHOICES FORCED BY EXTREME HEAT

Approximately 50 per cent of respondents in both countries reported having to choose between protecting their health during periods of extreme heat and carrying out their daily responsibilities such as work, caregiving and running errands.

FIGURE 4:
RESPONDENTS WHO HAD TO CHOOSE BETWEEN HEALTH AND DAILY RESPONSIBILITIES DISAGGREGATED BY COUNTRY AND HH MEMBER(S) WITH A DISABILITY



HHs with at least one member with a disability were significantly more likely to face this difficult decision, in Nepal, where 65 per cent of these HHs reported having to make this trade-off, compared to 33 per cent of HHs without a member with a disability (Figure 4). Respondents whose HH included a disabled member were approximately 2.2 times more likely to face the difficult choice between prioritizing their health and fulfilling daily responsibilities, compared to HHs without a disabled member.

Additionally, female respondents who were the sole-income earners in their HHs faced a 64 per cent higher likelihood of having to make this choice. In Bangladesh, the percentage change was 122 per cent for females who were the sole-income earners compared to other respondents. This effect was robust even when controlling for other confounding factors.

Dormitory for rickshaw pullers who have relocated from rural villages in search of better livelihood opportunities in Dhaka, Bangladesh. Photo: Climate Centre

Supporting the quantitative findings, women participating in the FGDs in Bangladesh and Nepal reported that their lives became extremely difficult during the peak hot days. They struggled to eat, sleep, earn a living and perform daily activities. Many women found it challenging to stay near the oven to cook meals for their families. Despite their discomfort, they were compelled to continue preparing food, fully aware that they needed rest but unable to escape their household responsibilities.

Men participating in the FGDs in Bangladesh highlighted that social conflict tended to increase during this period. They conveyed that many individuals struggled to get proper sleep at night, while the exhausting heat during the day directly affected their temperament. As a result, people often found themselves in a bad mood, leading to arguments, quarrels and even fights. Additionally, income lost during the hot season created substantial stress on mental health, which can further contribute to increased social conflicts.

> *I live in a tiny tin house with a very low floor height, which makes it incredibly hot inside. There are five people in my family living in this cramped space. We have only one small table fan, which means only one or two of us can find relief from the heat at a time, while the others suffer. We struggle to sleep night after night, and our children often cry from the discomfort. Life is painful for us during the peak hot days.*
>
> — A woman during an FGD in Ward 56, Dhaka South, Bangladesh

4.2 HEALTH IMPACTS

KEY FINDINGS:

- Extreme heat is causing widespread health impacts across all the project cities, with 76 per cent of respondents in Bangladesh and 51 per cent in Nepal reporting health-related illnesses.
- Common heat impacts included sleep disturbances (90 per cent), headaches (73 per cent), dehydration and skin diseases. Frequent fainting, breathing difficulties and even deaths from heatstroke and heart attacks, specifically among outdoor workers, were some of the health factors that participants also highlighted.
- Respondents in Bangladeshi cities required medical attention for heat-related illnesses at a higher rate (55 per cent) than in Nepal (23 per cent). However, few people went to hospitals or clinics for treatment due to cost-related barriers, and instead relied on over-the-counter therapies (through local medicine shops or unqualified practitioners).

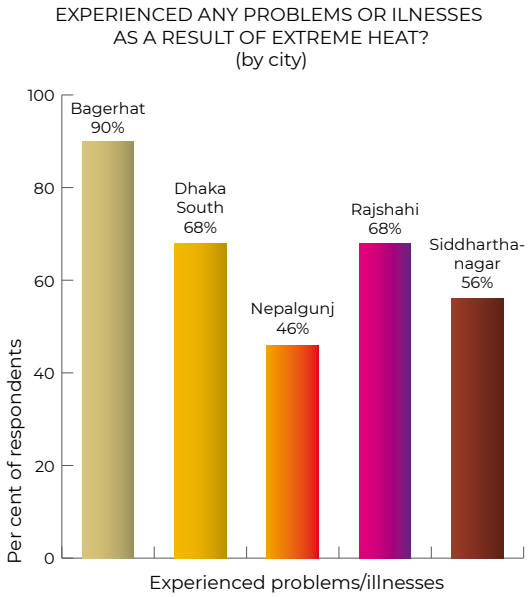
Heat-related illnesses have become a significant concern due to the extreme temperatures in all the cities studied. The survey findings indicated that the proportion of individuals reporting health issues related to extreme heat was much higher in Bangladesh than in Nepal, with rates of 76 per cent and 51 per cent, respectively.

Further examination of the data revealed that in Bagerhat 90 per cent of respondents reported experiencing heat-related illnesses (Figure 5). This was significantly higher than in the other two Bangladeshi cities, Dhaka South and Rajshahi, where the rates were both 68 per cent (Figure 5). In Nepal, a lower proportion of respondents in Nepalgunj (46 per cent) reported heat-related illnesses than the 56 per cent who did so in Siddharthanagar (Figure 5).

According to participants in the FGDs and KIIs in Bangladesh, while a few individuals were previously affected by specific illnesses, the entire community now faces these health challenges during the hot season. For example, skin diseases can be highly contagious; if one person in a HH contracts an infection, it often spreads to others in the family. Similarly, respondents in Nepali cities expressed comparable concerns, noting an increase in various infectious diseases and health issues during periods of extreme heat.

Some of the common heat illnesses in both countries that respondents reported include fatigue, dizziness, diarrhoea/ waterborne diseases, sleep disturbances, excessive sweating, skin diseases (such as rashes, skin allergies and fungal infections), fever, dehydration, vomiting, palpitations and high blood pressure. However, the survey findings indicated that around 90 per cent of respondents named sleeping disorders as the most significant health issue. Headaches were the second most common health issue across countries, reported by 73 per

FIGURE 5: HEALTH EXPERIENCES RELATED TO EXTREME HEAT BY CITY



cent of respondents in both countries. Broadly similar symptoms were reported across the two countries, and these align with research on the health symptoms of extreme heat globally.

Participants in the Bangladeshi FGDs and KIIs felt that the number of people who die due to heatstroke and heart attacks during the peak heat season was high. Bangladeshi FGD participants spoke about a story from June 2025, published in a local newspaper, about a rickshaw puller who was resting in his vehicle and ultimately died there. He remained unattended for 7–8 hours because passersby assumed he was merely taking a break. Eventually, students from Dhaka University discovered that he had passed away. Participants voiced that individuals who work outdoors, including rickshaw pullers, vegetable vendors, street food sellers and cleaners, are particularly vulnerable to heat-related illnesses. Furthermore, they shared that those with high blood pressure and heart conditions find very hot days extremely exhausting and challenging.

Additionally, community members pointed out that incidents of death by drowning tended to rise on hot days in Bangladesh, with more people jumping into bodies of water to cool off. Increased thirst during these days often led individuals to drink unsafe water, frequently without realizing the risk, which increases the likelihood of the transmission of waterborne diseases. There was also a surge in mosquito-borne illnesses such as dengue during periods of extreme heat.

In Nepal, participants in the FGDs reported several cases of fainting during the hot season. They also pointed out that some individuals experienced breathing difficulties on extremely hot days. One respondent shared that a student fainted while taking an examination during one of the extremely hot days. Additionally, some respondents who worked in a factory as daily labourers expressed their overwhelming struggles to work on the hottest days.

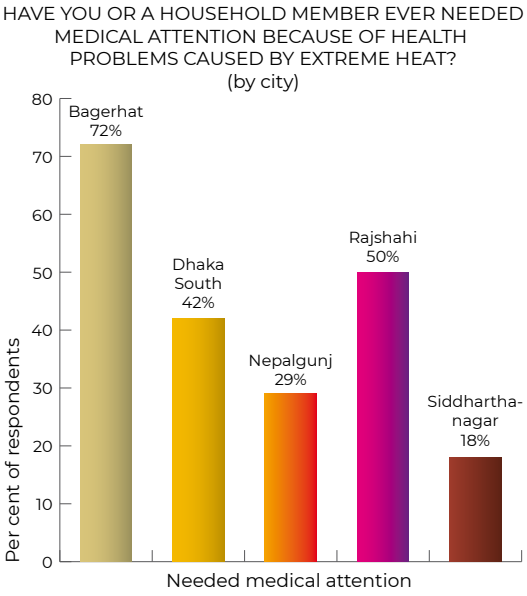
> *We feel exhausted due to the heatwave. We have observed even healthy individuals succumb to strokes during the extreme heat seasons. Some common illnesses during the peak hot days include diarrhoea, severe headaches, elevated pulse rates, high palpitations, breathlessness and skin diseases. There have also been instances of people fainting on the streets during these hot days. Moreover, it's not just the physical effects. Extreme heat makes us irritable, anxious or even sad. We feel like it also slows down our brain function. We face this in every summer.*

— A youth during an FGD in Ward 64, Dhaka South, Bangladesh

Art competition focusing on reducing the impacts of extreme heat in a secondary school in Bangladesh. Photo: BDRCS

The survey findings indicated that the need for medical attention due to heat illness is significantly higher in Bangladesh compared to Nepal, with rates of 55 per cent and 23 per cent, respectively. When examining variations across different cities, Bagerhat shows a particularly high incidence with 72 per cent of respondents reporting a need for medical attention (Figure 6). This is notably higher than other cities in Bangladesh, such as Rajshahi at 50 per cent and Dhaka South at 47 per cent (Figure 6).

FIGURE 6: RESPONDENTS THAT NEEDED MEDICAL ATTENTION BY CITY



Additionally, the binomial logistic regression models reveal that larger HH sizes are associated with a 28 per cent increase in the odds of requiring medical attention. Furthermore, higher education levels correlate with a slightly lower probability of needing medical care in both countries.

The findings from the FGDs present mixed views regarding the community's willingness to seek medical attention for heat-related illnesses.

In Bangladesh, the findings of the FGDs corroborated the survey data analysis. Many community members who participated in the FGDs reported that they sought primary treatment at government hospitals and clinics. However, while they often received free medication, most of the drugs prescribed by doctors in these facilities were beyond their financial means. As a result, many individuals chose to leave their illnesses untreated. Instead, they visited a local medicine shop to purchase over-the-counter medication for relief from symptoms such as fever and headache, opting for a symptomatic treatment approach. Occasionally, they also consulted unqualified practitioners for medicines. The critical barriers towards seeking treatment at hospitals or clinics for heat-related illnesses included cost, distance and time.

In the cities of Nepal, such as Siddharthanagar, outdoor workers – particularly autorickshaw drivers and cobblers – reported that they had never sought medical attention for heat-related health issues. They tended to say that they did not experience any serious health problems but managed minor issues like headaches with over-the-counter medications available at pharmacies. However, women respondents mentioned that they took their children to the hospital for vomiting and other heat-related conditions. There were no reports from Siddharthanagar of individuals lacking access to medical attention after visiting hospitals. Additionally, no specific instances of individuals avoiding care due to barriers were mentioned, although there may occasionally be a shortage of hospital beds. In Nepalgunj, respondents reported regularly visiting the hospital for heat-related illnesses, typically going to Bheri Zonal Hospital for treatment. However, in rural areas, the lack of nearby hospitals was identified as a barrier.

> *If we fall ill during the peak hot days, we sometimes go to the Dhaka Medical College Hospital. However, we can't afford to buy medicines. For example, two pills cost 270 Bangladeshi taka (BDT) [approximately 2.22 US dollars (USD)]; it becomes challenging for us to continue purchasing these medications. Sometimes, we also visit a local medicine shop and get some medicines for temporary relief.*

— Women's group member during an FGD in Dhaka, Bangladesh

Focus Group Discussions (FGDs) with women's groups in Dhaka, Bangladesh. Photo: Climate Centre

4.3 FINANCIAL IMPACTS AND HOUSEHOLD COPING STRATEGIES

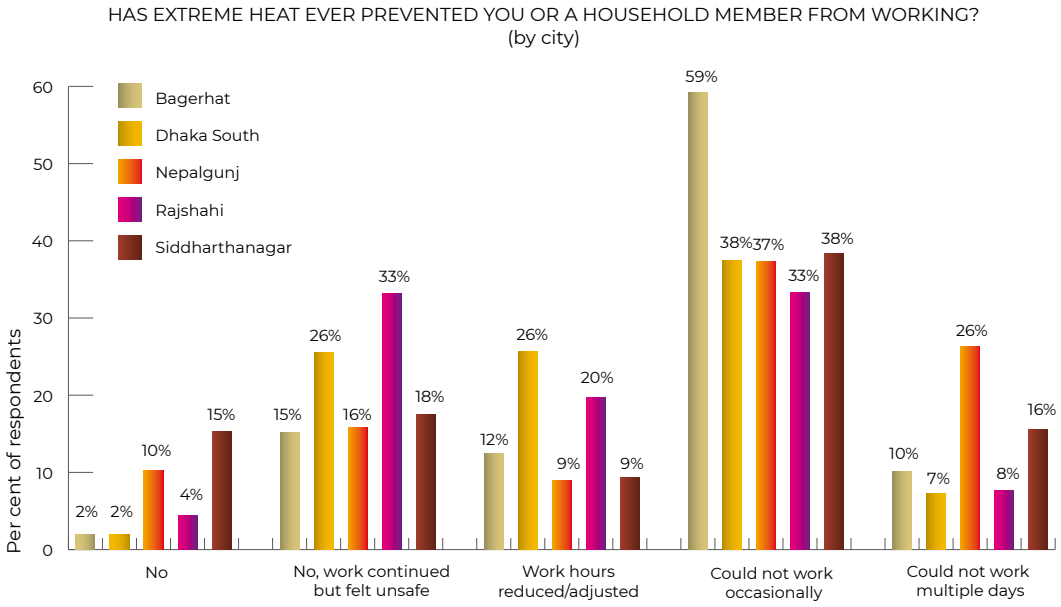
KEY FINDINGS:

- Extreme heat affects livelihoods by reducing working hours, income and productivity, particularly for outdoor and low-wage workers in Bangladesh and Nepal.
- Slightly more than half of the HHs (51 per cent in Bangladesh and 59 per cent in Nepal) reported that heat has prevented them from working.
- HHs with no formal education and those with a disabled member faced the highest risk of financial hardship during extreme heat.
- In Bangladesh, 54 per cent of HHs relied on savings or emergency funds to cope with income losses from extreme heat, while 36 per cent resorted to loans. In Nepal, 36 per cent used savings and 24 per cent borrowed money to manage financial strain during hot periods.

The survey results showed that extreme heat has a significant negative financial impact. Loss of income due to not being able to work during peak hot days was an especially critical effect of extreme heat in both Bangladesh and Nepal.

Slightly more than half of the respondents from both countries reported that heat has prevented them or a household member from working – 51 per cent of respondents in Bangladesh and 59 per cent in Nepal. The impact was strongest in Bagerhat, where 69 per cent of respondents indicated that extreme heat has occasionally or even repeatedly prevented them from working, followed by 63 per cent of respondents in Nepalgunj (Figure 7).

FIGURE 7: PROPORTION OF HH MEMBERS BY CITY PREVENTED FROM WORKING DUE TO EXTREME HEAT



The primary reasons given for the inability to work or reduced working hours were outlined by participants of the FGDs. Outdoor workers and daily wagers such as rickshaw pullers, construction workers, street vendors, porters and contractual employees in small- and medium-sized enterprises (SMEs) struggled to work effectively during peak heat. Many chose to stay at home to avoid the scorching sun. The extreme heat made it difficult for many to sleep well at night, leading to feelings of dizziness, headaches and illness, which often resulted in them missing work.

During very hot days, factories and SMEs frequently experienced prolonged power outages lasting 2–3 hours each time. This disruption led to decreased productivity, causing daily wage earners to face reduced working hours. Agricultural activities were also negatively impacted due to the intense heat and the drying up of water sources. Homemakers found it challenging to carry out household chores, as they quickly became dizzy and fatigued during peak heat days. People preferred to stay indoors and not go out much. As a result, outdoor workers, especially rickshaw pullers, street vendors and shop owners, experienced a decline in customer flow.

> *On very hot days our income goes down substantially, but expenses and loan payments don't stop. It puts a lot of pressure on us mentally. Even if it's hard, we can't afford to skip work because our families depend on it.*

— An autorickshaw driver, Siddharthanagar Municipality, Nepal

BDRCS youth volunteers are conducting heat perception surveys on an extremely hot day. Photo: BDRCS

Sixty-seven per cent of HHs in Bangladesh reported experiencing financial difficulties during recent periods of extreme heat, compared to just 44 per cent in Nepal. In Bangladesh, Bagerhat had the highest proportion of HHs (81 per cent) facing these financial challenges (Figure 8). It is important to note that Bagerhat is a smaller city compared to Dhaka and Rajshahi, which may result in fewer opportunities for income diversification than in other Bangladeshi cities.

Participants in the FGDs in both countries shared their struggles with income loss on very hot days. Outdoor workers in Bangladesh reported a significant income reduction of about 50 per cent. For instance, while a rickshaw puller typically earns between BDT 450–500 [approximately USD 3.70–4.10] on regular days, this amount drops to BDT 200–250 [approximately USD 1.64–2.05] on the hottest days. Expenses rise due to higher electricity bills, increased water consumption and higher medication costs. Similarly, outdoor workers in Nepal expressed that their income decreases significantly on hot days. A cobbler's income, for instance, can fall to around 300–400 Nepalese rupees (NPR) [approximately USD 2.13–2.85], which is much less than their usual earnings. This situation is compounded by the rental obligations of outdoor workers, causing considerable stress and reduced mental well-being. Communities in both countries reported difficulties in securing adequate food for themselves and their families during the hottest days.

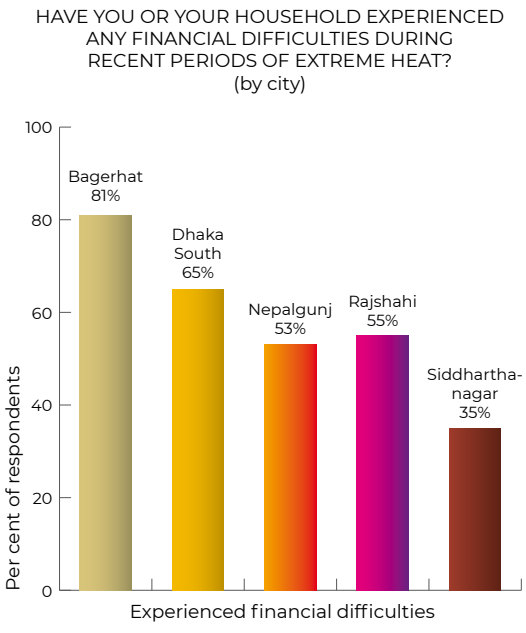
Further analysis reveals that higher incomes and levels of formal education reduce the likelihood of experiencing financial difficulties during extreme heat. Moving up one income bracket decreased the odds of facing these difficulties by 31 per cent. Additionally, advancing one education level (for example, from primary to junior high school) lowered the odds by 19 per cent.

However, the strongest effect was seen in HHs with at least one disabled member – this group was twice as likely to experience financial difficulties during extreme heat compared to HHs without a disability.

Figure 9 shows that respondents with no formal education, on the left of the chart, faced a high probability of experiencing financial difficulties during periods of extreme heat: 93.9 per cent if they had a HH member with a disability, and only slightly less (88.5 per cent) if their HH did not include a disabled member. With increasing levels of education (moving to the right of the chart), HHs without disabilities reduced their risk of experiencing heat-related financial difficulties by over 16 percentage points to 72.3 per cent, while respondents with a disabled family member experienced only a moderately decreased risk with increasing education levels.

This illustrates the importance of tailoring heat programmes to the needs of the most vulnerable, including the illiterate. Disseminating heat warnings via text messages will be ineffective, while posters or pamphlets can only

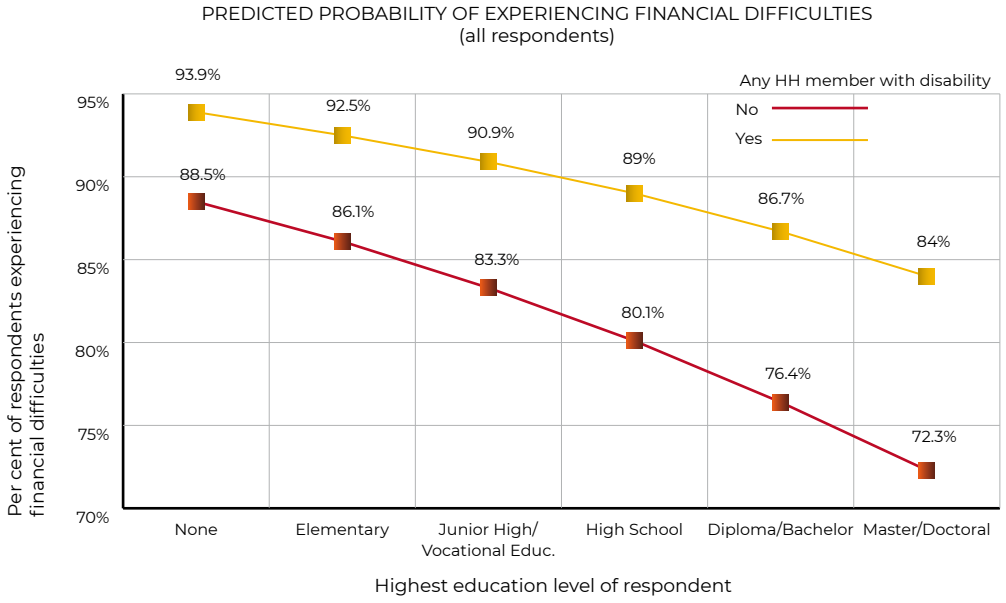
FIGURE 8: RESPONDENTS WHO EXPERIENCED FINANCIAL DIFFICULTIES BY CITY



be understood if they include visual depictions of the impending heat risks, their likely effects and what to do about them.

Interestingly, working primarily outdoors was associated with a 25 per cent reduction in the odds of experiencing financial difficulties. This aligns with the survey results which indicated that working mainly outdoors was associated with a 22 per cent reduction in the likelihood of having to choose between protecting one's health and fulfilling daily responsibilities, as well as a 20 per cent reduction in the odds of experiencing any problems or illnesses due to extreme heat. This effect may be observed because outdoor workers often have no choice but to endure the heat, whereas other categories of workers – those indoors or those who work both indoors and outdoors – can potentially shift to different activities during unusually hot periods.

FIGURE 9: PREDICTED PROBABILITY OF EXPERIENCING FINANCIAL DIFFICULTIES BY EDUCATION LEVEL AND DISABILITY STATUS (ALL RESPONDENTS)



> *During heatwaves, staying cool or resting feels essential, but many of us have daily-wage jobs. Skipping work often means skipping meals. We feel compelled to take risks even on extremely hot days when we don't feel well. Our friend Shafiq, a road repair worker, went to work with rashes on one of those hot days and ended up fainting near Bornali Mor [a neighborhood in Rajshahi]. Kuddus, a rickshaw puller from Kazla, gets nosebleeds every Boishakh [Bengali New Year].*
>
> — Outdoor worker during an FGD in Rajshahi, Bangladesh

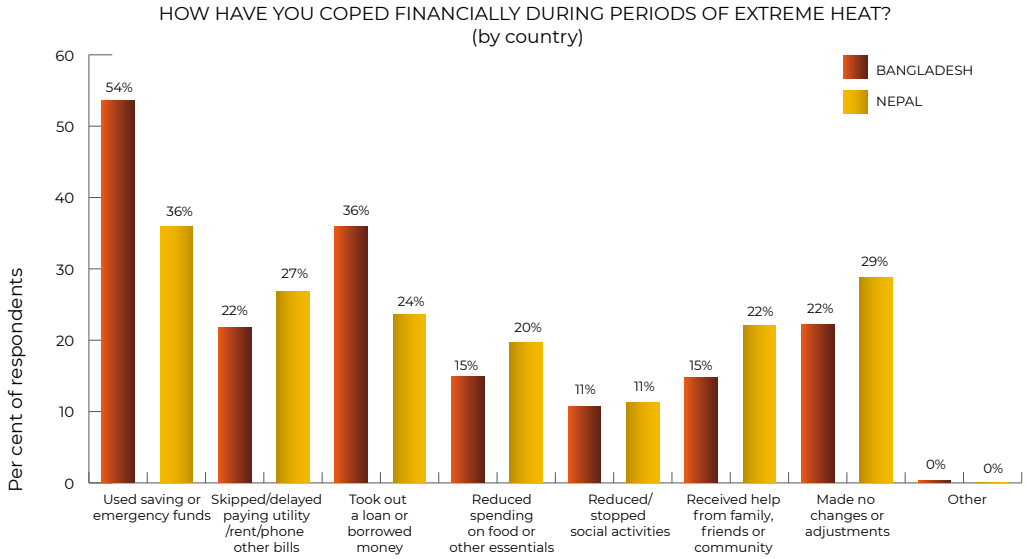
Coping strategies employed by affected households In Bangladesh, using savings or emergency funds was the most common financial coping strategy, with 54 per cent of respondents indicating this approach (Figure 10). In Nepal, 36 per cent of respondents also reported utilizing savings or emergency funds to manage income loss (Figure 10). Additionally, over one-third (36 per cent) of respondents in Bangladesh reported taking out loans or borrowing money to cope financially during periods of extreme heat, while 24 per cent of respondents in Nepal employed the same strategy (Figure 10).

Community members participating in the FGDs emphasized the need to take out loans to manage income loss resulting from extreme heat. Another prevalent coping strategy mentioned in both countries was significantly reducing household and personal expenses.

In Bangladesh, respondents described potentially harmful coping strategies. Many borrowed money from wealthy individuals at high interest rates and took out loans from microcredit institutions, such as BRAC, Asha and the SAJIDA Foundation, to support their families and provide meals for their children during the hot season. The typical interest rate charged by wealthy individuals is BDT 200 [1.64 USD] per BDT 1,000 [8.18 USD] borrowed each month, which translates to a 20 per cent monthly interest rate. In contrast, BRAC and Asha offer a more convenient repayment schedule, with weekly installments. However, their repayment mechanism requires 46 installments over 46 weeks for a loan that is intended to have only 40 installments. It has also been reported that many borrowers take out multiple loans, using new loans to repay existing ones, which increases their overall debt burden. The women's group in Dhaka South particularly stressed that loan providers often harassed them, threatened them with police involvement and even visited their homes if they failed to pay the installments for a few months.

In Nepali cities, too, outdoor workers and daily wage earners frequently reported taking out loans to manage income losses. Their typical strategy involved borrowing money from friends and family. There is limited information available on how Nepali city residents obtained loans in a more organized manner from banks or microcredit institutions. However, it is also worth noting that a significantly smaller percentage of people in Nepali cities reported experiencing financial difficulties due to extreme heat compared to those in Bangladesh.

FIGURE 10:
COPING MECHANISMS BY COUNTRY



4.4 PROTECTIVE MEASURES ADOPTED BY HOUSEHOLDS AND REASONS FOR NON-ADOPTION

KEY FINDINGS:

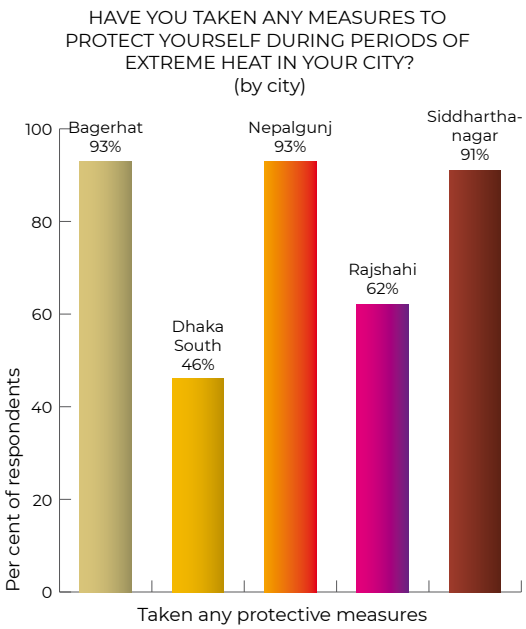
- Ninety-two per cent of respondents across the cities in Nepal reported taking measures to protect themselves during extreme heat, while only 67 per cent of respondents in Bangladesh did the same.
- Forty-four per cent of respondents indicated a lack of knowledge about the necessary adaptive measures to extreme heat. Forty-three per cent believed they were accustomed to extreme heat or felt that it did not affect them personally. Nearly one-third of respondents (29 per cent) stated that they did not take action because they had not received any alerts or warnings regarding the extreme heat.
- The most common coping measures were reported as increasing water intake, using fans, adjusting clothing and taking rest breaks. Women were found to be 44 per cent more likely than others to adopt protective behaviours.

NRCS volunteers are surveying with a street vendor – a cobbler in Siddharthanagar. Photo: NRCS

In Nepal, 92 per cent of respondents reported taking measures to protect themselves during extreme heat, while only 67 per cent of respondents in Bangladesh did the same. In the smaller cities of Nepalgunj and Siddharthanagar, extensive awareness campaigns and heat responses were communicated to the community in recent years so it is possible that given the small city size those communications may have played a role.

The adoption of protective measures against extreme heat varied significantly across the cities. Over 90 per cent of respondents in Bagerhat (Bangladesh), Nepalgunj and Siddharthanagar (both in Nepal) reported taking measures to protect themselves from the heat. In contrast, less than half of the respondents in Dhaka South (46 per cent) and 62 per cent in Rajshahi (both in Bangladesh) reported similar actions (Figure 11).

FIGURE 11:
PROPORTION OF RESPONDENTS TAKING PROTECTIVE ACTION BY CITY



It is noteworthy that women were approximately 44 per cent more likely than the general population to adopt protective measures.

The two dominant protective measures in both Bangladesh and Nepal were increasing water consumption and using fans for cooling. In Bangladesh, 93 per cent of respondents reported an increase in water consumption, while in Nepal the figure was 94 per cent. Similarly, the use of fans was more prevalent in Nepal, with 91 per cent of respondents favouring this method, compared to 82 per cent in Bangladesh.

Other popular coping mechanisms include adjusting clothing, reported by 41 per cent of respondents in Bangladesh and 49 per cent in Nepal, along with using a handheld fan that was mentioned by 45 per cent of respondents in Bangladesh and 43 per cent in Nepal.

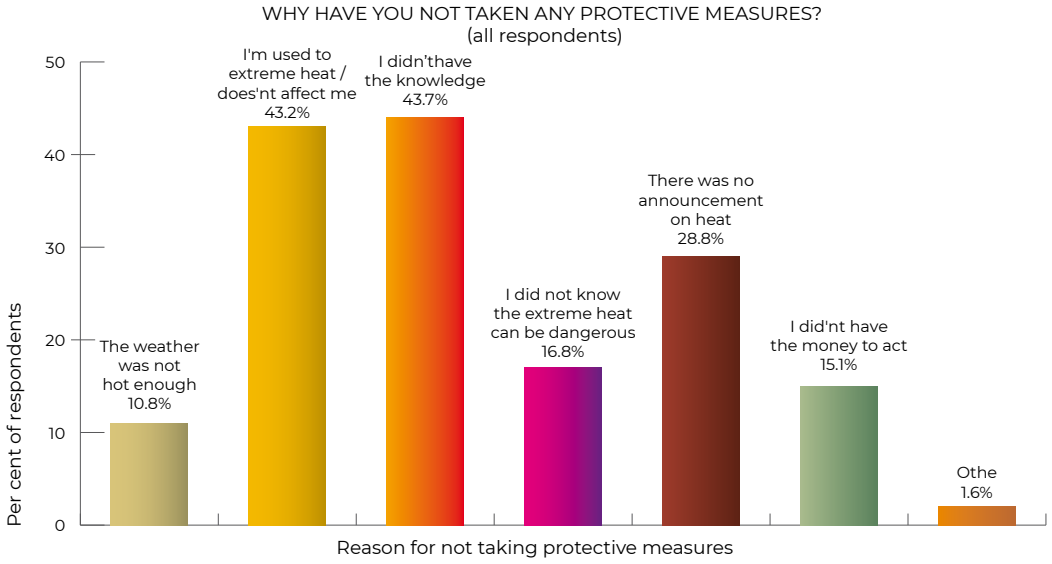
Some personal adaptive measures reported by respondents included wearing a cap while working outdoors, consuming oral rehydration solutions (ORSs) and saline solutions, taking regular breaks at work, resting under trees or in shelters, showering multiple times a day, and wearing loose-fitting clothing. Outdoor workers often avoided working between 11:30–12:00 and 15:30–16:00. Many preferred to work in the mornings or evenings to escape the heat of the midday sun. Some of them also utilized mosquito nets for protection. During the FGDs in Nepali cities, respondents mentioned traditional methods to lower indoor temperatures, such as placing straw or similar materials over tin roofs or paper cartons beneath them.

> *The issue of extreme heat is becoming a higher priority than it was previously. With rising temperatures each year and the increasing health impacts associated with heat, the Environmental Development Department in Rajshahi City Corporation is starting to take this issue more seriously. The focus is shifting from mere reaction to proactive planning, integrating heat resilience into urban development, and ensuring the protection of vulnerable communities. Although there is still much work to be done, the urgency of the situation is now clearly on the radar.*
>
> — Syed Mahmud-ul-Islam, Environmental Development Officer, Rajshahi City Corporation, Bangladesh

REASONS WHY NO PROTECTIVE MEASURES ARE TAKEN

While many community members took personal adaptive measures to cope with the extreme heat, some were reluctant or unable to adopt protective measures. The survey results revealed two primary reasons why individuals failed to take protective measures against extreme heat across the cities. Firstly, 44 per cent of respondents indicated a lack of knowledge about the necessary adaptive measures to extreme heat (Figure 12). Secondly, 43 per cent believed they were accustomed to extreme heat or felt that it did not affect them personally (Figure 12). These findings contrast with people's high agreement that extreme heat is an issue in their city and that they are vulnerable to extreme heat. However, this type of dissonance is not uncommon as, even in other heat-risk perception surveys, people may consider heat to be a risk generally but when asked about the concrete actions they are taking or their personal risk, they may not think the risk applies to them or they do nothing at all (IFRC, 2025). Furthermore, nearly one-third of respondents (29 per cent) stated that they did not take action because they had not received any alerts or warnings regarding the extreme heat (Figure 12).

FIGURE 12: REASONS FOR NOT TAKING PROTECTIVE MEASURES



NRCS volunteers are on a mission to raise public awareness in a city in Nepal, educating vulnerable individuals on how to stay safe during extreme heat. Photo: NRCS via IFRC

4.5 BEHAVIOUR CHANGE LINKED TO HEAT INTERVENTIONS

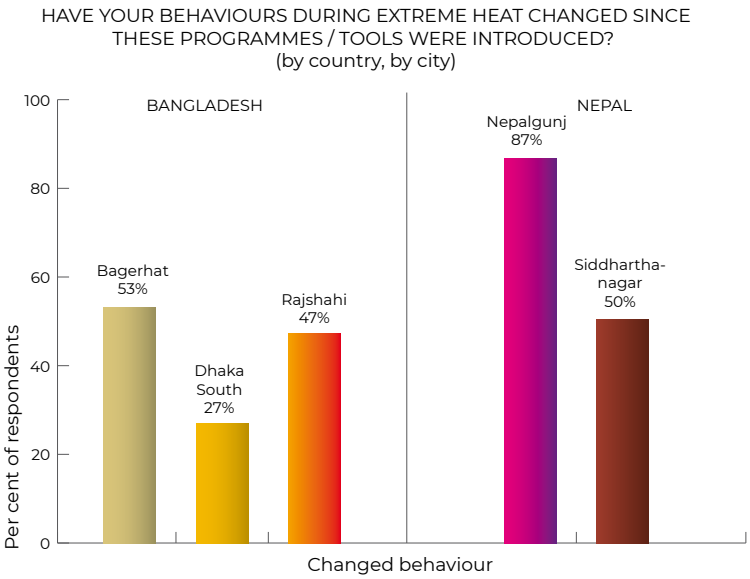
KEY FINDINGS:

- In Bangladesh, respondents with exposure to heat interventions were over twice as likely to have changed their behaviour as survey participants in control wards, with the greatest impact among the least educated, highlighting the effectiveness of targeted outreach.
- The size of cities and scale of interventions seems to have an impact on their outcomes – smaller cities like Nepalgunj, Nepal with widespread heat awareness campaigns, achieved far greater behaviour change than large metropolitan areas like Dhaka, Bangladesh where campaigns reached only specific communities.
- Around three-quarters (74 per cent) of respondents indicated that they pay closer attention to heat warnings, while nearly two-thirds (62 per cent) stated that they drink more water or use cooling products to stay hydrated. These responses varied based on educational levels.
- In Nepali cities, paying attention to heat warnings was the most widespread behavioural shift across all education and occupation groups, followed by visiting cooling centres or shaded spaces and increasing water intake.

Respondents from five cities in Nepal and Bangladesh were asked whether their behaviours during extreme heat periods have changed due to various heat-related programmes and tools. The results varied by city and background characteristics. Among these cities, Nepalgunj stands out, with 87 per cent of respondents reporting changes in their actions and behaviours in response to extreme heat. In Siddharthanagar, 50 per cent of respondents also reported similar changes (Figure 13).

In Bangladesh, more than 50 per cent of respondents in Bagerhat noted changes in their actions and behaviours during extreme heat (Figure 13). While Bagerhat does not have a formal HAP nor an EAP, there have been some heat alerts shared by the local meteorological office with at least one non-governmental organization (NGO) conducting a heat awareness campaign in the last year. However, the percentage of respondents indicating changes was relatively low in Dhaka South and Rajshahi, Bangladesh, with only 27 per cent reporting such changes in Dhaka (Figure 13).

FIGURE 13: CHANGES IN BEHAVIOUR BY COUNTRY AND CITY



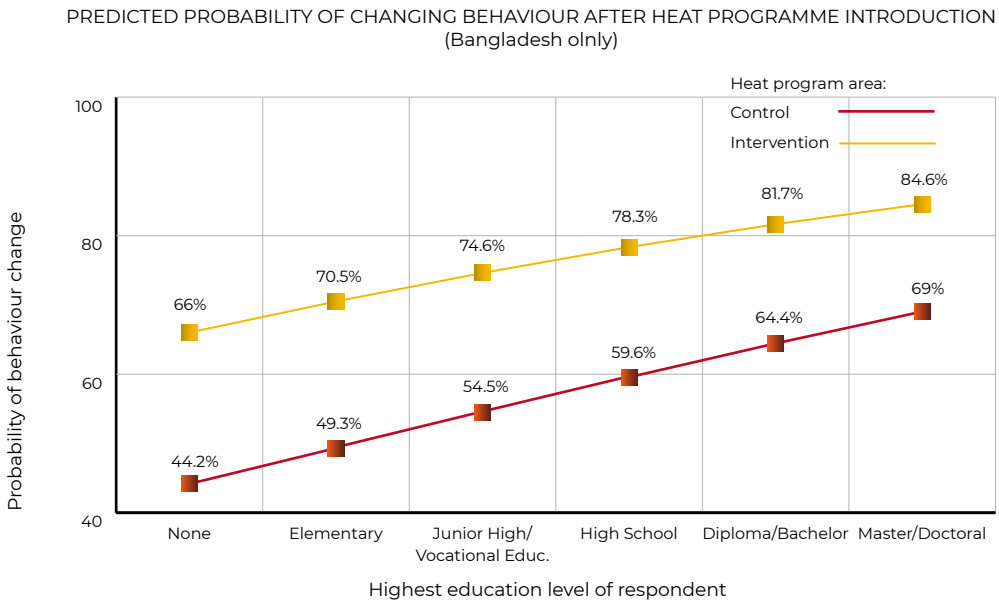
The size of cities and the scale of heat-related interventions may influence variations in behaviour change during extreme heat. For instance, Nepalgunj in Nepal is significantly smaller than Dhaka South and Rajshahi in Bangladesh, which may allow heat awareness campaigns and other preparedness measures to reach a larger proportion of the vulnerable population in identified hotspot areas. Additionally, since 2022, there have been extensive citywide heat risk awareness campaigns in Nepalgunj. In contrast, Dhaka is a metropolitan city where implementing citywide actions requires more resources and time. Although the Bangladesh Red Crescent Society (BDRCS) conducted heat awareness campaigns in Dhaka, these efforts were limited to specific neighbourhoods and targeted certain vulnerable groups, such as outdoor workers and residents of a few informal settlements.

Examining the sample population in Bangladesh enables us to determine the effect of heat programmes while controlling for other observable determinants. A strong, positive and statistically significant effect of heat programmes on behaviour change was found.

Respondents with exposure to heat interventions were over *twice* as likely to have changed their behaviour as the survey participants from control wards.

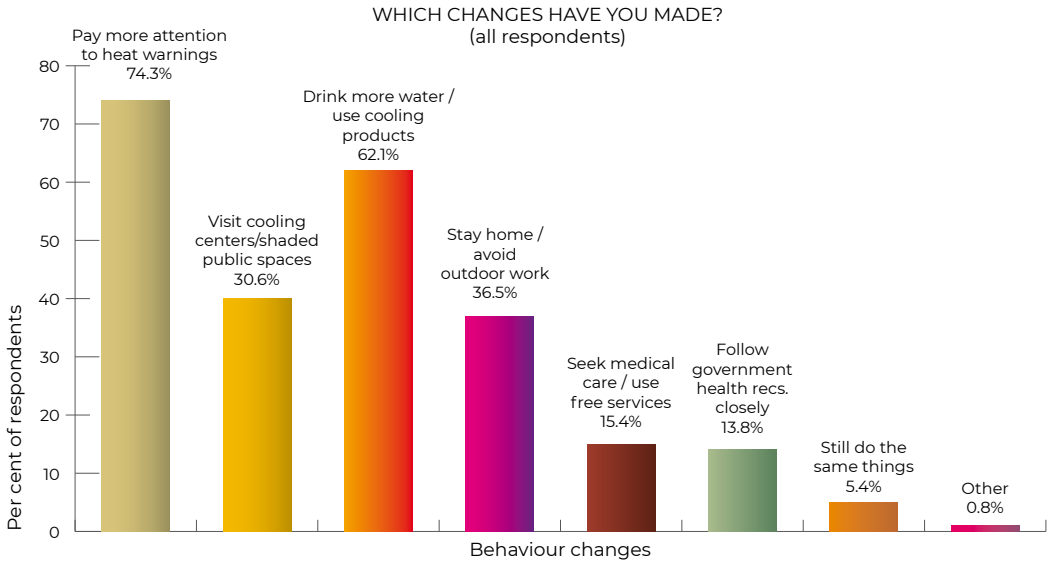
Figure 14 illustrates the effectiveness of heat programmes in inducing adaptive behaviour change in Bangladesh. The effect was most substantial for the least educated (the gap between intervention and control areas is widest on the left of the chart). This suggests that decision-makers planning heat interventions are well-advised to tailor their programmes to the most vulnerable populations to ensure the most significant possible uptake.

FIGURE 14: PREDICTED PROBABILITY OF HAVING CHANGED BEHAVIOUR AFTER HEAT PROGRAMME INTRODUCTION, BY EDUCATION AND HEAT PROGRAMME AREA (BANGLADESH ONLY)



Respondents from various cities have reported four major behaviour changes in response to extreme heat. Among these, three-quarters (74 per cent) indicated that they pay closer attention to heat warnings, while nearly two-thirds (62 per cent) stated that they drink more water or use cooling products to stay hydrated. These responses varied based on educational levels (Figure 15).

FIGURE 15:
BEHAVIOUR CHANGES MADE BY RESPONDENTS IN RESPONSE TO EXTREME HEAT



For instance, in cities in Bangladesh, respondents with little or no formal education reported that their most common behaviour change was drinking more water and using cooling products. In contrast, those with higher education – such as diploma holders, bachelor's degree holders, and those with master's or doctoral degrees – tended to pay more attention to heat warnings. Notably, in Bangladesh, respondents with higher levels of formal education preferred to use cooling centres and shaded public spaces more frequently than those with only an elementary education. Interestingly, a very low percentage of respondents in Bangladesh, regardless of their occupation or education level, sought medical care or followed government health directives to mitigate the impacts of extreme heat. This may be due to the high cost associated with formal healthcare and a lack of trust in government.

In Nepali cities, the most common behaviour changes for respondents, regardless of their education level, was also to pay more attention to heat warnings. Among those who work both indoors and outdoors, the next prioritized behavioural changes were visiting cooling centres or shaded public spaces as well as drinking more water or using cooling products.

Focus Group Discussions (FGDs) are being conducted with outdoor workers and commuters in Siddharthanagar. Photo: NRCS

4.6 AWARENESS OF HEAT INTERVENTIONS

KEY FINDINGS:

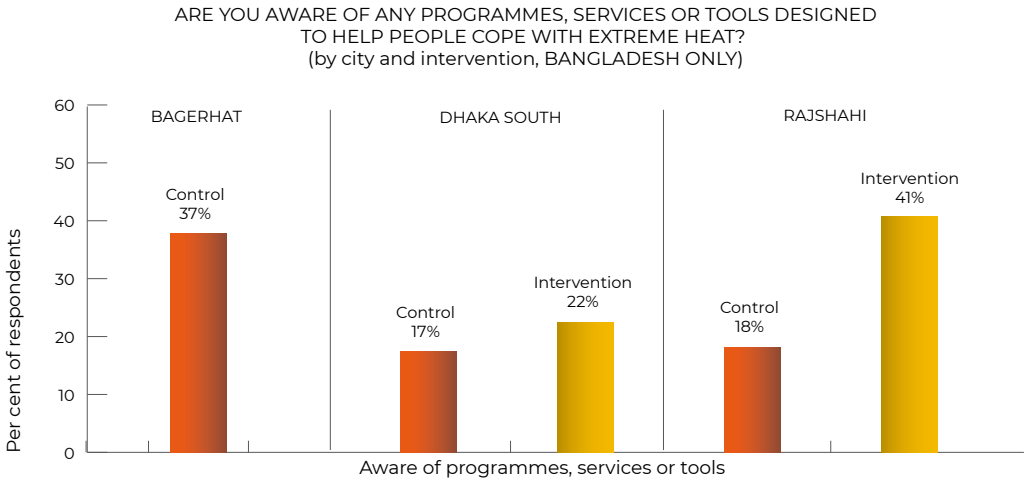
- Awareness of heat-related programmes, services and tools was higher in Nepal at 52 per cent, compared to 29 per cent in Bangladesh. This difference may stem from the comparatively smaller city size and extensive awareness campaigns in Nepalgunj and Siddharthanagar in Nepal.
- In Bangladesh, living in an area that has previously implemented a heat-related programme increased the likelihood of being aware of such programmes by 116 per cent.
- Individuals with higher education levels were more likely to be aware of heat-related programmes and each additional level of education increased the likelihood of awareness by 30 per cent.
- Awareness of Heat Action Plans (HAPs) and Early Warning Systems (EWSs) was higher in Nepal, especially among youths, whereas in Bangladesh's cities, HAPs had not yet been developed. In Bangladesh, awareness varied by age – youths were more familiar with EWS, while older adults were more aware of public awareness campaigns and adaptive behaviours. However, in both countries, the majority of participants in the FGDs, reported that systematic EWSs were lacking or inconsistent.
- Most people received heat information through television, word-of-mouth and mobile alerts.

The awareness of programmes, services and tools to help individuals cope with extreme heat was significantly higher in Nepal, at 52 per cent, compared to just 29 per cent in Bangladesh (Figure 16). This difference may stem from the comparatively smaller size of cities in Nepal as well as a varied socioeconomic context along with extensive awareness campaigns that have been conducted in Nepalgunj over the past four consecutive summers and in Siddharthangar during the last couple of summers.

Participants in the FGDs in Nepalgunj, Nepal stated that they received messages about adaptive measures to cope with extreme heat risks from the Nepal Red Cross Society (NRCS) and local municipality, which carried out an extensive campaign to raise awareness. The NRCS and the municipality conducted door-to-door visits to educate vulnerable populations and distribute pamphlets. They also posted information in key locations throughout the city. As a result, the residents of Nepalgunj were more aware of the risks associated with heatwaves. Some individuals also received alerts regarding heat warnings. Most people drank water regularly, took breaks and rested whenever possible at work and avoided outdoor activities during the peak heat hours. Parents encouraged their children to stay safe from the heat, and everyone tried to stay hydrated, particularly when caring for the elderly and young children.

Respondents in Siddharthanagar, Nepal highlighted several measures implemented in the city to reduce the impact of extreme heat, including the installation of shaded areas, benches and drinking water stations as well as tree planting by Red Cross partners and the local government. The NRCS has facilitated wall paintings, digital boards and radio programmes in certain wards on the dangers of extreme heat. Many respondents were aware that the city has developed a HAP. In addition to the NRCS, local NGOs and civil society organizations (CSOs) such as Marwadi Sewa and Yuwa Sangh are focusing on heat awareness campaigns and water distribution.

FIGURE 16: AWARENESS OF PROGRAMMES, SERVICES OR TOOLS BY CITY AND INTERVENTION IN BANGLADESH



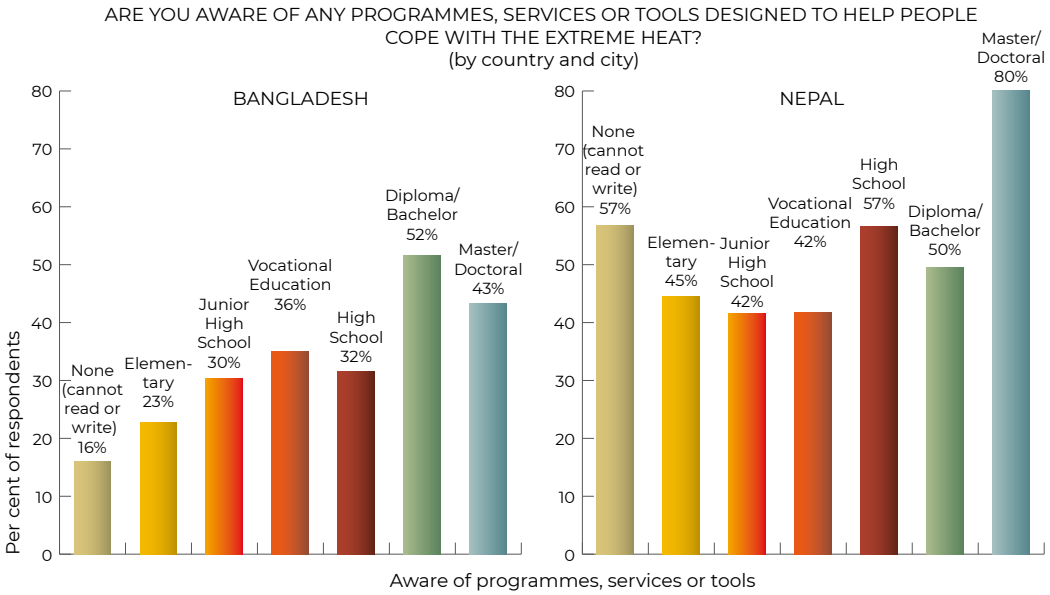
In Bangladeshi cities, awareness of heat-related programmes was relatively high. For example, in Bagerhat, awareness stood at 38 per cent among respondents, despite the city acting as a control area without prior experience of specific heat programmes. It is, however, possible that these residents were referring to information about general health and from meteorological services (Figure 16). The data from Dhaka South and Rajshahi, though, suggests a strong positive impact of heat programmes in increasing people's awareness of these initiatives. Living in an area that has previously implemented a heat-related programme (i.e., an intervention ward) increases the likelihood of being aware of such programmes by 116 per cent. The effect was particularly pronounced in Rajshahi, where over twice the proportion of households in intervention areas (41 per cent) were aware of these programmes compared to those in control areas (18 per cent) (Figure 16).

The findings from the FGDs indicated that respondents from Rajshahi were generally more aware of heatwave risks compared to those in Dhaka South and Bagerhat. Over the past few years, there have been comprehensive heat awareness campaigns in the city, including microphone or loudspeaker announcements, community meetings and one-on-one interactions with vulnerable communities. The municipality along with the BDRCS have distributed ORS, saline water, umbrellas and heat awareness leaflets. In a small pilot area in 2024, the BDRCS also provided cash assistance to vulnerable communities in Rajshahi when a heat threshold was reached.

Awareness campaigns and the distribution of heat protection items also took place in Dhaka South. However, it's possible that challenges with covering such a large metropolitan area with limited funding made these efforts significantly more challenging than in Rajshahi.

> *Since last year, representatives from the Bangladesh Red Crescent Society have been meeting with us to explain the dangers of heatwaves and how to protect ourselves. Their efforts have helped us gain a better understanding of the risks associated with extreme heat. As a result, we now carry drinking water with us when we go out for work and drink saline water to stay hydrated.*
>
> — Outdoor workers during an FGD in Rajshahi, Bangladesh

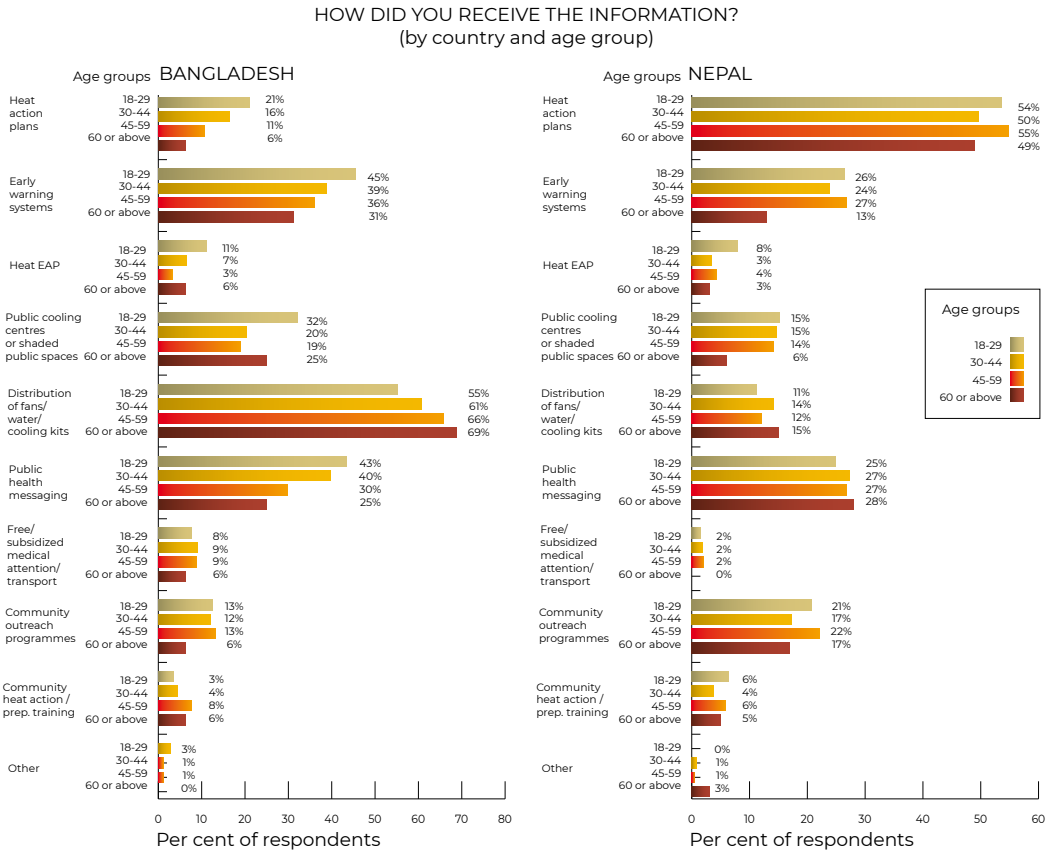
FIGURE 17: AWARENESS OF PROGRAMMES, SERVICES OR TOOLS BY EDUCATION LEVEL AND COUNTRY



The survey analysis revealed that individuals with higher education levels were more likely to be aware of such programmes (Figure 17). Each additional level of education increased the likelihood of awareness by 30 per cent.

However, findings from the FGDs indicated that many respondents, despite not having completed their elementary or junior high school education, were cognizant of the awareness-raising campaigns and response measures implemented by the Red Cross Red Crescent National Societies in collaboration with the local municipality. Similarly, women and outdoor workers in Nepalgunj, Nepal expressed their awareness of ongoing initiatives by the NRCS and the municipality to raise awareness about heat risks and to educate them on personal protective measures.

FIGURE 18: AWARENESS OF SPECIFIC PROGRAMMES, SERVICES OR TOOLS BY COUNTRY AND AGE GROUP



Awareness of specific programmes, services and tools varied significantly by city, age group and whether the area was part of an 'intervention' or 'control' area. In Bangladesh, areas such as Dhaka South and Rajshahi demonstrated that many respondents were aware of the HAP and the EWS as well as public awareness campaigns and response measures.

In Nepal, both cities have developed HAPs. It is important to note that the HAP in Nepalgunj was the first initiative of its kind in the country. Respondents from both cities were aware of the HAP for their respective city. Interestingly, although public messaging on awareness and response measures had been conducted in Nepalgunj for a longer period than in Siddharthanagar, a higher percentage of respondents in Siddharthanagar reported awareness of these initiatives.

This discrepancy may be because many respondents in Siddharthanagar were direct beneficiaries of the awareness campaign.

Interestingly, youths in Nepal were more aware of the HAP in their respective cities compared to those in Bangladesh (Figure 18). None of the targeted cities in Bangladesh had developed a structured HAP, which may have contributed to a lack of awareness among the youth. In Nepal, there was no significant variation in responses based on age. However, in the cities of Bangladesh, responses did vary by age group (Figure 18). For example, youths were generally more aware of early warnings, while respondents aged over 60 tended to be less informed about them (Figure 18). Conversely, older respondents were more familiar with public awareness campaigns and personal adaptive measures than the youths (Figure 18).

> *Awareness is increasing, and we are seeing some real changes in behaviour; people stay indoors, drink more water and use protective clothing. But infrastructure gaps remain; fans and water systems are still not enough and funding is very limited.*
>
> — Yadav Sapkota, Disaster Focal Person, Siddharthanagar Municipality, Nepal

Capacity Building Programme on Anticipatory Actions for Heatwaves in Dhaka, Bangladesh
Photo: BDRCS

The survey findings indicate that more people in Nepal (59 per cent) reported receiving a heat warning than in Bangladesh (47 per cent). However, the outputs from the FGDs and KIIs differed. In both countries, a majority of participants in the FGDs – which were primarily targeted at vulnerable groups – reported that they had never received early warnings of heatwaves.

Respondents from intervention areas in Bangladesh were three times more likely to have received a heat warning than people in the control wards. The effect of heat programmes on the probability of receiving a warning was most substantial for respondents with little or no education and lessened with increasing levels of education among the respondents. When examining the entire sample population, including Nepal, an additional level of education increased the probability of having received a warning by 21 per cent, indicating that warnings are more accessible to those with more education.

Most respondents in Nepalgunj indicated that they received heat warnings in their area. More than half of the respondents in Siddharthanagar similarly reported receiving heat warnings.

Focused Group Discussion (FGD) with the women's group in Nepalgunj. Photo: BDRCS

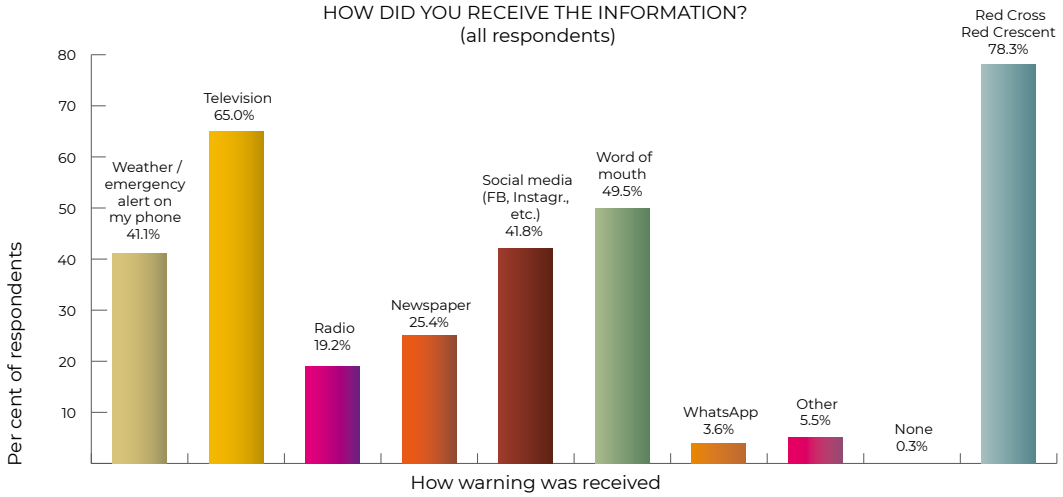
However, participants in the FGDs stated that there was currently no systematic heat EWS in place. They sometimes received temperature forecasts, primarily concerning maximum temperatures, but the information was not very structured and did not reach all vulnerable groups. Some stakeholders in the Nepali KIIs emphasized that coordination with the Department of Hydrology and Meteorology (DHM) and other city stakeholders was limited. While the DHM did publish heat bulletins, these were not consistently received by communities. The Chief of the Department of Education in Siddharthanagar municipality also reiterated that there was no formal EWS in the city. They pointed out the lack of coordination with the DHM and the irregular receipt of bulletins. This disparity in responses on the EWS requires further investigation with DHM officials to clarify how the heat EWS is structured and disseminated.

In Bangladesh, the survey results showed that 59 per cent of respondents in Bagerhat and 52 per cent in Rajshahi had received heat warnings. Interestingly, although Bagerhat is classified as a control area and Dhaka South and Rajshahi as intervention areas, a higher percentage of respondents in Bagerhat reported receiving heat warning messages compared to Dhaka South, where only 28 per cent of respondents indicated they had received such warnings. Additionally, very few participants in the FGDs across the cities reported receiving early warning messages. They emphasized that the warning system was ineffective and that early warnings were not delivered systematically. This may suggest that the heat EWS does not effectively reach all vulnerable groups in society across cities in Bangladesh, and that the system's mechanisms should be evaluated.

TYPE OF INFORMATION RECEIVED

Maximum temperature was the most commonly received information, mentioned by 76 per cent of respondents in Bangladesh and Nepal. In cities such as Dhaka South and Rajshahi in Bangladesh, a significant percentage of respondents also reported receiving information about the duration of extreme heat events, as well as advice on protective actions and what to do in the event of a heat emergency. In Nepal, many respondents in Siddharthanagar and Nepalgunj reported receiving information about maximum temperatures and advice on protective measures, respectively.

FIGURE 19: HOW INFORMATION WAS RECEIVED BY RESPONDENTS

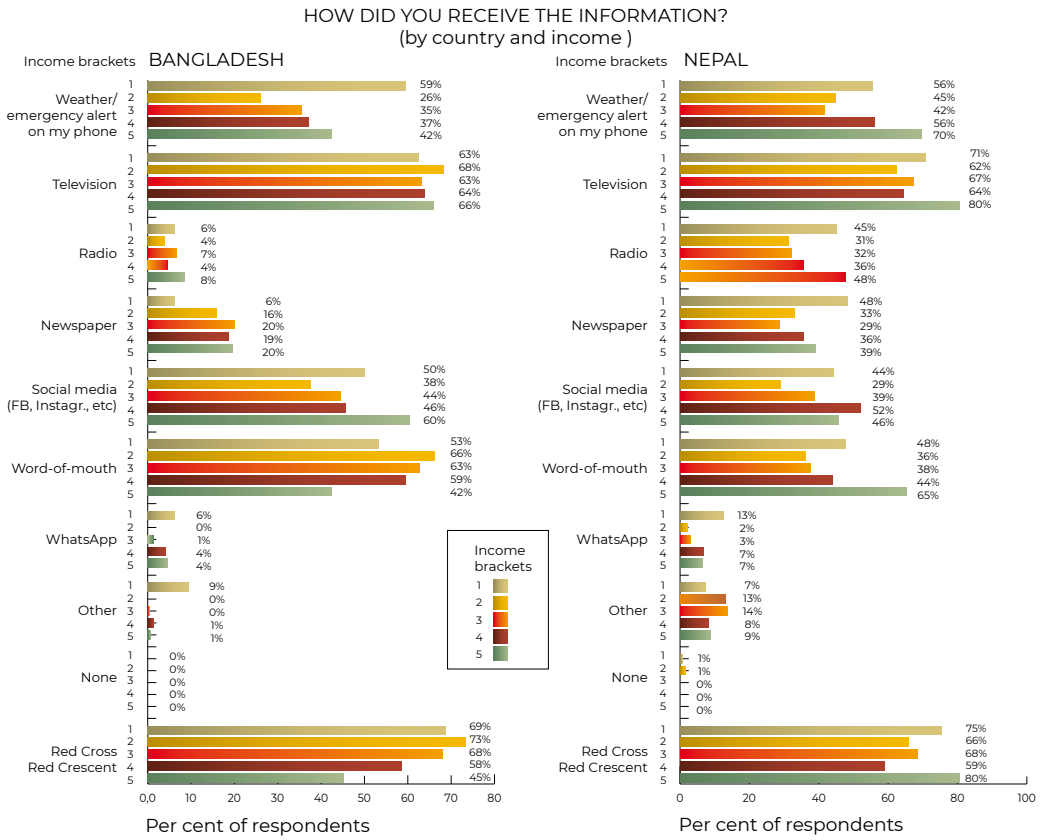


The most common channels through which people received information about extreme heat included television, word-of-mouth, social media and weather or emergency alerts on their phones. Notably, over 78 per cent of respondents reported receiving heat information from the BDRCS (Figure 19).

In both cities in Nepal, 95 per cent of respondents relied on the NRCS for heat information, with responses relatively consistent across different income brackets. For those in the highest income bracket, the most common sources of heat information included the NRCS, television, emergency alerts on phones and word-of-mouth (Figure 20). Individuals in the lowest income bracket typically received heat information through television, phone alerts, radio, word-of-mouth and newspapers (Figure 20). The NRCS remains the most common source of heat information for all age groups. However, younger individuals preferred to receive heat early warning messages through television, phone alerts and social media, while older adults primarily relied on television and word-of-mouth.

In Bangladesh, respondents in Bagerhat mainly relied on television and the BDRCS for heat information. In Rajshahi, in addition to the BDRCS, respondents also depended on word-of-mouth and television. In Dhaka South, however, only 36 per cent of respondents reported receiving heat information from the BDRCS. The most common channels for obtaining this information included alert messages on mobile phones, television, word-of-mouth and social media. The responses also varied by income bracket. HHs in lower income brackets tended to receive information through the BDRCS, word-of-mouth and

FIGURE 20:
HOW INFORMATION WAS RECEIVED BY COUNTRY AND INCOME BRACKET



television (Figure 20). In contrast, HHs in higher income brackets primarily relied on social media and television for heat updates (Figure 20). The dependence on the BDRCS did not vary significantly across different age groups in the cities of Bangladesh. Additionally, older adults (those aged 60 and above) tended to rely more on word-of-mouth and television, while youths preferred social media, word-of-mouth and television for receiving heat information.

Miking (making announcements on loudspeakers) for awareness-raising on extreme heat by the BDRCS volunteers
Photo: BDRCS

> *Public miking [making announcements on loudspeakers] is happening, but information should also be shared through community meetings, clear announcements and group discussions, not just miking. Messages should be timed and targeted better.*

— A representative from a mothers' group, Siddharthanagar Municipality, Nepal

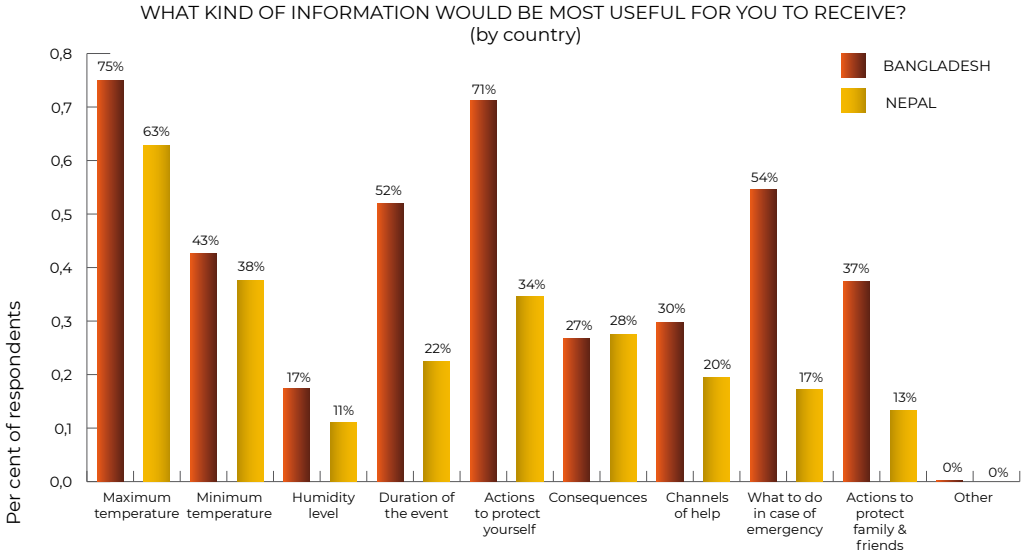
4.7 MAKING HEAT WARNINGS MORE EFFECTIVE

KEY FINDINGS:

- Participants from both countries expressed their desire for regular early warning messages that include information about upcoming maximum temperatures, duration, potential impacts and protective actions.
- Younger people relied on social media, while older adults preferred word-of-mouth or printed materials for receiving heat-related information in both countries.
- In Nepal, respondents underscored loudspeaker announcements (miking) as a practical and trusted way to receive information.
- In Nepal, the most recommended sources included television, social media, radio and posters or wall paintings. Respondents from Bangladesh suggested word-of-mouth as their preferred method for receiving information about extreme heat, with 83 per cent of the respondents expressing a desire for it. Other recommended channels for receiving extreme heat information in Bangladesh included television, social media and mobile phones.

Most respondents in Bangladesh (75 per cent) and Nepal (63 per cent) expressed that information on maximum temperatures would be the most useful (Figure 20). Additionally, a significant proportion of respondents, 71 per cent in Bangladesh, would like information on protective actions against heat, while only 34 per cent of respondents in Nepal considered this helpful information (Figure 21).

FIGURE 21: TYPES OF INFORMATION THAT IS MOST USEFUL TO RECEIVE BY COUNTRY



Furthermore, participants in the FGDs expressed a desire to receive regular early warning messages. These should include, they felt, information on the duration, potential impacts and recommended adaptive measures to mitigate these impacts.

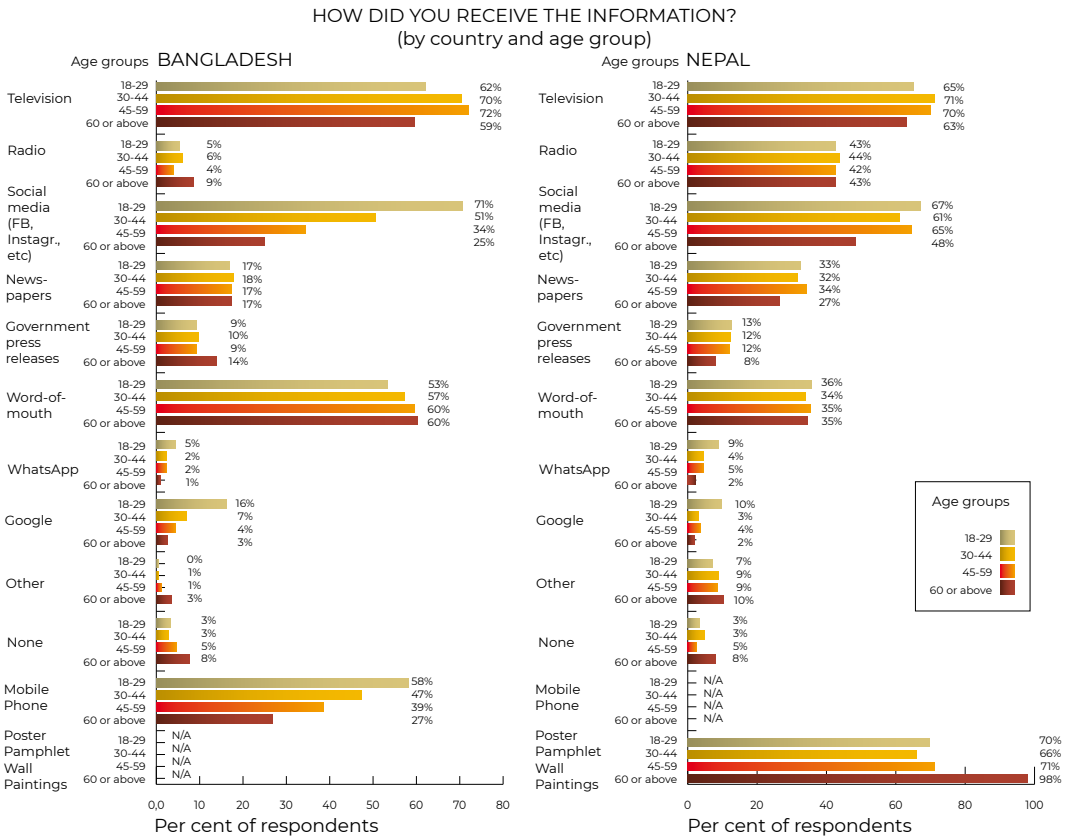
In both countries, the majority of the respondents (68 per cent) relied on television as their primary source of information about extreme heat. Social media was also a preferred channel for receiving health information, with 61 per cent of respondents in Nepal and 50 per cent in Bangladesh expressing their preference. Word-of-mouth followed

closely, with 57 per cent in Bangladesh and 35 per cent in Nepal reporting this as a favoured source of information. Radio was a popular source of information in Nepal, with 43 per cent of respondents indicating a preference for it. It was much less favoured in Bangladesh, where only 6 per cent mentioned it. The response option 'poster, pamphlet or wall paintings' was added to surveys in Nepal by the local team, where 73 per cent of respondents indicated that this was a valuable source for receiving information. In Bangladesh, the category 'mobile phone' was added to the survey by the local team, capturing 46 per cent of preferences, although this overlaps with social media, WhatsApp and word-of-mouth.

It is important to note that, although using loudspeakers (or miking) to make announcements was not an option, respondents from both countries expressed a preference for receiving heat information in this manner during the FGDs. They viewed miking as a convenient way to deliver information and had found it very useful for making announcements as well as for sharing details about events or campaigns.

There were clear differences in the sources of information among different age groups, with younger individuals using mobile phones and social media more frequently than older respondents (Figure 22). In Bangladesh, 71 per cent of people aged 18–29 relied on social media for heat information, whereas only 25 per cent of those aged 60 and above used social media as their source of information (Figure 22). In Nepal, the figures were 67 per cent for the 18–29 age group and 48 per cent for those aged 60 and older (Figure 22). In both countries, among individuals aged 30–59 years, television was a common source of receiving information on extreme heat (Figure 22).

FIGURE 22: SOURCES OF HEAT INFORMATION BY COUNTRY AND RESPONDENT AGE GROUP



An effective means of sharing information across all age groups was word-of-mouth, and elderly adults, particularly those aged 60 and above, preferred this medium for receiving information. This trend may reflect cultural aspects of the Bangladeshi community.

In Nepalese cities, older adults (those over 60 years old) primarily received information about extreme heat through posters, pamphlets and wall paintings. Individuals from other age groups also indicated a preference for using these sources to obtain heat information.

In Bangladesh, comparing the experiences of people in heat intervention areas with those in control areas revealed some interesting contrasts. In Dhaka South and Rajshahi, a higher percentage of respondents in the control areas used social media as a source of heat information compared to those in the heat intervention area. Specifically, 51 per cent of respondents in the control area in Dhaka South used social media, compared to 39 per cent in the intervention area.

In Rajshahi, the same trend was observed, with 60 per cent of HHs in the control areas relying on social media, compared to 52 per cent of those in the intervention area. In Rajshahi, word-of-mouth was the most reported medium for receiving information in the intervention areas, with 74 per cent of respondents mentioning it in favour, compared to just 51 per cent in the control areas. However, in Dhaka South, the situation was reversed; a greater proportion of control respondents, at 72 per cent, relied on word-of-mouth compared to 60 per cent of respondents in the intervention areas.

RECOMMENDED DISSEMINATION CHANNELS FOR SPREADING INFORMATION IN THE COMMUNITY

When survey respondents were asked how they believed information could be best disseminated in their communities, their answers reflected their personal preferences for information sources. In Nepal, the most recommended sources included television, social media, radio and posters or wall paintings. The respondents from Bangladesh suggested word-of-mouth as their preferred method for receiving information about extreme heat, with 83 per cent of the respondents expressing a desire for it. Additionally, other recommended channels for receiving extreme heat information in Bangladesh consisted of television, social media and mobile phones.

In both countries, HHs in the higher income bracket preferred television and social media. In contrast, HHs with comparably lower incomes reported word-of-mouth and radio as their preferred sources of information. Notably, word-of-mouth was the most popular choice across all income groups in Bangladesh.

A snakes and ladders game contextualized to make schoolchildren more aware of heatwaves and anticipatory actions
Photo: BDRCS

4.8 PERCEPTIONS OF HEAT AS A POLICY PRIORITY

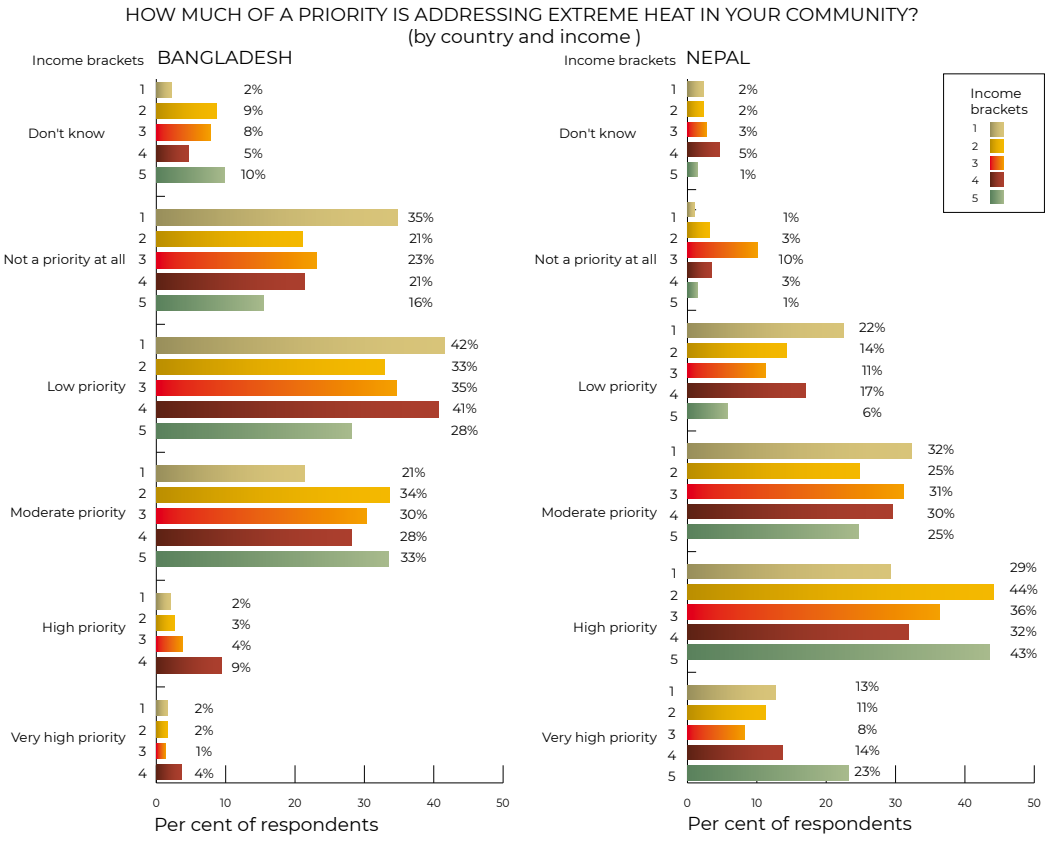
KEY FINDINGS:

- Nearly half of the respondents (49 per cent) in Nepal considered addressing extreme heat as a high or very high priority.
- A significant majority of respondents in Bangladesh (74 per cent) believed that insufficient action had been taken to protect people from the impacts of extreme heat, whereas 57 per cent of respondents from Nepal believed that adequate steps were being taken to address extreme heat.
- In Nepal, four-out-of-five respondents (79 per cent) believed that decision-makers understood what was needed during these hot spells 'somewhat' or 'very well.' In contrast, only 21 per cent of respondents in Bangladesh shared this perspective.

The level of priority assigned to addressing extreme heat varied significantly between Bangladesh and Nepal. In Bangladesh, only 6 per cent of respondents said addressing extreme heat was a high or very high priority, while in Nepal, this figure was 49 per cent. Most respondents across the country reported a moderate priority. However, it is striking that 56 per cent of respondents in Bangladesh reported that addressing extreme heat is either not a priority at all or a low priority. Due to the wording of the question, this may be reflective of their perceptions of the actual prioritization of heat by their local government rather than their opinions of where it should be prioritized.

In Bangladesh, 13 per cent of respondents from higher-income categories perceived addressing extreme heat as a high or very high priority in their community (Figure 23). In contrast, the majority of respondents across all income brackets saw this issue as either not a priority or only a moderate priority.

FIGURE 23: PERCEIVED PRIORITY OF ADDRESSING EXTREME HEAT BY COUNTRY AND INCOME



In Nepali cities, higher income respondents tended to perceive addressing heat risks in their communities as a more urgent priority, with responses mostly falling into the high to very high priority range. Among lower income respondents, however, opinions varied widely, ranging from low to high priority.

A significant difference between the responses from Bangladesh and Nepal is that 35 per cent of lower income respondents in Bangladesh viewed the issue of extreme heat in their community as not a priority at all, compared to only 1 per cent of lower income respondents in Nepal (Figure 23)**.**

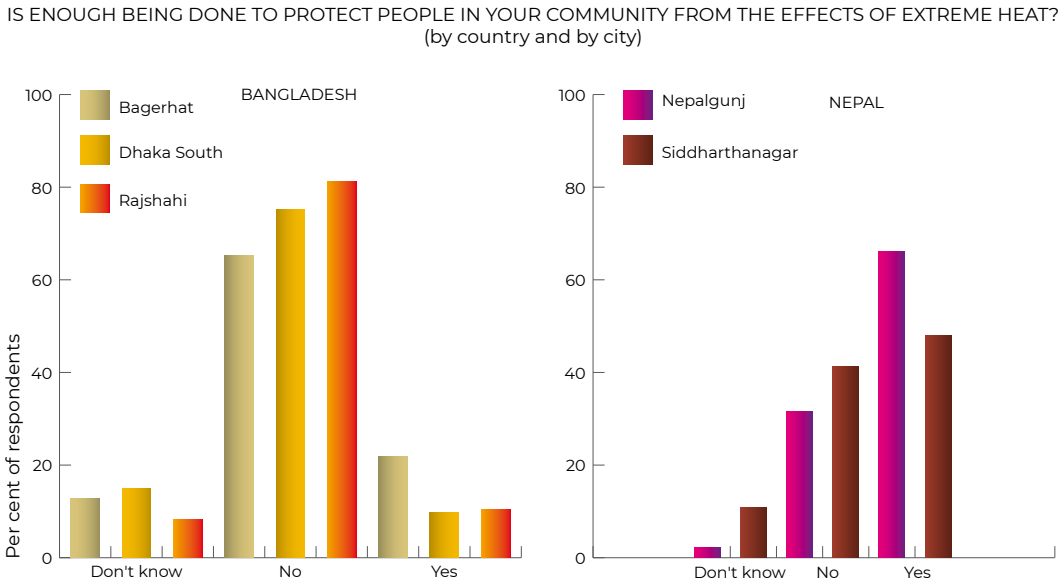
Given the community's perceptions about the extent to which extreme heat is a community priority, it is surprising that a significant majority of respondents in Bangladesh (74 per cent) believed that insufficient action had been taken to protect people from the impacts of extreme heat. Only 14 per cent felt that sufficient measures were in place. On the other hand, in Nepal, a majority of respondents (57 per cent) felt that adequate steps were being taken to address the issue, while 36 per cent did not share this belief.

> *On paper, heat is a priority, but the budget doesn't really reflect it. Only NPR 300,000 was allocated for heat-related work. We plan to push within our department to give it more attention in upcoming budgets. There will be a focus on volunteer training, awareness programmes, and greening schools through tree plantations.*
>
> — Chetansheel Lamsal, Under-Secretary for Education Department, Siddharthanagar Municipality, Nepal

NRCS volunteers are providing an umbrella to a street vendor in Nepalgunj to help her stay cool during the hot days. Photo: NRCS

Between cities there were considerable differences in perceptions of whether sufficient measures had been taken to protect communities from the effects of extreme heat. In Nepal, residents of Nepalgunj were significantly more optimistic than those in Siddharthanagar, with 68 per cent of people in Nepalgunj believing that sufficient measures were in place, compared to only 48 per cent in Siddharthanagar (Figure 24). The continued efforts to raise awareness of heat risks in Nepalgunj since 2023 could be one of the reasons for the large percentage of respondents giving positive feedback (Figure 24).

FIGURE 24.
PERCEPTIONS ABOUT ADDRESSING EXTREME HEAT BY COUNTRY AND CITY\



In Bangladesh, the views differed even more. In Bagerhat, 22 per cent of HHs felt that adequate protection measures against extreme heat had been implemented – twice the proportion of those who felt the same in Dhaka South and Rajshahi, where only 10 per cent believed enough was being done (Figure 24). Interestingly, Bagerhat was considered a control area with no prior exposure to heat programming, yet its residents have a comparatively more positive perception of heat action.

> *People in the community, especially the vulnerable, haven't been much involved in decisions about extreme heat. Most planning is done at the ward or municipal level without directly consulting with those affected, but we do realize that a more participatory approach is needed.*
>
> — Ward Chairman, Siddharthanagar Municipality, Nepal

NRCS volunteers are engaging with vulnerable communities to raise awareness of the risks of extreme heat and how to protect themselves. Photo: NRCS

DECISION-MAKERS' UNDERSTANDING OF COMMUNITIES' PREFERENCES DURING PERIODS OF EXTREME HEAT

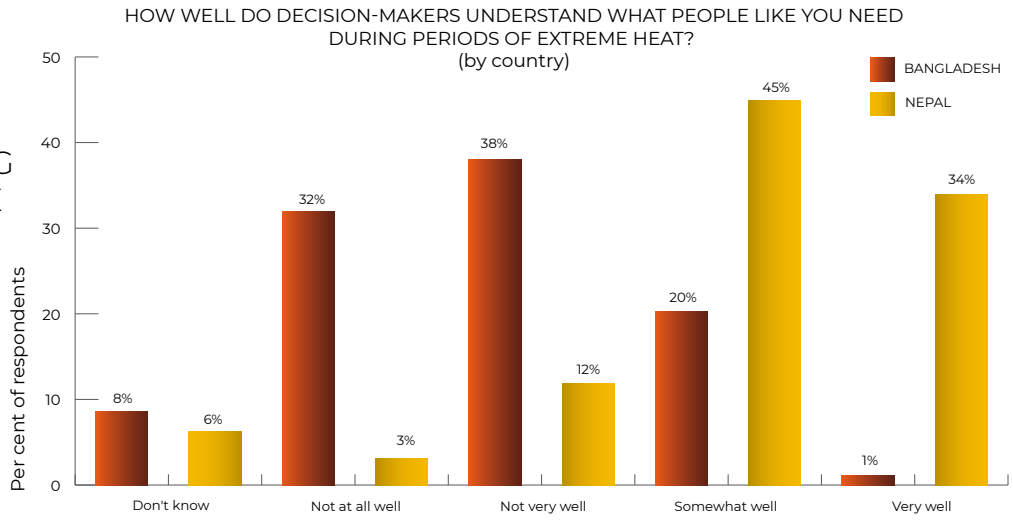
The responses suggested a substantial disparity between the two countries and these findings also aligned with views on whether adequate measures were being taken to protect communities from the effects of extreme heat. In Nepal, four-out-of-five respondents (79 per cent) believed that decision-makers understood what was needed during these hot spells 'somewhat' or 'very well' (Figure 25). In contrast, only 21 per cent of respondents in Bangladesh shared this perspective (Figure 25).

However, the policy-makers in Bangladeshi cities – such as the environmental development officer at the Rajshahi City Corporation – confirmed that the issue of extreme heat is becoming a higher priority than it was previously. The focus is shifting from mere reaction to proactive planning, integrating heat resilience into urban development and ensuring the protection of vulnerable communities. They indicated that there is still much work to be done, but the urgency of the situation is now clearly on their radar.

In the Dhaka South, the Dhaka City Corporation has initiated a project called the Improvement of Urban Public Health Preventive Services Project with support from the World Bank. This project will involve the installation of 30 public drinking water points and 30 handwashing stations as well as public toilets and the construction of 11 mobile toilets, in addition to the planting of 250,000 trees in the Dhaka South City Corporation area.

In Bagerhat, it has been reported that the Forest Department is actively pursuing large-scale afforestation and plantation programmes. Hundreds of thousands of trees are being planted each year, particularly at intersections, along roadsides and near power stations to help lower city temperatures.

FIGURE 25: PERCEPTIONS ON DECISION-MAKER UNDERSTANDING OF VULNERABLE GROUPS BY COUNTRY



The city authorities in Nepal are taking significant steps to reduce the impacts of extreme heat. In Nepalgunj, the city authority – in collaboration with the NRCS and other stakeholders – is leveraging resources to implement the HAP. The Nepalgunj sub-metropolitan city and Red Cross partners have jointly established a well-equipped cooling centre measuring 20 x 60 square feet. The construction of the cooling centre is complete and it will open for vulnerable groups soon. Furthermore, the district education department has incorporated extreme heat into the school curriculum and plans to install 'false ceilings' in all schools with tin roofs to lower temperatures. Recent school designs in the sub-metropolitan area feature either concrete roofs or provisions for false ceilings where needed. During heatwaves, the Nepalgunj sub-metropolitan area occasionally sprinkles water onto roads to lower the ambient temperature. The municipality and the NRCS have initiated various projects, funded through both local sources and external support, which include awareness and sensitization campaigns as well as warning and preventive messages disseminated through radio and newspapers. The NRCS has also facilitated the installation of drinking water facilities in schools.

In Siddharthanagar, Nepal several measures have also been implemented including the creation of shaded areas, the installation of drinking water stations, the planting of trees, and awareness campaigns through mobile phones and

Interview with Sayed Mahmud-ul-Islam, Environmental Development Officer, Rajshahi City Corporation, Bangladesh
Photo: Climate Centre

> *Over the past 5–6 years, the Rajshahi City Corporation has planted approximately 300,000 trees throughout the city. It is now hard to find any road dividers or footpaths that don't have trees. We have also focused on restoring water bodies and ponds; so far, we have successfully restored ten ponds and have proposed an additional 12 to the ministry. In summary, our emphasis on managing heat risk has significantly improved compared to earlier years.*
>
> — Sayed Mahmud-ul-Islam, Environmental Development Officer, Rajshahi City Corporation, Bangladesh

digital information boards. The NRCS and local government are the primary supporters of these initiatives. The NRCS has contributed by supporting wall paintings, digital boards and radio programmes in certain wards.

Some participants in the FGDs and KIIs reported that the Red Cross and its partners were currently the only organizations actively working in this area, with no other groups involved in the heat response efforts.

> *As a health unit, we plan to provide medical services and first aid at the cooling centres established by the sub-metropolitan office and the Nepal Red Cross Society. Furthermore, the health department is preparing for a potential health response to the heatwave. They have issued a circular to health centres to ensure they remain ready to respond, advising staff not to take leave during this critical time. Additionally, our priorities include stockpiling medications and ensuring that health personnel are prepared for any response efforts.*
>
> — Ram Bahadur Chand, Chief, Health Division, Nepalgunj Sub-Metropolitan City, Banke, Nepal

5 CONCLUSIONS AND RECOMMENDATIONS

This study incorporated both quantitative structured surveys and qualitative analyses based on the FGDs and KIIs. The heat perception surveys conducted in five cities in Nepal and Bangladesh represent a novel and rich dataset. The quantitative data analysis provides valuable insights from vulnerable urban populations, representing a diverse range of experiences across contexts.

This study demonstrates that extreme heat is a pervasive and escalating risk across urban centres in Nepal and Bangladesh, with clear and measurable impacts on health, livelihoods and well-being. Nearly all respondents reported experiencing periods of dangerous heat, and the overwhelming majority perceived themselves as vulnerable. Focus group participants across both countries confirmed that rising temperatures and humidity are lengthening the hot season, disrupting daily life and straining coping capacities.

The symptoms most respondents experienced – sleeplessness, fatigue, headaches, dizziness and trouble concentrating during periods of extreme heat – can and do have profound impacts on people's quality of life, well-being and productivity. To cover the income losses caused by extreme heat, vulnerable communities are often forced to take out loans, adding considerably to their mental stress. Furthermore, they face threats to food security during days of extreme heat.

The analysis found correlations between heat perception and various factors, including educational attainment, income level, household size and disability status. Those who are most vulnerable, such as individuals with limited education, low income, larger households, or disabled family members, are disproportionately impacted by extreme heat. Health burdens fall disproportionately on women (particularly sole earners), children, the elderly, and households with disabled members. The regression analysis confirms that disability and gender intersect with income and education to magnify vulnerability.

Although outdoor workers experience the highest risk from heat-related conditions, this study reveals that they report having limited knowledge about the dangers associated with extreme heat. They are also less likely to take protective measures, report symptoms of heat stress, or seek medical assistance. Additionally, outdoor workers often do not receive heat warnings and are generally unaware of programmes that provide this information, making them less likely to adjust their behaviour compared to individuals in other occupations.

Financial consequences are equally profound. More than half of respondents reported being unable to work during peak heat, with daily wage earners, rickshaw pullers, and outdoor workers most affected. Lost earnings coincide with higher expenses for water, electricity and medicine, forcing many households into debt. Borrowing, often at exploitative interest rates, was frequently reported as a coping strategy, especially in Bangladesh.

Protective actions are taken in most households, but awareness and uptake vary sharply by context. In Nepal, more than 90 per cent of households reported adopting protective measures, while

in Bangladeshi cities adoption was far lower, especially in Dhaka South and Rajshahi. The most common barriers were lack of knowledge, habituation to heat and the absence of official warnings. Awareness of formal heat programmes was significantly higher in Nepal, where municipalities and Red Cross branches have invested in repeated campaigns, than in Bangladesh where interventions are still in nascent stages.

Positively, the survey results indicate that heat programmes in these cities do deliver heat warning messages and protective advice to vulnerable populations, and are linked to positive behavioural changes. There is still significant potential for these programmes to expand and enhance their efficacy, particularly by tailoring interventions to address the specific needs of vulnerable groups.

It is also worthwhile to underscore that the perception and awareness of the extreme risks vary, based on the size and population of the cities. In smaller cities, targeted interventions seem to more effectively reach the vulnerable population groups, leading to more successful outcomes in addressing heat-related issues.

These are the overarching findings from the study, which are consistent across the cities where the study was conducted. However, it would be worth highlighting some of the country-level key findings.

The cities in Nepal have developed comprehensive HAPs, but financial limitations and resource constraints hinder their implementation. The demand for heat-resilient infrastructures, such as more shade, cooling centres and cool drinking water stations in public places, is increasing among vulnerable populations. The impact of ongoing efforts to raise heat awareness and enhance the city's heat resilience, particularly in Nepalgunj, is becoming increasingly evident.

In Bangladesh, none of the cities currently has a HAP. Risk reduction related to extreme heat has not yet been a high priority for local authorities. Due to the size, population and density of cities in Bangladesh, extensive programmes focused on reducing heat risk are necessary to reach vulnerable groups effectively. Reducing income loss due to extreme heat and making health infrastructure more affordable and easily accessible are priorities for the vulnerable groups surveyed.

RECOMMENDATIONS

Heat programmes are most impactful when tailored to the needs of the most vulnerable. In particular, the results indicate that interventions should be designed with a focus on households with disabled members, women who are sole earners, children and the elderly. Heat programmes must be built on an understanding of the special needs and experiences of each of these groups.

Outdoor workers, including rickshaw pullers and daily wage labourers, have been shown to be highly vulnerable and least likely to be reached by heat programmes. These populations face high exposure and limited options to rest. Therefore, interventions must double down on their efforts to reach and assist this group.

This study has shown that information sources such as radio, miking (loud speaker announcements) and illustrated posters that are accessible, especially for low-literacy populations, should be used. Heat programmes can use these insights to scale their reach and impact.

Solutions that expand protective infrastructure can reach key groups by increasing shaded areas, public drinking water stations and cooling spaces in marketplaces, schools and transport hubs. Low-cost household cooling techniques (e.g., straw or reflective coverings for tin roofs) through municipal campaigns, could reduce the impacts of extreme heat indoors.

Interventions that reduce financial strain during extreme heat should be prioritized. This can include cash or voucher assistance during heatwaves for the poorest households and outdoor workers, as well as regulating predatory lending practices that trap vulnerable households in cycles of debt.

Through this study, a number of lessons and reflections have emerged for future research planning and execution. This study made the most of its available resources and gathered a large dataset on individual heat experiences and the perceptions and needs of vulnerable populations in urban contexts. Spreading the sample across two countries, five cities and intervention-control locations required efficiency in questionnaire design and field team time. Some questionnaire modules – especially on household productivity, income, expenditure and health-related costs – had to be kept to a minimum. Future research would benefit from more granular data on these aspects to learn in-depth how household economics are affected by and, in turn, shape heat experiences and adaptive behaviours.

This research covered heat programmes in South Asian cities in general, not a specific heat-related programme, service or tool. Given that heat interventions are being adopted and scaled rapidly, it is important to assess their effectiveness in more detail. A future study could be designed to evaluate a specific programme in a particular location. Information about the heat intervention's implementation timeline, target population and geography would enable researchers to devise a (quasi-)experimental study design with stronger elements of randomization, allowing for the causal attribution of outcomes to specific heat interventions.

Finally, it would also be valuable to invest in long-term, high quality, monitoring and evaluation through household surveys and focus groups to regularly assess changing vulnerabilities, ensuring that programmes adapt as risks evolve.

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7
APPENDICES

7.1 APPENDIX A: METHODS

7.1.1 RESEARCH DESIGN AND RATIONALE FOR SELECTING THE STUDY CITIES

The objective of the study is to provide insights into the lived experiences, perceptions and needs of vulnerable urban populations exposed to extreme heat in South Asia.

NEPALGUNJ, NEPAL

Nepalgunj City is in Banke District, near Nepal's border with India. It regularly experiences high temperatures of over 40°C during the summer months. In 2023, the Nepalgunj Municipality in Nepal along with the Nepal Red Cross Society (NRCS) and the Red Cross Red Crescent Climate Centre (Climate Centre) published the Nepalgunj Heat Action Plan 2023 (Subedi, Khan & Singh, 2023). The HAP provides a framework for implementing, coordinating and evaluating extreme heat action across timescales in Nepalgunj to minimize the negative impacts of extreme heat on the health and livelihoods of the city's residents. It has now been operational for two years and provides an opportunity to learn from a city with multiple years of experience in implementing action on heat.

SIDDHARTHANAGAR, NEPAL

Siddharthanagar is in the Terai Plains of Nepal with a population of about 70,000 people. In 2024, the city of Siddharthanagar developed a Heat Action Plan, supported by the American Red Cross (ARC) and the Climate Centre. Parts of this HAP are being rolled out for the first time in 2025 and will be accompanied by a heat awareness-raising campaign. This represents a city at an early stage of heat action.

DHAKA SOUTH, BANGLADESH

In 2023, an Early Action Protocol (EAP) was developed and approved for highly vulnerable wards in Dhaka South. The EAP contains an action plan to be activated if the threshold is met of two consecutive days of temperatures forecast above 38°C. This plan was activated in April 2024, but temperatures did not meet the threshold for activation in 2025. The 2024 activation included a number of activities such as the dissemination of early warning messages, the distribution of safe drinking water and saline, and the provision of cooling stations and ambulance support for referral cases. This area, therefore, presents an opportunity to use the survey tools to understand heat risk perceptions in an area where early warnings and early actions have been implemented.

RAJSHAHI, BANGLADESH

Rajshahi, the fourth largest city in Bangladesh, is located on the northern bank of the River Ganges and spans 96.72 square kilometres (km^2). The city frequently records extreme heat with pre-monsoon temperatures exceeding 39°C almost every year

and peaking above 42°C on the hottest days. In collaboration with the Rajshahi City Corporation, Climate and Development Knowledge Network Asia and the UK Met Office, the Climate Centre published a report aimed at identifying heat thresholds and hotspots to guide action by the local government. Furthermore, a feasibility study for anticipatory action has also been conducted and a Heat Action Plan is currently being developed for this city. So far, there have been ad hoc actions taken by the municipality based on the studies shared and a very small pilot on supplementing the government Old Age Allowance to provide anticipatory cash for heatwaves. Therefore, this is a city in which heat policy tools are actively under development.

BAGERHAT, BANGLADESH

Bagerhat is a coastal municipality of 51,504 residents in southern Bangladesh and lies along the Bhairab River near the Sundarbans mangrove forest. Covering 7.53 km^2 and divided into nine wards, the city faces rising heat risks with increasing numbers of heatwave days over the past three decades. In 2010, Bagerhat recorded 91 heatwave days, the highest in recent history, while 2022 saw 85. From March to October, daily maximums range between 30–42°C, with an average of 35.6°C. Bagerhat was included in the survey as a city that is highly exposed to extreme heat where no substantial activities related to heat mitigation have yet been conducted. The city was chosen as a control for this study to facilitate a comparative study of responses between Bagerhat and the two other targeted cities in Bangladesh, which are larger or metropolitan areas where various interventions have already been implemented.

7.1.2 SAMPLE DESIGN

Given the research focus on heat hotspots in five cities, two-stage cluster sampling was considered the most appropriate approach. A guide was developed to support each country team to develop the country-specific sampling methodology based on their context and limitations (see Appendix A for the country-specific sampling design plans). As the first step, the team drew up a list of heat hotspots – i.e., municipal wards (clusters) with the highest exposure to extreme heat due to their natural and human geography. In each city, a sample of clusters was randomly selected proportional to size. In the second stage, households were selected randomly for inclusion in the study.

A survey sample representative of the vulnerable population would require 384 responses in each city, based on Cochran's standard formula for simple random sampling (with a 95 per cent confidence level, 5 per cent error margin and estimated population proportion of 0.5 for a given variable of interest). However, the cluster design increases the sampling variance. Therefore, the sample size must be adjusted by the design effect (*deff*) to account for the loss in precision.

Calculating the design effect as:

$$deff = 1 + (n - 1)\rho$$

Where:

n is the average cluster size (the study uses 20 for practicality)
ρ is the intra-cluster correlation coefficient (assumed to be 0.05)

Hence *deff* is estimated at 1.95. The simple random sample size of 384 was adjusted to 749 (384×1.95) to account for the multi-stage cluster design with the desired 5 per cent error margin. The team relaxed the required precision to 5.1 per cent and arrived at an adjusted sample size of 720 responses per city.

In Dhaka South and Rajshahi, Bangladesh the sample was stratified into wards with prior exposure to heat programming ('intervention' areas) and 'control' wards without dedicated heat-related services. For example, the Bangladesh Red Crescent Society (BDRCS) has a heat EAP in Dhaka; in Rajshahi, an advisory report on heat thresholds and hotspots was provided to the BDRCS and government authorities to enable them to provide assistance during periods of extreme heat.

Consequently, for Dhaka South and Rajshahi the total sample size of 720 per city was split into two: 360 households from intervention wards and 360 from control wards, to be able to compare their insights and discern the effects of heat programmes on people's experience and coping mechanisms during periods of extreme heat.

7.1.3 SAMPLE COMPOSITION: CHARACTERISTICS OF THE STUDY POPULATION

Table 2 shows the distribution of survey responses across sample population. Sampling targets were met, except in negligible instances of non-response in Rajshahi (345 interviewed versus 360 targeted households).

TABLE 2:
SAMPLE DISTRIBUTION. RESPONSES BY COUNTRY, CITY AND HEAT INTERVENTION STATUS

COUNTRY	CITY	HEAT PROGRAMME AREA	RESPONSES	PROPORTION
Bangladesh	Bagerhat	Control	720	19.9%
	Dhaka South	Control	361	10%
		Intervention	360	9.9%
	Rajshahi	Control	374	10.3%
		Intervention	345	9.5%
Nepal	Nepalgunj		741	20.4%
	Siddharthanagar		724	20%
TOTAL:			3,625	100%

A comparison of respondents' background characteristics by country shows statistically highly significant differences for most socioeconomic variables (Table 3).

For example, the proportion of women who indicated that they are the household's only income earner is much higher in Nepal (24 per cent) than in Bangladesh (6 per cent). The share of respondents who mainly work outdoors – an important sign of potential heat exposure – is 34 per cent in Nepal versus only half that number in Bangladesh (17 per cent). Moreover, in Nepal, the proportion of households with at least one member who has a disability is five times the incidence in Bangladesh (16 per cent versus 3 per cent).

Overall, it appears as if the sample population in Nepal is significantly more vulnerable than respondents from Bangladesh.

TABLE 3:
RESPONDENT BACKGROUND CHARACTERISTICS BY COUNTRY

VARIABLE	BANGLADESH	NEPAL	DIFFERENCE	P-VALUE
Median income bracket (1–5, last 30 days)	3	2	1	0***
Female respondent	40.7%	46.5 %	-5.8	0.0006***
Female sole-income earner	5.6 %	23.7 %	-18.06	0***
Respondent mainly works outdoors	16.5 %	34.2 %	-17.7	0***
Sole-income earner works mainly outdoors	10.4 %	23.3 %	-12.93	0***
Household has >= 2 income contributors	10.8 %	29.9 %	-19.1	0***
Respondent has no education	17.1 %	35.2 %	-18.07	0***
Any HH member with disability	3.2 %	16.4 %	-13.2	0***
Any HH member with long-term illness	45.9 %	40.3 %	5.52	0.0111*
Household size	4.28	5.87	-1.6	0***
Any elderly (>= 60) household members	28.0 %	56.1 %	-28.05	0***
Any children 0–4	28.4 %	32.3 %	-3.95	0.0118*
Ever experienced extreme heat	93.8 %	93.9 %	-0.13	0.8724

Significance levels: *** p < 0.001; ** p < 0.01; * p < 0.05; . < 0.1
p-values are shown for two-sided T-tests with a 95 per cent confidence level, except Kruskal–Wallis tests for income ladder (ordinal variable) and household size (not normally distributed).

Within each country, it is evident that significant between-city differences exist in the sample population, especially in Nepal. For example, nearly half of the respondents in Nepalgunj (48 per cent) work mainly outdoors versus only 24 per cent in Siddharthanagar. In Bangladesh, the differences between respondents from the three cities are less pronounced.

As a basis for assessing the effectiveness of heat programmes, it is important to understand whether there are differences in background characteristics between respondents from heat programme (intervention) areas in Bangladesh versus those living in control wards, because socioeconomic differences can have a strong mediating effect on heat-related outcomes (Gronlund, 2014).

Statistically significant differences exist for only two variables. Firstly, the proportion of respondents without any formal education – who indicated that they cannot read or write – is 22 per cent among the heat programme intervention group versus 15 per cent among the control group. Secondly, the share of households with any member that has a long-term illness is 50 per cent in the control group versus 38 per cent in the intervention group.

The following section explains the study's analytical approach to identify the most important factors shaping people's experiences and responses to extreme heat, while accounting for the significant differences in the sample population between countries, cities and intervention/control groups.

7.1.4 ANALYTICAL APPROACH

The study focuses on vulnerable urban populations from different countries' climatic, cultural and socioeconomic contexts. The analytical approach must therefore be able to account for differences in respondent characteristics to isolate the effects of specific independent (explanatory) variables that can influence the outcomes of interest.

All main outcome variables analysed in this study can be expressed in binary form – i.e. they take a value of '0/1' or 'yes/no'. For example, the study asked whether the respondents ever needed to seek medical attention because of the impacts of extreme heat, or whether they ever experienced financial difficulties during periods of unusually hot weather.

Binomial logistic regressions are used to model the effects of the most important respondent background characteristics – and, in Bangladesh, the exposure to heat programmes – on people's heat experiences and adaptive or coping strategies.

The general base model can be expressed as:

$$\text{logit}\,(p_i) = \beta_0 + \beta_1\,(\,predictor_1\,) + \ldots + \beta_i\,(\,predictor_i\,)$$

whereby p_i is the probability of the outcome being analysed (e.g., experiencing financial difficulties because of extreme heat), β_0 is the intercept (i.e., the log-odds for a respondent whose values for all predictors are set to zero or the reference level), and $\beta_1, \ldots, \beta_i$ are the coefficients showing the effect of each predictor variable on the log-odds of the outcome being analysed. Each coefficient represents the expected change in the log-odds of the outcome per unit increase in the predictor (or when the condition holds true, for binary variables), *holding all other variables constant*.

For the full model specifications, the study uses important background characteristics showing significant differences between population groups and a likely effect on heat-related outcomes. For Bangladesh, the regression model includes the group membership (intervention versus control) to assess the effects of heat programmes.

Full model specifications:

$$\text{logit}\,(p_i) = \beta_0 + \beta_1\,(\text{age of respondent}) + \beta_2\,(\text{female respondent}) + \beta_3\,(\text{female sole-income earner}) + \beta_4\,(\text{works mainly outdoors}) + \beta_5\,(\text{highest education level}) + \beta_6\,(\text{any household member with disability}) + \beta_7\,(\text{household size}) + \beta_8\,(\text{income bracket}) + \beta_9\,(\text{Bangladesh: heat programme exposure})$$

Each regression model controls for location fixed effects to account for unobserved time-invariant factors specific to each city that might bias the relationship between other variables.

Since the log-odds (i.e., the natural logarithm of the odds) are difficult to interpret, the results are reported in the narrative by transforming the coefficient log-odds to the odds ratio *OR* (the ratio of the odds of an event occurring in one group to the odds of the event occurring in another group) by calculating the exponential of the coefficient e^{coeff}. For easier interpretation, we also report the percentage increase/decrease in odds with the following transformation: $(OR - 1) \times 100$.

7.1.5 QUALITATIVE DATA AND ANALYSIS

In addition to the surveys, a set of focus group discussions (FGDs) and key informant interviews (KIIs) were conducted in each city. This qualitative data helps to provide important context and an opportunity to dive deeper into the perceptions and reasons behind these, and is used in this analysis to complement and provide important colour to the quantitative survey results. Employing a mixed-methods approach in this study strengthens the overall analysis by ensuring the data is not only statistically sound but also grounded in lived experience.

For each of the cities the list of FGDs and KIIs conducted is provided below. The transcripts of the qualitative data were reviewed and translated before a thematic analysis was conducted to reveal common themes.

TABLE 4:
FOCUS GROUP DISCUSSION AND KEY INFORMANT INTERVIEW RESPONDENTS IN BANGLADESH

DATE 2025	CITY	STAKEHOLDER	TOOL	PARTICIPANT
5 July	Bagerhat	Women's group	FGD	Ward No. 7 (Rail Road)
5 July		Mixed group		Ward No. 6 (Rail Road)
4 July		Different outdoor working group		Ward No. 7 (Rail Road)
3 July		Government representative	KII	Representative from Environment Department/Forest Department
3 July		Health expert		Deputy Civil Surgeon/Dr. Pradip Bakshi
4 July		Development practitioner		Shilpi Akter, District Coordinator, Rupantor NGO
1 July	Rajshahi	Women's group	FGD	Ward No. 4 (Councilor Office)
2 July		Mixed group		Ward No. 28 (Dharampur)
4 July		Different outdoor working group		Ward No. 11 (Rajshahi College Field)
2 July		Government representative	KII	CEO (Chief Executive Officer), Rajshahi City Corporation / Forest Department
3 July		Health expert		Civil surgeon
3 July		Development practitioner		Representative NGO forum / other
7 July	Dhaka South City	Women's group	FGD	Ward No. 55 (Kamrangirchar)
7 July		Mixed group		Ward No. 64 (Konapara)
10 July		Different outdoor working group		Ward No. 1 (Taltola Market)
8 July		Government representative	KII	Md. Shirajul Islam (Chief Urban Planner)
8 July		Health expert		Nishath Parvin (Chief Health Officer) Dhaka South City Corporation
10 July		Development practitioner		Representative from NGO forum

DATE 2025	CITY	STAKEHOLDER	TOOL	PARTICIPANT
22 June	Siddharthan-agar	Auto drivers	FGD	Buddha Chowk
22 June		Women's group		Ward No. 9
23 June		Women's group		Ward No. 9 (Kathautiya)
23 June		Cobblers		Ward No. 7 (Aawa Road)
22 June		Ward No. 7 Chairman	KII	Damodar Sharma Ghimire, Ward No. 7 Chairman
22 June		Municipality officers		Chetansheel Lamsal, Under-Secretariat; Yadav Sapkota, Disaster Focal Person
23 June		Public Health Office		Kedar Nath Shah, Vaccine Officer
23 June	Nepalgunj	Outdoor labourers and auto drivers	FGD	N/A
23 June		Women's group		Puraina
24 June		Mixed group		Ward No. 22
22 June		Government representative	KII	Gorakh Bahadur Thapa, Chief of Education and Sports Division
23 June		Government representative		Ram Bahadur Chand, Chief of Health Division; Jageshwor Basnet, Public Health Officer
24 June		Government representative		Abdul Gaffar Halwai, Ward Chairman

7.2 APPENDIX B: RESEARCH INSTRUMENTS

7.2.1 NEPAL SAMPLING DESIGN PLAN

HOUSEHOLD SURVEY

Total sample size: 1,440
Siddhartha Nagar: 720
Nepalgunj: 720

Context: The HAP of Siddharthanagar Municipality has categorized five wards (6, 7, 10, 11 and 13) as hotspot wards. Similarly, the report 'identification of heat threshold and heat hotspots in Nepalgunj' authored by the Climate Centre categorized five wards (13, 14, 19, 21 and 22) as hotspot wards. This perception study shall focus on these ten wards from two cities. According to the 2021 Census, the total population in the heat hotspot wards in Siddharthanagar is 25,007, while in the hotspot wards in Nepalgunj it is 36,039.

The survey will use a two-stage stratified cluster sampling method, designed to ensure that the study is both representative and feasible to implement within real-world fieldwork constraints. This method is both efficient and reliable for surveys in large and diverse populations.

A. Recommended formula (Cochran's sample size formula):
For large populations (10,000+), use this simplified formula:
$\mathbf{n_0 = (Z^2 \times p \times (1-p)) / e^2}$
Where:
Z = 1.96 (for 95 per cent confidence)
p = 0.5 (maximum variability, safest assumption)
e = 0.05 (5 per cent margin of error)
Result:
$n_0 = (1.96^2 \times 0.5 \times 0.5) / 0.05^2 = 384$

B. Adjusting for cluster sampling (with stratified two-stage design):
In both Nepalgunj and Siddharthanagar, Nepal it is not feasible to randomly select individuals from across the entire city; thus, the survey plans to use cluster sampling. The study plans to conduct the household survey in all the wards identified as hotpots in both cities.

The population composition throughout both cities is similar; however, the survey plans to adopt statistical adjustment known as the **design effect (*deff*)** of 1.95 to increase confidence in the results of a two-stage cluster approach, i.e., the sample size will increase by 95 per cent.

C. Final sample calculation:
The design effect is calculated as:
$deff=1+(n-1)\rho$
Where:
n is the average cluster size (proposed: 20 for practicality)
ρ is the intra-cluster correlation coefficient (assumed to be 0.05)
Hence the *deff* is estimated at **1.95.**

This means the simple random sample size of **384** would have to be adjusted to 749 (384 × 1.95) to account for the multi-stage cluster design with a desired 5 per cent error margin.
When relaxing the required precision to 5.3 per cent, the required adjusted sample size would be 667 (**rounded to 720**), in each city.

Cluster selection: For the household survey, the clusters are based upon the *tole* level data available at the ward offices. A *tole* is not an actual administrative division but a settlement or group of neighbouring households. The size of tole may range from several dozen to a few hundred households. Within the study area the smallest *tole* comprises 17 households, while the largest one has 560 households. The *toles* with less than 50 households have been clustered into adjacent *toles*. A total of 30 clusters in each city will be considered for the household survey, which are selected at uniform interval from a randomly generated initiator.

Sample size distribution: The given 720 sample size will be uniformly distributed among the clusters for the study. As there are 720 households and 30 clusters in each city, 24 households will be selected in each cluster.

Selection of households: As the households in both cities do not hold unique household numbers or names, random sampling across the cities is very challenging. The household will be selected via a random walk within the selected cluster. Households will subsequently be selected by skipping every 4–8 households, based upon the total households in the selected cluster.

7.2.2 BANGLADESH SAMPLING DESIGN PLAN

The Rockefeller Foundation Heat–Health Comprehensive Perception Study in Bangladesh will be conducted in three cities – Dhaka South, Rajshahi and Bagerhat. Dhaka South and Rajshahi will work as intervention areas where an Early Action Protocol (EAP) and Heat Action Plan (HAP) have been initiated respectively in 2024. Bagerhat will act as the control, where no such official interventions have yet been initiated, but the temperature is increasing at an alarming rate every year with last year being under the 'moderately high' category.

SAMPLE DESIGN:

A. Sample size formula (Cochran's formula):
For populations over 10,000, use:
$\mathbf{n_0 = (Z^2 \times p \times (1\text{-}p)) / e^2}$
Where Z = 1.96 (95 per cent confidence), p = 0.5, and e = 0.05 $\longrightarrow$ $\mathbf{n_0 = 384}$

B. Cluster sampling adjustment:
Due to operational limits in Nepalgunj and Siddharthanagar, cluster sampling will be used, focusing on hotspot and selected non-hotspot wards. A design effect (*deff*) of **1.95** is applied to adjust for the two-stage sampling design, accounting for intra-cluster correlation.

C. Final sample size:
Using *deff*:
Adjusted sample = 384 × 1.95 = 749
If relaxing precision to 5.3 per cent, the sample size reduces to **667**, rounded up to **720 per city**. The data collection process for the study will be conducted between 3–15 July 2025. A mixed method approach will be used to collect data.

Quantitative data collection: A household survey will be conducted. Following the sample strategy developed by the ARC and Climate Centre, 720 household surveys will be collected from each city, totalling 2,160 households' data for three cities (as referred to the sample size guidance).
The wards where the data collection will be conducted are:

CITY	TOTAL WARDS IN THE CITY	TOTAL NO. OF WARDS FOR DATA COLLECTION	HEAT HOTSPOT WARDS	BDRCS INTERVENTION WARDS
Dhaka South	75	16	1, 3, 14, 15, 19, 20, 55, 56, 57, 63, 64, 67, 68, 69, 70, 74	55, 56, 57
Rajshahi	30	10	1, 4, 11, 14, 16, 19, 24, 25, 28, 30	4, 6, 19, 24, 28
Bagerhat	9	9	1, 2, 3, 4, 5, 6, 7, 8, 9	

N.B.: Quantitative data will be collected from heat hotspot wards in each city

CLUSTER APPROACH AND COMPARISON

Within cities: The study will enable both within-city and between-city comparisons. Within cities such as Dhaka South and Rajshahi, data will be collected from identified hotspot wards, allowing comparison between areas that have received BDRCS interventions and those that have not. For example, in Dhaka South, 16 hotspot wards will be surveyed, of which three have had BDRCS support. While in Rajshahi, ten hotspot wards will be covered, with five prior interventions. In contrast, Bagerhat represents a new city where no BDRCS interventions have been implemented to date, and no heat action awareness campaigns or plans have been conducted or developed.

Between cities: Comparative analysis will be conducted between cities with existing plans, policies or interventions (e.g., Dhaka and Rajshahi) and those without (e.g., Bagerhat). This provides an opportunity for between-city comparisons – such as Dhaka and Rajshahi (with existing interventions) versus Bagerhat (without interventions) – to assess the impact of preparedness and planning.

Selection of households:
Since households in all three cities lack unique identifiers or complete name lists, random sampling across the entire cities is not feasible. Therefore, households will be selected using the random walk method as recommended in the sampling guidelines.

Qualitative data: Three FGDs and three KIIs will be conducted in each city, totalling nine FGDs and nine KIIs for the three cities.

The FGDs and KIIs will be conducted with:

FGD	KII
FGD with vulnerable women group	KII with government representative
FGD with mixed group	KII with health expert
FGD with different outdoor working group	KII with development practitioner

Enumerator selection:
A total of 30 enumerators (ten from each city) will support the collection of household survey data. In addition, two more enumerators per city will support BDRCS/IFRC/ARC staff in conducting the FGDs & KIIs. These 36 enumerators will be selected from the BDRCS RC Youth volunteers pool, who have previous experience in data collection processes. The 36 RC Youth volunteers will participate in a two-day training programme on data collection, followed by a one-day field testing of the household survey tool.

7.2.3 SURVEY QUESTIONNAIRE

EXTREME HEAT EXPERIENCES STUDY

SURVEY QUESTIONNAIRE

Enumerator number:
Respondent number:
Name:
Date:
City:

Introduction: Good morning/afternoon, my name is _____. I am here on behalf of [Name of National Society]. We are conducting a study to better understand how people perceive the risks and impacts of extreme heat in the city of [ENTER NAME OF CITY]. This interview will take approximately XX minutes. All the information you share will be used only for research purposes. Any data collected – whether written, audio or photographic – will be stored securely and kept confidential. At the end of the study, all materials will be protected and managed by [Name of National Society]. Your participation is entirely voluntary. You may choose to participate or not, skip any questions you're uncomfortable with, or stop the interview at any time. There are no right or wrong answers – we are only interested in your honest experiences and views. If you decide to participate, your experiences will be very useful for the development of the study. Is everything clear to you? Do you have any questions before we begin?

Section I: General information

1. How old are you? _____

2. Gender
   a. Female
   b. Male
   c. Other

3. What is your marital status?
   a. Single (never married)
   b. Married and living together
   c. Married but not living together
   d. Divorced
   e. Widowed
   f. Separated (not legally divorced)
   g. Other (please specify):

4. What is your present religion, if any?
   a. Hindu
   b. Muslim
   c. Buddhist
   d. Christian
   e. Kirat (for Nepal)
   f. Sikh
   g. Jain
   h. Atheist
   i. Agnostic
   j. No religion
   k. I don't know
   l. Other (please specify):

5. In the last 30 days, approximately how much money has your household earned in total? (*This includes income from all sources, regular jobs, daily labour, small businesses, remittances etc.*)

Bangladesh:

a. Under 5,000 Bangladeshi taka (BDT)
b. 5,000–10,000 BDT
c. 10,001–15,000 BDT
d. 15,001–20,000 BDT
e. 20,001 BDT and above
f. Prefer not to answer

Nepal:

a. Under 10,000 Nepalese rupee (NPR)
b. 10,000–20,000 NPR
c. 20,001–30,000 NPR
d. 30,001–50,000 NPR
e. 50,001 NPR and above
f. Prefer not to answer

6. What is your occupation?
   a. Unemployed
   b. Formal employment
   c. Occasional work/day labourer/ informal sector
   d. Homemaker
   e. Self-employed
   f. Student
   g. Agriculture/livestock
   h. Other (please specify):

7. Are you the only source of income in your household?
   a. Yes
   b. No
   c. I don't know

8. [If 'no' in Q7] Who else contributes to the household income?
   a. Father
   b. Mother
   c. Sibling(s)
   d. Spouse/partner
   e. Children
   f. Other (please specify):

9. Where do you usually do your work?
   a. Mainly outdoors (e.g., farming, construction, street vending, transport work)
   b. Indoors – light work (e.g., office, shop, school, salon)
   c. Indoors – physical or heavy work (e.g., factory, garment work, workshop, kitchen)
   d. Both indoors and outdoors
   e. Not applicable, currently not working

10. What is your highest level of education?
    a. None (cannot read or write)
    b. Vocational education
    c. Elementary school
    d. Junior high school
    e. High school
    f. Diploma/bachelor
    g. Master/doctoral

11. Including yourself, how many people are part of your household? (*Please include all family members or others who are considered part of the household, even if they are temporarily living elsewhere. For example, someone working abroad or in another city, but who still sends money home or returns regularly*). Don't include people who live here but have their own arrangement).

    _____

12. Including yourself, how many people usually sleep under the same roof as you at night? (*This includes all people who regularly sleep under this roof, whether or not they are part of your household, such as roommates, co-workers or mess members*).

    _____

13. Out of the total number of people living in your household, how many are:
    a. Children (0–4 years) _____
    b. Children (5–17 years) _____
    c. Adults (18–59 years) _____
    d. Older adults (60 years and above) _____
    e. People with a disability _____
    f. People with a long-term illness or pre-existing medical condition _____
    g. Pregnant or breastfeeding women _____

14. [If long-term illness or pre-existing medical condition]: What type of long-term illness or medical condition does the person (or people) in your household have? [*Multiple answers*]
    a. Diabetes
    b. Heart disease or high blood pressure
    c. Respiratory illness (e.g., asthma, COPD)
    d. Physical disability due to illness or injury
    e. Mental health condition
    f. Cancer
    g. Chronic kidney disease
    h. Other (please specify)
    i. I don't know/prefer not to say

Section II: Heat awareness and perceptions of risks

Questions	Yes	No	I don't know
15. Have you ever experienced periods of unusual or uncomfortable hot weather in your city?			
16. Do you think there has been an increase in temperature in recent years in your city?			
17. Do you feel that extreme heat is a problem in your city?			
18. Does extreme heat affect you or your household in any way?			

19. [if 'yes' in Q18]: How does extreme heat affect you? [*Multiple answers*]
    a. Health issues
    b. Loss of income or reduced work hours
    c. Decreased access to food
    d. Decreased access to water
    e. Increased community aggression or violence
    f. Lower work productivity
    g. Disruptions in electricity supply
    h. Reduced participation in social or community activities
    i. Other (please specify)

20. Thinking about your community, can you name some groups of people who you think are most vulnerable to extreme heat? [*Do not provide the respondent with the options below, but select which ones best approximate the responder's answer*] [*Multiple answers*]
    a. Pregnant women
    b. Elderly
    c. Newborns
    d. People with disabilities
    e. People with underlying conditions/diseases
    f. People with obesity
    g. Youth
    h. Children
    i. Outdoor workers
    j. Athletes or people doing intense physical activity
    k. People with mental health conditions
    l. Informal settlers
    m. Homeless people
    n. Homemaker
    o. Other (please specify)

21. Do you consider yourself vulnerable to extreme heat?
    a. Yes
    b. No
    c. I don't know

22. During periods of extreme heat, have you experienced any problems or illnesses as a result of the extreme heat?
    a. Yes
    b. No
    c. I don't know

23. [If 'yes' in Q22] Have you experienced any of the following symptoms during the extreme heat days: [*Multiple answers*]
    a. Sleeping problems
    b. Fatigue or tiredness
    c. Feeling anxious or restless
    d. Trouble concentrating
    e. Headache
    f. Immense thirst
    g. Excessive sweating
    h. Dehydration
    i. Dizziness
    j. Sunburn
    k. Nausea
    l. Vomiting
    m. Cold or clammy skin
    n. Fainting (passing out)
    o. Diagnosed sunstroke
    p. Diagnosed heat stroke
    q. Worsening of heart condition (e.g., chest pain, palpitations)
    r. Worsening of lung condition (e.g., difficulty breathing, asthma attack)
    s. Other (Please specify)
    t. Prefer not to say

24. Have you or a member of your household ever needed medical attention because of health problems caused by extreme heat?
    a. Yes, myself
    b. Yes, a household member
    c. No

25. During extreme heat periods, have you or a household member ever needed emergency medical attention for a pre-existing health condition (like heart disease, asthma, diabetes, etc.) that got worse?
    a. Yes, myself
    b. Yes, a household member
    c. No

25. Have you or your household experienced any financial difficulties during recent periods of extreme heat?
    a. Yes
    b. No
    c. I don't know

26. [If 'yes' in Q24] In what ways did extreme heat affect you or your household financially? [*Multiple answers*]
    a. Higher electricity or utility bills
    b. Increased water usage
    c. Loss of income from missing work
    d. Medical expenses due to heat-related illness
    e. Spent money on fans, cooling devices or repairs
    f. Transportation costs (e.g., transportation with air-conditioning, transfer to cooling centres, clinics, etc.)
    g. Childcare costs (e.g., staying home due to closed schools)
    h. Other (please specify):

27. Has extreme heat ever prevented you or a household member from working?
    a. Yes, could not work multiple days due to the extreme heat
    b. Yes, could not work occasionally
    c. No, but work hours were reduced or adjusted
    d. No, work continued without any changes even though it felt unsafe
    e. No, extreme heat did not affect work or working conditions
    f. Not applicable (no one in the household works)

28. How serious do you think the risk of extreme heat is to your health or well-being?
    a. Not at all serious
    b. Slightly serious
    c. Moderately serious
    d. Very serious
    e. Extremely serious

Section III: Adaptation strategies and barriers

29. Have you taken any measures to protect yourself during periods of extreme heat in your city?
    a. Yes
    b. No
    c. I don't know

30. [If 'yes' in Q29] What do you do to protect yourself from extreme heat? [*Do not provide the respondent with the options below, but select which ones that best approximate the responder's answer*] [*Multiple answers*]
    a. Increase consumption of water
    b. Use an electric fan
    c. Use air-conditioning
    d. Use a local fan made of wood/cloth/paper (hand fan)
    e. Sleep or rest during hottest periods of the day
    f. Adjust clothing (wear loose clothes, light materials/colour, wear a hat)
    g. Keep windows closed when outdoor temperature is higher
    h. Visit parks / green areas
    i. Avoid or reduce physical activity
    j. Avoid or reduce outdoor activities
    k. Eat small or lighter meals
    l. Consumption of electrolyte-containing beverages
    m. Consumption of mineral salts
    n. Take more frequent showers or baths to cool down
    o. Use roof-cooling measures (e.g., sprinkling water on the roof, covering the roof with cloth or other materials)
    p. Other (please specify):

31. [If 'yes' in Q29)] Are there any traditional or local methods you use to protect yourself during periods of extreme heat? [*open-ended question*]

    _____

32. [If 'no' in Q29] If you do not take any measures, why not? [Select all that apply]
    a. The weather was not hot enough
    b. The extreme heat does not affect me / I am used to extreme heat
    c. I did not know that extreme heat can be dangerous
    d. I did not have the knowledge on how to prepare or what to do
    e. There was no announcement on the extreme heat situation
    f. I did not have the money to take action to prepare, respond or protect myself
    g. Other (please specify)

33. How have you coped financially during periods of extreme heat? [*Multiple answers*]
    a. Used savings or emergency funds
    b. Skipped or delayed paying other bills (rent, utilities, phone)
    c. Took out a loan or borrowed money
    d. Reduced spending on food or other essentials
    e. Reduced or stopped attending social activities
    f. Received help from family, friends or the community
    g. Made no changes or adjustments
    h. Other (please specify)

34. Have you ever had to choose between protecting your health during periods of extreme heat and keeping up with your daily responsibilities, like work, errands, caregiving etc.?
    a. Yes
    b. No
    c. I don't know

Section IV: Policy intervention-related questions

35. Are you aware of any programmes, services or tools designed to help people cope with the extreme heat?
    a. Yes
    b. No
    c. I don't know

36. [If 'yes' in Q35] Which of the following government programmes, services or tools are you aware of? [*Do not provide the respondent with the options below, but select which ones best approximate the responder's answer*] [*Multiple answers*]
    a. Heat action plans (e.g., city or regional policies to protect people during extreme heat)
    b. Early warning systems (e.g., heat alerts or notifications via text, phone or media)
    c. Heat early action protocols (EAP)
    d. Public cooling centres or shaded public spaces
    e. Distribution of fans, water or cooling kits during heat events
    f. Public health messaging (e.g., TV, radio, social media campaigns on heat safety)
    g. Free or subsidized medical attention or transportation during extreme heat
    h. Community outreach programmes (e.g., home visits, check-ins or support for vulnerable populations)
    i. Community heat action or preparedness training
    j. Other (please specify):

36. Have you ever received a heat warning in your area?
    a. Yes
    b. No
    c. I don't know

37. [If 'yes' in Q36] What type of information did you receive? [*Multiple answers*]
    a. Maximum temperature
    b. Minimum temperature
    c. Humidity level
    d. Duration of the event
    e. Actions to protect yourself, your family and friends
    f. Consequences
    g. Channels of help
    h. What to do in case of emergencies
    i. Other (please specify)

38. [If 'yes' Q36] How did you receive the information?
    a. Weather or emergency alert on my phone
    b. Television
    c. Radio
    d. Newspaper
    e. Social media (Facebook, Instagram, etc.)
    f. Word-of-mouth (community leaders, neighbours, family members, and/or friends)
    g. WhatsApp
    h. Poster/pamphlet/wall paintings
    i. Other (please specify)
    j. None

39. Have your actions or behaviours during periods of extreme heat changed since these programmes, services or tools were introduced?
    a. Yes
    b. No
    c. I don't know

40. [If 'yes' in Q39] Which of the following changes have you made? [*Do not provide the respondent with the options below, but select which ones that best approximate the responder's answer*] [*Multiple answers*]
    a. I pay more attention to heat alerts or warnings
    b. I visit cooling centres or shaded public spaces
    c. I drink more water or use cooling products provided by the government
    d. I stay home or avoid outdoor work during extreme heat
    e. I seek medical care or use free services during heatwaves
    f. I follow government health or safety recommendations more closely
    g. I still do the same things as I did before the programmes existed
    h. Other (please specify):

Section V: Decision-maker versus community viewpoints

41. In your opinion, how much of a priority is addressing extreme heat in your community?
    a. Not a priority at all
    b. Low priority
    c. Moderate priority
    d. High priority
    e. Very high priority
    f. I don't know

42. In your opinion, is enough being done to protect people in your community from the effects of extreme heat?
    a. Yes
    b. No
    c. I don't know

43. How well do you think decision-makers understand what people like you need during periods of extreme heat?
    a. Very well
    b. Somewhat well
    c. Not very well
    d. Not at all well
    e. I don't know

Section VI: Information and communication channels

44. What kind of information would be most useful for you to receive? [*Multiple answers*]
    a. Maximum temperature
    b. Minimum temperature
    c. Humidity level
    d. Duration of the event
    e. Actions to protect yourself
    f. Consequences
    g. Channels of help
    h. What to do in case of emergencies
    i. Actions to protect your family and friends
    j. Other (please specify):

45. What sources do you use to get information about extreme heat? [*Multiple answers*]
    a. Television
    b. Radio
    c. Social media (Facebook, Instagram, etc.)
    d. Newspapers
    e. Government press releases
    f. Word-of-mouth (community leaders, neighbours, family members and/or friends)
    g. WhatsApp
    h. Google
    i. Newspaper
    j. Poster/pamphlet/wall paintings
    k. Other (please specify)
    l. None

46. In your community, how do you think information can best be spread? [*Multiple answers*]
    a. Television
    b. Radio
    c. Social media (Facebook, Instagram, etc.)
    d. Newspapers
    e. Government press releases
    f. Word-of-mouth (community leaders, community volunteers, neighbours, family members and/or friends)
    g. WhatsApp
    h. Google
    i. Poster/pamphlet/wall paintings
    j. Other (please specify)
    k. None

47. How often do you search for information related to temperatures?
    a. Never
    b. Almost never
    c. Occasionally
    d. Once a week
    e. Every day

Section VII: Final question

48. Is there anything else you would like to share about problems with heat in your city, or what might help you and your neighbours to stay cool during heatwaves?

7.2.4 KEY INFORMANT INTERVIEW GUIDE

EXTREME HEAT EXPERIENCES STUDY

KEY INFORMAT INTERVIEW GUIDE (DECISION-MAKERS)

Introduction: Good morning/afternoon, and thank you for taking the time to speak with me today. My name is [Insert Name] and I am working with [Name of National Society]. We are conducting a study to better understand how people experience and respond to extreme heat, especially in communities that are more vulnerable to its effects.

The purpose of this interview is to learn from your knowledge and experience. We're interested in your personal insights, observations and professional perspective. The conversation will take approximately 60 minutes.

There are no right or wrong answers – we are only interested in your opinions and personal experiences. We want to hear what you think and feel. Your views will help us make recommendations to better support people like you during periods of extreme heat.

Everything you share will be kept anonymous. We will not record your name in the final report, and any recordings or notes we take will be stored securely. Your participation is entirely voluntary – you can skip any questions or stop at any time without any consequences.

Do you have any questions before we begin? May we have your permission to continue?

Consent:

A. Warm-up / Context-setting (5–10 minutes)

1. Could you please introduce yourself, your role and how your department/ organization is involved in heat risk or urban resilience work.

B. Perceptions of heat and impacts of extreme heat

2. From your perspective, have you noticed a change in the frequency or intensity of extreme heat events in recent years? Please explain.
3. In your opinion, how does extreme heat affect the population of this city (examples)?
    a. Health?
    b. Work or income?
    c. Daily activities or responsibilities at home?
4. Who do you think are the most vulnerable groups in this city to extreme heat?
    a. Why are these groups particularly vulnerable?
5. Are there any areas or zones within the city that have been identified as particularly high-risk for extreme heat?
    a. What factors contribute to these areas being more vulnerable?

C. Community adaptation strategies and barriers

6. What do people in your community do to protect themselves during periods of extreme heat?

7. How have people in your community coped financially during periods of extreme heat?

8. Do you think people in your community have ever had to choose between protecting their health during extreme heat (e.g., staying cool, staying home) and meeting other important needs (e.g., going to work, earning income, caregiving responsibilities)?
    a. If 'yes': Could you provide some examples?

D. Policy intervention-related questions

9. What kinds of policy tools or interventions are currently in place to reduce the impact of extreme heat? Please feel free to consider not only government-led efforts, but also the roles played by civil society, community-based organizations, humanitarian actors or others involved in this space.
    a. Are there early warning systems, heat action plans, etc., in place?

10. In your view, how effective are current responses in reaching and protecting vulnerable populations?

11. What are the biggest challenges or barriers your organization faces in implementing extreme heat-related responses?

12. [IF THERE ARE HEAT ACTION PLANS, EARLY WARNING SYSTEMS, ETC.] Have you observed any changes in protective behaviours among communities since the introduction of these plans/tools?
    a. If 'yes', what kinds of changes have you noticed? What do you think has contributed to them?

E. Differences in perception: Vulnerable groups versus decision-makers

13. In your opinion, how much of a priority is addressing extreme heat within your organization or decision-making body?
    a. Has this priority changed in recent years? Why?

14. How well do you think your current plans and policies address the needs of vulnerable groups?

15. Are community members or representatives engaged in any way in decisions or planning about addressing extreme heat?
    a. If yes, how?
    b. If not, why not?

16. What are the main gaps or challenges in addressing the needs of vulnerable groups during periods of extreme heat?

F. Wrap-up and closing

Thank you so much for your time and for sharing your thoughts and experiences. What you have told us is very valuable.

Before we end, is there anything else you would like to share that we have not talked about?

7.2.5 FOCUS GROUP DISCUSSION GUIDE

EXTREME HEAT EXPERIENCES STUDY

FOCUS GROUP DISCUSSION GUIDE (VULNERABLE GROUPS)

Introduction: Good morning/afternoon, and thank you for joining us today. My name is [Insert Name] and I am working with [Name of National Society]. We are conducting a study to better understand how people experience and respond to extreme heat, especially in communities that are more vulnerable to its effects.

Today's discussion will take around 1.5 hours. There are no right or wrong answers – we are only interested in your opinions and personal experiences. We want to hear what you think and feel. Your views will help us make recommendations to better support people like you during periods of extreme heat.

Everything you share will be kept anonymous. We will not record your name in the final report, and any recordings or notes we take will be stored securely. Your participation is entirely voluntary – you can skip any questions or stop at any time without any consequences.

We kindly ask that everyone listens respectfully and allows each other time to speak. Please feel free to express yourself in any way you feel comfortable.

Do you have any questions before we begin? May we have your permission to continue?

Consent:

A. Warm-up / Context-setting (5–10 minutes)

1. Please tell us your name and something about your daily routine during extremely hot days.

B. Perceptions of heat and impacts of extreme heat

2. Have you noticed an increase in temperatures in recent years? Please explain.

3. How do periods of extreme heat affect your:
   a. Health?
   b. Work or income?
   c. Daily activities or responsibilities at home?

4. Have you or a member of your household ever needed medical

attention because of health problems caused by extreme heat?
   a. If 'yes': Did you receive medical attention? Please explain.
   b. If 'did not get medical attention': What were the reasons you were not able to seek or receive medical attention?

5. Have you or your household experienced any financial difficulties during recent periods of extreme heat?
   a. If 'yes': What are the main difficulties?
   b. If 'yes': How have you coped financially during periods of extreme heat?

6. Have you ever had to choose between protecting your health during extreme heat (e.g., staying cool, staying home) and meeting other important needs (e.g., going to work, earning income, caregiving responsibilities)?

7. Who do you think are the most vulnerable groups in this city to extreme heat?

C. Adaptation strategies and barriers

8. What do you usually do to protect yourself and/or your family during periods of extreme heat?

9. Are there any protective actions that people in your community wish they could take to reduce the impact of extreme heat, but have not been able to? What challenges or barriers have prevented these actions from being carried out?

D. Policy intervention-related questions

10. Are you aware of any programmes, services or tools designed to help people cope with the extreme heat? This can include government initiatives, health services, community-led activities or support from humanitarian or relief organizations.
    a. Do you have access to these services or tools? If so, which ones?

11. How have your actions or behaviours during periods of extreme heat changed since these programmes or tools were introduced?
    a. Are there things you stopped doing or started doing differently in recent years?
    b. Which changes have made the biggest difference for you or your community?

E. Differences in perception: Vulnerable groups versus decision-makers

12. In your opinion, how much of a priority is addressing extreme heat for people in your community?
    a. How much of a priority do you think it is for local authorities or the government?

13. How well do you think local authorities or the government understand what people like you need during periods of extreme heat?

a. How could the local authorities or the government better understand and respond to your needs?

14. Have you or people in your community ever been included in decisions or planning about addressing extreme heat?
15. What actions do you think local authorities should take to help reduce the impact of extreme heat in this city?

F. Community needs and recommendations

16. How do you think information can be shared more effectively with you and your community?

G. Wrap-up and closing

Thank you so much for your time and for sharing your thoughts and experiences. What you have told us is very valuable.

Before we end, is there anything else you would like to share that we have not talked about?

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