"UNDER THE SCORCHING SUN„

Women's Experiences of Extreme Heat in Dhangadhi, Nepal

In Dhangadhi, Nepal, the risks associated with extreme heat are adversely affecting the health, livelihoods and daily life of women, especially those from marginalised communities with low socioeconomic status. A lack of knowledge, information, and resources for developing coping mechanisms to manage the impacts of extreme heat, is exacerbating women's vulnerabilities. Building women's resilience to heat is critical to foster community-wide resilience in the face of a changing climate, ensuring no-one is left behind.

Women are vulnerable to extreme heat:

Heatwaves are rising in frequency, duration and intensity, posing serious public health and socioeconomic challenges globally. Heat-related impacts affect millions of people worldwide, but these impacts are not evenly distributed (ADB, 2025). Gender plays a very important role in determining vulnerability, exposure, and adaptive capacity. Studies shows that women, particularly in low-income settings and vulnerable communities, are immensely affected by heatwaves as women have specific physical, social, and economic vulnerabilities that affect their health (Euler, 2023). In certain situations, women are at a greater risk of heat-related illness and death compared to men during heatwaves. This vulnerability can be attributed to physiological differences, unequal access to resources, limited healthcare services, social and cultural norms and economic factors (ADB, 2025; Kim, 2024; Susan & Jenkins, 2002). However, the impact of gender on vulnerability varies by context. For instance, in the Republic of Korea heat-related mortality rate was higher amongst elderly men, as they were more socially isolated compared to women (Kim et al., 2020). Therefore, it is essential to consider the specific local context and vulnerability factors when addressing the gender aspects of heat risk.

Evidence reveals that each 1°C increase in maternal heat exposure is associated with heightened risks of stillbirth, preterm birth, and low birth weight (Woods & Agoncillo, 2024).

Prolonged heat stress can also interfere with hormonal control, contributing to reproductive health disorders at different stages of life (Woods & Agoncillo, 2024). In Nepal, when the mean temperature exceeds 33°C, the estimated risks of preterm and stillbirths increases significantly (ADB, 2025). Ignoring the unequal effects of extreme heat on women will worsen existing gender disparities (ADB, 2025).

In developing countries such as Nepal, women make up the majority of the informal economy. A study conducted in three South Asian countries, including

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Nepal, indicates that 60 per cent of women engage in unpaid work during heatwaves (UN Women, 2022b). Even women who primarily stay indoors, such as housewives, are not safe from the risks of heat. In poorly constructed homes, particularly those with tin roofs or inadequate ventilation, indoor temperatures can exceed outdoor temperatures making these women more vulnerable to heat exposure (Tasgaonkar & Murari, 2025). Therefore, it is essential to consider both domestic and occupational exposure when assessing the heat vulnerability of women.

Rising heat risk and heat risk perception among women in Dhangadhi

Dhangadhi Sub-Metropolitan City, situated in the Terai region of Nepal, is one of the most heat-exposed areas in the country. Weather data from the Department of Hydrology and Meteorology (DHM) reveals that the city frequently experiences extended heatwave events,[1] with at least five significant heatwave periods recorded in 2023 alone.

Extreme heat is a silent and persistent concern, particularly in Dhangadhi, where summer temperatures can reach up to 45°C during heatwaves. This excessive heat poses serious risks to productivity, economic growth, and the local population's health. Vulnerable groups, such as children, the elderly, outdoor workers, and individuals with pre-existing health conditions, are especially at risk. Reports also indicate that the Terai region of Nepal experiences annual heat-related mortality (Kandel & Shyangtan, 2024).

The community's awareness of health risks caused by extreme heat is insufficient and varies based on gender, age group, occupation, and level of education. There has been limited research in the city or region to understand how women are affected by extreme heat. In response to this knowledge gap, the Nepal Red Cross Society (NRCS), in collaboration with the Red Cross Red Crescent Climate Centre, with support from the British Red Cross, conducted a heat risk perception study in Dhangadhi. A primary aim of this study was to assess the awareness, access, and utilisation of extreme heat risk information and alerts among various population groups, including women.

The study involved household surveys with a sample size of 985 respondents and approximately 25 Focus Group Discussions (FGDs) targeting five specific groups: residents of informal settlements, pregnant and lactating women, outdoor workers, students, and older individuals with chronic diseases. During the peak heat season, the surveys and FGDs were conducted in mid-June to early July 2024.

Dhangadhi Sub-Metropolitan City

Map of Nepal

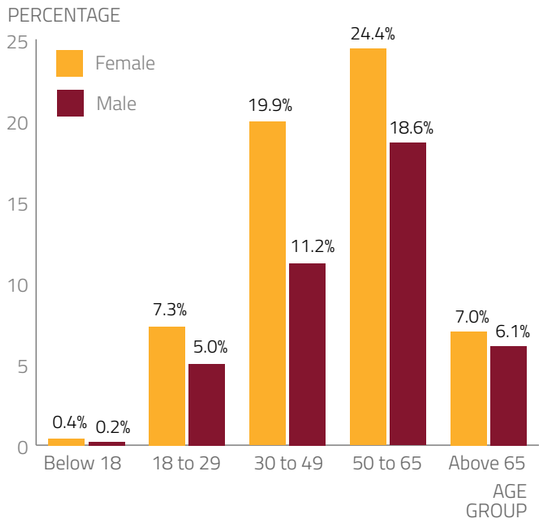
Study area
(*Source:* Author's illustration based on data obtained from Open Data Nepal

1 According to the DHM, a mild heatwave occurs in Dhangadhi city when the maximum temperature exceeds 37.7°C for three or more consecutive days; moderate heatwave occurs when maximum temperature exceeds 39.4°C for three or more consecutive days and extreme heatwave occurs when maximum temperature exceeds 41.7°C for three or more consecutive days.

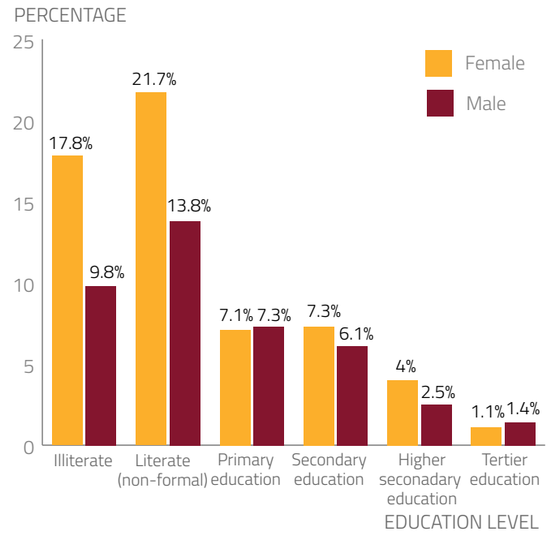
Higher numbers of women were surveyed than men

Of the 985 respondents, 59 per cent, or 585 individuals, were women, primarily in the adult to middle-aged age groups. Notably, most female respondents were illiterate or could only sign their names, having received no formal education or completed structured learning programmes. In terms of occupations, the majority of women were homemakers working more than 12 hours a day. Others worked as farmers, vendors, or daily wage labourers in construction.

Distribution of respondents across different age groups and gender



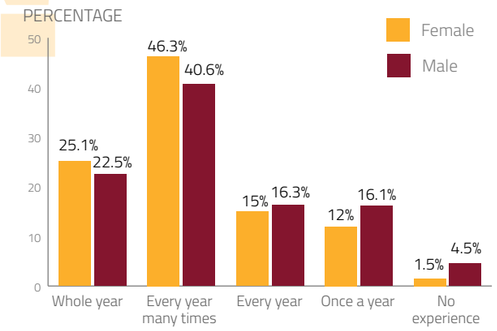
Educational background of the respondents



Both women and men reported experiencing extreme heat throughout the year or multiple times each year. A higher proportion of women in the survey indicated experiencing periods of unusually hot weather

Heatwaves are common in Dhangadhi. Residents of the city often experience these extreme temperatures throughout the year, with women reporting greater exposure to heatwaves than men. The analysis of the perception study suggests that 46 per cent of women and 41 per cent of men have experienced unusually hot weather multiple times each year. Additionally, 25 per cent of women and 23 per cent of men have reported experiencing unusually hot weather throughout the year. Comparing the two groups reveals that both women and men frequently experience uncomfortable or excessively hot weather, with a slightly higher number of women reporting regular exposure to heat. Furthermore, during the FGDs, most pregnant and lactating mothers reported experiencing hot weather annually, particularly in May and June.

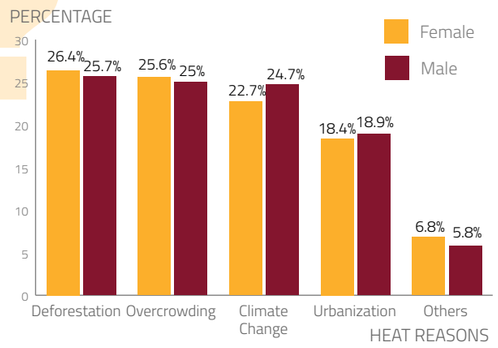
How often do you experience periods of unusually hot weather?



"It's difficult to stay inside all day during heatwaves, especially when we have to cook."

A woman homemaker during the FGD

What do you think the causes of rising temperatures?



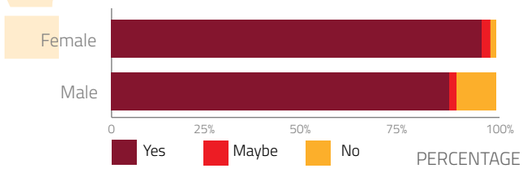
It is important to note that climate change is one of the three main factors that participants identified as contributing to the increasing risks of extreme heat in Dhangadhi. This demonstrates the community's awareness of climate change. Nearly all participants (98 per cent) reported observing rising temperatures over the years and experiencing higher levels of heat strain each year. These observations reflect their awareness of long term changes in weather patterns likely linked to climate change.

Women are concerned about extreme heat risks as they face adverse heat impacts and income losses

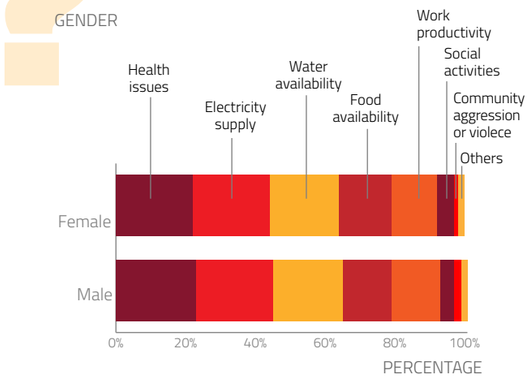
In Dhangadhi, most participants were concerned about extreme heat. Women expressed slightly higher concern (90 per cent) than men (85 per cent). Both women and men identify several significant risk factors associated with extreme heat, including health issues, electricity supply, and water availability. In terms of health impacts, women frequently experience difficulties sleeping, as reported in the FGDs. Other symptoms include headaches, increased thirst, fatigue, excessive sweating, anxiety, and dizziness, mentioned by 15-30 per cent of women respondents.

The four main health impacts of extreme heat reported by pregnant and lactating women are skin diseases, dehydration, cardiovascular issues, and respiratory or allergy-related problems. Additionally, during the FGDs, pregnant and lactating mothers noted that the frequent power outages (3-4 hours daily) worsen the effects of heat on them. For outdoor workers, including women, the significant health effects of extreme heat reported include fever, headaches, and skin diseases. Mosquito-borne diseases were also mentioned in Dhangadhi, especially in the informal settlements. Rising temperatures are enhancing mosquito breeding cycles and their habitats, increasing the risk of diseases such as dengue and malaria (Jackson, 2022).

Are you concerned about the effects of extreme heat on your health?



What areas of life are most affected by extreme heat?



"Because of the heat, we get headaches and fever. We miss work and spend more on medicine."

A woman outdoor worker during the FGD

What symptoms of extreme heat risk do you observe in your health?[2]

	HEATMAP OF SYMPTOMS AND ILLNESS SEVERITY ACCROSS DIFFERENT GROUPS				
	Informal settlers	Elderly	Pregnant	Students	Outdoor workers
Skin disease	3	3	3	3	3
Dehydratation	1	3	3	1	2
Diarrhea	2	3	2	1	2
Cardiovascular problems	0	1	3	3	1
Cough and cold	3	2	1	2	0
Respiratory and allergy-related problems	0	2	3	3	0
Fever	0	0	2	3	3
Headachae	2	0	2	2	3
Nausea and dizziness	0	2	2	2	1
Vomiting	3	0	0	2	2
Fatigue and physical, discomfort	1	1	2	0	2
Mosuito-brone diseases (dengue, malaria)	3	0	0	2	0
Loss of appetite	1	0	2	0	1
Dry throat	0	0	2	1	0

SEVERITY

0.0 0.5 1.0 1.5 2.0 2.5 3.0

The majority of women who work outside the home (e.g. agricultural labour, daily wage earners, street vendors) reported that extreme heat significantly impacts their sources of income. These women typically work in environments without air conditioning or adequate ventilation, increasing their exposure to extreme heat. On particularly hot days, they often work only five to eight hours, a substantial decrease from their usual 12 or more working hours.

Many women participating in the FGDs reported challenges in accessing safe drinking water due to decreased groundwater levels and the drying up of wells. This situation forces them to travel to alternative water sources, especially during periods of extreme heat. They also encounter further difficulties such as insufficient water for agriculture, which results in wilting crops, declining seed quality and reduced soil fertility. All of these issues negatively affect their income and overall livelihoods.

The most common coping mechanisms women employ to deal with extreme heat include drinking fluids, using fans and taking daytime breaks whenever possible. They also adjust their clothing as needed.

More than half of the respondents, regardless of gender, indicated that they spend more money during extremely hot days. During the peak hot days, they incur additional expenses on electricity, healthcare, medicines and beverages.

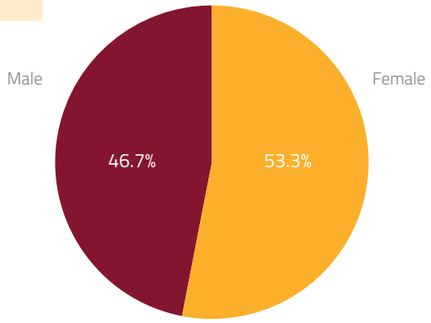
2 The colours in the following figure indicate the severity of heat-related symptoms among participants, based on their frequency of reporting in FGDs, on a scale from zero to three, with lighter colours representing less severity and darker colours indicating greater severity.

"No one has helped us. We manage on our own by using hand fans, resting under trees and buying medicine from our own."

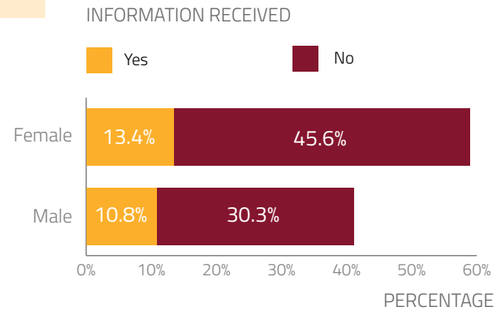
An elderly woman during the FGD

A majority of women haven't received any information related to the risks of extreme heat and any heat alert messages

What percentage of respondents stated they did not receive information or messages regarding the risks associated with extreme heat?



Do you have access to alerts or warnings about extreme heat?



Extreme heat significantly impacts women who are particularly concerned about the associated risks. Although both women and men reported a lack of information regarding extreme heat risks and their effects, a slightly higher percentage of women (53.3 per cent) than men (46.7 per cent) indicated that effective heat alert communications are unavailable in the city. Women tend to check weather forecasts more frequently than men; approximately 35 per cent of women check alert messages daily, compared to about 28 per cent of men. Despite this, many women do not receive extreme heat alert warnings. The survey reveals that 45.6 per cent of women reported not receiving any heat alert communications, compared to only 30.3 per cent for men. This disparity may stem from the current alert channels – primarily local FM radio, television, and social media – not adequately reaching all women, especially those residing in informal settlements or with limited access to mobile phones and digital platforms.

During the FGD, some of the pregnant women mentioned even when they sometimes receive heat alert information, there are no specific recommendations on what to do during a heatwave or how to take care of themselves. Women have expressed a desire to receive timely heat alert messages that include information about the duration of the event, actions to protect against extreme heat and maximum temperatures.

Given the numerous challenges faced by communities in Dhangadhi, it's noteworthy that a remarkable 99 per cent of respondents, regardless of gender, indicated that they do not seek help from the government or NGOs to cope with extreme heat or heatwaves.

Strengthening women's resilience to beat the heat in Dhangadhi

The FGDs with women from diverse socioeconomic backgrounds highlighted that social equity and empowerment are essential for enhancing women's resilience to extreme heat in Dhangadhi. This goes beyond mere climate adaptation and requires a multi-faceted approach at various levels. Building women's resilience to extreme heat requires inclusive planning and governance that includes gender-sensitive plans and policies, investments in green infrastructure, and the development of accessible technologies. These elements are essential to creating safe and cool environments for everyone, particularly for women and vulnerable populations who are most affected by these conditions (ADB, 2025).

Implement the Dhangadhi Heat Action Plan (HAP) 2025 in gender sensitive way: Dhangadhi has developed a comprehensive HAP focusing on women and other vulnerable groups to reduce the risks associated with extreme heat. The city authority, the heat task force, and other stakeholders must ensure women are actively engaged in the implementation processes related to heat preparedness, response and long term urban planning measures. Special emphasis should be placed on building the capacity of women, including homemakers, women working outdoors, women with disabilities, and women from marginalised communities. This approach will help develop adaptation and mitigation solutions that consider the needs of all social groups, rather than concentrating solely on the most visible groups, such as outdoor labourers (Magotra, 2023).

Development of gender responsive heat early warning: Development of gender responsive heat early warning plays a crucial role in addressing the different heat vulnerabilities, adaptation capacities of both men and women (UN Women, 2022a). The perception study in Dhangadhi indicated that nearly 46 per cent of women reported not receiving any heat alert messages, compared to 30 per cent of men, highlighting a significant communication gap. Therefore, it is critical to develop and disseminate early warning or alert communication messages through channels that are accessible to women. In Dhangadhi, both men and women have expressed a desire to receive heat alerts through their preferred communication channels, such as radio, in-person conversations, one-on-one communication and television. It is essential to ensure that these alert messages reach everyone, even those in the most vulnerable or last-mile communities as outlined in the Dhangadhi HAP 2025.

When women are actively involved in designing and implementing early warning systems for heatwaves, the warnings reach more people because women are well-connected in their communities and can spread information effectively through diverse social networks such as family, neighbours and informal groups.. Their participation also helps ensure that messages and actions reflect women's real life responsibilities, needs and risks (like caregiving, water collection, indoor heat exposure.) (UN Women, 2022a). Without gender-sensitive systems, warnings might not reach or resonate with women, particularly when they have less access to information or are not involved in decision-making.

Developing gender-sensitive urban design: This approach can help lessen the impacts of extreme heat, particularly for women living in low income urban areas, by utilising passive cooling solutions and enhancing infrastructure. In low income settlements, improving access to electricity and safe water reduces the gender specific burdens associated with heat, especially during domestic tasks such as cooking and collecting water. These infrastructure improvements address women's vulnerabilities arising from extreme heat (Li, 2024). Additionally, authorities must ensure the establishment of shelters, cooling centres, water distribution points and health clinics in strategic locations where women often need them, such as near markets.

Community-based women's awareness and health programmes: Community-based women's awareness and health programmes tailored to women's needs, delivered in local languages, and involving women's participation in their design and implementation, are effective strategies for mitigating heat-related risk (Johar et al., 2025).

Develop national, regional, and city-level policies: Policies must include gender sensitive protocols and preparedness strategies within the most heat impacted sectors such as health, agriculture, employment, urban planning, etc. ensuring the unique needs of women are met (ADB, 2025).

Research on heat risks on women: More research initiatives are needed to fill existing knowledge gaps regarding climate risks. The World Meteorological Organisation (WMO, 2023) outlines several key research priorities that should guide these efforts:

- Documenting and examining the gender dimensions of climate risks and their adverse outcomes, focusing on the effects across women's lifespans -from childhood and adolescence through pregnancy and old age.
- Studying the impact of heat stress and other compounding factors on negative pregnancy outcomes, including poor maternal health, perinatal mortality and the health of vulnerable newborns.
- Designing early warning systems for extreme heat events in lowand middle income countries (LMICs) that are specifically tailored to meet the needs of pregnant women and young children.
- Conducting an in-depth investigation into the various sociocultural factors that put women at greater risk for extreme heat, and developing strategies to address these challenges.

Addressing these priorities can enhance our understanding of women's vulnerabilities to extreme heat, strengthen their coping strategies, and identify affordable solutions.

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