The weather does not support farmers: an exploratory qualitative study in Kavre district, Nepal.

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Abstract

Kavre district, Nepal, is highly vulnerable to climate change impacts, including increases in erratic rainfall, drought, floods, and landslides. As gender roles, culture, age, physical and physiological characteristics increase, mainly Nepalese women's and children's, health risks associated with climate change and air pollution, listening to and learning from women is critical. This study explores women's perspectives and lived experiences concerning climate change, consequent adverse impacts on agriculture and health, and ongoing adaptation and mitigation strategies. Assessing perspectives and lived experiences related to climate change can offer opportunities to explore understanding, local beliefs, experiences with adverse impacts and adaptation. We used a descriptive qualitative approach. An equal number of focus group discussions (FGDs, n=8) and key-informant interviews (KIIs, n=8) were conducted. Purposive and snowball sampling were used to recruit participants. Four research assistants with public health backgrounds and climate change training were employed to assist with this work. All interviews were conducted in the Nepali language using an interview guide. All KIIs and FGDs were audio-recorded and transcribed verbatim in Nepali. Data were analyzed in NVivo 1.7 using content analysis. Forty-two of the 48 participants identified as women. The largest proportion of participants was aged greater than or equal to 50 years (18/48), had no formal education (21/48), and were either older women (>55 years) (13/48) or mothers of children younger than five (11/48). Three main topical areas emerged from the FGDs and KIIs: (i) the winds of change, (ii) the unpredictability of weather, and (iii) acting locally. The study provides insights into how women and children in rural communities in a Nepali hill district experience, adapt and mitigate climate change impacts. These findings can help inform the development of interventions to better address women's and children's needs and concerns, essential to promoting well-being and reducing impacts exacerbated by climate change.

Keywords: lived experience, climate change, health, women, children, Nepal

1. Introduction

Human activities are estimated to have already caused a mean rise in global surface temperature of approximately 1.1°C since 1850-1900, according to the 2021 Intergovernmental Panel on Climate Change Sixth Assessment Report (1). It is projected that if the current trend persists, this will reach 1.5°C between 2030 and 2052 (2), resulting in significant threats to human health, mediated through social and environmental determinants of health, including clean air, safe drinking water, sufficient food and secure shelter (3). Globally, under mid-range emissions scenarios, climate change is expected to cause around 250,000 additional deaths annually just from malaria, malnutrition, diarrhea and heat stress by
2050 (4). The world must limit temperature rise to 1.5°C to prevent additional catastrophic human health impacts.

Climate change threatens Nepal's agriculture, food security, water resources, and health. The agriculture sector contributes over one-third of Nepal's Gross Domestic Product, and two-thirds of its population remains heavily dependent on rain-fed agriculture for subsistence (5). However, extreme climate conditions, notably persistent increases in mean annual temperature and precipitation, have adversely affected the agricultural production system, exacerbating food insecurity and undernutrition (4,5). The retreat of glaciers in Nepal's Himalayan region is occurring faster than in other mountain ranges and is one of the most noticeable impacts of climate change (6). Such rapid glacier retreat is likely to increase the risk of catastrophic natural events such as glacial lake outburst floods and landslides, impacting human mortality and morbidity (6). Thus, the adaptation of climate change-relevant behaviours and actions is urgent.

All countries are at risk of climate change impacts. However, those harmed first and worst by climate crisis are those that have contributed least to its causes and have the least adaptive capacity, including low-and middle-income countries like Nepal (7). Nepal's contribution to greenhouse gas emissions is 0.027 percent of global emissions (8) but was ranked ninth among the countries most affected by climate change between 1999 and 2018 (9). Approximately 80% of its population is at risk from natural hazards (10). Nepal's complex topography and comparatively low socioeconomic status further increase its vulnerability to climate change (8).

Gender roles, decision-making power, culture, age, physical and physiological characteristics disproportionately expose Nepalese women and children to bear the greater impacts associated with climate change and air pollution (7,11–13). For example, pregnant women have a critical concern about the safe delivery of a child following a disaster (14). Kabir et al. (15) reported that young girls and women face a shortage of sanitary pads and appropriate toilet facilities due to a lack of privacy following disasters. Women, particularly in low-income countries, also travel a long distance to fetch water after natural disasters. The reduced availability and contaminated water cause hygiene-and sanitation-related problems, such as urinary tract infections and diarrhea (14,15). Disasters put women and girls, particularly those in marginalized sectors, at higher risk of physical and sexual abuse (16,17).

Problem-solving and decision-making capacity of women is vital to developing climate change solutions. Therefore, assessing women's perspectives and lived experiences related to climate change, local experiences with adverse climate change impacts, and adaptation is critical. This study explores women's perspectives and lived experiences related to climate change, consequent adverse impacts on agriculture and health, and ongoing mitigation and adaptation in response to these changes.

**Methods**

**1.1 Study setting**

Kavre is one of 77 districts in Nepal and is composed of 13 rural and urban municipalities. The district, with Dhulikhel municipality as its headquarters, falls within Bagmati Province and comprises an area of 1,396 Km². We conducted this study in two rural municipalities: Bhumlu and Mahabharat (Figure 1).
Bhumlu rural municipality covers over 91 km² and is culturally, linguistically, and ethnically diverse. It has a population of 15,858, according to the 2021 Nepal Census (18). Brahmin, Chhetri, Tamang, Pahari, Dalit, Majhi, Newar, and Dashdani are the major ethnic groups in the region (18). Most of the population is Hindu, followed by Buddhists (18). Agriculture is the primary livelihood, while business and remittances from foreign employment are other important sources of income for people in this municipality (18).

Mahabharat rural municipality occupies an area of 186 km², divided into eight wards. The region's geography includes steep hills and mountains. Nepal's 2021 census reported a total population of 16,148 (18). There are an estimated 3,297 households, with the largest ethnic group being Tamang, followed by Brahmin, Chhetri, Newar, Dalit, and Majhi (18). The population of this municipality is largely Hindu or Buddhist. The primary source of income is also agriculture. Other sources include livestock farming, tourism, and herb collection (18).

1.2 Participants and recruitment

Eligible participants included women, particularly family caregivers of children under five years. Women participants were further grouped into pregnant women, mothers of children under five years, and older women (≥ 55 years). We also included participants representing community health groups, such as the chief of community health centers and members of health mothers' groups (community groups that bring together women of reproductive age to discuss and promote safe motherhood, maternal and child health, and nutrition, family planning, water, sanitation, and hygiene (24)), Health Facility Operation Management Committee members, and Female Community Health Volunteers. Furthermore, to be eligible, participants needed to:

(i) Be permanent residents of one of the included municipalities, and
(ii) Have lived in the region for the past 20 years.

Each category of participants was grouped into separate FGDs. The primary reason for including women, particularly family caregivers of children under five, was to learn about their firsthand experiences and perspectives concerning weather change, changes in precipitation and agricultural patterns, and consequent health impacts on women and children. The other participants from community-based health-related groups (members of the Health Facility Operation Management Committee, health mother’s group members, Female Community Health Volunteers, and chief of health centers) were included to elicit broader community perspectives. Written informed consent was obtained from each participant.

We received support from community members to identify eligible participants meeting the study inclusion criteria. A purposive and snowball sampling technique was used to recruit eligible participants between November 2021 and January 2022. All potential participants we reached out to agreed to participate in the study.
1.3 Data collection

We employed four local research assistants, two females and two males, to collect in-person qualitative data using an FGD and KII guide in English and Nepali (Table 1). KII includes interviewing persons who know what is happening in the community and have firsthand knowledge about the community (19). Each research assistant had an undergraduate degree in public health and at least one year of community health experience. We trained research assistants by conducting repeated mock interviews to enhance familiarity with the discussion topic, build confidence, and deal with the potential issues that could arise, such as participants deviating from the discussion topic and unequal participation. We also oriented the research assistants on the study proposal, including giving them a primer on climate change and health.

**Table 1: Interview guide questions and emergent topical areas**

<table>
<thead>
<tr>
<th>SN.</th>
<th>Interview and FGD Questions</th>
<th>Topical areas emerged</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>What do you think of when you hear &quot;climate change?&quot;</td>
<td>First topical area</td>
</tr>
<tr>
<td>2</td>
<td>How have you experienced/witnessed or heard of changing rainfall patterns, extreme temperatures, increased intensity and frequency of natural disasters, loss of water sources, or poor air quality?</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>What do you think are the factors that drive climate change/air pollution or the effects mentioned above?</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>How have you experienced or heard of adverse impacts of climate change/air pollution, changing rainfall patterns, extreme temperatures, increased intensity and frequency of natural disasters, or poor air quality? If so, can you share that with us?</td>
<td>Second topical area</td>
</tr>
<tr>
<td>5</td>
<td>What are you doing to mitigate or adapt to those adverse impacts? Or what do you think should be done to address those issues?</td>
<td>Third topical area</td>
</tr>
</tbody>
</table>

An equal number of FGDs (n=8) and KIIIs (n=8) were conducted in the two municipalities, four FGDs and KIIIs in each rural municipality, with 4-6 participants per FGD. Each KII and FGD was approximately one and a half hours in length. Within each pair of research assistants, one conducted all the interviews, while the other took reflexive and observational notes during and after the KIIIs and FGDs. We also collected socio-demographic data from the participants at the start of the KIIIs and FGDs (Table 1). At the end of the interview, each participant was paid an honorarium and provided with refreshments. The other two research assistants collected socio-demographic data and paid honorariums. All research assistants participated in regular debriefing sessions throughout the data collection process to discuss interviews, amend the interview guides, and refine lines of inquiry.

All KIIIs and FGDs were audio-recorded. The recordings were transcribed verbatim and were proofread for accuracy.
1.4 Data analysis

We obtained ethics approval from the University of Alberta Health Research Ethics Board (Pro00107397) and the Ethical Review Board of Nepal Health Research Council (Protocol Registration # 340/2021) before beginning the study.

Content analysis (20) of the Nepali transcripts was completed using NVivo 1.7 (21) by the principal investigator, a native Nepali speaker. Only selected references were translated into English for quotes in the results. The principal investigator familiarized himself with the data and rigorously read transcripts to generate ideas for codes to describe the content. Codes were assigned to data to describe points raised in the KIIS and FGDs. Each time the principal investigator noted something different in the data, a new code was generated, critical to organizing data into meaningful groups. Codes were then sorted into broader topical areas. The principal investigator and supervisor reviewed and refined the main topical areas, checked for overlapping sub-topics, and confirmed that codes supported them, naming and describing each.

Throughout the data analysis steps, we used an inductive approach to identify, examine and report topical areas within the data through an iterative analytic process. The process helped achieve deeper insight into participant perspectives and lived experiences, thus providing structured and rigorous guidelines to ensure that emergent topical areas were firmly rooted in the data.

2. Results

The study included eight FGDs and eight KIIs (48 participants in total) and explored women's perspectives and lived experiences about climate change. Forty-two of the 48 participants identified as women. The largest proportion of participants was aged greater than or equal to 50 years (18/48), had no formal education (21/48), and were either older women (>55 years) (13/48) or mothers of children younger than five (11/48). Participant socio-demographic data are presented in Table 2. Most participants reported never having heard the Nepali phrase for "climate change," so we used a term meaning "a long-term change in the weather." Participants were also asked about the direct impacts of such changes (i.e., change in rainfall and temperature, loss of previous water resources, increased frequency and intensity of disasters, and poor air quality).

Table 2: Socio-demographic characteristics of study participants

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n=48 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>9 (19)</td>
</tr>
<tr>
<td>30-39</td>
<td>7 (15)</td>
</tr>
<tr>
<td>40-49</td>
<td>14 (29)</td>
</tr>
<tr>
<td>≥ 50</td>
<td>18 (37)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>42 (88)</td>
</tr>
<tr>
<td>Male</td>
<td>6 (12)</td>
</tr>
<tr>
<td>Highest completed education</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>No formal education</td>
<td>21 (44)</td>
</tr>
<tr>
<td>Primary education</td>
<td>5 (10)</td>
</tr>
<tr>
<td>Secondary education</td>
<td>16 (33)</td>
</tr>
<tr>
<td>Higher secondary education</td>
<td>6 (13)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mothers of children under five</td>
<td>11 (23)</td>
</tr>
<tr>
<td>Older women (≥ 55)</td>
<td>13 (27)</td>
</tr>
<tr>
<td>Health Facility Operation Management Committee</td>
<td>9 (19)</td>
</tr>
<tr>
<td>Female Community Health Volunteer</td>
<td>10 (21)</td>
</tr>
<tr>
<td>Others (farmers, primary school teachers, health mother's group)</td>
<td>5 (10)</td>
</tr>
</tbody>
</table>

Three central topical areas emerged:

1) the winds of change,
2) the unpredictability of weather, and
3) acting locally.

3.1 The winds of change

This topical area captures women’s perspectives on climate change. An area of discussion across focus groups and KIIs was factors they believed drove climate change. A few participants shared that they focused on their livelihoods and were unaware of climate change due to a lack of television and radio access. Most participants who shared their perspectives felt they did not know much and described climate change as seasonal, such as from winter to summer. Others reported that sudden and extreme shifts in weather patterns, such as sudden rain or rapid temperature change, characterized climate change.

Participant 5 (P5)- I don’t know what to say. When the weather changes, it gets very cold.

P4- Winter is about to pass, and summer starts. Wind blows. Climate change is like that.

P3- I don’t know.

P2-climate change is starting of summer after winter and afterwards rainy season. (U-5 mothers, FGD-7)

A small proportion of participants who reported they had previously heard of climate change reported it as a phenomenon characterized by changing rainfall patterns, extreme temperatures, disasters such as floods, landslides, and wind storms, and the increased duration of foggy weather. Participants described
these changes as a shift from previously steady and uniform regional natural patterns to the current state where established patterns have been altered.

Climate change is a change in the climate between now and before. It is getting hotter in Jumla [a district in western Nepal] now. The rainfall is untimely and heavy, but it was not like this before. The heat was tolerable in the summer, but now it is too hot, and winter is colder. The temperature and rainfall pattern has changed. (Health Facility Operation Management Committee, P3, FGD-4)

Participants who reported having heard of climate change were asked about the factors driving climate change. Others were asked about the causes of specific direct impacts of climate change. Most participants identified deforestation as the principal cause. Participants reported that population increases led to more human activity resulting in deforestation, which led to changes in rainfall, temperatures, loss of water resources, and disaster events. Responses suggested that there was more forest cover in the past and highlighted the impact of human population growth on the environment.

There used to be dense forests and fewer people before, but now the population has grown, and people started cutting down trees for different things. The forests are shrinking. So, the rainfall has become unpredictable. The lack of forest area has caused an increase in temperatures. There are no shades, even for the land. (Older mothers, P4, FGD-6)

Several participants discussed air pollution as another principal cause. They highlighted the increasing use of plastic, particularly for food wrap, and its haphazard disposal and burning as contributing to the deterioration of air quality in the region. They also expressed concern about adverse impacts on the population. Others compared current air quality to past air quality and linked deterioration to road construction and the increasing use of motor vehicles. They also described people's negligence in deliberately setting wildfires to convert wood into fertilizer, contributing to air pollution and climate change.

It is not good to burn plastics, but people burn them. Many foods come in plastic packs, and people throw them in public places and burn them, emitting harmful chemicals into the air. It affects every age group and both males and females. When the summer season starts, people are mobilized, setting fires everywhere. They believe forest fires are essential to convert wood into fertilizer and don’t care about the impact on human settlement (Health Facility Operation Management Committee, P2, FGD-2)

Overall, participants focused on local factors as the causes for experiencing climate change with less focus on broader and global scale factors.

3.2 The unpredictability of weather

This topical area captures participants' lived experience of adverse impacts that they attributed to climate change. Those who reported not having heard of climate change were asked about their experiences with the effects of irregular rainfall, water scarcity, extreme temperature, and natural disasters on agriculture, the environment, and women's and children's health.
3.2.1 The weather does not support farmers

Almost all participants across the FGDs and KIIs reported that climate change or the specific direct impacts of climate change affected agriculture in the region. Participants highlighted four significant impacts: crop infestation, increased use of pesticides, soil quality degradation, and decreased productivity. They unanimously recognized crop infestation as a significant problem faced by the community. However, participants did not necessarily link specific climate factors (i.e., temperatures, precipitation, wind, or humidity) and the emergence of pests. Some participants reported that crop infestation created a compelling need for the use of pesticides, resulting in increased use. Others expressed distress that pesticide use was not helping to mitigate the problem, but instead, they felt it was contributing to undermining soil quality, resulting in reduced productivity. They mentioned that other factors, such as strong wind, were responsible for destroying crops. They also observed that fruit trees are maturing slower and that the yield and size of the fruit was smaller.

P1 ……Pests are damaging crops. Different diseases are emerging, and we are compelled to use pesticides.

P5 Pests damaged our crops. We hardly manage to protect crops using pesticides, but a strong wind destroys them. Spinach dies as it begins to grow. There has been a decrease in productivity. I wonder if the soil quality has decreased? Soil has been taken for the lab test, but we do not know the result yet. (Female Community Health Volunteer, FGD-1)

Participants observed changes with more irregular precipitation than in the past. Most felt this had contributed to reduced agricultural productivity due to this dependence on rainfall.

…….We rely on rain for farming. During the rainy season and when farmers must plant seeds, it does not rain. The weather does not support farmers. Other times when rain is not necessary, it rains heavily. The rain is unpredictable. (Health Facility Operation Management Committee, P2, FGD-3)

3.2.2 Uncertainty in rainfall timing and intensity

Participants identified several climate change-attributable environmental impacts in the region. The depletion of water sources was most frequently mentioned and was linked to deforestation. Participants reported wells in their area that dried up over time. They also mentioned a growing shortage of drinking water faced by the community.

The water sources have dried compared to what we have seen and used. There were two wells at the base of Swami, but they have dried up. The well near the Baraha tree has also dried up, so the community in that location faces a severe water shortage problem. The intensity of the water flow from the source has decreased. (Female Community Health Volunteer, P5, FGD-1)

Another environmental impact that most participants mentioned was erratic rainfall. They described the challenges of facing unpredictable and unreliable rainfall in their region. Participants mentioned farmers’ reliance on rain for farming. It was mentioned that rain is often untimely, highlighting the importance of rainfall timing and its impact on their crops. They emphasized that the current rainfall pattern differs from the past and has affected their livelihood through agricultural loss.
....before there used to be timely rainfall. Now, it rains when it is time to harvest rice. It does not rain when we need it. It starts to rain when the rice grain is ready for harvest. Sometimes it rains frequently, and other times there is no rain. (Older mother, P5, FGD-5)

Participants also mentioned disasters and extreme temperatures. They experienced landslides in their villages and attributed this to deforestation and earthquakes. Participants also highlighted infrastructure construction in the area, such as road transportation, which may have contributed to landslides.

We have faced landslides in our village. Last year, there were massive landslides near the school. (Female Community Health Volunteer, P2, FGD-2)

It is freezing in the winter and sweltering hot in the summer compared to the past. (Health Facility Operation Management Committee, P5, FGD-4)

3.2.3 Women and children may bear health risks

Participants were asked about climate change-related health impacts or specific direct impacts of climate change on women and children. However, links between climate change and women's and children's health were not explicitly mentioned. Participants were then asked to discuss women's and children's health concerns or significant health problems facing communities. Other probes included asking about the health impacts on women, particularly pregnant mothers and children younger than five years, related to changing agricultural patterns, long-term weather patterns, temperature and precipitation changes, and disaster events.

3.2.3.1 New mothers are becoming weak

Participants mentioned maternal undernutrition, stillbirth, and low birth weight when prompted to talk about the common health issues of women in the region. One participant (a community health worker) reported that:

Due to inadequate crop production and increasing consumption of packaged foods, pregnant women are lean. They come to health centers for an antenatal check as required but complain of weakness and headaches. We used to give birth to babies weighing 3-4 kgs at home, but they can't bear the pain and have to be referred to the Dhulikhel Hospital. (Female Community Health Volunteer, P3, FGD-1)

Another participant mentioned a stillbirth but did not mention the reason for such an adverse birth outcome.

3.2.3.2 Seasonal variation in pneumonia cases in children

Many participants across the FGDs and KIs mentioned respiratory tract infections and diarrheal diseases as critical health problems in young children. Participants believed that respiratory infections were becoming more common and severe, potentially due to changes in weather patterns. Some participants felt diarrhea was becoming less common, possibly due to improved hygiene and sanitation practices:

Diarrheal diseases have decreased compared to the past. In the past, there were poor hygiene and sanitation practices; we drink clean water now, every house has a latrine, and there is no
more haphazard disposal of waste. That's why the cases of diarrheal diseases have reduced.
(Female Community Health Volunteer, P1, FGD-1)

However, others reported increased diarrhea cases.

3.3 Acting locally
Participants mainly discussed changing patterns in relation to the local context. They pointed out several climate change-related issues (i.e., agriculture, environmental, and human health) experienced in their region. Participants mentioned several local-level behaviours and actions, including at the household level (use of improved cooking stoves), at the community level (water management, reforestation programs and control of forest fires), and at the local government level (strengthening the health system and planned road construction). Behaviours and actions included proposed solutions and currently practiced actions and behaviours.

3.3.1. Drinking water supply at the door
Almost all participants across the FGDs and KIIs mentioned water shortages in their communities. They reported having implemented various solutions to mitigate water scarcity, including constructing a public water reservoir or water tank. Some participants mentioned water reuse to reduce strains on limited water resources.

People used to fetch water from a well. Sometimes they were able to get it, while other times not. Now that there is a water tank, we collect water and keep it full. We don't have to walk long distances. Everyone has the water pipe connected to the water tank. (Health post incharge, KII-6)

3.3.2 Collaborate for a greener earth
Most participants mentioned that reforestation could address environmental problems such as poor air quality, water shortages, and disasters. They highlighted the importance of collaborating with local government bodies to protect existing trees and implement reforestation practices.

In our ward, we collaborate with the official from the community forest and have initiated a reforestation program. (under 5 mother, P2, FGD-7)

3.3.3 Build hospital at a local level
Most participants spoke of healthcare system-related issues the community faced. They suggested corresponding actions or improvements to increase access to basic health services and meet maternal and child health service needs. For example, a lack of diagnostic services in the community, such as ultrasound and blood glucose tests, was reported, which compelled them to travel long distances that cost time, energy, and money. They also discussed the lack of qualified health workers, e.g., doctors, as a barrier to receiving quality health services. Overall, participants pointed out a critical gap in providing adequate and accessible healthcare services to the community.

I wish they had constructed a hospital in our municipality. Patients could then commute to the hospital quickly and not have to travel a long distance for treatment. We have to go to the Dhulikhel Hospital to do the video x-ray. It would have been better if we had the provision of video X-rays in our health centers. (Older mothers, P4, FGD-6)
3.3.4 Collective efforts to protect air

Participants reported that monitoring air pollution could protect and promote the health and well-being of the community. They recognized forest fires as a critical problem in their community. Participants suggested mitigation strategies such as checking on forest fires and emphasizing community awareness. They stressed that the community should be sensitized to the importance of forests and the adverse impacts on human health and lives associated with forest fires. They pointed out the critical role of local government in such initiatives along with other local stakeholders and considered formal rules and regulations important.

I think if I alone go and tell people to stop setting fires in the forest, it will not work. It needs combined efforts from local government, different organizations, and schools. We must enforce strict rules and regulations, or people will take them lightly. (Health Facility Operation Management Committee, P3, FGD-3)

Participants pointed to the benefits of replacing traditional cooking stoves with improved cooking stoves or using cleaner fuels (e.g., gas stoves) in the home, including reduced indoor air pollution, less respiratory illness and improved cleanliness. They acknowledged the lack of improved cooking stoves or cleaner fuels in all households in the community and reported that wood stoves are used in most homes.

People have been advised to use improved cooking stoves at home. Some households use the improved cooking stove while others don't. If we use the improved cooking stoves, then it will release the smoke outside. We will have less asthma, and the house also looks cleaner. (Under 5 mothers, P2, FGD-7)

Participants also mentioned the unintended consequences of road expansion, notably ambient air pollution and its consequent effects on respiratory health and vision. They called for a more comprehensive and sustainable approach to infrastructure development.

Our neighbourhood has dusty roads. The daily vehicle use makes the area very dusty. It makes it difficult to breathe and open our eyes. It would have been better if they had developed a good road. (Under 5 mother, P4, FGD-7)

3. Discussion

This study explored climate change perspectives and lived experiences of participants who identified as women and family caregivers of children younger than five in two rural communities. Participants' responses highlighted that climate change is perceived as seasonal change. Participants mentioned several impacts of climate change on their daily lives through disruption of agriculture (e.g., crop infestation, increased pesticide use, soil quality degradation, and decreased productivity) and environments (e.g., loss of water resources, erratic rainfall and extreme temperature). They also raised issues of women's and children's health (e.g., maternal and children undernutrition, low birth weight, stillbirth, respiratory illnesses, and diarrhea) as maternal-child health problems of concern to them. All participants highlighted local-level climate-relevant behaviours and actions (e.g., water preservation, reforestation programs, strengthening the health system, controlling air pollution, and solid waste management) as critical to adaptation and mitigation in the region.
Participants’ responses to the concept of climate change highlighted that they perceived it as a change in weather and season. Most participants reported not having heard of climate change. Those who had heard of climate change perceived it as a change in daily weather or a cyclical change of seasons. Nevertheless, most attributed changes they had experienced, at least partly, to climate change. Nash et al. (22) also discussed participants' perspectives of climate change as seasonal change who reported having observed changes in local weather and climate variability.

Study participants mentioned unpredictable changes in climate conditions in their region and concerns about the environment, agriculture, and women's and children's health. They frequently mentioned experiencing and witnessing hotter summers and colder winters, more erratic and lower rainfall volumes, loss of water resources, and deteriorating air quality. A few participants also associated disaster events with weather changes, particularly dry landslides in the region. In most cases, the aforementioned climate-related issues emerged after a direct probe. Some participants also pointed to causal factors beyond immediate local risk factors, such as deforestation affecting precipitation and subsequently landslides and forest fires, increased vehicle use, and conventional cooking stove use affecting indoor air quality. Similar to previous research (22,23), participants in our study offered opinions and shared lived experiences on various climate-relevant issues.

Most participants mentioned that their agricultural yields had been adversely affected by irregular rainfall, wind, and crop infestation, through different pathways, resulting in poor harvests. They expressed helplessness about their dependency on rain-fed agriculture. Actions such as pesticide use were reported to mitigate crop infestation. However, decreased soil fertility and consequent crop yield loss were mentioned, attributed to increased pesticide use. The reports of a decline in agricultural productivity associated with climatic factors, particularly temperature increases, are found in studies elsewhere (24–26). Such adverse effects on agricultural yield are important, especially for rural communities in lower-income countries, due to their dependence on agriculture for subsistence and lack of adaptative capacity compared to high-income countries (24–26).

The study investigated participants’ experiences of adverse health impacts attributable to climate change. We probed this issue, asking participants what they felt were the most critical health problems for mothers and children in their community. They mentioned stillbirth, low birth weight, diarrhea, and respiratory illness among young children as significant health problems. Such climate change-linked health impacts mentioned by participants are consistently observed in published findings (27–32). Participants reported undernutrition in women and children as having a significant health impact, as reported in previous studies examining factors such as temperature and rainfall (33,34). However, our study participants also mentioned undernutrition to decreased agricultural productivity and a consequent shift toward consuming processed foods.

As described by study participants, the environmental, agricultural and health impacts reveal their socioeconomic vulnerabilities to climate change. For example, the majority of the participants had no formal education or only primary education, lived in a rural community, reported using traditional solid-fuel cooking stoves, relied on traditional agricultural practices for livelihoods, and had inadequate access to basic maternal and child health services. This predisposes them to increased vulnerability to climate change. In their call for research, Xu et al. (13) also mention that people with low socioeconomic status are particularly at risk of climate change and air pollution-related health impacts.
All participants tended to focus on variability experienced in terms of local weather patterns. Therefore, local actions and behaviours were discussed to mitigate and adapt to climate change impacts. For example, water management through the construction of public water reservoirs was the most common action reported to deal with water shortages. Studies in other lower-middle-income countries like Bangladesh have also reported climate change-induced water shortage problems. Pond sand filters, rainwater harvesting, and importing potable water with support from the government and non-government organizations were mentioned as possible adaptation strategies (15).

Although reforestation initiatives have not yet been adopted in the two communities in Kavre, participants across all FGDs and KIIs believed that reforestation could help address several problems, including water shortages, poor air quality, and the risk of landslides. Indigenous people in the Dolakha district of Nepal have adopted community-based reforestation and forest management initiatives to mitigate impacts attributed to local climate variability (35). Community awareness programs can further sensitize people to the importance of preserving forests, desisting from cutting down trees and setting fires for a healthier ecosystem, cleaner ambient air, and improved human health (35).

A key strength of this study methodology has been its flexibility, which places the research focus on the participants to generate rich data. The study sampled two rural areas with diverse socio-demographic profiles. The findings provide insights into climate change perspective and lived experience of women in a rural setting which has not been well documented. Several areas of concern emerged from the FGDs and KIIs, notably water shortages, reduced agricultural productivity, crop infestations, and increased pesticide use, which can guide long-term climate change adaptation planning by the local, provincial, and the federal government. Such guide can support fulfilling the Nepal's government climate change commitments while promoting well-being and strengthening resilience of women to climate change impacts.

A limitation of this study is that it was conducted in only two rural municipalities. Perspective and lived experience of women related to climate change may differ by residence, i.e., rural and urban. Exploring urban residents’ viewpoints and lived experiences would have enhanced the generalizability of the study findings to other populations in Nepal.

4. Conclusion

The study provides insight into how women of rural communities in Kavre district of Nepal perceive climate change and their lived experiences. Women have observed and experienced severe impacts, mainly related to the environment and agriculture. These effects are magnified by poverty and poor health service infrastructure. Interventions to address the needs and concerns of women and children are essential to promote their well-being and boost their resilience to climate change impacts.

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Reference


