

 Journal of International Law & Human Rights	Journal of International Law & Human Rights ISSN (Print): 3007-0120 ISSN (Online): 3007-0139 Volume 5, No.8, 2026, 01-16 DOI: https://doi.org/10.59075/jilhr.v5i8.216 Journal Homepage: http://journals.centeriir.org/index.php/jilhr	 Center of Innovation in Interdisciplinary Research
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Global Warming and Climate Vulnerability in South Asia: A Qualitative Analysis of Extreme Weather, Himalayan Instability, and Human Security

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Abstract

Climate change, with its effects on global warming, has become a major environmental and human security issue for South Asia, which is densely populated, sensitivity to climate, having socioeconomic inequalities and low adaptive capacity. This study qualitatively looks at the symptoms and impacts of global warming in south Asia especially extreme weather events, instability in the Himalayas, climate vulnerability and human security. A qualitative descriptive-interpretive research design is used and secondary data are drawn from peer-reviewed academic research, international and regional organisation reports, government and policy documents and credible contemporary news. Qualitative document analysis and thematic analysis are used to detect common themes on extreme heat, floods, droughts, glacier and snow loss, water insecurity, livelihood disruption, displacement and infrastructure vulnerability. Results show that global warming is aggravating interconnected and cascading South Asian risks, while vulnerable communities are disproportionately suffering social, economic, environmental, and human-security impacts. The 2026 disaster in the Nepal Himalayas is particularly emphasized as a case of recent cryospheric instability, extreme terrain, exposed infrastructure and low preparedness that can lead to severe humanitarian effects. But, although disasters cannot be blamed entirely on global warming, the evidence suggests that a changing climate is impacting the environmental context in which these hazards happen. The study also shows that uneven exposure, sensitivity and adaptive capacity and responsibility contribute to the distribution of climate-related risks, when interpreted in the Climate Vulnerability and Climate Justice Framework. The study calls for a combination of integrated adaptation, functioning early-warning systems, regional cooperation, climate-resilient infrastructure, and climate finance and technology to make South Asia more resilient to climate change.

Keywords: Global warming; Climate vulnerability Extreme weather; Himalayan instability; Human security



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Article History: Received: 01-08-2026

Accepted: 14-09-2026

Published: 01-10-2026

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Introduction

One of the greatest environmental and human security issues of the twenty-first century is the global warming. Atmospheric concentrations of greenhouse gases and the global temperature and climate system are now much higher than they have been in the distant past, due to human activities, especially the continued use of fossil fuels (Intergovernmental Panel on Climate Change [IPCC], 2023). The need for such an emergency is highlighted by the some of the recent observations: 2015–2025 was the 11 hottest years on record (World Meteorological Organization (WMO, 2026a)), and in 2025 temperature was approximately 1.43°C above the 1850–1900 average. More and more impacts are being felt on the environment and on socioeconomic life due to a global warming that leads to more frequent and more extreme climate hazards such as heat, heavy precipitation, droughts and other climate hazards (WMO, 2026a).

The high population density, vulnerability of climate-dependent agriculture, significant coastal settlements, poverty, socioeconomic inequalities and lack of adaptive capacity make South Asia one of the most climate vulnerable regions of the world. Latest studies indicate that the region is heating up faster than the rest of the world. In Asia, the warming trend is almost double that of the rest of the world, and climate change is exacerbating vulnerability to extreme weather, increasing the threat to human life, ecosystems and economies as reported by WMO (2025). Likewise, by 2030, almost 90% of South Asia's population is projected to be at risk from intense heat and over one fifth at risk from severe flooding, according to World Bank (2025). The trends show that global warming is not only an environmental issue in South Asia but it is a significant threat to food security, water availability, public health, livelihood, infrastructure development and human security.

The Hindu Kush Himalaya (HKH) is very important in this regional climate system. With glaciers and snow fields, it provides a source of water to the life and livelihoods, as well as the economies of millions of people in South Asia, of the big river systems. However, high mountain environments are under threat due to the warming climate, reduced snow and glacier mass loss and changing precipitation patterns. The WMO (2026b) reported mass loss for all of the glaciers monitored in HMA in 2025 due to above normal temperature and below normal winter snowfall. The changes elevate the risk of glacial lake outburst floods, landslides, avalanches, flash floods and water insecurity, as well as pose a threat to hydropower, agriculture, tourism and downstream communities.

A recent example of these compound vulnerabilities is the occurrence of the devastating flash flood in Nepal in August 2026. At the border between Nepal and China, a big rock fall and glacial ice breakdown caused devastating floods and rockfalls, causing property and human damage. Although the mechanisms involved in each disaster event must be understood, before and after, scientists have observed that warming temperatures can also play a role in glacier and mountain instability, and in increasing the hazard risk at higher elevations (Nature, 2026). The disaster, therefore, provides valuable lessons to be studied in relation to environmental change, disaster vulnerability, exposure to infrastructure and human security.

Given the growing scientific evidence on climate change, it is necessary to have a more comprehensive qualitative analysis that would connect the concepts of global warming, vulnerability of South Asia and instability of the Himalayas with human security in one analytical framework. Existing assessments have been limited in addressing the social and environmental dimensions of vulnerability in an integrated way, and have tended to concentrate on a given hazard or sector. The present study is based on qualitative analysis of secondary data that

deals with the implications of global warming in South Asia focusing on extreme weather, instability of Himalayan region and human security. To highlight the broader implications of climate vulnerability and climate justice and to illuminate the broader challenges confronting climate vulnerable South Asian societies, Nepal is used as a contemporary case-study.

Statement of the Problem

Global warming is one of the most important environmental and human-security concerns and in the South Asian region, increased exposure to extreme heat, floods, and droughts, changes in precipitation patterns, glacier retreat and other climate change hazards are occurring. The rising temperature and changing climate is a serious threat to the mountain ecosystems and beneficiaries (water, agriculture and hydropower) of the Hindu Kush Himalaya. The recent disaster in Nepal due to the climate change also illustrates the climate hazards of the Himalayan communities including floods, landslides, glacier and infrastructure damages. These impacts go beyond environmental, to include livelihoods, food and water security, public health, housing, and economic stability. Although the effects of climate change at the individual level have been documented in considerable scientific studies, a comprehensive qualitative study on the connection between climate change, instability in the Himalayas, climate vulnerability and human security in South Asia is required. Therefore, this study has been initiated to fill the above gap, which deals with the multi-dimensional aspects of global warming in South Asian context particularly in the case of Nepal as a modern example.

Significance of the Study

The study is important because it brings to the academic literature on global warming and climate vulnerability a focus on the unique challenges of South Asian societies. It offers a qualitative understanding of the climate change's environmental, social, economic and human security impacts, not just as 'environmental events'. An understanding of the vulnerability of mountain communities and mountain populations with downstream dependence is enhanced through special emphasis in understanding Himalayan warming and glacier instability. Today's analysis of Nepal as a case study provides a good idea about the relationship between climate related hazard, a vulnerable population and infrastructure. The study also underscores issues regarding climate justice since it shows inequalities in exposure, vulnerability, responsibility and adaptive capacity. The results could prove to be helpful for policy makers, environmental groups, and development banks to bolster climate adaptation, disaster readiness, and climate smart infrastructure. The study can serve as a foundation for the further study in qualitative studies on climate vulnerability, human security and environmental changes in developing regions.

Scope of the Study

The study concentrates on global warming and its effect on environment, society, economy and human security particularly in the South Asian countries like Nepal, India, Pakistan, Bangladesh and Bhutan. In this regional context, a focus is given to the environmental instability in the Himalayas such as glacier retreat, alteration of precipitation patterns, occurrence of floods, landslides and other climate related hazards. To develop a detailed knowledge of the vulnerability of communities and critical infrastructure in the context of global warming and associated environmental changes, the case of present-day Nepal is discussed. This study examines some of the key areas that can be affected by the crisis including threats to human security, livelihoods, food and water security, public health, displacement and infrastructure. From methodological perspective, research is qualitative, secondary data analysis of information collected from peer-reviewed academic literature, scientific evaluations,

government and policy documents, institutional reports and reliable media. No primary data collection, interview, surveys or statistical analysis is used. Rather than the interpretation of existing documentary evidence, it does highlight major patterns, relationships and dimensions of climate vulnerability and climate related risks in South Asia.

Research Objectives

The research objectives are as follow:

- To examine the major manifestations and environmental consequences of contemporary global warming in South Asia, with particular focus on extreme weather events and Himalayan instability.
- To analyze the social, economic, environmental, and human-security impacts of global warming on vulnerable populations in South Asia, using Nepal as a contemporary case study.
- To critically explore climate vulnerability and climate justice in South Asia in relation to unequal exposure, adaptive capacity, and the consequences of global warming.

Research Questions

Following are the research questions:

- What are the major manifestations and environmental consequences of contemporary global warming in South Asia, particularly in relation to extreme weather events and Himalayan instability?
- How does global warming affect social, economic, environmental, and human security in vulnerable South Asian communities, particularly in Nepal?
- How do climate vulnerability and climate justice shape the unequal experiences and adaptive capacities of South Asian populations facing the impacts of global warming?

Research Methodology

Research Approach

The present study use qualitative research method for studying global warming in multi-dimensional impacts on climate vulnerability in South Asia. The qualitative approach is appropriate to achieve deep understanding of contexts of manifestation of global warming at local level in form of extreme weather events, environmental instability in the Himalayas and threats to human security. It collates and summarizes the scientific, institutional, policy and scholarly literature, to record patterns, meanings and inter-relations of climate risk in the region. The qualitative approach also allows the study to look at the social and human aspects of climate change such as vulnerability, displacement, livelihood insecurity, damage to infrastructure, and uneven adaptive capacity.

Research Design

This study is qualitative descriptive – interpretative research. The descriptive part facilitates systematic documentation of salient features and implications of global warming in South Asia and the interpretive part helps the researcher to discuss the nexus of environmental changes, extreme climate events, social vulnerability, and human security. The study also takes into account Nepal as an example of the modern-day case; it does so with reference to South Asia. The Nepal case is an interesting example to look at how warming in the Himalayan region is related to glacier and mountain instability, extreme flooding, vulnerability of infrastructure, and human security.

The design is suitable for a secondary-data study because evidence from a number of documentary sources can be collected into a single study and interpreted in a geographical, environmental and socio-political setting. Importantly the study does not assert that global warming is the direct cause of any given disaster but rather it outlines the potential for the anthropogenic climate change to combine with already present environmental and socioeconomic vulnerabilities to exacerbate climate-related risks.

Research Method

The qualitative document analysis is the principle research technique employed. Document analysis is a technique for systematically reading and interpreting documents to acquire knowledge and understanding of the phenomenon under study in the research (Bowen, 2009). Documents are the main means for evidence in research in this study rather than as supporting documents.

The documents that were analyzed are related to the substantive issues of global warming, climate change, vulnerability of countries of South Asia, environmental changes in the Himalayas, extreme weather events and human security. It is appropriate as it addresses a phenomenon in the region that is currently under way and has abundant scientific, institutional, governmental and policy records.

Sources of Data

The study relies exclusively on **secondary data**. The sources will include:

- peer-reviewed journal articles;
- academic books and book chapters;
- IPCC assessment reports;
- United Nations and UN-affiliated reports;
- World Bank publications;
- Asian Development Bank reports;
- government climate and disaster-management documents;
- national climate-change policies and assessments;
- reports of recognized environmental and scientific institutions;
- credible international and national news reports;
- official reports and documented evidence concerning climate-related disasters in Nepal and other South Asian countries.

Priority will be given to **peer-reviewed and authoritative institutional sources**, particularly for scientific claims. News reports will primarily be used to document recent events, particularly the 2026 Nepal case, and will be cross-checked against scientific or institutional evidence wherever possible.

Geographical Scope

This study focuses on South Asia, particularly on Nepal, India, Pakistan, Bangladesh and Bhutan. These countries offer a wide range of examples of climate vulnerability including: hazards from glaciers and mountains; extreme heat; floods; water insecurity; agricultural disruption; coastal vulnerability; and displacement. The region is studied on the example of Nepal because of its geographical location in the Himalayan region and its sensitivity to the glacier-related hazards, landslides, floods and conditions in the Himalayas.

Document Selection and Sampling

The sampling method for this research is purposive sampling because the research is qualitative and secondary data. Documents will be purposefully chosen based on these criteria: relevance, credibility, authority, and direct connection to the research goals and questions.

The following inclusion criteria will be applied:

1. Documents directly addressing global warming, climate change, climate vulnerability, extreme weather, Himalayan environmental change, or human security.
2. Studies focusing on South Asia or providing directly relevant comparative/global evidence.
3. Peer-reviewed academic publications and authoritative institutional or governmental reports.
4. Recent publications will be prioritized for contemporary climate conditions, while seminal studies will be retained where they provide essential theoretical or conceptual foundations.
5. Documents providing substantive evidence relevant to the Nepal case study will receive particular attention.
6. Sources published by recognized scientific, governmental, intergovernmental, or academic institutions.

Sources lacking identifiable authorship, methodological credibility, or reliable evidence will be excluded.

Data Analysis

Thematic analysis will be used to analyze the collected secondary data. The analysis will follow the steps outlined by Braun and Clarke (2006) of familiarisation with selected documents, identification of relevant text material, coding and developing of overarching themes, review of themes, and interpretation of the results.

The analysis will be organized around the following major themes:

Theme 1: Contemporary Global Warming

Temperature rise, changing climatic patterns, and major manifestations of anthropogenic climate change.

Theme 2: Extreme Weather in South Asia

Heatwaves, floods, extreme precipitation, droughts, storms, and other climate-related hazards.

Theme 3: Himalayan Instability

Glacier retreat, glacier-related hazards, permafrost degradation, landslides, and changing hydrological conditions.

Theme 4: Human Security

Impacts on health, food security, water security, livelihoods, migration, displacement, and infrastructure.

Theme 5: Climate Vulnerability

Exposure, socioeconomic sensitivity, poverty, geographic vulnerability, and differences in adaptive capacity.

Theme 6: Climate Justice

The unequal distribution of climate risks, responsibility for greenhouse-gas emissions, and the differentiated capacity of South Asian countries and communities to respond.

Thematic analysis is particularly appropriate because it allows evidence from diverse documentary sources to be synthesized while retaining the contextual meaning of individual cases (Braun & Clarke, 2006, 2021).

Data Triangulation and Trustworthiness

Triangulation of sources will be employed to help establish credibility and trustworthiness of the research. Evidence will be examined through a range of different evidence sources, including peer reviewed research; IPCC reports; UN reports; Government documents; institutional assessments and reputable media reports. Scientific statements about climate change will receive higher credibility if backed by several independent and authoritative statements. The researcher will also be able to differentiate between established facts and documented observations and interpretations. This is especially relevant in the aftermath of recent disasters as in Nepal where the physical trigger of disaster does not necessarily mean anthropogenic climate change.

Ethical Considerations

As this study is using secondary data from public sources, there are no direct risks to subjects of this study. There are no direct risks to participants to the study as the study is based on secondary data collected from the public domain. Ethical practices will include representing sources accurately, acknowledging and citing sources appropriately, avoiding plagiarism and differentiating evidence from interpretation, however. To minimise misrepresentation, where possible facts will be compared with those reported in news and institutional documents. The study also will not assert a causal relationship between climate change and a specific disaster without evidence to support that assertion.

Theoretical Framework

The theoretical framework of this study is based on the Climate Vulnerability and Climate Justice Frameworks that are the suitable optics for understanding the disparity in the climate change environmental and human effects in South Asia. The vulnerability dimension is primarily based on the conceptualisation of climate risk by the IPCC which defines vulnerability as the level of exposure combined with the sensitivity to climate hazards, as well as the adaptive capacity and coping ability of a population, such that exposed populations with limited adaptive capacity and coping ability are more vulnerable to climate impacts (IPCC, 2022). The geographical location, poverty, socio-economic inequalities, dependence on climate sensitive livelihoods and low adaptive capacity, particularly in South Asia, makes the framework highly relevant in this context (IPCC, 2022). The study builds on this vulnerability perspective by adding the notion of climate justice – inequality in the allocation of climate risks, obligations, resources and capability to adapt to climate change. Climate justice is relevant as South Asia is extremely vulnerable to climate changes and has a high degree of socioeconomic inequalities and vulnerability (Prajapati et al., 2023). These perspectives enable the study to focus on global warming as a multi-dimensional phenomenon, one that is felt differently, socially vulnerable, secures human safety, has different adaptive capacity

and is just. Thus the framework will be used as a tool or guideline for a qualitative analysis of the extreme weather events, the instability in the Himalayas and its impact on the communities in the South Asian region, where Nepal is a contemporary example.

Review of Literature

Global warming is now widely acknowledged to be a multi-dimensional crisis, beyond the warming itself, because of other extreme climate events that result from global warming, ecosystem damages, food and water insecurity, health risk and displacement and threats to human security. The Asia Region is also warming and warming extremes, particularly in South Asia where heatwaves, droughts, floods, glacier melting and changes in monsoon patterns have been identified as vulnerabilities as a result of the Intergovernmental Panel on Climate Change (IPCC) report in 2022. This is supported by more recent observations. The World Meteorological Organization (WMO, 2025) admitted the warming over Asia is nearly double the global warming rate, societies and ecosystems are burdened with increasingly flooding, droughts and extreme heat caused by glacier melt. Likewise, the State of the Climate in Asia 2025 highlights how hazardous heat, catastrophic floods, extreme drought, glacier retreat and record ocean temperatures are interrelated regional risks (WMO, 2026a). Climate change has therefore been increasingly referred to as a compound and cascading risk rather than simply an environmental issue.

There are a number of recent publications on extreme heat in South Asia. The systematic review of temperature projections and heatwave attribution over India indicated that under future warming scenario, the likelihood of heatwaves is projected to be significantly increased in the eastern and central Indo-Gangetic Plain (IGP) region (Kumar et al., 2024). There is a human element story that is very significant because of working populations in the field who are not provided with cooling and health services. UNICEF (2024a) estimates that three quarters of South Asian children are already experiencing very high temperatures and that many more will be at high risk to extreme heatwaves in the near future. During the heat season of 2024 (43-47°C), some parts of northern India experienced severe heat wave conditions and they also observed it for Pakistan (UNICEF, 2024b). The impacts of extreme heat on productivity and health costs were estimated to be significant in Bangladesh by the World Bank in 2026, highlighting the direct economic impacts of climate change and its effects on human wellbeing. These studies suggest that heat causes an environmental, health, labour and economic-security problem.

Flooding and variations in precipitation are also identified as key climate risks in South Asia. According to the IPCC (2022), extreme precipitation and floods are likely to increase in the region of South Asia with warming, however, it is important to note that there is a region-seasonal variability. In 2025 WMO (2026a) shared information about catastrophic events of rainfall and flooding in some countries of Asia including Pakistan and Sri Lanka. A country study on compound vulnerability of Bangladesh is included. Nearly 6 million people were affected by the heavy rain and flooding of August – September 2024 with losses to infrastructure, housing, agriculture and fisheries, education and health services, according to the World Bank assessments (World Bank, 2025a). Such evidence demonstrates a socioeconomic exposure and vulnerability of infrastructure and institutions to climate hazard impacts as well.

Another key research area, also under current focus, is the food security and agricultural vulnerability. Rehman et al. (2024) reveal that climate change has strong correlation with food security pressures in South Asia, as agriculture is affected by the effects of climate change, variation in rainfalls, economic pressures and lack of financial support to farmers. This is also to be noted in the case of Jambor and Elias (2024) who bring the influence

of climate, agricultural productivity, economic development and crisis situations on food security to the highlight in Asian countries. Climate change also increases the likelihood of the impact of food systems as well as reduces the productivity of crops and growth periods and can cause water stress (IPCC, 2022). The results are important for the region of South Asia where agriculture remains a major employment and livelihood option. The effects of climate change on food production are thus far-reaching, ranging from household incomes to food prices, to rural poverty and migration.

Another interrelated aspect is water insecurity. Glaciers in the Hindu Kush Himalaya (HKH) help to control water flow in some of the largest river systems in Asia. Since 2000, there has been a significant increase in glacier mass loss, as indicated by long-term observation of glacier mass balance in the region, with a trend towards negative glacier mass balance (ICIMOD, 2026). Additionally, ICIMOD (2026) warns about double the rates of glacier ice loss since 2000 in the HKH and cautions on the impact of glacier ice loss on water availability or hazards downstream. The detailed study done in the Nepals earlier also pointed out that there was significant shrinkage of glaciers there, as well as glacier mass balance, loss of ice mass, and increase in the glacier lakes which further illustrates vulnerability and risk for the formation of GLODFs in Nepal (Khadka et al., 2023). Glacier loss thus causes a paradox: water availability in the long term will decline as glacier reserves diminish, but water availability and flood risks may increase in the short term.

The social aspects of the climate vulnerability in the Himalayas are now being increasingly recognized in recent studies. In the Kashmir Himalayas, Malik and Ford (2025) demonstrate how climate vulnerability is affected through the changing climate and also due to the experiences, perceptions and adaptive actions of the community. Their conclusions confirm the notion of vulnerability as a dynamic and not static phenomenon. The vulnerability of Nepal is also described as the interaction between climatic hazard, geography, socioeconomic conditions, institutional weakness and development pathways, by the World Bank (2024). The results are in line with IPCC's (2022) conclusion that climate risk is not only the result of climate hazards, but the result of climate hazards, exposure, vulnerability and adaptive capacity.

Research on the impact of climate change on health has also increased. In South Asia, however, the risks of climate change to health and wellbeing are high and existing physical and social vulnerabilities in the region can further impact the health effects of climate change (Butler and Rahaman, 2024). A recently conducted systematic mapping of the South Asian climate-health literature revealed 308 studies and highlighted that there is more research on health impacts than on adaptation, policy, governance and decision-making (Asaaga et al., 2024). The same study highlights the importance of early-warning systems for disease sensitive to the climate, which are integrated early. The results indicate that, apart from deaths in the wake of disasters, the vulnerability to climate change should be evaluated based on the longer-term impacts on disease, mental health, health services and community resilience.

The effects of climate change also have a major impact on migration and displacement. Based on a South Asian review, Ahmed et al. (2024) show that economic, social, and political conditions interact with climate-related hazards to affect population mobility. The multi-layered, complex nature of climate hazards and migration is discussed in the country reviews for Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka. Similarly, Almulhim et al. (2024) say that climate induced migration in the Global South is a combination of environmental stress and socioeconomic vulnerabilities. The displacement is thus not only a reaction to a certain climatic event; it can be explained by the climate change and by the low adaptive capacity of the population

combined with poverty and livelihood insecurity and environmental degradation, which may influence the decision on mobility.

Another literature body is on the topic of adaptation and resilience. According to the World Bank (2024) adaptation measures can significantly mitigate the damages caused by climate change, while adaptation costs are likely to disproportionately affect poorer households. Similarly, Asaaga et al. (2024) note the need for better early-warning and forecasting systems in South Asia. Early warnings and coordinated action can substantially mitigate the impact of disasters, as highlighted by the WMO (2026a). However, the literature reveals that the adoption of technology is not enough when institutional capacity, funding, infrastructure and crossborder cooperation are lacking. Thus, the Asian Development Bank (2025) highlights good governance, good environmental information, more ecosystem-based approaches, and investments in nature as essential components of climate resilience.

There is a critical stance to the climate-justice literature. Paprocki (2024) has argued that to attain climate justice in South Asia, one must analyse climate issues within the lens of historical inequality, political economy and climate risk and resource distribution in adaptation policies. This is especially relevant in the so called vulnerable countries such as Nepal, where the historical contribution to the global emission is small while the impacts of climate are high. This question has become a very acute one in the recent times in the light of the disaster in Nepal 2026. The event on Aug. 26 caused a huge ice/rock failure, causing a record level of flooding, significant damages to communities and the hydropower facilities. A compound mountain hazard, scientists have noted, could increase the background risk of these hazards under warming conditions, glacier retreat and permafrost instability; and, "from a science perspective, it makes sense to be cautious about drawing a causal connection to the specific event," (Associated Press, 2026; Reuters, 2026a).

Literature review reveals that there is some strong evidence available on the different aspects of climate change in South Asia involving heat, flooding, agriculture, health, migration, glaciers loss and adaptation. However, there is a lack of coherence in connecting these with an integrated qualitative study of climate vulnerability and human security, particularly the connection between the environmental vulnerability of the Himalayas and the socio-economic impacts of the region in general. The Nepal 2026 disaster is a very up-to-date case study that may be employed to talk with these interrelated processes. The present reporting also suggests that early-warning systems and the sharing of information between countries are also among the climate vulnerabilities alongside environmental changes, and are connected to governance and institutions (Reuters, 2026b). Therefore, this study is also an important contribution to literature on the synthesis of recent secondary evidence in the light of climate vulnerability and climate justice framework in the context of South Asia, especially Nepal.

Findings and Discussion

The secondary sources were analysed qualitatively and resulted in six themes that were interrelated: accelerated global warming, extreme climate events, Himalayan cryospheric instability, threat to human security, climate vulnerability differentials and climate justice and adaptation. The results show that the climate change in South Asia cannot be seen as a chain of single climate phenomena. In contrast, risks are cascading in the region due to geographical exposure, socio-economic conditions, weaknesses of infrastructure and lack of adaptive capacity interacting with global warming. The evidence further suggests that the Hindu Kush Himalaya (HKH) is a very significant climate-risk zone, particularly as climate change in the mountains has ramifications that reach beyond high altitude communities to those in the downstream areas that rely on common river systems.

Accelerating Global Warming and Increasing Climate Extremes

The first great revelation is that the global warming is accelerating and that it is coming in the form of compounded and intertwined climate extremes rather than simply temperature. The World Meteorological Organization (WMO, 2026a) recorded extreme heat, long dry spells, intense and torrential rains, glacial melting and record high ocean heat in Asia in 2025. The mean temperature in Asia in 2025 was almost 0.96°C above the 20-year mean (1991–2020) and was warming at a rate of almost 2 times the global mean over the longer observational period.

The detection supports the international scientific findings that human induced warming is impacting the chances and/or intensity of climate extremes (IPCC, 2023). The consequences are especially dire for South Asia, given that climatic extremes happen in a dense population where portions of the population remain reliant on climate-sensitive livelihoods and agriculture. The effects of warming are therefore transferred through a few channels: the warming impact on health and labour productivity; excess water causes flooding and damages infrastructure; insufficient water causes less agriculture and water, and new challenges are added to already vulnerable communities as a result of the changing climate.

The analysis thus suggests that the compound-risk (the effect of climate change as a risk combination) will be a more and more crucial understanding of the phenomenon in the future. As many as five of these issues may be present simultaneously in a community. This is the interconnectedness that reinforces the perspective that the world problem of global warming can not only be framed within an environmental lens, but also a human-security lens as well.

Extreme Weather and Human Security in South Asia

The second is the escalating threat of extreme weather to people's security. WMO evidence, however, reveals the devastating impact of extreme weather events in Asia is taking its toll on the human and economic lives of millions of people, with devastating floods, heatwaves and droughts impacting the livelihoods of millions (WMO, 2026a). The 2025 climate record also shows the impacts of extreme events cross national boundaries and impact on food systems, infrastructure, health, water resources and economic activity.

It provides an exposure cascade for South Asian societies:

Climate extreme → infrastructure disruption → loss of livelihoods → food/water insecurity → displacement → decreased human security.

The results show that the intensity of the hazard is thus not the only factor that influences the severity of climate impacts, but also the social conditions under which the hazard occurs. Limited capacity to prepare, relocate, recover and rebuild is a characteristic of poor households, agricultural workers, mountain communities, informal settlements, and those living in hazard prone areas. It aligns with the vulnerability as an interaction between exposure and sensitivity with adaptive capacity as defined by IPCC (2022).

Climate change becomes development problem, as well as environmental. Reproductive assets can be destroyed and public funds can be diverted from long-term development to disaster response and reconstruction in the event

of repeated disasters. Consequently, vulnerability can further accentuate poverty and inequality already experienced and, in turn, further intensify climate vulnerability as a result of climate events and climate impacts.

Himalayan Instability and the Emerging Water-Security Crisis

The third significant discovery is related to the fast-changing cryosphere of the Hindu Kush Himalayan region. The recent ICIMOD evidence showed that glaciers in the HKH are losing ice at a growing rate with the rate of ice loss doubled since 2000. The organization has been estimated to have lost up to 27 metres of ice since 1975 and has important consequences for the population relying on the region's water resources (ICIMOD, 2026a).

Retreat of glaciers is not the only problem. In April 2026, ICIMOD reported that the snow persistence in the HKH is 27.8% below LTA, the fourth year of below normal snow persistence in a row. Ten out of the total 12 river basins in the region experienced less than average snow cover and this is a concern for water availability (ICIMOD, 2026b).

They suggest a short- and long-term water security paradox. The melting glaciers/snowfields may result in increased natural flow and increased risk of flooding in the near term, but decreased natural flow storage over time, important for river systems during dry periods. Therefore, the effects of global warming could increase the risk of flooding, and also exacerbate water shortages.

Himalayan rivers cross nation borders, which spreads the repercussions of the events in Nepal, India, Pakistan, Bhutan and Bangladesh. The impact of climate change in the mountains is not limited to Nepal and the Himalayas, but is a security issue involving various South Asian countries and its impact on agriculture, hydropower production, drinking water, mountain ecosystems and regional development.

The 2026 Nepal Disaster: A Contemporary Illustration of Cascading Climate Risk

The latest instance of the findings is the disaster in Nepal in August 2026. A large disintegrating of glacial ice and bedrock near the Nepal-China border occurred on August 26 that produced a devastating avalanche and flood, affecting habitation and infrastructure. Early reports indicated a large death toll, numerous missing persons and extensive destruction and the extent of the tragedy became evident when rescue operations continued.

This event is significant as it shows the interplay of the four factors of cryospheric instability, steep topography of the Himalaya, rivers and exposure of infrastructure and human vulnerability. Later, hydropower plant facilities were significantly damaged, roads and bridges damaged as well, and damaged transportation connections slowed down rescue and relief efforts.

Important analytical distinction is needed in the qualitative evidence. It's not something that you could say is due to global warming. The first was a physical event with a glacier and bedrock collapse which will need to be determined by event-specific scientific investigation. But, as pointed out by experts, the warm climate and glacier retreat and degradation of permafrost can render high mountain environments more prone to these hazards. Recent reports also indicate that the Nepal event was one of a series of increasing hazards in the Himalayas as a result of climate warming.

Then, the conclusion in the case of Nepal, is that global warming doesn't have to be the direct cause of the disaster itself, but can make the environment conducive to the disaster than it is today.

Climate Vulnerability and Unequal Adaptive Capacity

The fifth discovery is that the impact of climate change does not occur uniformly. The effects of a climatic hazard on a community can vary greatly based on their economic resources, infrastructure, geographical location, information access, governance capacity and adaptation capacity. This is consistent with IPCC (2022) which emphasizes hazard-exposure-vulnerability-adaptive capacity interactions in their role in shaping climate risk.

Nepal is one of the countries where this difference can be vividly felt. It is very much at risk in the context of the Himalayas and has limited capacity for adaptation and disaster management at the country level. Losses resulting from the events of August 2026 illustrated the potentially secondary disaster caused by the loss of roads, bridges, communication and warning facilities to affected communities. In September 2026, Reuters reported that Nepal is planning to reconstruct and upgrade early-warning systems across the Nepal-China border, such as seismic detectors, cameras, satellite communications and strengthening data sharing between the two nations.

The findings have revealed that adaptation capacity is one of the key elements of vulnerability to climate change. Early-warning systems, climate information, climate-resilient infrastructure, emergency communication and evacuation planning and cooperation across borders can help significantly reduce the impact of disasters. All of these have to be ongoing investments and institutional co-ordinations.

Climate Justice and the South Asian Climate Burden

The last significant discovery is related to climate justice. The issue of vulnerability of climate in South Asia is a critical one and is interlinked with climate responsibility-impact imbalance. The impacts of a warming climate can be particularly harsh for countries and communities that have emitted relatively little greenhouse gas in their past.

This is quite stark in Nepal. While its share of global GHG emissions is very small, its mountain communities are becoming more sensitive to risks from glacier retreat, flooding, landslides and alterations in water systems, and other climate impacts. The 2026 disaster, therefore, demonstrates that climate change is not simply a matter of exposure to climate change but also who will be responsible for paying for the global crisis and who will be able to do something about it.

The results are thus in line with the climate-justice view laid out in the theoretical part. There is a need to increase the focus on adaptation finance, technology transfer, disaster preparedness, loss and damage, and vulnerable and Indigenous communities' involvement in decision-making in the context of climate justice. The ICIMOD (2026c) regional cryosphere strategy also calls for coordinated monitoring of glaciers, snow and permafrost, due to the fact that the changes in the HKH can impact more than two billion people living downstream.

Overall Discussion

Combining the results, it can be concluded that the vulnerability of the climate in South Asia has changed from a chain of hazards to a system of interrelated and cascading hazards in the context of global warming. Extreme heat impacts on health, productivity; precipitation changes causes flooding and droughts; glacier/snow loss exposure is both a short and long-term threat to water security; and these environmental stresses combine with poverty, infrastructure constraints, livelihood dependency and institutional capacity.

This interplay between these two is evident in the Nepal disaster in the recent past. It demonstrates that hazards in the Hindu Kush Himalaya can turn into an immediate human-security hazard when combined with human settlements, hydro-power development, tourism and transportation facilities and inadequate early-warning systems. The need for regional cooperation is also evident based on the current evidence: Environmental systems that are affected by glaciers, rivers, precipitation and mountain hazards do not respect international boundaries.

The outcomes of the study as a whole support the thesis presented in this study, namely, that South Asia is not only experiencing a growing number of climate hazards, but also a growing number of climate vulnerabilities. Therefore, integrated responses that consider the challenge of emission reduction, climate change adaptation, resilient infrastructure, early-warning systems and ecosystem protection, transboundary cooperation and climate-justice mechanisms are essential to tackle the emergency situation of a disaster and contribute towards a more comprehensive solution.

Conclusion

The findings of this research indicate that the global warming trend is clearly affecting climate vulnerability in South Asia to a high degree, as it is creating an interplay of environmental, socio-economic and human security risks. The qualitative analysis of secondary data reveals that the environmental events that will grow in number with climate change—like climate change, increasing instability of the Himalayas, glacier retreat, extreme heat, droughts, floods and rising temperatures—are not happening in isolation, but are interconnected, and are likely to have a negative impact on less adaptable populations. This is especially true for the Himalayan region, where the potential rise in risks of cascading hazards like glacial floods, landslides, avalanches, water insecurity and damage to critical infrastructure due to accelerated glacier and snow loss is particularly critical. The 2026 Nepal disaster is a case in point for when cryospheric instability, extreme topography, vulnerable settlements, infrastructure vulnerability and insufficient disaster preparedness can all contribute to a large scale disaster response. The disaster may not only be attributed to global warming, but it also indicates a climate context of warming and thereby renders the environment in the Himalayas unstable. The results also suffer from a massive injustice in terms of who is responsible for global climate change emissions and who suffers the losses due to climate change, as countries and communities in the South Asian region are generally the most vulnerable to climate change, but have relatively low climate change footprints, while relatively high losses. To overcome these challenges, it is necessary to adopt a comprehensive strategy with a combination of mitigation and adaptation to climate change that is appropriate to the local conditions, a good early-warning system, climate-resilient infrastructure, sustainable water use and ecosystem management, as well as disaster preparedness, regional cooperation and equitable access to climate finance and technology. A climate resilient South Asia, therefore, needs to acknowledge global warming as a multifaceted threat to human security, inequality and climate justice, and have to ensure that effective and equitable responses are sensitive to the needs, vulnerabilities and adaptation capacity of climate-sensitive groups.

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