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## Climate Change-Induced Disaster and Its Impact on the National Security of Nepal

Chandra Shekhar Kapri\*

### Abstract

In the 21<sup>st</sup> century, Climate Change emerges as a non-traditional but significant contemporary challenge, acting as a potential threat multiplier in the realm of non-conventional security. While this change poses a major global environmental challenge, particularly affecting Asia, a few studies argue the ramifications of climate change for national security. As a Himalayan country, Nepal, being unique topographically with an altitude ranging from 60m to 8848.86m, is prone to various kinds of disasters, including climate change-induced among many. Existing scholarship on national security, few have explored the potential threats due to its impacts, however, the domestic literature lacks clarity on Nepal's vulnerability towards this. In this context, geographically located in the lap of the Himalayas, Nepal has been lagging far behind in grasping the issue of climate change through the lens of national security. This study maps the possible connection between these two by examining the major adverse environmental trends and disasters that pose a security threat to Nepal. It also aims to explore the ways to potential mitigating or adaptation measures to the effects of climate change on national security which eventually helps security professionals, scholars, and decision-makers. This article uses a content analysis approach to conclude the collected information where thematic analytical interpretation is used.

**Keywords:** Climate change, national security, disaster, security stressors, human security, climate finance

### Introduction

Climate Change has been the biggest contemporary non-traditional security challenge facing humanity in the 21<sup>st</sup> century, posing a great threat that tends to influence large-scale human migration, economic and social depression over scarce natural resources, and political systems, which cause a higher degree of uncertainty. It refers to any change in climate over time, as a result of either or both natural variability and anthropogenic factors (Onuoha & Ezirim, 2010). In the academic discourse, there is still a debate on whether climate change is real or just a natural phenomenon. Albeit, few conspiracy theorists claim global warming is a politically driven tactic to instil fear, echoed by climate change deniers (Coleman, 2014). Despite their scepticism, the

\* Lieutenant Colonel, Nepali Army  
Email ID : kaprichandra@gmail.com

consensus among the majority of climate scientists, supported by the Intergovernmental Panel on Climate Change (IPCC), affirms anthropogenic climate change, which prompts imbalances in the environment and influences every sector of human life, and security. Climate change is real and will have wide-ranging consequences in many areas, including security (Rawal, 2021).

The climate change-induced destabilization may lead to a major economic, environmental, and political crisis affecting the entire world, notably the Himalayan countries, small island nations and the least developed states face disproportionate challenges due to their limited resources, making them particularly vulnerable to significant loss of life and adverse impacts on investment and economic stability (Bhargava, 2023), thereby threatening national security dimensions by increasing environmental degradation, scarcity of resources, transforming social structure, and damage to infrastructure. Addressing these threats require a comprehensive study and decisive action.

Climate change has been a much-discussed topic; hence, numerous studies have been conducted in many areas across the globe. Few studies argue that it poses a long-term threat with significant implications for quality of life and the greatest challenge for certain individuals, communities, nation-states, and even the globe (Scheffran and Battaglini, 2011). In addition to those, there is a vast array of literature regarding the subject related to national security, the impact of climate change, and its adaptation but very few books, research work, and articles have enlightened the relationship between the former two. In this context, it is pivotal for Nepal to ponder the issue through the lens of national security in the present-day scenario.

Nepal, being a least developed mountainous country geographically located in the lap of the Himalayas, is one of the most vulnerable nations in terms of climate change (IPCC report 2022). Warming (temperature increase) in Nepal, is projected to be higher than the global average. Temperature changes between the periods 1900–1917 and 2000–2017 in Nepal are estimated at between 1.0°C–1.3°C (WBG & ADB, 2021). Additional studies specifically focused on the Himalayan region report higher rates of warming, with average temperatures increasing by 1.5°C between 1982–2006 (WBG & ADB, 2021). Increases in temperature and adverse weather patterns exacerbate the frequency of disasters. Due to the difficult geographical terrain, disaster response operations are becoming much more complex and costly in terms of resource mobilization when mega-disasters occur. Nepal needs to pay special attention and be prepared with an appropriate security model to cope with the threat posed by climate change in the future. Undergraduates, graduates, and doctoral students should be encouraged to research and participate in such projects and capstone initiatives that could assist planners and decision-makers in formulating and implementing sustainable adaptive strategies.

This paper explores the possible connections between climate change and national security, with special emphasis on disasters caused by climate change, with particular reference to Nepal. It further examines the major environmental trends and key climate change-induced disasters that pose a security threat to the country. It concludes with a range of recommendations on how least-developed countries like Nepal could mitigate the security threats posed by this change.

### **Research Methodology**

This is the qualitative research based on content analysis and exploratory research design. It helps in the exploration of ongoing issues of climate change-induced disasters and their security implications. Research also elucidates how similar non-traditional threats emerging as

a security challenge in the modern security realm. The sources of data for this study are based on secondary data. Literatures were identified for review through a comprehensive search using electronic and non-electronic databases.

The study spotlights the climate change associations with national security in general, major climate-induced disasters, and possible adoption measures to the challenges posed by it to the national security of Nepal. References cited in the literature were searched and imported studies were collected in full text. The data obtained from various sources have been analyzed by using content analysis where thematic analytical interpretations have been used. Theoretically, it follows an idea of critical constructivism incorporating a theoretical perspective to enhance the broader framework of climate change and national security. Consultation with subject matter experts and representatives of concerned local communities has also been undertaken. The study comprises scientific and empirical data collected from both primary and secondary sources; hence the research is qualitative in nature.

### Conceptual Framework

The researcher has attempted to utilize different scholar’s idea in generating the conceptual framework applicable to the proposed study. Different scholars have presented the issue in different ways based on their interests. Despite being believed by 97% of scientists on the anthropogenic climate change, few deny to consort with the fact (Ritchie, 2016). This study focuses on anthropogenic climatic change and its consequences keeping the skeptic and climate change denier’s views in the backdrop. The major focus area of the study is based on the conceptual framework of analyzing the interrelationship between climate changes, climate-induced disasters and the national security of Nepal.

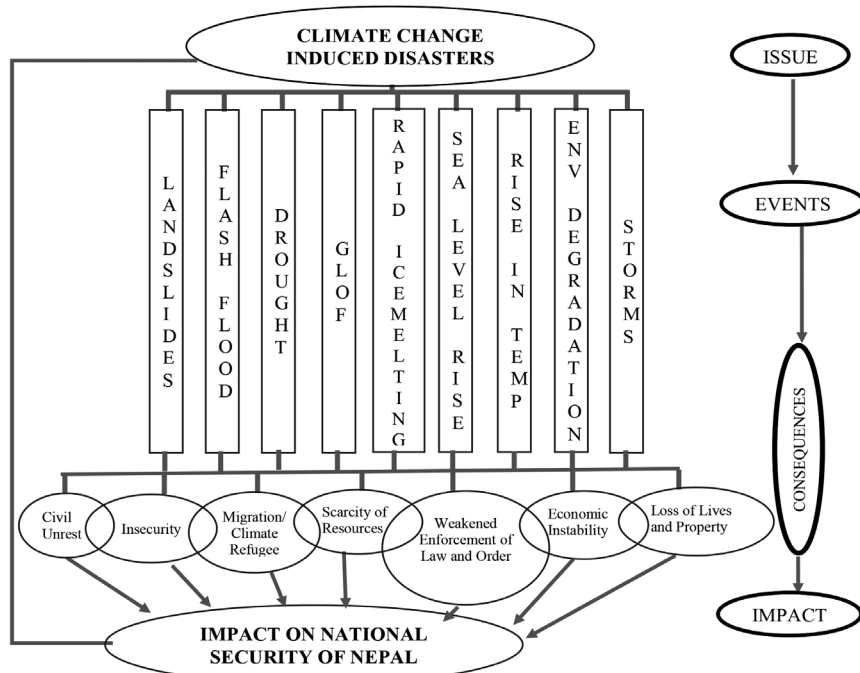


Figure 1: Conceptual Framework

### **Why Climate Change is Significant to Nepal?**

Nepal faces various climate risks and water-related hazards due to swift snow and ice melting in the mountains and heavy rainfall in the foothills during the monsoon season (WBG & ADB, 2021). It is estimated that millions of Nepalese are vulnerable to the effects of climate change, which include decreased agricultural output, food insecurity, pressure on water supplies and biodiversity, and damage to lives and property (NPC, 2022). The country faces flooding, landslides, unprecedented rainfall, food shortages and a rapidly changing ecosystem. Due to a combination of political, geographic, and social factors, Nepal is recognized as vulnerable to climate change impacts, ranked 128th out of 181 countries (WBG & ADB, 2021). The Index assesses 181 nations by gauging a score that measures a country's susceptibility to climate change and other worldwide challenges, alongside its preparedness to enhance resilience. UN Secretary-General Antonio Guterres has also shown his serious concerns about climate change during his visit to Nepal on October 2023. He said that, Glaciers are melting at records and the effect is devastating as swollen lakes bursting, cultures threatened, mountainsides exposed, inflaming the risk of rock slides, landslides and avalanche (Gurubacharya, 2023).

The Least Developed Countries (LDCs) receive climate finance primarily for adaptation, whereas high Carbon emitting countries receive climate finance for mitigation. There are currently 46 LDCs like Nepal has submitted Nationally Determined Contributions (NDCs) with almost all conditional targets. Research indicates that approximately 65 percent of financial support for climate-related initiatives is directed towards middle-income nations, with only 20 percent allocated to Least Developed Countries (Pandey, 2023). Nepal's national adaptation plan, sanctioned by the cabinet in October 2021, spans from 2021 to 2050 and delineates a series of adaptation initiatives to be executed across three distinct phases: immediate, mid-term, and long-term (Subedi, 2022). It estimates the adapting costs will total USD 21 billion up to 2030, rising to USD 46.4 billion by 2050. The proposal outlines that Nepal will fund USD 1.5 billion of these expenses internally, indicating that external funding of USD 44.9 billion will be necessary for climate adaptation efforts until 2050 (Pyakurel, 2022). No single country will certainly receive all climate finance as grants to achieve their climate pledges (Pandey, 2023). To meet the target set by the Nepal government based on the Paris Agreement is another challenge. It indicates that government of Nepal needs to wisely prioritize sectors that climate finance makes sense for investment based on the national interest of the country. Aforementioned literatures show that climate change affects comparatively more to lowlands and high Himalayan countries.

Nepal has an agrarian economy. A large portion of the population is dependent on natural resources for livelihood. Soil erosion, landslides and unpredicted & extreme weather patterns have a direct impact on crop production. Increases in atmospheric carbon dioxide (CO<sub>2</sub>) may increase the growth of plants, but decrease their quality i.e. low amount of nutrition (EPA, 2023). Cattle would need to eat more to get the same nutritional benefits. Similarly, rising level of atmospheric CO<sub>2</sub> reduces the concentrations of protein and essential minerals in most plant species, including wheat, soybeans, and rice. This affects the nutritional value of crops and represents a potential threat to human health (EPA, 2023). Additionally, rapid melting of the Himalayas, Glacial Lake Outburst Floods (GLOF), increased intensity of landslides & flash floods, resource scarcity and limited resources to address climate-induced disasters are the major variables that made climate change an important subject in the Nepalese context.

### **Relation between Climate Change and Disasters**

It is not easy to distinguish the disasters whether it is induced by climate change or natural ones. Climate-induced disasters cause around 65% of all disaster-related annual deaths in Nepal (MoFE, 2021). The frequency and intensity of disaster occurrence and their nature support the literatures to conclude that climate change is real and a significant subject to various academics/professionals.

Climate change has distinct and significant effects on different types of natural calamities. Many literatures and most of the climate scientists have proved that climate change has a linkage with disastrous activity. Major disasters and their linkage with climate change are floods, earthquakes, extreme temperatures, landslides, drought, and Glacier Lake Outburst Flood (GLOF). The connection between floods and climate change comes down to a few ways that climate change impacts water. The relation between earthquakes and climate change is slightly less straightforward and certainly less influential (Blackett, 2023). The connection with extremely high temperatures is more intuitive Greenhouse gases (GHGs) are being trapped in the atmosphere and this leads to warming (Crimmins, 2022). Climate change contributes to increased precipitation variability, elevating the risk of landslides and posing threats to infrastructure and communities. A GLOF happens when the dam holding back a glacial lake collapses, leading to swift and severe flooding that causes devastation for communities in close proximity. As glaciers thaw, the resulting water has the potential to infiltrate crevices within the Earth's crust, leading to their expansion and decreased stability (Blackett, 2023).

### **Climate Change and National Security**

The relationship between climate change and national security has become a subject of public debate and academic inquiry. Rapidly changing climatic conditions exacerbate the challenges to the security of the nation. The national security, unlike the traditional concept, possesses multiple dimensions, comprising economy, food, physical, environmental, energy and cyber security, which are mutually interrelated and interwoven (UNEP, 2022). Climate change is increasingly being viewed from multiple perspectives. Similarly, the dimension of national security is increasing in the world day by day. The modality of security differs from country to country. The situation in Nepal stands out as a particular topic due to its unique characteristics, including its diverse topography, geopolitical context, and national economy (Sharma, 2023; Paudel, 2021).

The scientific evidence is now overwhelming that climate change poses many threats and challenges to the security and prosperity that face humanity all over the world (Rashid et al, 2011). Initially, the definition of national security was primarily associated with managing conventional threats with military capabilities but in the modern concept, it is more engaging in handling non-traditional issues like pandemics, climate change, and other similar issues by applying all the available resources in an integrated approach. Climate change can affect the security dimension in multiple ways. The increase in severe climate change-related disasters has also warranted larger engagement of security forces in humanitarian assistance and disaster response operations. The events such as the Jure landslide in 2014, the Terai flood in 2017, the Bara Parsa rainstorm in 2019, and the Melamchi and Manang floods in 2021 have highlighted the necessity of security forces to strengthen their involvement and capabilities in humanitarian and disaster response efforts, despite their main duty being national defense (Malla, 2023).

Similarly, climate-induced disasters cause greater loss of lives and property and reduce the availability of resources, creating competition among the population, thereby resulting in mass displacement and creating the 'Climate Refugee' crisis. This hunt for resources causes further conflict, as witnessed in history (Conger, 2020). Some concrete links between climate change and security threats are rising temperature, precipitation changes, and extreme weather events that could be significant threats to national key economic sectors such as energy, industries, transport, agriculture, water resources, and public health (Rashid et al, 2011).

While looking over the issue with military glance, the impact of climate change impedes the usage of technology and equipment that are crucial for defense and also increases the frequency, scale, and complexity of operations, making them more expensive. The effects of climate change on water, food, and energy scarcities, mass migration, upsurge in local and global conflicts, and pandemics pose a significant threat to national security (Rawal, 2021). The impact of climate change on national security is particularly significant in areas where environmental and natural resource issues exacerbate existing political, socio-economic, religious, and cultural tensions. These challenges pose threats to both the well-being of populations and the stability or legitimacy of governments (Onuoha & Ezirim, 2010). The changing environment not only affect the life of human beings but also generate larger societal effects, either by undermining the infrastructure of society or inducing responses and adversely affecting social systems (Rashid et al, 2011). In fact, the associated socio-economic and political stress can erode the functioning of communities, the effectiveness of institutions and the stability of societal structures. Hence studies suggest that, Climate change will aggravate existing problems such as poverty, social tensions, environmental degradations as well as weak political institutions that threaten the national security of the state.

### **Climate Change-Induced Disasters in Nepal**

Nepal is highly vulnerable to climate change-induced disasters, despite having contributed little to global greenhouse gas emissions (Pyakurel, 2022). Major climate-induced disasters are;

#### ***Flood***

Floods are particularly associated with summer monsoon rains, and are a feature of current climate variability. The nation's extensive network of over 6,000 rivers and smaller streams, spanning a combined distance of 45,000 kilometers, sustains irrigated farming and various livelihoods. However, their overflowing poses significant challenges in valleys and the terai region, causing widespread devastation (Sapkota & Rijal, 2016). The flood in Melamche in 2021 resulted in a staggering loss of 2 billion NPR to the Melamchi Water project. In the same year, 12 hydro projects under construction incurred damage, with the Madi Khola Hydro project, nearing completion at 44 megawatts, bearing the brunt. Likewise, the Sanima and Sunkoshi hydro projects suffered damage during the Jure landslide dam burst flood in 2014, and the Upper Dordi Khola Hydropower project was affected by the 2019 flood. Additionally, approximately four dozen concrete bridges across the country sustained damage during the 2021 monsoon season (NDRRMA, 2021). Monsoon-led flooding in June 2023 has destroyed three suspension bridges, five concrete bridges, and two hydro projects resulting 5 dead, 28 missing in floods and landslides in Koshi hill districts (Shakya et al, 2023). Sankhuwasabha has been hit hardest by the rain-induced disaster in the eastern region.

### ***Landslides***

Landslide is another climate-induced disaster often related to extreme rainfall and flood events. Landslides are not unfamiliar in a nation where nearly 80% of the terrain is in slope (Bhusal, 2020). It many occur naturally but human activities have been making the situation worse. The occurrence of landslides can be triggered by high precipitation hence; climate change can have a significant role in increasing the frequency of landslides. landslide near Machhapuchhre mountain in Kaski in 2012, a landslide in Syabun, Sankhwasabha in 2014, Landslide in sunkoshi sindhupalchok in 2014, a landslide in Dhorpatan-9 Baglung in 2020 are a few examples (Shakya et al, 2023). Over the years, landslides and floods have remained the major killer disaster in the country (Mandal, 2019). The rate of fatalities and the scale of devastation are increasing each year. Nepalese lost their lives in floods and landslides claimed 282 lives in 2014, it reached 453 in 2015 and 455 in 2016 (Mandal, 2019). The topography, weather patterns, delicate geology, and human actions predominantly contribute to these disasters.

### ***GLOF***

Nepal, due to its geographical location located in the range of the Hindu Kush Himalayas is vulnerable due to a large number of glacial and snow concentrations. Rapid melting of ice in mountains has resulted in the formation of new glacial lakes and the enlargement of existing ones. These lakes possess inherent instability and are susceptible to sudden drainage, posing a significant risk to individuals and assets situated in the valleys beneath them. Rapid cascading ice on the Bhote Kosi River, Tama Kosi, Marsyangdi, and the Arun is a growing threat to GLOF (Nepali Times, 2021). Most of our river basins are originated from Tibet and the Himalayan region. Out of the 1,466 glacial lakes in Nepal, 21 pose potential risks and six are considered to be at a high risk of an outburst (Bhandari, 2020). There are 42 dangerous lakes in the Kosi basin alone, like Imja, Tso Rolpa, Lower Barun, and Hongu. Additionally, there is also the danger of transboundary GLOFs. There have been 15 glacial lake flooding events recorded in the last decade out of them 11 originated from the Tibet Region. In 1981, a glacial lake burst in China caused a flood on Bhote Kosi in Nepal damaging the Sun Kosi power plant and washing out a 25km section of the Arniko Highway, cutting Nepal's only road to China for three years (Nepali Times, 2021). Such incidents not only endanger the security of affected areas but also carry huge economic losses to the country as a whole.

### ***Drought***

Nepal also holds moderate exposure to drought hazard and moderate levels of vulnerability (WBG & ADB, 2021). Due to climate change, some part of the country gets excessive amounts of rain while other parts suffer from drought. Increasing temperature is triggering drought events. The impact of the 2008-2009 winter droughts on farming and local food security was severe (Sapkota & Rijal, 2016). In that period, most monitoring stations received less than 50% of normal rainfall, 30% recorded no precipitation at all and temperatures were 1-2°C above average (Sapkota & Rijal, 2016). The rainfall data of the last 30 years (from 1991 to 2020) shows that 768.7mm of rain would fall, on average, in June and July but only 555.5mm of rainfall has been recorded across the country since the start of the monsoon in 2023 (Paudel, 2023). The study on drought impacts on agriculture reveals that the frequency of droughts has

increased during the winter wheat cropping season. Decreased precipitation during the winter of 2015/2016 led to lower yields in winter crops, impacting 87% of the population in Western Nepal (Sharma & Pokhrel, 2021). So far, the two most widespread summer drought years were 1992 and 2015, where larger areas were affected by drought severities (Shrestha, 2022).

Besides aforementioned events, there are many other climate-induced disasters whose frequency of occurrence is projected to increase if the climate continues to change abruptly at the present pace. The survey shows that the Loss and damage due to climate change is increasing. Therefore, Nepal stands as one of the nation that is most susceptible to the impacts of climate change, particularly facing water-related calamities and extreme weather events such as droughts, storms, floods, and landslides, which are significant disasters.

### National Security Implications by Climate Change-Induced Disasters

The effects of climate change are evident across all areas. Both gradual occurrences like drought and glacier melting, as well as sudden events like floods, fires, and landslides, are becoming more frequent, severe, and extensive (MoFE, 2021). The diverse terrain of Nepal has its unique character. Terai lands are more vulnerable to flood and drought, the hilly region is vulnerable to landslides and the Himalaya region is vulnerable to glacial lake outburst flood. The figure below illustrates the major climate change-induced disasters that occurred in Nepal.

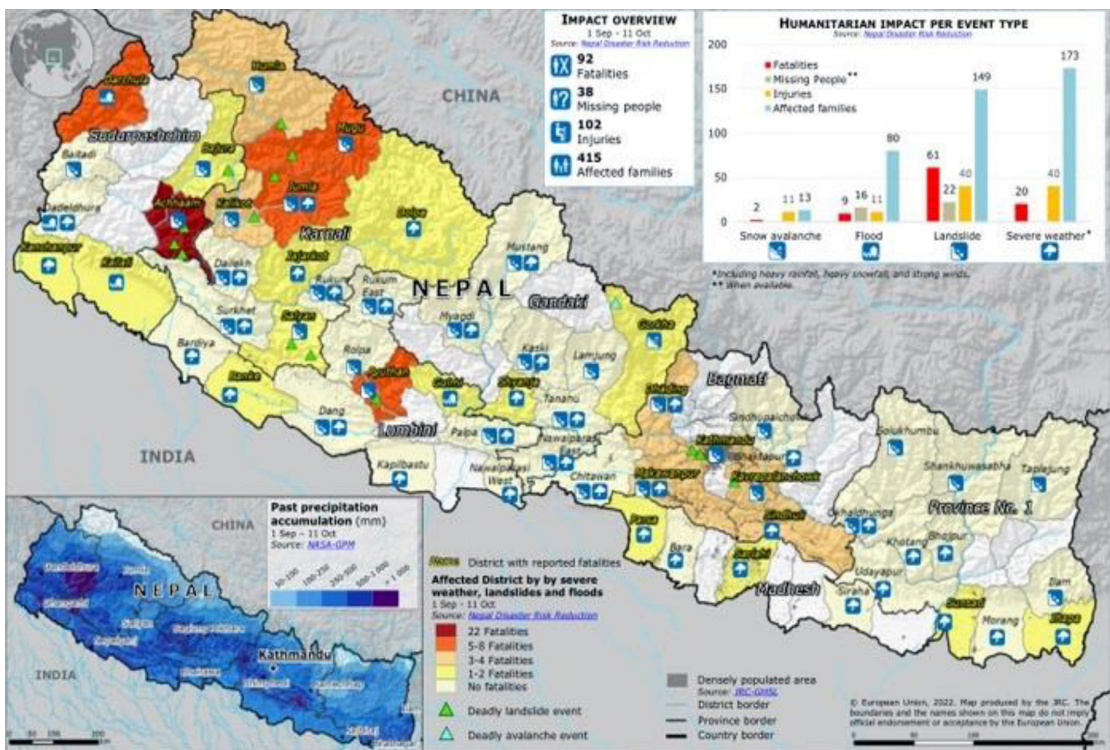


Figure 2: Severe Weather, Landslides and floods in Nepal  
(Source: Emergency Response Coordination Centre (ERCC)-2022)



Major Security Implications Due to Climate-induced Disasters in Nepal are:

### ***Threat to Security Forces***

Security forces are considered as the prime responder during rescue and relief operations even though their bases/barracks and installations have frequently been threatened by various types of disasters. Floods at Army Barrack, Koshi Tappu in 2008, Rautahat Barrack in 2019, Nawalparasi in 2021 and landslide at Nepali Army security post Lamabagar, Dolakha causing damage to weapons & equipment are a few examples of the susceptibility of military bases to environmental hazards. Likewise, the security outpost of the Armed Police Force stationed at the Melamchi Drinking Water Project was also washed away by the flash flood in 2021. With the ongoing impacts of climate change becoming increasingly evident worldwide, Nepal stands as one of the most susceptible nations, enduring the full force of these adversities (Malla, 2023). Since, Security camps themselves are not immune to the impacts of disasters, posing a direct threat to national security is imminent. Additionally, existing weapon and armament systems might not be much effective to operate in such extreme climatic conditions. Hence, they may require special weapons, equipment and accessories in order to adapt to the changing security environment.

### ***Mass Migration/Climate Refugees***

Due to uncertainty of safety and security induced by adverse weather events and disasters, people are migrating especially from Himalayas and hilly regions to Terai to their comfort. In the last decade (2012-2021), 3.4 million people were displaced due to disasters or to avoid natural hazards (Talchabhadel, 2023). Migration affects the balance of the existing society in terms of resources, social culture, and values. It has the potential to disrupt the bonds of peaceful coexistence among previously harmonious groups who are separated by various cultural, ethnic, religious, and political differences, which can greatly unsettle the stability and security of a nation (Onuoha & Ezirim, 2010). As arable land loses its fertility and existing habitations become inhospitable due to harsh environmental conditions, individuals will inevitably vie for the remaining fertile land or opt to relocate to new areas. For example, droughts triggered by climate change in countries like Niger Republic and the Republic of Chad have led to food shortages and undesirable living conditions, compelling their citizens to migrate. Given their proximity to Nigeria, this migration has implications for Nigeria's national security (Onuoha & Ezirim, 2010). Keeping this issue in mind, what security situation happens to small states like Nepal in case of huge number of climate refugees start to come from neighboring countries due to extreme weather events? Can Nepal sustain them? These are serious questions as far as national security is concerned.

### ***Impact on National Economy***

Operations to address mega-disasters and catastrophes are obviously costly itself. The diminishing snow cover in mountainous regions, biodiversity depletion, heritage site destruction from disasters, unpredictable weather patterns, and disruptions to travel and tourism significantly impact the country's economy. There is an increasing worry regarding how climate change is influencing livestock farming. Literature shows that climate change adversely affects livestock and poultry (Sapkota & Rijal, 2016). During particularly severe years such as 2017, marked by events like the Terai floods, the economic impact and devastation resulting from this

singular disaster amounted to approximately 2.08 percent of the GDP (MoFE, 2021). Excessive rain during October resulted in the loss of 325,258 metric tons of rice valued at approximately Rs 8.26 billion (Shrestha, 2022). The government has been facing challenges to provide socio-economic support to its people in the aftermath of disasters. For instance, the Melamchi Valley community is still in need of assistance following the devastation caused by the unprecedented flood of 2021 (Subedi, 2022). Besides huge losses of lives and property, erosion of soil, severe landslides, adverse patterns of rainfall, and flood affect the agricultural product which ultimately impacts economy of the country which in turn undermines national security.

### ***Environmental Degradation***

Air pollution stands as a leading cause of environmental decline due to climate change, already evident within the nation. In March of 2020, Nepal was ranked as the eighth most polluted country globally according to the World Air Quality (AQ) report. Chronic Obstructive Pulmonary Disease (COPD) linked to air pollution now accounts for approximately 16.3 percent of total deaths in Nepal, a notable surge from 6.1 percent in 1990. Additionally, recent years have witnessed a rise in health issues like allergies, cancers, and neurological complications (Malla, 2023). Government of Nepal is working hard to effectively launching campaigns to protect environment.

### ***Effect on Development***

The devastation caused by disasters to infrastructure and development efforts will significantly set back the country's progress for decades. Consider Nepal's relentless pursuit of development; enduring repeated climate change-related disasters will severely impact its situation in the next two to three decades. This is a highly critical matter that demands both national and international attention (Malla, 2023).

### ***Likelihood of Conflict***

Scarcity of resources, loss of lives and property can create a social conflict. The imminent risk of societal discord stems from possible disparities in social status and conflicts over resources, notably water. Water scarcity is a pressing issue that demands immediate attention. It threatens every aspect of our lives, from food security to public health, economic stability, and political power (Karki & Acharya, 2023). The decline of societal and cultural principles can lead to social tensions, ultimately weakening the stability of a nation's security (Malla, 2023). Additionally, it has the potential to disrupt the previously harmonious coexistence among groups, dividing them along various cultural, ethnic, religious, and political lines. On the other hand, if a government is seen as unable to tackle these climate-aggravated challenges, it may lead to increased feelings of exclusion and disadvantage among the impacted people, as well as a greater sense of bitterness toward the government.

### ***Effects on International Relations***

National situation will inevitably affect international relations. Experts suggest that the forthcoming water scarcity due to climate change could negatively impact international relations. The unilateral development of flood defenses, such as border road networks, by our neighboring country to the south could potentially create unforeseen diplomatic challenges (Malla, 2023). A new trend of cloud seeding projects launched by both neighbors and its effects

on natural weather systems would be another issue. Being a small states like Nepal, sustaining climate refugees due to climate-related events would become another threat to national security if in case such a situation occurs. Furthermore, control of water by upper riparian countries, floods on trans-border Rivers, and mass migration across the border are the likely issues to raise the tension between the two countries. Even with a border that's easily crossed, a common culture, religious bonds, and significant interpersonal connections, the management of water resources spanning both India and Nepal has frequently sparked diplomatic tensions (Vasani, 2023). In recent times, Nepal has experienced revived historical conflicts regarding boundary issues concerning shared water resources with both India and China. These disputes still persist despite several bilateral and multilateral treaties signed over the course of history (Dahal, 2022). Hence, water scarcity due to unpredicted weather patterns cause a likelihood of conflict which can undermine national security.

### **Recommendations**

The culmination of this research underscores the critical imperative for urgent and comprehensive climate change adaptation and mitigation strategies tailored to the unique context of Nepal. The following key points are highlighted to guide future action:

#### ***Awareness Programs***

Different scholars have presented climate change in different ways based on their interests. Common consensus and understanding is essential to come up with an actionable plan. This involves providing comprehensive training on emergency response, first aid, and community-based disaster risk management. On top of that, the Government should encourage the concerned authorities to incorporate lessons at schools and colleges to make aware budding brains regarding climate change, environmental protection and measures of mitigation & adaptation into their curricula.

#### ***Hazard Mapping/Recognition of Vulnerabilities***

Nepal's vulnerability to climate change is distinct, accentuated by its Himalayan landscape where challenges and risks demand immediate actions and tailored solutions. The government or concerned authority should level the areas as High Risk, Risky and mild zone based on their degree of vulnerability. It can best be implemented by local governments as the constitution of Nepal has provisions of executive act to Village or Municipal. By identifying and categorizing vulnerable areas, resources can be allocated efficiently and tailored solutions can be developed to address the specific needs of each category.

#### ***Strict Implementation, Enforcement of Law and Order***

By acknowledging vulnerabilities, each level of government should work towards safeguarding lives and property, ensuring sustainable development building a more resilient and adaptive society in the face of climate change challenges. Additionally, fostering collaboration with regional and national agencies is essential to align local strategies with broader climate action initiatives. In search of their own comfort, People are settling in high-risk areas (Banks of Rivers, bottlenecks, close to highways etc). Hence, concerned authorities should strictly implement land use provisions and enforcement of law & order to reduce loss and damage.

### ***Integrated Strategy***

Climate change, a non-military threat has multidimensional security implications which demand an integrated national security strategy. Collaboration among government agencies, local communities, and international partners is imperative for a holistic and effective response. However, a comprehensive strategy is required to tackle the security issues arising from climate change on the strategic level. They should then ascertain the long-term and short-term approaches, instruments and institutions to deal with the root causes, and their manifestations in security challenges (Rawal, 2021).

### ***Adaptive Measures***

Advocacy for the development and implementation of adaptive measures is central to mitigating identified threats. This encompasses infrastructure enhancements, the establishment of early warning systems, sustainable land-use planning, and initiatives fostering livelihood diversification in communities dependent on vulnerable sectors. Experts also argue that the impacts of climate change are beginning to affect military strategies and technologies. Changes in weather patterns, increased frequency of disasters and severity of extreme weather events are shifting operational landscapes, rendering military operations more unpredictable and posing challenges for planning and execution (Malla, 2023). To enhance climate resilience at the local level, it is crucial to build the capacity of local governance bodies, community leaders, and residents in climate change adaptation and disaster risk reduction.

### ***Research, Sharing of Knowledge and Experiences***

The imperative for ongoing research cannot be overstated. A nuanced understanding of the evolving dynamics of climate change impacts in the region is vital for informed decision-making. National and international knowledge sharing is the key in developing more effective solutions and policies.

### ***Threat Assessment, Planning, and Preparation***

The geo-strategic location of Nepal has always made it vulnerable when it comes to National Security. For the countries like Nepal, having limited resources on hand, dealing with multifaceted threats caused by climate change in the diverse terrain is costly. Migration caused by disaster, the likelihood of social conflict due to scarce of resource and migration, and economic fragility are major threats to National security. Hence, Climate change adaptation and mitigation, along with disaster management, should be encompassed within the purview of the National Security Council. Meticulous planning should be prepared considering the existing border control system and two overly populated neighbors.

### ***International Cooperation***

United Nations agencies and other regional organizations are the best-suited partners to address the long-term effects of climate change. Thus, for inter-agency coordination, there is a need to create a climate security focal point at the highest level of each country's bureaucracy. The last step will be to plan to treat the symptoms and fundamental causes discretely while addressing their causal relationship holistically (Rawal, 2021). Recognizing the shared environmental challenges, collaborative efforts can significantly bolster resilience and promote sustainable development in Nepal.

### ***Proactive Action in the Protection of the Environment***

Government of Nepal needs to find innovative ways to combat the effects of climate change. To foster the go green campaign, a solid plan should be implemented like, encouraging students for plantation upon joining the School/University and nurture it until graduation. To protect the environment from further degradation, scientific ways of waste management following the 3R (Reduce, Reuse, and Recycle) principle can be implemented at all levels. Similarly, campaign to encourage the use and invest in green energy sectors is highly demanded. Government should urge international agencies/partners to work collectively in nature conservation and protection of environment. The Prime Minister of Nepal, during the 28th Conference of Parties (COP) held in the UAE, stressed the importance of reforming the framework for utilizing climate grants, redirecting them towards the nation's priorities. Raising a voice in such international forums is obviously worthy but it would be unwise only to demand climate finance as grants without prioritizing areas of investment (Pandey, 2023). Pragmatic and timely measure needs to be taken proactively to identify the threat and ensure possible risk reduction. The Government of Nepal should negotiate wisely in international forums to receive climate finance as a grant and make justifiable use of it.

### **Conclusion**

Climate change and national security have become a buzz word in the field of security studies for the last several decades. The issue of climate change is highly complex and critical. Climate change-induced disasters in Nepal have the potential to threaten the overall framework of national security through various catastrophes. Climate-induced migration, scarcity of important resources, impact on human security, mobilization of security forces in handling catastrophes with limited resources, and multidimensional impact on the economy of the nation are major issues related to national security. The potential security impact of climate change requires proactive measures, regional and international cooperation, and comprehensive strategies to integrate climatic adaptation and disaster risk reduction. National efforts for adaptation and mitigation to reduce the probable impact by accelerating the negotiation to receive climate finance as a grant and meet the target set by the Nepal government i.e. zero GHG emissions by 2050.

Unlike other security challenges, the effects of climate change are a globally intertwined phenomenon. To the Himalayan countries like Nepal, the foremost concerns should revolve around tackling climate change through mitigation, adaptation, disaster risk reduction, and response. It's imperative to perceive and confront climate change as a matter of national security. Given its multifaceted threat, it's advisable to incorporate climate change mitigation and disaster management within the purview of the National Security Council, considering that safeguarding national security is the fundamental duty of the state. This significant non-military threat, which holds a high probability and carries substantial impact, requires significant focus and a suitable plan to mitigate potential security repercussions. Certainly, it is now imperative for the country to contemplate beyond and rise above these pressing concerns, given that time is swiftly moving forward and the path ahead seems daunting.

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