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Effect of Climate Change on Nepal and Its Policy

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Abstract:

This study examines the impact of climate change on Nepal, a vulnerable third-world country, and evaluates the effectiveness of its policy responses. The aim is to identify key areas affected by climate change and assess gaps in policy implementation. This study employed descriptive and analytical methods using primary qualitative data and secondary information sources. The tools included interviews, policy document analysis, and climate data reviews. Data are collected from government reports, international climate studies, and field observations. Climate change has significantly affected Nepal's agriculture, biodiversity, water resources, and public health. Despite comprehensive policies on deforestation, pollution, and climate vulnerabilities, there is a substantial gap between policy formulation and implementation. The findings are relevant to environmental policymaking, climate adaptation planning, and resource management in developing countries. This study can guide policymakers, environmentalists, and NGOs in enhancing implementation strategies for climate resilience. This study highlights the critical disconnect between policy and practice in Nepal's climate change efforts. This research provides new insights into specific implementation challenges and offers practical recommendations for bridging these gaps, contributing to global discourse on climate change adaptation in developing countries.

Keywords: climate change, environment, policy.

气候变化对尼泊尔的影响及政策

摘要:

本研究考察了气候变化对尼泊尔这个脆弱的第三世界国家的影响，并评估了其政策应对措施的有效性。研

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究目的是确定受气候变化影响的关键领域，并评估政策实施中的差距。本研究采用描述性和分析性方法，使用主要定性数据和次要信息来源。研究工具包括访谈、政策文件分析和气候数据审查。数据来自政府报告、国际气候研究和实地观察。气候变化严重影响了尼泊尔的农业、生物多样性、水资源和公共卫生。尽管尼泊尔制定了全面的森林砍伐、污染和气候脆弱性政策，但政策制定和实施之间仍然存在巨大差距。研究结果与发展中国家的环境政策制定、气候适应规划和资源管理有关。本研究可以指导政策制定者、环保主义者和非政府组织加强气候适应力的实施战略。本研究强调了尼泊尔气候变化努力中政策与实践之间的关键脱节。本研究为具体的实施挑战提供了新的见解，并为弥合这些差距提供了切实可行的建议，为发展中国家气候变化适应的全球讨论做出了贡献。

关键词：气候变化、环境、政策。

1. Introduction

In the intricate tapestry of global climate change, Nepal occupies a seemingly minute position, contributing a mere 0.027 percent to the cacophony of greenhouse gas emissions. Yet paradoxically, it is the fourth most vulnerable nation to the ravages of climate change. This stark incongruity underscores the complex interplay of environmental factors and socioeconomic vulnerabilities that define Nepal's precarious position on the global stage. Climate change, marked by gradual but profound shifts in long-term weather patterns, has transcended from a distant specter to an urgent and comprehensive global challenge. The repercussions reverberate across diverse sectors, transcending geographical boundaries and geopolitical divides (Dixit, 2015). In Nepal, nestled amid the towering Himalayas, these consequences are particularly pronounced, casting a long shadow over the nation's ecological integrity and socioeconomic stability.

Despite its minuscule contribution to the global emission footprint, Nepal has been disproportionately affected by the cascading impacts of climate change. The fragility of its mountainous ecosystems, coupled with the socioeconomic vulnerabilities of its population, renders it acutely susceptible to environmental perturbations (United Nations Environment Programme, 2019). From erratic weather patterns and glacial retreat to intensified natural disasters and water scarcity, the manifestations of climate change permeate every facet of Nepalese life, exacting a toll that is both immediate and enduring. Nepal's plight serves as a poignant reminder of the inherently interconnected nature of our planet's ecosystem (HELVETAS Swiss Intercooperation Nepal, 2011). The disparity between its negligible emissions and disproportionate vulnerability underscores the need for collective action on a global scale. Addressing the multifaceted challenges posed by climate change demands a concerted effort to transcend national boundaries and foster collaborative endeavors rooted in equity, solidarity, and shared responsibility (Intergovernmental Panel on Climate Change, n.d.). Only through such collective resolve can we hope to mitigate the impacts of climate change and safeguard the future of vulnerable nations like Nepal, ensuring a more resilient and sustainable world for generations to come (Lamsal et al., 2014).

Nepal, situated amid the towering Himalayas, is particularly vulnerable to the adverse impacts of climate change, ranking fourth globally as the most vulnerable country (MoFE, 2021). This vulnerability stems from numerous factors, including geographical location, socioeconomic conditions, and reliance on climate-sensitive sectors. The effects of climate change manifest in a myriad of ways across Nepal's diverse landscapes, presenting challenges that transcend geographical boundaries and societal sectors. From prolonged droughts to erratic and excessive rainfall leading to floods, landslides, and perilous inundation of glacier lakes, the country bears witness to a spectrum of environmental disruptions. These impacts disproportionately burden communities already grappling with impoverished socioeconomic conditions, worsening existing vulnerabilities, and perpetuating cycles of hardship (Regmi & Karki, 2010).

In contemporary global discourse, climate change is a ubiquitous and pivotal issue, commanding attention at international forums and driving policy agendas worldwide. Recognizing the urgency of the situation, Nepal has made significant commitments at both national and international levels to address the challenges posed by climate change. These commitments reflect a proactive stance aimed at mitigating the adverse impacts of climate change and enhancing the country's resilience against future environmental perturbations (Regmi et al., 2014). Through a combination of national policy frameworks and active participation in international climate agreements, Nepal attempts to confront the multifaceted challenges of climate change. However, despite these efforts, the road to effective climate action is fraught with obstacles, ranging from resource constraints to institutional capacities and implementation gaps (United Nations Framework Convention on Climate Change, 2007).

This article explores the intricate interplay between climate change and Nepal's policy responses, shedding light on the multifaceted impacts of climate change and the efficacy of mitigation and adaptation measures. By delineating the scope and magnitude of the effects of climate change on Nepal and examining the dynamics of policy implementation, this study seeks to contribute to a deeper understanding of the challenges and opportunities inherent in addressing climate change in

the context of a developing nation like Nepal.

2. Problem Statement

Climate change presents a significant challenge for Nepal, with numerous policies aimed at addressing its impact, but it is hindered by a lack of effective implementation. The adverse effects of climate change, particularly in the Himalayan belt, include decreased agricultural production and increased vulnerability to hazardous disasters. Despite its profound implications, climate change has not garnered sufficient political attention, especially during elections, resulting in a dearth of immediate action. This gap between policy formulation and implementation underscores a broader issue of inadequate political will and commitment within the government. Nepal's vulnerability to adverse climatic impacts persists, despite its minimal contribution to global emissions. While the country has prepared various policy documents and adopted a Green, Resilient, and Inclusive Development (GRID) approach, challenges remain in translating these into tangible outcomes. The National Climate Change Policy 2019, along with other regulatory frameworks, offers a policy framework, while the Nationally Determined Contribution (NDC) and National Adaptation Plan (NAP) aim to foster resilience and adaptive capacity. The key issues of this research are as follows:

- Inadequate implementation of climate change policies despite their proliferation;
- Insufficient political prioritization of climate change issues, leading to a lack of immediate action and response.

3. Objectives of the Study

The objective of this study is to ascertain the manner in which the Nepalese government formulates and implements climate change regulations and identify the reasons why climate change is not a prominent political issue. The goals of this research are as follows:

- To assess the extent of implementation gaps in climate change policies despite their proliferation within the Nepalese governmental framework;
- To examine the factors contributing to the insufficient political prioritization of climate change issues, particularly during election cycles, and their implications for immediate action and response.

4. Methodology

This study employs a dual approach, combining primary qualitative data collection with a thorough review of secondary sources, to delve into the impact of climate change on Nepal and evaluate the effectiveness of its policy responses. The methodology entails an exhaustive examination of existing documents, reports, and literature on climate change policies and their execution in Nepal.

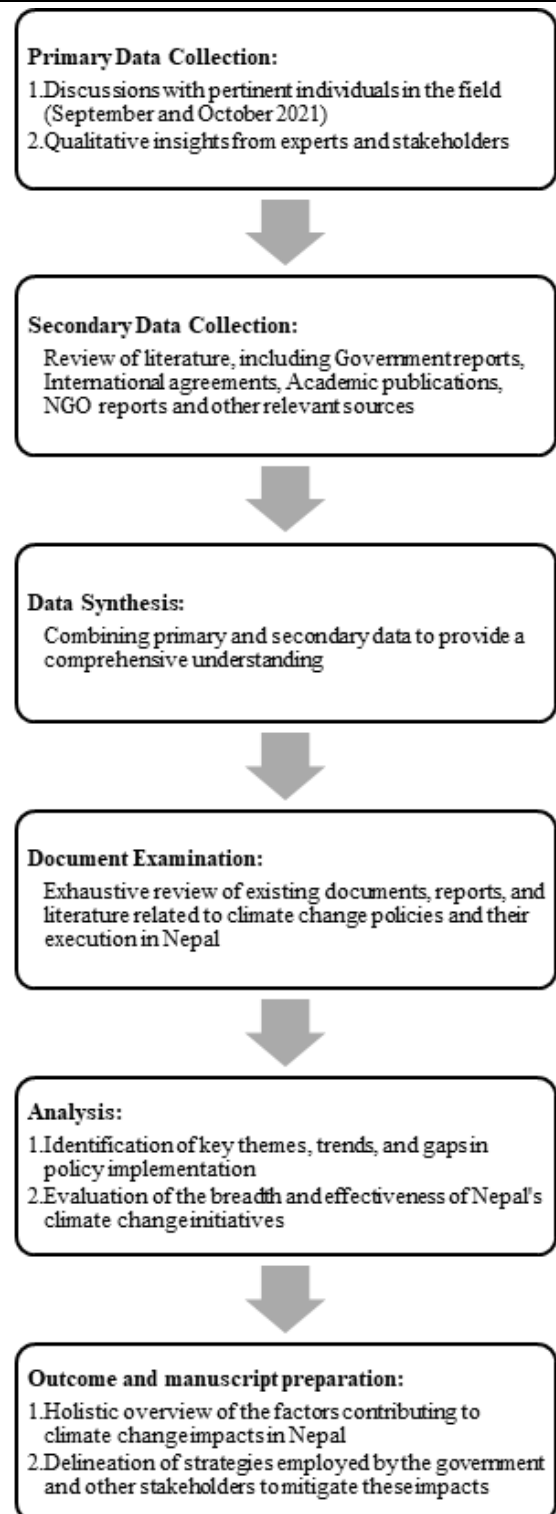


Figure 1. Flowchart of methodology used (The authors)

Primary qualitative data were collected through discussions with relevant individuals in the field during September and October 2021. These discussions allowed for a nuanced exploration of the subject matter and provided insights directly from experts and stakeholders. Secondary data were sourced from a wide range of literature, including books, journals, articles, websites, and other relevant publications. This multifaceted approach ensured a comprehensive understanding of Nepal's climate change landscape and the responses it elicited.

A meticulous review of documents related to climate change policy forms the cornerstone of this

methodology. Government reports, international agreements, academic publications, NGO reports, and other pertinent sources were scrutinized to gauge the breadth and effectiveness of Nepal's initiatives in combating climate change. This comprehensive examination provided a rich tapestry of information, enabling the identification of key themes, trends, and gaps in policy implementation.

By synthesizing primary and secondary data, this research endeavors to offer a holistic overview of the factors contributing to climate change impacts in Nepal. Moreover, it seeks to delineate the strategies employed by the government and other stakeholders to mitigate these impacts. Through rigorous analysis, the study sheds light on the intricate dynamics underlying climate change adaptation and mitigation efforts in Nepal.

In essence, this chapter underscores the importance of a multifaceted approach to understanding and addressing the challenges posed by climate change. By combining firsthand insights with a thorough review of the existing literature, the study aims to contribute to a nuanced understanding of Nepal's response to this pressing global issue.

5. Findings and Discussion

Climate change is no longer a distant threat but an immediate reality, exerting profound impacts on nations worldwide. Nepal, situated in the fragile ecosystem of the Himalayas, faces formidable challenges across various sectors due to its changing climate, exacerbating vulnerabilities and posing significant risks to its population and infrastructure. This paper aims to delve into the multifaceted impacts of climate change in Nepal, elucidate the challenges it presents, and examine the responses and adaptation strategies employed by the government and community.

5.1. Impacts of Climate Change

One of the most visible manifestations of climate change in Nepal is the melting of snow and the formation of glacial lakes. These changes not only jeopardize natural habitats but also pose imminent threats to human settlements and critical infrastructure. Accelerated melting of glaciers increases the risk of natural disasters such as floods and landslides, which can have devastating consequences for communities living in mountainous regions (Intergovernmental Panel on Climate Change, 2014).

Agriculture and food security, vital to Nepal's economy and livelihoods, are severely imperiled by shifting climate patterns. Erratic rainfall, prolonged droughts, and extreme weather events disrupt agricultural activities, leading to crop failures, food shortages, and loss of livelihoods. Furthermore, water resources, which are indispensable for both rural and urban communities, are under unprecedented strain due to alterations in precipitation patterns and the accelerated melting of glaciers. This precipitates water scarcity, compromises sanitation, and undermines hydropower generation, compounding vulnerabilities

across the spectrum (Intergovernmental Panel on Climate Change, 2014).

The consequences of climate change go beyond environmental issues and extend to social and economic aspects, including human health. Climate change has catalyzed the proliferation of vector- and waterborne diseases, posing formidable challenges to public health systems. Moreover, extreme weather events, such as heatwaves and floods, increase the risk of injuries, displacement, and mental health issues among affected populations, escalating healthcare burdens and societal disruptions.

5.2. Government Responses and Adaptation Strategies

Despite the evident impacts of climate change, Nepal has demonstrated commitment to addressing these challenges through policy measures and adaptation strategies. The National Climate Change Policy emphasizes both adaptation and mitigation efforts to address the adverse impacts of climate change. Importantly, the policy underscores the imperative to mainstream gender equality and social inclusion (GESI) into climate change mitigation and adaptation programs, acknowledging the disproportionate impacts of climate change on vulnerable groups.

However, the translation of climate change policies into actionable outcomes in Nepal is hindered by substantial challenges, primarily financial constraints. The funding gap for climate-resilient infrastructure hinders the effective implementation of adaptation and mitigation measures. Although the government has earmarked a substantial portion of the budget to the local level for climate-related initiatives, hurdles persist in operationalizing this allocation and ensuring accountability and transparency.

5.3. Gender Disparities and Challenges

Gender disparities persist in Nepal, particularly in the agricultural sector, where women face systemic discrimination and unequal access to resources and opportunities. Despite policy intentions to promote gender-friendly concepts and mobilize financial systems to promote gender and social justice, challenges remain in translating these intentions into action. Women farmers, such as Shanta Silwal, exemplify the challenges faced by women in agriculture, highlighting the need to address gender inequalities to ensure equitable outcomes.

Climate change poses multiple challenges for Nepal, affecting various sectors and exacerbating vulnerabilities, particularly among marginalized groups. While policy measures and adaptation strategies are in place, there are gaps in implementation and resource allocation. Addressing these challenges requires concerted efforts to integrate gender equality and social inclusion into climate change initiatives and ensure effective implementation of policies at the grassroots level. It calls for collaborative action involving government agencies, civil society organizations, and

international partners to build climate resilience and promote sustainable development in Nepal.

5.4. Climate-Induced Agricultural Vulnerability

In recent years, the world has experienced a surge in the frequency and severity of extreme weather events, providing stark evidence of the reality of climate change. From devastating wildfires, record-breaking heatwaves, catastrophic floods, and unpredictable storms, the impact of climate change is felt across the globe. Amidst these crises, one of the most pressing issues is the decline in agricultural production, which poses a significant threat to food security and livelihoods for millions of people worldwide. This article explores the intricate relationship between climate change and agriculture, draws insights from case studies in Nepal, and proposes solutions to address this crisis.

5.5. Understanding the Global Context of Climate Change

Climate change, primarily driven by human activities such as burning fossil fuels and deforestation, has led to a steady rise in global temperatures. This temperature increase has disrupted weather patterns, resulting in more frequent and intense extreme weather events. Heatwaves, droughts, floods, and landslides are becoming increasingly common, posing significant challenges to agricultural systems worldwide. These disruptions not only affect crop yields but also threaten the livelihoods of millions of farmers reliant on agriculture for their sustenance.

5.6. Some Case Studies

The floods that devastated Melamchi, Nepal, in June serve as a poignant reminder of communities' vulnerability to the impacts of climate change. Situated in the Sindhupalchok district near Kathmandu, Melamchi has long been susceptible to natural disasters because of its geographical location. However, the magnitude of the flooding in June exceeded all expectations, underscoring the growing unpredictability of weather patterns.

Although the exact cause of the flood is still under investigation, climate change is believed to have played a significant role. Heavy rainfall and the possibility of glacier bursts in the Himalayas are among the factors considered. Regardless of the specific cause, the consequences of the flood were devastating, displacing families, destroying homes, and disrupting livelihoods. Sunmaya Khing and her family, like many others, were forced to flee their homes in search of security.

In ongoing discourse, the toll of natural disasters continues to mount, with hundreds of lives lost each year, including in Nepal, where floods, landslides, and droughts claim numerous victims. As the rainy season sets in, reports emerge of lives lost and homes destroyed by landslides and droughts, despite the onset of the monsoon on June 12 (Jeth, 2024), marking a recurring pattern of devastation.

Yet, despite the annual recurrence of such tragedies, the government appears apathetic toward prevention efforts. Although natural disasters may be inevitable, the government's silence on proactive measures is concerning. In Nepal, the absence of secure settlements, reliable early warning systems, and a cohesive national policy exacerbates the frequency and severity of disasters.

Moreover, haphazard road construction coupled with a lack of coordination among different administrative levels exacerbates disaster vulnerability. According to the National Disaster Risk Reduction and Management Authority, landslides have claimed 904 lives over the past nine years, with an additional 233 individuals reported missing. Similarly, floods have resulted in nearly 800 fatalities and more than 500 missing persons during the same period.

The absence of secure and integrated settlements emerges as a critical concern, necessitating urgent government action. Government advocacy of environmentally sustainable development underscores the need for comprehensive policies to safeguard vulnerable communities. However, the dearth of accessible information leads citizens to be unaware of safe living areas, perpetuating the cycle of loss and devastation.

The inadequate dissemination of research findings further compounds the problem. Despite the efforts of geologists and climatologists, the lack of coordination impedes the translation of valuable insights into actionable measures. Consequently, communities remain uninformed about the risks they face, leading to preventable tragedies.

At the grassroots level, some progress has been made in the implementation of early warning systems. However, insufficient cooperation among administrative divisions hampers effective disaster management. Against the backdrop of the COVID-19 pandemic, the risks posed by floods and landslides intensify economic vulnerability, underscoring the urgency of proactive measures.

The Department of Water and Meteorology's forecasts serve as crucial tools for disaster preparedness. However, the absence of a national early warning policy has undermined these efforts, leaving communities vulnerable to unforeseen disasters. Stakeholders stress the need for comprehensive policies to streamline disaster response mechanisms and prioritize pre-disaster preparedness.

Unplanned road construction intensifies vulnerability to disasters, and heavy machinery increases the risk of landslides and floods. Implementing scientifically sound infrastructure development practices can mitigate these risks and protect vulnerable communities.

Despite constitutional provisions mandating disaster preparedness, deficiencies persist in Nepal's disaster response. The focus remains on post-disaster response rather than proactive measures, highlighting the need for a change in disaster management strategies.

Strengthening disaster management authorities and conducting regular drills can enhance preparedness at all levels.

Community involvement is crucial in disaster risk reduction efforts. Local disaster management committees, supported by adequate funding, can spearhead preventive measures and improve coordination with relevant authorities. Understanding local geographical conditions and coordinating with relevant authorities are essential steps in disaster preparedness.

Effective disaster management requires a comprehensive approach that considers watershed conditions, soil structure, and land use patterns. By combining the Department of Hydrology and Meteorology's forecasts with community-driven disaster management initiatives, Nepal can minimize human and economic losses.

International examples underscore the effectiveness of proactive disaster preparedness measures. By prioritizing structural mitigation efforts and adhering to standardized development practices, Nepal can reduce the impact of recurring disasters. Clear guidelines for settlement and infrastructure development are essential for mitigating the risks associated with haphazard construction.

In conclusion, proactive disaster preparedness measures are paramount to Nepal's resilience against natural disasters. By prioritizing secure settlements, implementing reliable early warning systems, and adhering to standardized development practices, the country can mitigate the impact of recurring disasters. The effective collaboration of governmental entities with the participation of the local community is of paramount importance for the successful mitigation of disasters.

The absence of a national early warning policy in Nepal has exacerbated the challenges of disaster preparedness, as highlighted by Dr. Upreti, a climatologist affiliated with Practical Action Nepal. While the weather forecast division issues predictions, these efforts are insufficient without a comprehensive policy framework guiding pre-disaster preparation. Stakeholders note that despite the establishment of the National Disaster Risk Reduction and Management Authority, there has been disproportionate focus on relief and rescue rather than proactive measures. The lack of a master plan for safe settlements further underscores the need for a cohesive national policy to address disaster risk.

Random road construction practices increase vulnerability, particularly in landslide-prone areas. Prioritizing road development often overlooks scientific planning, leading to increased risks of floods and landslides. Experts emphasize the importance of adhering to scientifically guided approaches to infrastructure development to mitigate these risks effectively.

Despite constitutional provisions mandating disaster preparedness, deficiencies persist in Nepal's disaster

response. The focus remains on post-disaster response rather than proactive measures, highlighting the need for a paradigm shift in disaster management strategies. Strengthening disaster management authorities and conducting regular drills can enhance preparedness at all levels. Pre-disaster preparation is crucial for mitigating risks and protecting vulnerable communities. Local disaster management committees, supported by adequate funding, can spearhead preventive measures and improve coordination with relevant authorities. By understanding local geographical conditions and coordinating with relevant agencies, communities can enhance their disaster resilience. Effective disaster management requires a comprehensive approach that considers watershed conditions, soil structure, and land use patterns. By combining forecasts with community-driven disaster management initiatives, Nepal can minimize human and economic losses. Lessons learned from international experience underscore the efficacy of proactive disaster preparedness measures.

In conclusion, proactive disaster preparedness measures are essential to Nepal's resilience against natural disasters. By prioritizing secure settlements, implementing reliable early warning systems, and adhering to standardized development practices, the country can mitigate the impact of recurring disasters. Effective coordination between governmental levels and community involvement are vital for successful disaster management.

5.7. Impact on Agriculture and Livelihood

For farmers like Sunmaya Khing and Radhika Diwali, the decline in agricultural production is not just a theoretical concern but also a harsh reality they confront daily. In Dahachoki, Khing's family had relied on agriculture for generations, but the shifting weather patterns brought about by climate change posed new challenges. Crop diseases, erratic rainfall, and landslides have become increasingly common, making it difficult to sustain productivity.

The landslide that destroyed their homes and farms was a devastating blow, forcing them to relocate to Lele in search of a fresh start. Khing's narrative exemplifies the challenges faced by farmers globally in responding to the impacts of climate change on agricultural production. Uncertain weather patterns, extreme events, and environmental degradation undermine farmers' ability to cultivate crops and raise livestock, jeopardizing their food security and economic well-being.

Radhika Diwali's experience in Makwanpur highlights the challenges facing farmers in Nepal. The annual flooding of the Bagmati River forced her to abandon her village and seek other opportunities. Despite her efforts to maintain agricultural activities, she is increasingly burdened by the demands of climate change and the unpredictability of weather patterns. Like Khing, Diwali faces an uncertain future as she grapples with the consequences of environmental degradation and declining agricultural productivity.

5.8. Addressing the Crisis: Policy Solutions and Community Resilience

In response to these challenges, urgent action is needed to mitigate the impact of climate change on agriculture and ensure the resilience of farming communities. At the policy level, governments must prioritize climate adaptation and mitigation measures, invest in sustainable agricultural practices, and promote climate-smart technologies. Legal instruments such as the Climate Change Policy (CCP) in Nepal play a crucial role in guiding government actions and fostering institutional capacity to address climate-related challenges.

Furthermore, community-based initiatives are essential for building resilience and empowering farmers to adapt to changing conditions. By providing training, resources, and support networks, communities can enhance their ability to withstand environmental shocks and sustain their livelihoods in the long term. Initiatives such as reforestation, soil conservation, and water management are critical for preserving natural ecosystems and enhancing agricultural productivity despite climate change.

The decline in agricultural production amidst the climate change crisis poses a formidable challenge for farmers worldwide. Sunmaya Khing, Radhika Diwali, and countless others are at the forefront of this crisis, grappling with the consequences of environmental degradation and extreme weather events. However, by implementing policy solutions and fostering community resilience, we can mitigate the impact of climate change on agriculture and secure the livelihoods of farming communities for generations to come. As Nepal, the fourth most climate change-vulnerable country in the world, faces major challenges, concerted effort and international cooperation are essential to chart a path toward a more sustainable and resilient future.

6. Conclusion

In the face of escalating climate change impacts, Nepal exemplifies vulnerability amidst a global crisis. Despite its minimal contribution to global emissions, Nepal suffers disproportionately from environmental degradation, which is exacerbated by fragile ecosystems and socioeconomic vulnerabilities. This study illuminates the multifaceted effects of climate change on Nepal and evaluates the efficacy of its policy responses.

Through comprehensive regulations and adaptation methods like the National Climate Change Policy and international partnerships like the Nationally Determined Contribution (NDC), Nepal has demonstrated a proactive approach to addressing climate change. These programs demonstrate how dedicated the nation is to reducing negative effects. However, institutional capacities, implementation gaps, and budget limitations make it difficult to translate these ideas into concrete results.

The impacts of climate change on Nepal affect

various sectors, including agriculture, food security, water resources, public health, and infrastructure. Particularly vulnerable communities bear the brunt of these impacts, necessitating tailored adaptation measures to ensure equitable resource distribution and resilience.

Several industries, including infrastructure, public health, water resources, agriculture, and food security, are all impacted by climate change. The effects are more severe for communities that are already at risk; thus, specific adaptation strategies are needed to ensure that resources are distributed fairly and to increase resilience. A deliberate effort to close the gap between the creation of policies and their implementation is necessary for Nepal to take effective climate action. To effectively handle the problems caused by climate change, institutional capacities must be strengthened, multi-stakeholder cooperation must be encouraged, and implementation mechanisms must be strengthened. Furthermore, it is essential to include social inclusion and gender equality in climate change activities to guarantee fair results and strengthen the voices of excluded people.

The findings of this study emphasize the urgent need for Nepal to enhance the implementation of its climate policies. The research underscores the need to tackle resource constraints and augment institutional capacity by pinpointing the gaps between the formulation and execution of policies. Policymakers, environmentalists, and non-governmental organizations can benefit from the study's conclusions, which can help them create more resilient and successful policies for climate adaptation. In addition, the focus on social inclusion and gender equality offers a framework for ensuring that climate programs are inclusive and equitable and strengthening marginalized and vulnerable communities. The findings of this study contribute to international discussions on adaptation to climate change by offering useful insights for similar situations in other developing countries.

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Authors' Contributions

Tara Nath Ghimire: data collection, draft preparation, and final proofreading.

Dol Raj Kafle: data collection, draft preparation, and proofreading.

Sujata Karki: field reporting, draft preparation, and final proofreading.

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