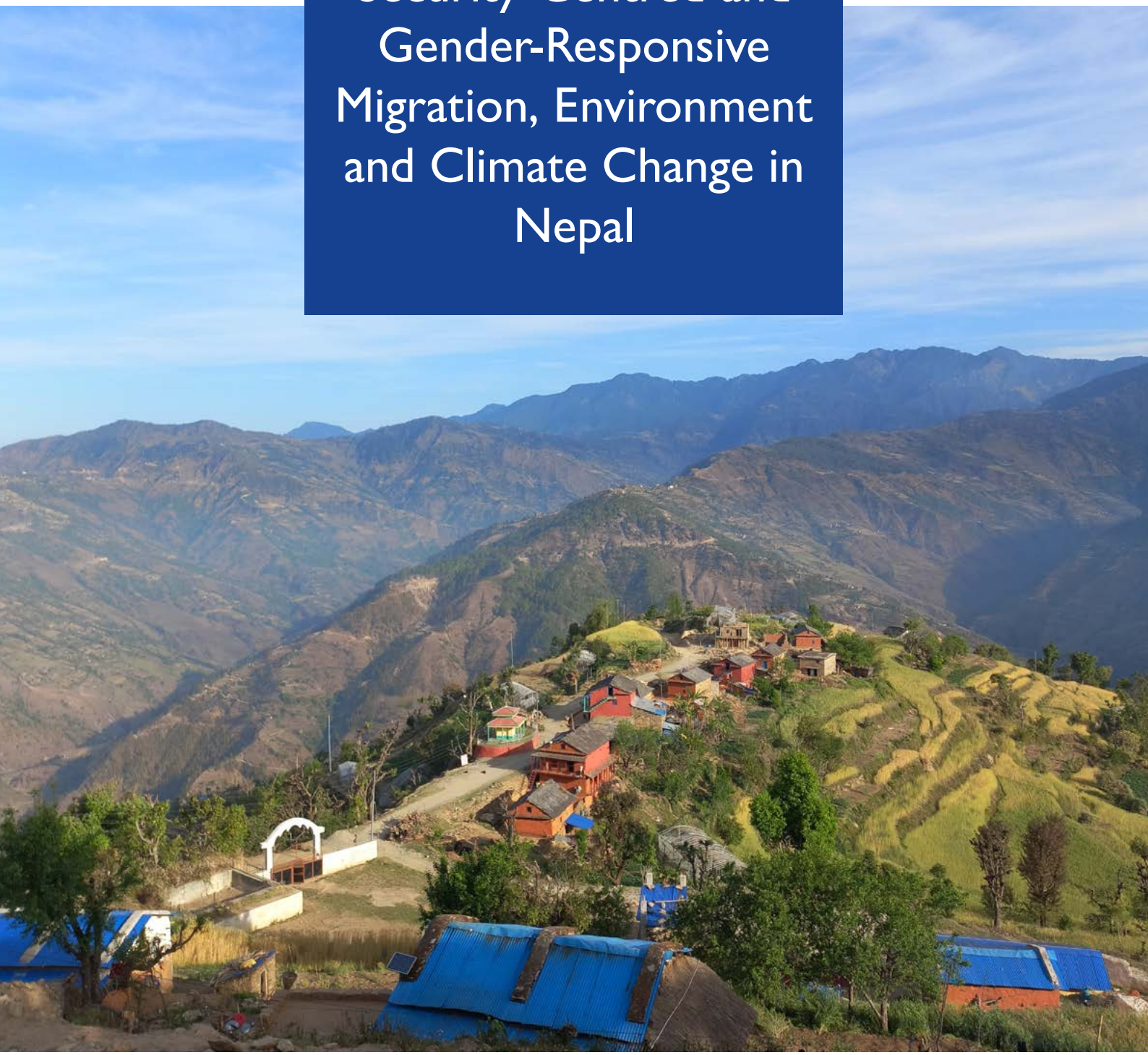
Research on Human Security-Centred and Gender-Responsive Migration, Environment and Climate Change in Nepal



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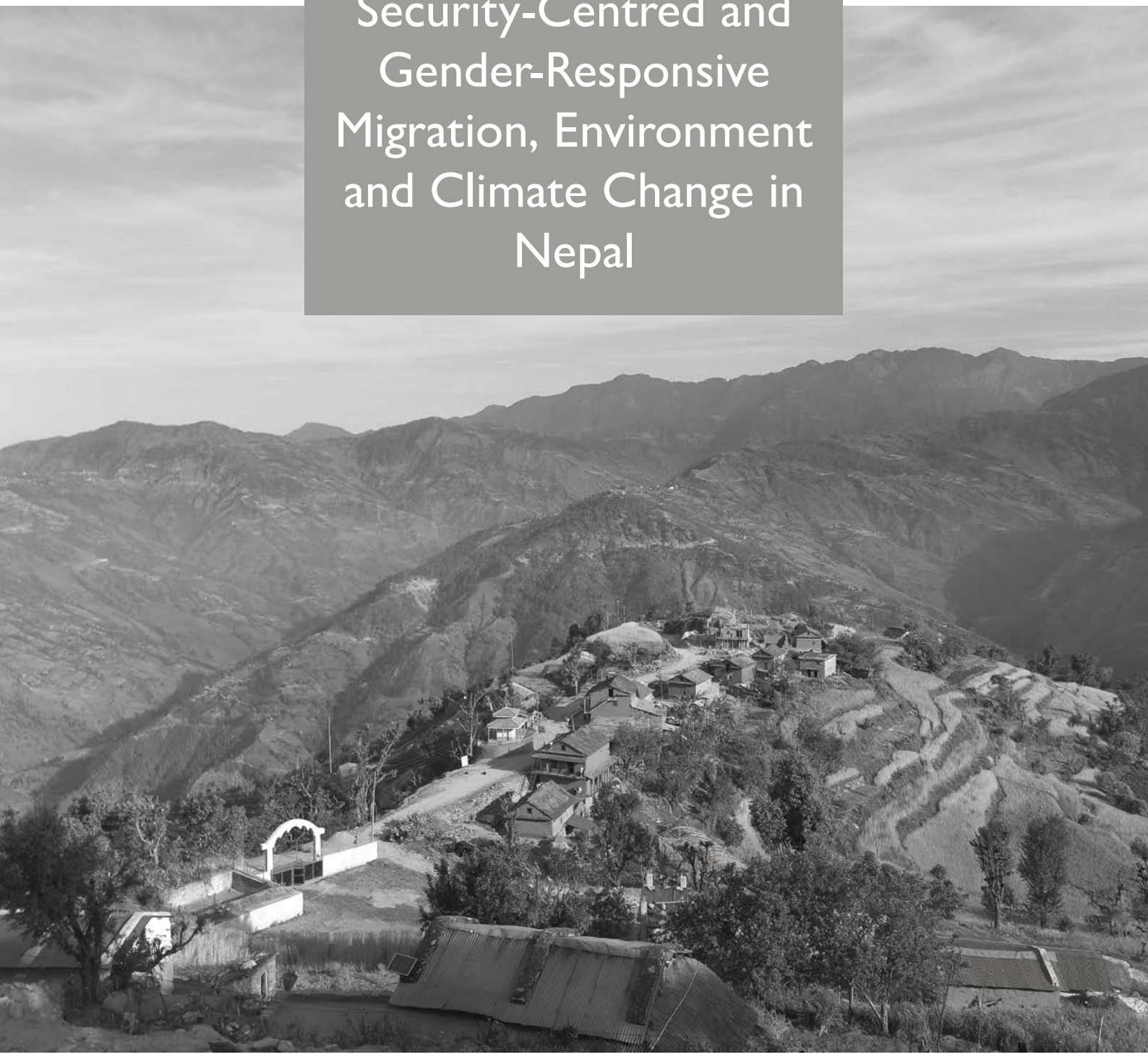

Government of Nepal

Bikas Udhyami

IOM UN MIGRATION

Government of Nepal
Ministry of Labour, Employment & Social Security
Singhadurbar, Kathmandu
Nepal

Ref. No.: 97

Date:- 27th Nov, 2024

Message from the Honorable Minister,

Ministry of Labour, Employment and Social Security.

It is my pleasure to see the research on human-security-centered and gender-responsive migration, environment, and climate change in Nepal published by the International Organization for Migration (IOM).

The research report provides an evidence-based analysis of the migration, environment, and climate change (MECC) nexus in Nepal. This report is intended as a key resource for policymakers and stakeholders involved in shaping national policies.

The Ministry of Labour, Employment and Social Security (MoLESS) acknowledges the need for initiatives to mitigate the adverse effects of climate change and address the drivers and structural factors that compel people to migrate. MoLESS also emphasizes the importance of further research and stakeholder consultations to establish labor migration as a climate change adaptation strategy, fostering collaboration through regional cooperation.

I am confident that the insights presented, and the recommendations made in this report will support the development of future initiatives to promote safe, orderly, and regular migration, ensuring that migration benefits all.

Thanking you,

Sharat Singh Bhandari
Minister

Sharat Singh Bhandari
Minister

Ministry of Labour, Employment and Social Security

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Government of Nepal

Ministry of Labour, Employment & Social Security

Ref. No.: 96

Singhadurbar, Kathmandu
Nepal

Date:- 27th Nov, 2024

Message from the Respected Secretary,

Ministry of Labour, Employment and Social Security.

It is my pleasure to write this message for the research report on human-security-centered and gender-responsive migration, environment, and climate change developed with support from the International Organization for Migration (IOM) and with guidance from the technical working group.

Migration presents both opportunities and challenges; it has become an important adaptation strategy for communities affected by climate stress while also introducing social, economic, and environmental considerations that require thoughtful management. MoLESS is committed to promote research on labor migration as a climate change adaptation strategy.

I firmly believe this report will be useful for policymakers and stakeholders as well as development agencies working to promote safe, orderly, and regular migration.

Thanking you,

Mukunda Prasad Niraula

Secretary

Ministry of Labour, Employment and Social Security

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Foreword by the Chief of Mission

I am pleased to introduce the research report on human-security-centered and gender-responsive migration, environment, and climate change in Nepal, developed with the support of IOM Development Fund. The report is the result of several months of consultations and research, guided by the Technical Working Group (TWG) comprising representatives from the Ministry of Labour, Employment and Social Security (lead ministry), the Ministry of Forests and Environment, the Ministry of Federal Affairs and General Administration, the National Disaster Risk Reduction and Management Authority and the National Planning Commission.

In Nepal, a country marked by diverse landscapes and high climate vulnerability, understanding the migration and climate change nexus is essential for crafting responsive policies and programmes. This research report comes at a pivotal time when the need for climate-resilient and inclusive migration policies is greater than ever.

Nepal's population, particularly in rural and mountainous regions, faces unique challenges stemming from shifting climate patterns, environmental degradation, and limited economic opportunities. These factors often drive migration, as people seek better livelihoods and safer living conditions. Yet, migration presents both opportunities and challenges. While it serves as a critical adaptation strategy for communities impacted by climate stress, it also brings social, economic, and environmental considerations that require careful management.

This report represents a significant step towards developing a comprehensive understanding of the interplay between migration, environmental change, and climate resilience in Nepal. By providing data, insights, and evidence-based recommendations, it aims to support policymakers, practitioners, and community leaders in devising strategies that are both climate- and human-security-centered. Notably, this report emphasizes gender-responsive approaches, recognizing the distinct ways in which migration and climate change impact women and marginalized groups. The findings presented here highlight the critical need to explore solutions for three groups in the context of climate change and environmental degradation: (a) people who wish to move, (b) people who are already on the move or are displaced and (c) people who wish to stay in their place of origin.

I am grateful to the Ministry of Labour, Employment and Social Security for assuming the role of lead ministry in the Technical Working Group and guiding the process from the outset. I sincerely thank all the TWG members for their engagement, guidance and valuable input.

Helene Fors

Chief of Mission

International Organization for Migration

Nepal

ACKNOWLEDGEMENTS

Research on human-security-centred and gender-responsive migration, environment and climate change in Nepal was carried out in close coordination with, and with technical support from, the technical working group comprising representatives from the Ministry of Labour, Employment and Social Security (lead ministry), the Ministry of Forests and Environment, the Ministry of Federal Affairs and General Administration, the National Disaster Risk Reduction and Management Authority and the National Planning Commission.

The research report was drafted by a team of researchers from Bikas Udhyami: Sanjay Sharma (lead researcher), Nani Maiya Sujakhu and Sailesh Ranjitkar.

This study would not have been possible without the dedicated guidance of Pratistha Pyakurel and Dipina Sharma Rawal. We thank the IOM Headquarters research team and the IOM regional expert team who took the time to review the work and provide inputs at various stages of the report.

The research team is deeply grateful to the respondents who agreed to participate in this study. We thank the representatives from Sanfebagar Municipality, Krishnapur Municipality, Mahabu Rural Municipality and Khandachakra Municipality.

Special thanks to Simon Hay for copy-editing the report and Print Communications for designing the report layout.

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BIPAD	Building Information Platform Against Disaster
CBO	community-based organization
CMIP	Coupled Model Intercomparison Project
COVID-19	coronavirus disease 2019
CSO	civil society organization
DPRP	disaster preparedness and response plan
DRR	disaster risk reduction
EIA	environmental impact assessment
EPA	Nepal's Environment Protection Act (2019)
FGD	focus group discussion
HDI	Human Development Index
HPI	Human Poverty Index
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LGBTIQ+	lesbian, gay, bisexual, transexual, intersex and queer
KII	key informant interview
MECC	migration, environment, and climate change
NAP	Nepal's National Adaptation Plan (2021–2050)
NDRRMA	National Disaster Risk Reduction and Management Authority
NGO	non-governmental organization
NPR	Nepalese rupees
NSO	National Statistics Office
RCP	representative concentration pathways
SPEI	Standardized Precipitation Evapotranspiration Index
SSP	shared socioeconomic pathway

People bringing fodder to their homes from the nearest forest in Mangalsen, Achham.
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EXECUTIVE SUMMARY

Climate change is a significant global challenge, with a particularly strong impact on Nepal due to its fragile ecosystem, topographic variations and dependency on climate-sensitive sectors like agriculture, water and forestry (World Bank et al., 2011). Women and marginalized social groups, especially uneducated Dalit women, are severely impacted by climate change due to their limited access to resources and low adaptive capacity. The Karnali and Sudurpashchim provinces, characterized by their geographic diversity and socioeconomic challenges, are especially vulnerable. These areas face a range of climate-related threats including water scarcity, floods, landslides and food insecurity, further exacerbated by poverty and limited access to basic services. They are also among Nepal's key migrant origin regions (Bhattarai et al., 2023).

Research methodology

This study was conducted in four local government areas spanning four districts and two provinces:

1. Karnali Province
    (a) Mahabu Rural Municipality (Dailekh district)
    (b) Khandachakra Municipality (Kalikot district)
2. Sudurpashchim Province
    (c) Sanfebagar Municipality (Achham district)
    (d) Krishnapur Municipality (Kanchanpur district).

Krishnapur is a municipality in the Tarai plains, while the remaining three districts are in hilly areas. The research employed a mixed methods approach, combining both qualitative and quantitative methodologies to comprehensively explore the linkages between gender, migration, environment and climate change. In-depth interviews, key informant interviews (KIIs) and focus group discussions (FGDs) were conducted to gather qualitative data. To provide quantitative data, a household survey was also carried out, with a sample size of 399 households, a confidence level of 95 per cent and a margin of error of 10 per cent.

Major findings

Characteristics of respondents

Across the four municipalities, the majority of respondents were female heads of households (n=349). The high proportion of women-led households is due to men's outmigration.

The current level of educational attainment in the surveyed municipalities falls significantly short of the national averages. National and international standards typically aim for universal primary and secondary education, yet many respondents, particularly women (53%) and Dalits (73%), lack any formal education. For instance, in Mahabu, 64 per cent of respondents have no formal education, and in Sanfebagar, 53 per cent of women fall into this category. Higher education attainment is scarce across all groups, with men slightly more represented than women. These disparities can be attributed to limited access to educational institutions, socioeconomic constraints prioritizing immediate work over education, and cultural attitudes, especially towards women's education. This educational deficit is particularly detrimental to Dalit women, who face compounded disadvantages, limiting their opportunities both locally and in potential migration scenarios.

Environmental stressors and human mobility

The respondents perceived significant environmental changes in the past decade across four municipalities with increase in environmental stressors like droughts, deforestation and heat, particularly in Khandachakra, Krishnapur and Sanfebagar: 98 respondents in Khandachakra and Krishnapur reported perceiving environmental changes, compared to 54 in Mahabu. All municipalities report decreases in water sources and rainfall, with the most notable declines in Krishnapur and Sanfebagar.

Respondents perceived a decrease in rainfall (271 responses), and water sources rapidly drying up, resulting in a decrease in the number of water sources (226). Rising temperatures (219), droughts (231) and deforestation (144) were also widely reported, suggesting significant concern about environmental degradation.

Altogether, 959 responses were documented mentioning various stressors due to environmental changes. Environmental stressors like erratic precipitation (delayed monsoons: 37; dry conditions: 27; heavy rain: 13), temperature fluctuations (cold spells: 27; hot weather: 55) and extreme weather events (droughts: 33; unpredictable weather: 26; and strong winds: 52) are disrupting traditional farming practices and depleting livelihood options across the study areas. A consistent grouping of changes in rainfall patterns, water scarcity, crop losses and increased human–wildlife conflicts was reported by 127 respondents, identifying a cycle of environmental degradation and socioeconomic vulnerability.

The degradation of agricultural lands and the risks posed by extreme weather events have prompted many to migrate in search of better living conditions, leading to further socioeconomic challenges in both migrant sending areas (all four municipalities) and migrant receiving areas (primarily Krishnapur). Migration decisions are influenced by a combination of environmental stressors and socioeconomic factors such as rapid onset disasters, economic disparities and lack of local facilities such as education and health-care access. While migration provides financial benefits, it also poses emotional and social challenges, highlighting the sacrifices made in pursuit of a better future, often severely increasing the burdens carried by women who stay back.

Women's migration is influenced by gender roles and societal attitudes. Migration offers economic opportunities and fosters self-reliance among women, but it also poses significant challenges and reflects broader structural inequalities.

The lack of sufficient job opportunities within the resident municipalities compels some local residents to seek employment elsewhere, including through internal migration to places like Surkhet, Dhangadhi and Kathmandu, seasonal migration to India, and foreign employment to other countries. Findings from both the qualitative and quantitative studies indicate a strong preference among residents to remain in their villages if it were possible to achieve a comparable income locally. Mahabu and Krishnapur demonstrate higher rates of residents choosing to stay, benefiting from robust potato production and favourable proximity to India for seasonal work opportunities. In contrast, Khandachakra and Sanfebagar face greater challenges, with potential income sources like pine resin tapping and wild mushroom harvesting underutilized due to infrastructure and technical limitations.

These findings about migration highlight the crucial role of economic development initiatives and climate-smart adaptation measures in fostering local employment opportunities and potentially reducing the need for outmigration and undressing the concerns of the population staying back.

Policy analysis

Nepal's federal, regional and local environmental and disaster-related policies need to recognize the impact that climate change and environmental degradation have on migration and gender relations and vice versa. Environmental stressors such as erratic rainfall and increased flooding – seen in places like Krishnapur and Sanfebagar – compel populations to migrate in search of safer conditions; yet migration can also exacerbate environmental pressures, as communities might adopt unsustainable practices in new locations. This reciprocal relationship underscores the need for cohesive policies that integrate climate change resilience and migration strategies, enabling governments to better prepare communities for climate impacts while promoting sustainable development.

The existing policy landscape of Nepal at the national, provincial and local levels do not integrate migration, environment and climate change (MECC). Consequently, the climate-related and migration-related policies are in silo. For instance, policies that directly confront the issues of climate change and environmental degradation – such as the National Climate Change Policy, the National Adaptation Plan, the Employment Policy, the Environment Protection Bill (Karnali Province), the Disaster Preparedness and Response Plan (Khandachakra Municipality) and the Disaster Management Fund Operation Procedure (Sanfebagar Municipality) – emphasize the importance of integrating climate adaptation into development planning. This includes enhancing adaptive capacity and resilience across vulnerable sectors, and prioritizing climate-adaptive technologies and sustainable practices in agriculture and others. However, these policies overlook the unique challenges faced in such situations by displaced, trapped, or immobile households and communities.

Furthermore, some policies may not adequately consider the needs of marginalized populations. For example, the Disaster Management Fund Operation Procedure across municipalities excludes internal migrants due to residency requirements (such as a migration certificate or citizenship issued through the respective administration office) and lacks sufficient focus on the specific needs of women and girls from migrant families or trapped populations and other marginalized groups such as people with disabilities.

Climate-smart adaptation strategies and technologies

Climate-smart technologies are crucial to mitigate the adverse impacts of climate change and enhance resilience. In the study areas, some climate-smart technologies are being adopted at the government and community level, but much remains to be done. The effective use of technologies can help household members who stay back. Currently, household surveys clearly demonstrate a significant workload increase after the outmigration of a member of the household. Respondents with a household member who had outmigrated reported an average increase in daily work time of 3.1 hours in Khandachakra, 4.9 hours in Krishnapur, 6 hours in Mahabu and 4.5 hours in Sanfebagar.

Climate-smart technologies used in the studied municipalities include small irrigation systems, water extraction pumps, solar technology and fuel saving stoves. Results suggest that Khandachakra and Krishnapur municipalities have a higher adoption rate of both climate-smart and women-friendly technologies (such as filters, rice cookers and food blenders) compared to Sanfebagar. Use of such technologies appears to be lower in Mahabu Rural Municipality. Such technologies ease the workload of women managing homes during male outmigration. Despite these efforts, sociocultural barriers and financial constraints limit broader adoption.

Engagement of mobile populations and existing mechanisms promoting their participation

The involvement of locals in climate change adaptation programmes is vital for their success and sustainability. Among the range of local stakeholders are returnee migrants, who bring back not just financial remittances (money), but also social remittances (skills). Leveraging the skills, experiences and finances of the returnees could boost the agricultural and economic development of the community. An elected male representative of Mahabu mentioned that his ward is engaging with returnees in order to use their skills and investment in the agricultural sector.

However, engaging migrants and local populations in climate change adaptation has several challenges. Most of the local residents across the four municipalities were largely unaware of both climate change-related and migration-related programmes at the local level. Such lack of awareness also hinders inclusivity and meaningful participation.

Past programmes have not always addressed community needs, with former participants across the four municipalities feeling they were irrelevant or lacked follow-up. For instance, a training programme on vegetable farming in Krishnapur was organized, but no follow-up was done, resulting into skill loss. Often, such government programmes are of most benefit to members of the communities who are already better off. Programmes have not been able to provide opportunities to socially excluded groups such as marginalized women, women receiving remittances, Dalit households and trapped populations. This lack of equitable access to the opportunities granted by such programmes remains a problem.

Furthermore, the research findings highlight the crucial role that indigenous knowledge plays in climate change adaptation. Interviewees across the study areas emphasized that local knowledge is rapidly disappearing and stressed the importance of reviving local practices to enhance climate resilience. For example, traditional practices like planting Amriso (tiger grass) and managing kitchen gardens using animal manure show significant potential in mitigating climate impacts.

Recommendations

The following recommendations are proposed, based on the research.

Targeting people who choose to move

The federal government, in collaboration with provincial and local governments, should develop targeted support mechanisms to promote safe, regular and orderly migration, such as skill development programmes, information campaigns and microfinancing options. Governments should recognize migration as a viable adaptation strategy. Facilitating safe, orderly and regular migration pathways allows communities to leverage remittances to enhance human security and support climate adaptation efforts both in migrant-sending and migrant-receiving areas. Prospective migrants across the four municipalities reported that they have limited access to such information and training programmes. The non-governmental sector can join in to provide technical and related expertise.

Targeting people who choose to stay

Government initiatives should prioritize the creation of sustainable livelihood opportunities in rural areas to reduce overreliance on climate-sensitive sectors and mitigate the drivers of outmigration. This may involve promoting climate-smart agriculture, sustainable forestry and agroforestry practices, ecotourism and renewable energy enterprises. KII participants

stressed the need to promote such livelihood options. Furthermore, local government and NGOs, including CSOs and CBOs, should encourage the adoption of modern farming techniques, such as the use of polyhouses and tractors, to increase productivity and reduce labour dependency. As per the adaptation needs of the locals, the federal government should spearhead this through related plans, policies and programmes, while implementation should be the responsibility of local governments.

Targeting people on the move or displaced because of climate change

Implement measures to address environmental stressors such as deforestation, soil degradation, water scarcity and erratic weather patterns that are driving migration in the region. Develop targeted programmes for those displaced by climate change, environmental degradation, or associated disasters. These vulnerable groups require immediate assistance as well as long-term support linking to livelihood opportunities and durable solutions, such as returning to their places of origin, integrating into current communities, or relocating with participatory decision-making involving affected households and government coordination. This can be spearheaded by provincial and local level governments with the support of the federal government and could include reforestation programmes, sustainable agricultural practices, water conservation initiatives and disaster risk reduction (DRR) measures.

Targeting local-level enterprises

The governmental and private sector should come together to introduce diversified livelihood options, such as skill development programmes, small-scale industries and ecotourism initiatives so that more opportunities can be created at home for those wishing to stay or for returnee migrants. Such enterprises can also lead skills training initiatives for prospective migrants.

For environment-friendly infrastructural development.

One reason for high rates of outmigration is the lack of infrastructural support in place. Therefore, governments should invest in improving local infrastructure, including education, health-care facilities and employment opportunities. To take development hand-in-hand with environmental measures and ensuring that infrastructural development does not create additional environmental degradation, local governments should work with the provincial and federal governments. The technical expertise of returnee migrants who have worked in the construction sector would be of help.

Empowering local governments

The federal government should strengthen the capacities of provincial and local governments through tailored capacity-building programmes that address the intersection of climate adaptation, environmental degradation and migration, thereby promoting human security. These programmes should target returnee migrants, those who stay back (especially women receiving remittances and marginalized communities), prospective migrants and individuals at risk of getting displaced.

An abandoned house after a flood in the Budhiganga river in Sangabagar, Achham.
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1

INTRODUCTION

1. INTRODUCTION

1.1. BACKGROUND

Climate change is increasingly recognized as a threat multiplier, exacerbating existing vulnerabilities and exerting profound impacts on the environment, livelihoods and human security (Goodman and Baudu, 2023). These impacts are particularly severe in communities that lack the necessary resources and adaptive capacity to respond effectively. Human mobility, including migration, both intra-State and internationally, has emerged as a common strategy employed by individuals and households to mitigate the adverse effects of climate change and environmental stressors (Salick and Byg, 2007; Sujakhu et al., 2016). A household member (or members) migrating can significantly alter gender roles within the household, especially in patriarchal societies where migration is perceived as an option only or primarily available to men (Maharjan et al., 2020). In countries like Nepal, where human mobility is deeply intertwined with livelihoods on social, economic and historical levels, the nexus between migration, environment and climate change (MECC) is complex and often poorly understood (IOM, 2017).

The study acknowledges that migration – even when undertaken as a climate change adaptation strategy – can still create socioeconomic vulnerabilities that require integrated policy solutions centred on community capacity-building. Recent studies have highlighted the impacts of environmental stressors – including droughts, floods and forest fires – on livelihoods and human mobility (Bista et al., 2021; Pokhrel et al., 2021). Migration remains a key strategy for households in these regions to diversify income in light of climate change pressures, but it also creates several vulnerabilities specific to gender roles (Maharjan et al., 2020; Sujakhu et al., 2016). Migration not only exacerbates gender role imbalances, with women who stay behind facing additional household burdens; it also creates opportunities, by providing women with more political and socioeconomic independence. Reflecting on these diverse outcomes, this research uses a mixed methods approach to understand, analyse and formulate concrete policy recommendations for gender-responsive and human-security based approaches to address the human mobility consequences of climate change in Nepal's Sudurpashchim and Karnali provinces.

In this research, key terms are defined based on established frameworks such as those provided by United Nations bodies, including the International Organization for Migration (IOM). As described by the Intergovernmental Panel on Climate Change (IPCC), climate change "refers to any change in climate over time, whether due to natural variability or as a result of human activity" (UNFCCC, 2011:1). IOM considers human mobility as "a generic term covering all the different forms of movements of persons," including various forms of human mobility such as tourism, which is not encompassed by the term migration (IOM, 2019a). Migration, according to the IOM, involves "the movement of persons away from their place of usual residence, either across and international border or within a State (IOM, 2019a). It encompasses various forms including cross-border, international and internal movement, and movement that is voluntary or displacement due to conflict, threats, or environmental factors. Human security, as defined by the United Nations, is "the broad range of conditions that threaten the survival, livelihood and dignity of people and their communities, particularly those who are most vulnerable" (United Nations, 2016:7). Taking a gender-responsive approach ensure that the distinct needs, roles and experiences of individuals based on their gender are considered in policies and interventions.

Additionally, there are other climate, weather and environmental conditions not specifically delineated in the above definitions, such as pollution, climate impact, environmental and weather conditions, humidity, wind and the Standardized Precipitation Evapotranspiration Index (SPEI).[1] These categories of environmental stressors are considered in this research because of their relevance to the study area.

1.2. THE RATIONALE OF THE RESEARCH

This research as collaboratively undertaken, with guidance from the technical working group comprised of the National Planning Commission, the Ministry of Federal Affairs and General Administration, the Ministry of Forests and Environment, the Ministry of Labour, Employment and Social Security and the National Disaster Risk Reduction and Management Authority (NDRRMA), and with the support of IOM. The study unravels the complexities that define these vulnerable regions. It includes a specific focus on gender dynamics, human security threats and the integration of climate-induced human mobility into national policies, and generates insights that can catalyse policy changes at both governmental and individual levels. By offering evidence-based recommendations, this research informs policies that are responsive to the unique challenges faced by the communities in Sudurpashchim and Karnali, ultimately fostering resilience and contributing to the well-being of the population in the face of the multifaceted impacts of the MECC nexus.

1.3. RESEARCH OBJECTIVES

The following are the detailed objectives of the research:

- Investigate the various dimensions of human mobility induced by both abrupt and gradual environmental changes. Assess the impact of environmental stressors on the occurrence of forced migration, examining how these dynamics manifest in different regions and communities.
- Evaluate the use of resilient and climate-smart technologies and adaptation measures designed to alleviate the challenges faced by women and spouses remaining in their homes due to migration. Examine consumption patterns and the willingness to adopt potential technologies and adaptation measures that reduce drudgery and enhance resilience.
- Investigate the engagement of mobile populations, specifically focusing on vulnerable groups such as people with disabilities, ethnic minorities, LGBTIQ+ people and ultrapoor households in government-led development projects and climate change adaptation programmes.
- Examine the extent to which considerations of climate-induced human mobility are incorporated into existing national policies and frameworks. Identify gaps and shortcomings in the current policy landscape and explore potential models or approaches from other regions that could serve as benchmarks for Nepal.

1.4. RESEARCH QUESTIONS

Aligning with the research objectives, the following are the research questions. Annex 2 shows the forms that these research questions took when put into practice in questionnaires, interviews and other research tools.

Mobility dimensions and environmental stressors

- What are the primary environmental stressors (droughts, water scarcity, floods, forest

1 SPEI captures the main impact of increased temperatures on water demand. For more, see Vicente-Serrano and NCAR, n.d.

fires, landslides) in Karnali and Sudurpashchim provinces that contribute to sudden and slow onset changes and that affect human mobility? How do they manifest in different regions and communities?
- How do these environmental stressors impact forced migration within the researched areas and local governments?

Resilient and climate-smart technologies and adaptation measures for women and spouses who stay behind

- What innovative climate-smart technologies and adaptation measures are currently available or in development to alleviate the burdens faced by women and spouses who stay behind, and to what extent are they effective?
- What innovative climate-smart technologies and adaptation measures are women and spouses staying behind willing or wishing to adapt? What are the sociocultural barriers to their adoption and success, and what are the facilitators?

Engagement of mobile populations (including vulnerable groups such as people with disabilities, ethnic minorities, LGBTIQ+ people and ultrapoor households) in development and climate change programmes

- How actively are mobile populations engaged in government-led development initiatives and climate change adaptation programmes in Karnali and Sudurpashchim provinces?
- What are the existing mechanisms or platforms facilitating the participation of mobile populations in these programmes? What are the perceived barriers to effective engagement? What improvements can be made?

Integration of climate-induced human mobility in national policies

- To what extent are climate-induced human mobility considerations integrated into Nepal's existing national policies and frameworks?
- What are the gaps or shortcomings in the current policies regarding the inclusion of climate-induced human mobility, and how might these be addressed?
- What successful models or approaches from other countries or regions could serve as benchmarks for Nepal in integrating climate-induced human mobility into its policies and frameworks?

1.5. THEORETICAL FRAMEWORK

Human security remains key in the time of climate change, in which the most vulnerable populations are threatened by multiple hazards spanning the environmental, socioeconomic and political aspects of human life. The United Nations General Assembly has highlighted seven types of human security: food, health, environmental, personal, community, political and economic (United Nations, 2016:7). Climate change has the potential to negatively affect all these, and to affect human and non-human lives with varying degrees of impact. Climate vulnerabilities include both environmental aspects – such as the occurrence of disasters posing a threat to human lives –and other aspects, such as lack of food security because of low agricultural productivity or increased human–wildlife conflict. Adger et al. (2014:759) define human security "as a condition that exists when the vital core of human lives is protected, and when people have the freedom and capacity to live with dignity". Adger's definition includes aspects of freedom and capacity that are similar to those addressed by capability theorists such as Amartya Sen.

Using Sen's approach, de Haas (2021) explains the capability to migrate. The traditional understanding of migrants as male, autonomous and rational calculative agents has long

been discredited. Current migration theory analyses the various social, cultural and political aspects brought into play in decision-making about whether to migrate or not. The field of migration studies has been further enriched by incorporating migrant identities, subjectivities and lived experiences into theory building.

Further expanding on the capability approach in the context of climate risks, Mallick and Schanze (2020) use the categories of capability and aspiration, with regard to the decision to move or to stay, to identify four population groups: voluntary migrants; voluntary non-migrants; forced (involuntary) migrants; and involuntary non-migrants (trapped populations). Voluntary migrants have both the capabilities and the aspiration to migrate, whereas voluntary non-migrants have the capability to move but no aspiration to do so. Involuntary migration, in their terminology, refers to the situation of people who do not have the aspiration to migrate, but nonetheless find themselves forced to move. Here, the capability to migrate does not play a deciding role because of various factors that compel their mobility. Lastly, involuntary non-migrants are the trapped people who do not have the capability to migrate despite having the aspiration to do so. Multiple factors contribute to the aspiration and capability to migrate (Mallick and Schanze, 2020). Using the capabilities framework, this research considers all four of these types of human mobility (including non-movement), and analyses the factors that determine the capability to migrate.

1.6. MIGRATION AS A PHENOMENON

People from across Nepal are on the move for a variety of reasons. The trend of outmigration from Nepal has always received greater attention than internal migration. Unlike the other three municipalities that are a part of this research, Krishnapur is not just a migrant-origin district, but also a migrant-destination one. Though Khandachakra and Sanfebagar are home to some in-migrants, mostly from the district and nearby areas, the rate of in-migration in Krishnapur is much higher. For instance, according to the National Census of 2021, Krishnapur's population showed an increase of more than one fourth in a decade (2011–2021) while Khandachakra's population increased by about 10 per cent. Krishnapur ranks forty-sixth nationally in terms of proportion of population gain and fifty-third in terms of net population gain. Interestingly, during these 10 years, Sanfebagar's population decreased by almost one fourth. In terms of the proportion of population decline, Sanfebagar is the highest among urban municipalities and fourteenth across Nepal after 13 rural municipalities. In terms of net population decrease, Sanfebagar is third nationally. Mahabu's population also decreased by about 6 per cent between 2011 and 2021.

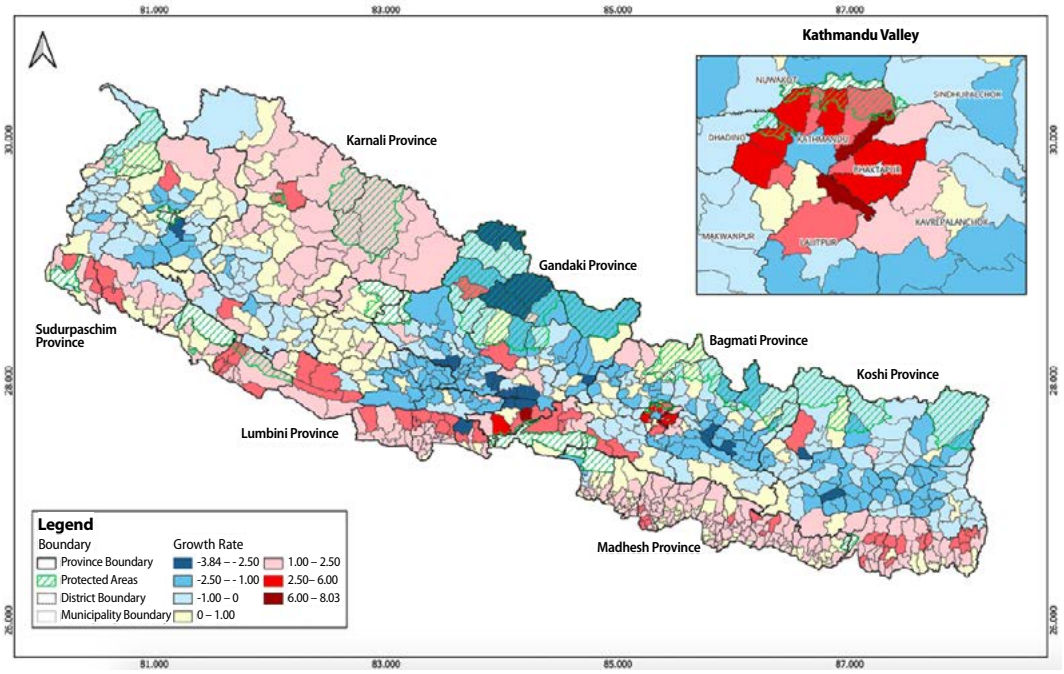
Table 1. Population difference across municipalities

Total population	2011	2021	Difference	Percentage
Sanfebagar	33 788	25 891	−7 897	−23.37%
Mahabu	19 277	18 059	−1 218	−6.32%
Krishnapur	56 643	71 500	14 857	+26.23%
Khandachakra	20 288	22 274	1 986	+9.79%

Source: CBS, 2011; NSO, 2021.

The following map suggests that Sanfebagar is among the very few municipalities that has experienced a negative population growth in recent times (between 2011 and 2021).

Figure 1. Population variations across local governments



Source: NSO, 2024:27.

Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the IOM.

1.7. REVIEW OF THE LITERATURE

Nepal, with its diverse topography ranging from high mountains to sub-tropical plains, faces both ecological abundance and environmental threats (MoFE, 2021). As illustrated by the NDRRMA Building Information Platform Against Disaster (BIPAD) (NDDRMA, n.d.), the country contends with seismic activity, epidemics, fires, floods, landslides and climatic hazards, compelling diverse natural resource-based livelihood strategies. Nepal's climate is heavily influenced by the Himalayan range and the South Asian monsoon, resulting in marked variations in temperature and rainfall across short distances (Bagale et al., 2023). The country receives an average annual rainfall of about 1800 millimetres, with notable temporal variations from east to west and south to north (Baniya et al., 2019). The eastern and central regions generally experience higher rainfall compared to the western areas (Karnali and Sudurpashchim) of the country. Temperatures range from tropical heat in the Tarai to cooler temperatures in the Himalayas and other mountains, with an average temperature decrease of 6°C for every 1,000 metres of altitude gain (Thakuri et al., 2019). Nepal's unique geological, topographic and hydrometeorological features expose it to frequent and severe natural hazards. The Nepal Climate Vulnerability Study Team (NCVST, 2009) highlights the impact of "far-off climate-related" events on local conditions, leading to extreme events like floods, droughts and forest fires.

Agriculture remains the predominant livelihood in Nepal, engaging 60 per cent of the population, including a significant percentage of women and men (Slavchevska et al., 2020). The slow modernization of agriculture and reliance on manual labour has led to income source diversification, with migration emerging as a crucial strategy (Chhetri et al., 2023). Migration, deeply ingrained in Nepalese society for centuries, serves as a supplementary income source and a response to climatic hazards, as well as to political and economic changes and disasters. The impact of migration and climate change has been profound, especially in affecting gender roles and relations (IOM, 2019b). With men largely migrating outside the household for income generation, decision-making has gradually shifted to

women. However, the shift is slow because of the resistance posed by the patriarchal nature of society that has allowed women limited power over resources and decisions.

Zhou and Chi (2024), in their review, documented various types of environmental stressors by categorizing them based on the underlying forces:

- Disaster-related stressors refer to sudden-onset environmental events that occur over a short period and have significant consequences for people and their property. Examples include earthquakes and forest fires.
- Precipitation-related stressors encompass environmental measures related to precipitation, including rainfall amount and frequency, monsoon delays, droughts, floods and drying up of water resources.
- Temperature-related stressors refer to temperature metrics in the form of absolute values, extremes and anomalies. These include heat waves, cold waves, hotness and coldness.
- Land-related stressors refer to environmental measures that impact the land and soil. These include damaged land, deforestation, desertification, land and soil erosion and degradation, land quality, landslides, soil pollution and soil salinization.
- Loss-related stressors refer to environmental measures related to economic losses from events like crop failure, livestock loss and property damage.

A study by Bista et al. (2021) focusing on the Sudurpashchim and Karnali provinces underscores pronounced drought variations in agricultural areas, signifying heightened vulnerabilities compared to other land cover zones. Additionally, Pokhrel et al. (2021), in their study focusing on flood-prone areas in the lower Karnali River Basin, document risk management measures and advocate for robust disaster management plans. Given the recurrent impact of extreme weather on agricultural output, it is plausible that individuals seek alternative livelihood sources. These studies contribute valuable insights, urging further academic exploration to inform comprehensive policies and strategies for sustainable development in these regions.

1.7.1. The migration–environment–climate change–gender nexus in Nepal

The MECC nexus has significant gender dimensions that cannot be overlooked. People of all genders experience the impacts of environmental degradation and climate change differently, and their migration patterns and experiences are shaped by prevailing gender norms, roles and power dynamics (IOM, 2017).[2]

In Nepal, women's livelihoods are deeply intertwined with natural resources, as they traditionally play a significant role in agriculture, forestry and water management (IOM, 2019b). The impacts of climate change – such as droughts, floods and land degradation – disproportionately affect women, who often bear the burden of securing food, water and fuel for their households (Sujakhu et al., 2016; Maharjan et al., 2020). When environmental stressors disrupt traditional livelihoods, migration becomes a coping strategy for both people of all genders. However, gender norms and societal expectations often influence migration patterns and experiences. In many cases, and especially in heteronormative households, men migrate in search of employment opportunities, while women stay back to assume

2 While the original goal of this research was to analyse and address the experiences of migrants and non-migrants of all genders, the closed nature of Nepalese society and the deeply entrenched gender norms meant that only data regarding the experiences of male and female migrants and non-migrants could be obtained. Data concerning the experiences of migrants and non-migrants with diverse gender identities was not available. For this reason, the analysis and conclusions of this report are only able to address the experiences of male and female migrants and non-migrants.

additional responsibilities in managing households and farms and caring for members of the household (IOM, 2019b).

The patriarchal and heteronormative social framework means that the absence of men due to migration can exacerbate women's workloads and increase their vulnerability to various forms of exploitation and abuse (Rao et al., 2019; Chhetri et al., 2023). Additionally, women who migrate independently often face gender-specific challenges such as limited access to resources, discrimination and increased risks of exploitation and gender-based violence (IOM, 2017). It is crucial to recognize that women are not merely passive victims of environmental change and migration; they also play active roles in adapting to these challenges. Maharjan et al. (2020) highlight instances where women have taken on non-traditional roles and decision-making responsibilities in the absence of their migrant husbands, fostering their empowerment and resilience.

Addressing the gender dimensions of the MECC nexus requires a holistic approach that considers the different and intersecting challenges faced by people of all genders, and promotes their active participation in decision-making processes related to climate change adaptation, migration policies and development strategies (IOM, 2017). Gender-responsive policies and interventions are crucial to ensure that the specific needs, vulnerabilities and capabilities of people of all genders are recognized and addressed, ultimately contributing to more equitable and sustainable outcomes.

1.7.2. Migration in the time of climate change

Climate change has emerged as a significant driver of migration, both internally and across borders. The adverse effects of climate change – such as rising temperatures, erratic rainfall patterns, droughts, floods and other extreme weather events – have disrupted traditional livelihoods and threatened human security, compelling individuals and communities to seek alternative means of survival (IOM, 2017).

In the context of Nepal, climate change has exacerbated existing environmental stressors, leading to a decline in agricultural productivity and increased food insecurity, particularly in rural areas. Sujakhu et al. (2016) and Maharjan et al. (2020) highlight that migration serves as a crucial adaptation strategy for households in climate-sensitive regions, enabling income diversification and reducing vulnerability to environmental shocks. However, migration itself can create socioeconomic challenges, particularly for those staying back, often women and children, who bear the brunt of additional household responsibilities (IOM, 2019b). The nexus between climate change, environmental degradation and migration is complex and multidimensional. Chhetri et al. (2023) underscore the intricate interplay between forest resources, agricultural practices and migration patterns in the middle hills of Nepal, where deforestation and declining agricultural yields have contributed to outmigration. Moreover, the impacts of climate change on migration are not uniform across regions, communities, families and individuals, as they are influenced by various socioeconomic, cultural and political factors (IOM, 2017).

As climate change intensifies, migration is likely to become an increasingly prominent adaptation strategy, particularly in regions where traditional livelihoods are heavily dependent on natural resources. However, it is crucial to recognize that migration is not a panacea and can create new vulnerabilities and challenges for both migrants and their communities of origin (Maharjan et al., 2020).

There are various forms of migration observed in Nepal, particularly labour migration, among which the most common are internal migration; seasonal or cyclic migration that mostly

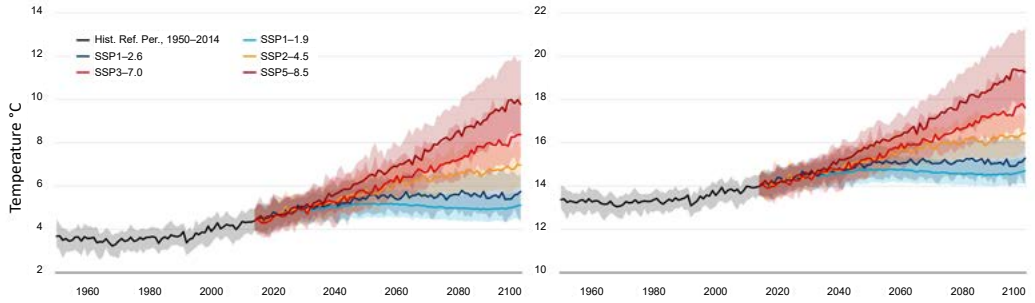
happens to India; and foreign employment in countries beyond India. Internal migration is the most overlooked form of migration in Nepal, from both policy and practice perspectives. The movement of Nepalese people within the country happens for various reasons (such as employment, education and marriage), but the great attention paid to international migration for employment and study has meant that other forms of migration are often overshadowed. Seasonal migration is a traditional practice in Karnali and Sudurpashchim, where Nepalese people travel to India for work opportunities, typically in agriculture, during specific seasons (Bhattarai et al., 2023; Sharma et al., 2014; Thieme, 2006).

Unlike foreign employment, seasonal migration does not require passports or extensive legal procedures. This temporary movement is often considered part of local mobility and is not formally recorded. For local residents, it is a normal part of their life cycle (Sharma, 2007). In contrast, foreign employment refers to long-term migration to other countries for employment opportunities. Foreign employment typically involves stricter legal procedures, potentially requiring passports, visas and work permits. The challenges and considerations associated with foreign employment differ significantly from the highly informal and unregulated seasonal migration (Bhattarai et al., 2023; Sharma et al., 2014).

1.7.3. Provincial mean surface temperature changes in Karnali and Sudurpashchim provinces

Using data from the World Bank Climate Knowledge Portal, the graphs in Figure 2 show historical and projected changes in mean surface temperature (°C) relative to the baseline period 1950–2014 for the Karnali and Sudurpashchim provinces in Nepal.

Figure 2. Historical and projected changes in mean surface temperature (°C): Karnali Province (left) and Sudurpashchim Province (right)



Source: World Bank, n.d.

Note: SSP numbers indicate climate change scenarios of projected socioeconomic global changes up to 2100 as defined in the IPCC Sixth Assessment Report on climate change in 2021. Hist. Ref. Per. = historical reference period.

Historical changes (1993–2023):

- The black line represents the average temperature change.
- The grey shaded area represents the tenth to ninetieth percentile range (encompassing most observed temperatures).
- Karnali Province experienced a temperature increase of 0.8°C between 1993 and 2013, followed by a further 0.3°C rise between 2013 and 2023.
- Sudurpashchim Province observed a similar trend, with a temperature increase of 0.74°C between 1993 and 2013 and an additional 0.29°C increase between 2013 and 2023.

Future projections (to 2100):

- Coloured lines and shaded areas represent projected temperature changes under different greenhouse gas emission scenarios.

- These projections are based on simulations from the Coupled Model Intercomparison Project Phase 6 (CMIP6) and are consistent with observed historical trends.
- The text boxes indicate the likely temperature rise by 2050 for each province under various scenarios:
    - Low emissions (SSP1-1.9 and SSP1-2.6): Expected temperature increase of approximately 0.8°C to 1°C by 2050 for both provinces.
    - Medium emissions (SSP2-4.5 and SSP3-7.0): Projected temperature rise of around 1.3°C to 1.5°C by 2050.
    - High emissions (SSP5-8.5): Significant temperature increase of nearly 2°C by 2050 is anticipated.

Both provinces have experienced significant temperature increases over the past three decades. Future projections indicate continued warming under all emission scenarios, with the magnitude of change dependent on greenhouse gas emissions levels. Implementing strategies to reduce greenhouse gas emissions is crucial to mitigate the potential impacts of climate change on these regions.

Climate projection data are modelled data derived from global climate models compiled through the Coupled Model Intercomparison Projects (CMIPs), overseen by the World Climate Research Programme. The data presented here are from CMIP6, the sixth phase of CMIPs. CMIP data form the foundation for the IPCC assessment reports, and CMIP6 specifically supports the IPCC Sixth Assessment Report.

The historical rise in temperatures has contributed to a range of environmental stressors, including:

- More frequent and intense heatwaves;
- Altered precipitation patterns;
- Changes in agricultural productivity.

As projected changes to the climate unfold, these environmental stressors are expected to intensify, exacerbating their negative impacts on communities. These stressors, in turn, can impact livelihoods and human security, potentially driving migration as people seek to adapt to or escape increasingly challenging conditions. Nepal is highly susceptible to natural disasters, including floods, landslides, droughts and extreme weather events. These disasters have caused significant loss of life, property and livelihoods. The average economic loss per year due to climate-induced disasters is USD 27.78 million, or 0.08 per cent of Nepal's national GDP (DCA, 2021). A trend analysis of 14 climate-related disasters since 1990 reveals a rise in their frequency and intensity. Floods and landslides pose the most significant threats in terms of human and economic losses, displacing populations and disrupting lives and livelihoods. Several pieces of research reported that a majority of those affected adopted migration as a coping mechanism (Van Der Geest and Schindler, 2016; Sujakhu et al., 2016). The devastating floods of 2021, following an unprecedented drought, illustrate the compounding effects of climate-induced disasters (Rijal, 2021). Such events not only disrupt lives but also act as potent drivers of human mobility.

The interplay between climate change, natural disasters and human security in Nepal is complex and multifaceted. Rising temperatures exacerbate existing vulnerabilities and contribute to increased disaster risks. The compounding effects of climate-induced disasters disrupt lives, livelihoods and social structures, forcing people to adapt and sometimes migrate.

1.7.4. Climate-smart technologies and adaptation measures

Climate change has posed significant challenges to subsistence and traditional agricultural practices and livelihoods, particularly in regions heavily reliant on natural resources. In response, the adoption of climate-smart technologies and adaptation measures has become increasingly crucial to mitigate the adverse impacts of climate change and to enhance resilience (IOM, 2017).

In Nepal, where a significant portion of the population depends on agriculture, the impacts of climate change – such as erratic rainfall patterns, droughts and soil degradation – have severely affected crop yields and food security (Bista et al., 2021). The adoption of climate-smart technologies and adaptation measures can help address these challenges and support sustainable agricultural practices.

Climate-smart technologies encompass a range of innovations and practices that aim to increase productivity, enhance resilience and reduce greenhouse gas emissions (Safdar et al., 2024). Examples include drought-tolerant and flood-resistant crop varieties; improved irrigation systems; conservation agriculture practices; and renewable energy sources for agricultural activities.

Adaptation measures, on the other hand, refer to strategies and actions taken to reduce vulnerability and enhance resilience to the impacts of climate change (IPCC, 2014; Sujakhu et al., 2022). These measures can include diversifying livelihood options; implementing early warning systems; promoting agroforestry practices; and strengthening community-based natural resource management. The adoption of these technologies and measures is crucial, particularly for those who stay back, when other household members migrate. Because it is more often men who migrate, and because household structures are typically patriarchal and heteronormative, women often bear the brunt of additional responsibilities in agriculture and household management when men migrate, and access to climate-smart technologies and adaptation measures can alleviate their burdens and enhance their resilience.

However, the successful adoption and implementation of these technologies and measures are influenced by various factors, including access to information, financial resources and sociocultural barriers. Addressing these barriers and promoting the active participation of members of local communities – particularly women and marginalized groups – in the development and dissemination of climate-smart technologies and adaptation measures is essential for their effective implementation and long-term sustainability.

Moreover, a comprehensive approach that integrates climate-smart technologies and adaptation measures with broader development strategies – such as improving access to education, health care and alternative and diversified livelihood opportunities – is crucial for building resilient communities and addressing the complex migration–environment–climate change nexus.

2

METHODOLOGY OF THE RESEARCH

2. METHODOLOGY OF THE RESEARCH

2.1. INTRODUCTION

The research for this report was conducted using a mixed methods approach, combining qualitative and quantitative methodologies, to comprehensively explore and analyse the multifaceted dimensions of the MECC–gender nexus in Sudurpashchim and Karnali. This methodological choice was rooted in the recognition that the MECC nexus is a complex phenomenon involving diverse human experiences and contextual nuances as well as quantitative patterns. By emphasizing a predominantly qualitative research focus, the study aimed to capture the rich narratives, perspectives and sociocultural intricacies associated with MECC in the local context. Qualitative methods – including in-depth interviews, FGDs and KIIs – enable a nuanced understanding of the lived experiences of individuals and communities affected by the MECC nexus. The quantitative component supplements this qualitative depth by providing statistical insights, offering a holistic and corroborative perspective. This mixed methods approach ensured a robust and triangulated exploration of MECC, combining qualitative depth with quantitative rigor to provide valid and reliable research findings. The research was divided into four different but overlapping stages, as detailed in this chapter.

2.2. RAPID NEEDS ASSESSMENT

A rapid needs assessment visit was carried out in early February 2024 in Karnali and Sudurpashchim provinces. During the assessment, the team met with the provincial Ministry of Internal Affairs and Law officials and local authorities of Mahabu Rural Municipality and Sanfebagar Municipality. At these meetings, the local and provincial authorities highlighted the need to conduct research to understand the impact of climate change on various aspects of human life and the environment, including migration and displacement, livelihoods, gender and disasters.

2.3. DESK RESEARCH

Throughout the research, the team conducted a comprehensive desk study to gather existing information on human security threats and climate-related human mobility. The desk study comprises a secondary literature review, a review of secondary data and a thorough analysis of the existing legal framework related to migration, environmental degradation, climate change and the nexus between them. Furthermore, the review considered research reports, federal, provincial and local government policy documents related to disasters, climate change and migration, a review of hydrometeorological data of study areas to establish interlinkages, population profiles of the municipalities and annual programmes of the municipalities, among others. This comprehensive study examined available statistical information, reports and data sets related to climate patterns, environmental changes, migration trends and associated socioeconomic indicators.

2.4. QUALITATIVE STUDY

In the study, in-depth interviews, KIIs and FGDs were conducted based on semi-structured questions, checklists and field observations in order to gather qualitative data on resilient technologies, the engagement of mobile populations and the integration of climate-induced human mobility into national policies. Carried out between February and May 2024, the qualitative study encompassed the following:

- In-depth individual interviews: The research team conducted qualitative and long-form in-depth interviews with 20 individuals in each municipality. These interviews were conducted with women from migrant households, with men from migrant households, with women from non-migrant households, with men from non-migrant households, with returnee migrants, with prospective migrants, with individuals hit by disasters, and with individuals displaced for a variety of reasons. The research tried to ensure gender and minority representation across the board.
- KIIs: 32 interviews were conducted with government officers, including DRR focal persons, forest officers, mayors, deputy mayors, representatives from the branches of governments responsible for planning, agriculture, and women's issues. KIIs were conducted as well with personnel from the Agriculture Knowledge Centre, the Vet Hospital and Livestock Services Expert Centre, the Provincial Research and Training Academy, the Ministry of Internal Affairs and Law of Karnali Province and the Ministry of Internal Affairs and Law of Sudurpashchim Province, the Provincial Policy and Planning Commission, and at the federal level from the Alternative Energy Promotion Centre, the Nepal Agricultural Research Council and the Nepal Academy of Science and Technology. KIIs were also conducted with academics, researchers and experts in the field of MECC, and with representatives from provincial ministries, policy and planning commissions and federal ministries, including the technical working group members.
- FGDs: A total of 14 group discussions were held in the four municipalities. In each of the four municipalities, three FGDs were conducted with a mixed group of women from migrant and non-migrant households, a mixed group of returnee men and men from migrant and non-migrant households, and one with prospective migrants. Two additional FGDs were conducted in Sanfebagar and Krishnapur with a mixed group of individuals displaced due to environmental stressors; no such individuals were available in Khandachakra and Mahabu. These FGD participants were identified through stakeholder mapping and based on discussions with local government and ward officials. It should be noted, however, that the migrant households and individuals are different from the displaced individuals in that the former have chosen mobility voluntarily while the latter are forced to move.

The in-depth interviews and FGDs were conducted with a diverse set of individuals. A substantial portion of each interview and FGD was about the current environmental and social vulnerabilities; other parts focused on gender, migration and human security-related issues. Previous IOM studies such as the MECC study in Sri Lanka (IOM and Sri Lanka MoE, 2023) and the regional MECC study in South Asia (IOM, 2017) have shown that, most times, climate change-affected individuals do not know that the environmental drivers are indeed drivers for migration. Considering this, the research sought to better gather information on the current environmental and social vulnerabilities of the discussants and interviewees, and their consequences.

2.5. QUANTITATIVE STUDY

Subsequently, the study entered the primary data-collection phase, centred on a household survey. This survey captured firsthand experiences, perceptions and impacts of MECC on individuals and communities. A structured questionnaire was designed, encompassing variables related to migration patterns, environmental changes, socioeconomic conditions and adaptive strategies. The survey was conducted across targeted households in the four municipalities, ensuring a representative sample. This quantitative data collection employed statistical techniques to derive patterns, correlations and trends, enriching the overall research insights with quantifiable evidence. The sequential integration of secondary data analysis and

primary household surveys ensures a comprehensive and nuanced exploration of the MECC dynamics in the study regions. With a focus on statistical analysis, this survey captures broader patterns and correlations within a representative sample of households. While qualitative methods offer narrative depth and context-specific insights, the household survey complements these by providing quantitative data, ensuring a comprehensive understanding of the MECC nexus. This combined approach enhances the research's robustness and depth. The following section describes in detail the sampling technique and study areas.

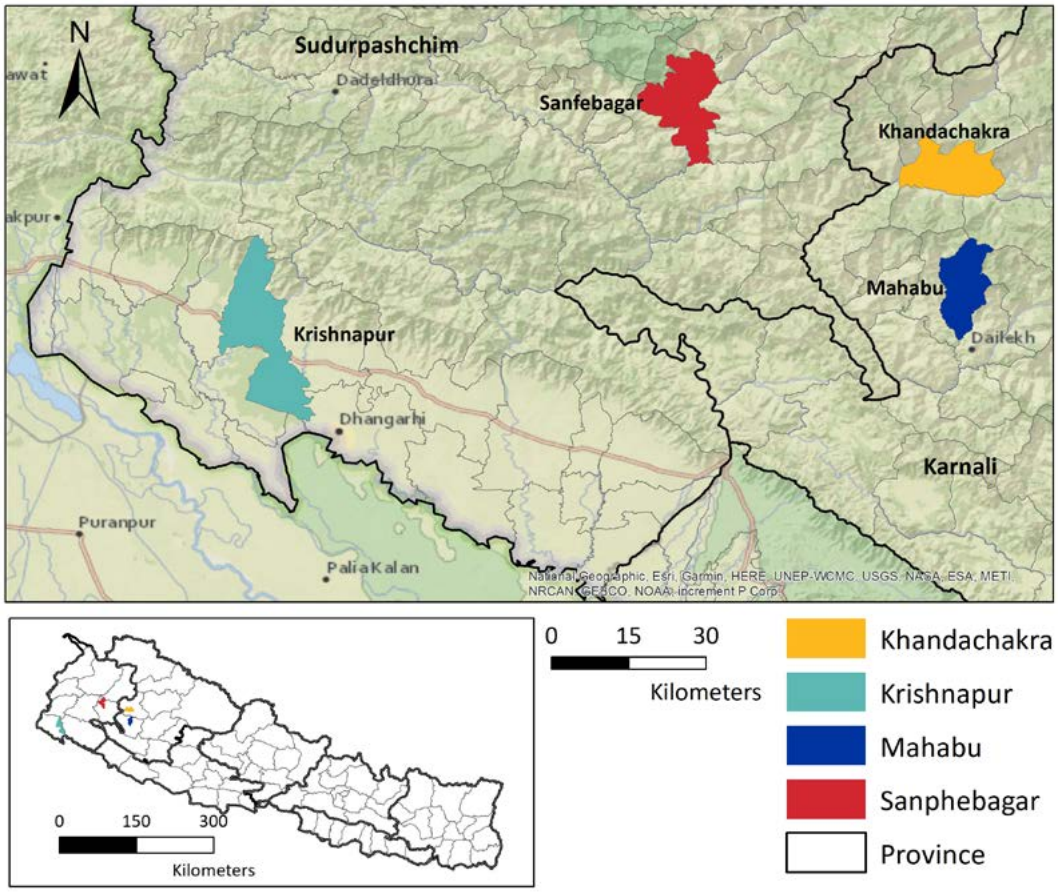
2.5.1. Sampling approach and study areas

Based on the climate change vulnerability Human Development Index, migration trends, information about exposure to multi-hazards derived from an existing government database, reports, consultations and validation with provincial and local government officials, the following municipalities were proposed for the study. These municipalities were considered for both qualitative and quantitative studies.

Table 2. Names of the study areas by district and province

Local government	District	Province
Mahabu Rural Municipality	Dailekh	Karnali
Khandachakra Municipality	Kalikot	Karnali
Sanfebagar Municipality	Achham	Sudurpashchim
Krishnapur Municipality	Kanchanpur	Sudurpashchim

Figure 3. Geographic map of the four study areas



Note: This map is for illustration purposes only. The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the IOM.

Furthermore, the following data presented in Table 3 are retrieved from the NDRRMA BIPAD portal. The portal maintains a range of data and information from a variety of sources, including those that are recorded by the local and provincial governments and the Nepalese police.

Table 3. Vulnerability and risk assessment of selected local governments

Unit	Municipality	Sanfebagar (Urban) Municipality	Krishnapur (Urban) Municipality	Mahabu Rural Municipality	Khandachakra (Urban) Municipality
	District	Achham	Kanchanpur	Dailekh	Kalikot
	Province	Sudurpashchim	Sudurpashchim	Karnali	Karnali
Risk	Fire	✓	✓	✓	✓
	Earthquake	✓	✓	✓	✓
	Landslide risk	0.327	0.034	0.296	0.103
Vulnerability	HDI	0.378	0.475	0.422	0.374
	Life expectancy	67.14	67.8	68.03	63.64
	HPI	46.7	26.6	41.4	45.2
	Per capita income	536	938	684	578
	Remoteness	4.3	3.54	4.71	6.02
	Total school	NA	49	36	37
From 14 January 2023 to 24 January 2024	Deaths of people	0	0	4	0
	Injured people	3	0	49	0
	Missing people	0	0	0	0
	Incidents	8	3	30	1
	Estimated loss (NPR)	Not available	305 000	2 000 000	Not available
	Infrastructure destroyed	0	0	3	0
	Livestock destroyed	10	0	28	0

Source: NDRRMA, n.d.

Table 3 presents key risk indicators, vulnerability metrics and disaster-related statistics for the studied municipalities. It indicates that landslide risk is notably low in Krishnapur than in the other three, while significantly higher in Sanfebagar and Mahabu, indicating a need for enhanced mitigation in the latter areas. The Human Development Index (HDI) rating is highest in Krishnapur, while Human Poverty Index (HPI) rating is lowest there, suggesting better development and lower poverty levels. Per capita income is significantly lower in Sanfebagar and Khandachakra than in the other two municipalities, highlighting the need for economic development. Mahabu has the highest life expectancy (68.03 years) but faces frequent incidents and substantial estimated losses (NPR 2 million), indicating a need for improved emergency response and infrastructure resilience. Addressing these areas – risk mitigation, economic development, health care, emergency preparedness and educational infrastructure – is crucial for enhancing overall development, safety and quality of life.

Table 4. Vulnerability and risk assessment and identifying adaptation options

District	Achham	Kalikot	Dailekh	Kanchanpur
Exposure	0.366	0.233	0.393	0.473
Sensitivity	0.848	0.885	0.907	0.683
Adaptive capacity	0.476	0.294	0.363	0.62
Vulnerability	0.733	0.925	0.885	0.455
Baseline context of climate extreme events	0.515	0.427	0.472	0.57
Climate extreme events composite RCP 4.5 2030	0.499	0.433	0.481	0.561
Climate extreme events composite RCP 4.5 2050	0.616	0.533	0.599	0.672
Climate extreme events composite RCP 8.5 2030	0.523	0.443	0.504	0.596
Climate extreme events composite RCP 8.5 2050	0.686	0.594	0.661	0.783
Baseline risk	0.301	0.217	0.371	0.299
RCP 4.5 2030 risk	0.305	0.221	0.379	0.297
RCP 4.5 2050 risk	0.353	0.27	0.468	0.348
RCP 8.5 2030 risk	0.31	0.228	0.399	0.309
RCP 8.5 2050 risk	0.382	0.304	0.518	0.398

Source: MoFE, 2021.

Table 4, on vulnerability and risk assessment and identifying adaptation options, presents district-level vulnerability, exposure, sensitivity and adaptive capacity scores, as well as climate extreme event projections and associated risks under different climate change scenarios for the years 2030 and 2050. RCP 4.5 designates a "representative concentration pathways" that is described by the Intergovernmental Panel on Climate Change (IPCC) as a moderate scenario in which emissions peak around 2040 and then decline; RCP 8.5 is the highest baseline emissions scenario considered by the IPCC, in which emissions continue to rise throughout the twenty-first century. The table shows that Kalikot is the most vulnerable, followed by Dailekh and Achham respectively. This allows us to better contextualize the need for adaptation strategies and identify appropriate climate-smart technologies tailored to the local conditions in respective municipalities. Additionally, the projections of climate extreme events and their associated risks highlight the urgency of integrating climate-induced human mobility considerations into policy frameworks to support affected communities effectively.

Table 5. District risk profiles subnational assessment

District	Achham	Kalikot	Dailekh	Kanchanpur
Multi-hazard risk	Score: 0.650 Rank: 5/77	Score: 0.592 Rank: 20/77	Score: 0.602 Rank: 16/77	Score: 0.573 Rank: 26/77
Multi-hazard exposure	Score: 0.562 Rank: 37/77	Score: 0.325 Rank: 74/77	Score: 0.511 Rank: 42/77	Score: 0.836 Rank: 4/77
Vulnerability	Score:0.715 Rank: 6/77	Score: 0.726 Rank: 5/77	Score: 0.634 Rank: 11/77	Score: 0.391 Rank: 54/77
Coping capacity	Score: 0.362 Rank: 65/77	Score: 0.274 Rank: 71/77	Score: 0.338 Rank: 62/77	Score: 0.378 Rank: 48/77

District	Achham	Kalikot	Dailekh	Kanchanpur
Resilience	Score: 0.305 Rank: 70/77	Score: 0.274 Rank: 72/77	Score: 0.352 Rank: 65/77	Score: 0.559 Rank: 20/77
Multi-hazard exposure	Score: 0.562 Rank: 37/77	Score: 0325 Rank: 74/77	Score: 0.511 Rank: 42/77	Score: 0.836 Rank: 4/77
Earthquake	100%	100%	100%	100%
Extreme heat potential	13%	0%	3%	100%
Fluvial flood potential	1%	1%	1%	26%
Landslide potential	100%	100%	99%	<1%
Wildfire potential	42%	1%	46%	92%
Pluvial flood potential	2%	3%	3%	39%
Information access vulnerability	Score: 0.620 Rank: 26/77	Score: 0.659 Rank: 23/77	Score: 0.590 Rank: 28/77	Score: 0.408 Rank: 57/77
Access to clean water vulnerability	Score: 0.557 Rank: 19/77	Score: 0.576 Rank: 15/77	Score: 0.789 Rank: 1/77	Score: 0.404 Rank: 42/77
Economic constraints	Score: 0.860 Rank: 4/77	Score: 0.942 Rank: 3/77	Score: 0.685 Rank: 13/77	Score: 0.555 Rank: 29/77
Food insecurity	Score: 0.816 Rank: 4/77	Score: 0.821 Rank: 3/77	Score: 0.683 Rank: 13/77	Score: 0.231 Rank: 69/77
Gender inequality	Score: 0.802 Rank: 3/77	Score: 0.615 Rank: 11/77	Score: 0.507 Rank: 20/77	Score: 0.386 Rank: 40/77
Vulnerable health status	Score: 0.635 Rank: 9/77	Score: 0.745 Rank: 4/77	Score: 0.552 Rank: 15/77	Score: 0.365 Rank: 44/77
Child health	Score: 0.823 Rank: 2/77	Score: 0.719 Rank: 6/77	Score: 0.678 Rank: 10/77	Score: 0.378 Rank: 48/77
Coping capacity	Score: 0.362 Rank: 65/77	Score: 0.274 Rank: 71/77	Score: 0.338 Rank: 62/77	Score: 0.509 Rank: 20/77
Economic capacity	Score: 0.064 Rank: 75/77	Score: 0.068 Rank: 74/77	Score: 0.140 Rank: 65/77	Score: 0.359 Rank: 26/77
Governance	Score: 0.621 Rank: 15/77	Score: 0.542 Rank: 27/77	Score: 0.648 Rank: 8/77	Score: 0.534 Rank: 28/77
Environmental capacity	Score: 0.269 Rank: 34/77	Score: 0.000 Rank: 49/77	Score: 0.000 Rank: 49/77	Score: 0.652 Rank: 16/77
Infrastructure capacity	Score: 0.250 Rank: 71/77	Score: 0.245 Rank: 72/77	Score: 0.288 Rank: 68/77	Score: 0.530 Rank: 33/77
Communications capacity	Score: 0.117 Rank: 75/77	Score: 0.118 Rank: 74/77	Score: 0.209 Rank: 72/77	Score: 0.514 Rank: 24/77
Logistics capacity	Score: 0.503 Rank: 54/77	Score: 0.489 Rank: 57/77	Score: 0.502 Rank: 55/77	Score: 0.495 Rank: 56/77
Energy capacity	Score: 0.131 Rank: 71/77	Score: 0.129 Rank: 72/77	Score: 0.154 Rank: 68/77	Score: 0.581 Rank: 29/77
Infant mortality rate (per 1 000 live births)	37.8	63	39.8	40.3

District	Achham	Kalikot	Dailekh	Kanchanpur
Population below poverty	47.20%	57.90%	35.80%	31.40%
Population with safe drinking water	60.20%	59.00%	53.90%	96.90%
Adult literacy	45.10%	45.30%	52.30%	63.00%

Source: Recca et al., 2023.

The multi-hazard risk and exposure levels among the municipalities show significant variations. Sanfebagar (Achham) and Krishnapur (Kanchanpur) have relatively higher risk scores respectively compared to Mahabu (Dailekh) and Khandachakra (Kalikot). Notably, Krishnapur stands out with the highest multi-hazard exposure score, indicating substantial vulnerability to hazards like extreme heat, floods and wildfires. In terms of vulnerability and coping capacity, Mahabu and Khandachakra in Karnali Province exhibit higher vulnerability scores than Sanfebagar and Krishnapur in Sudurpashchim Province. Conversely, Krishnapur leads in coping capacity, followed by Sanfebagar, Mahabu and Khandachakra, suggesting varied resilience levels across the municipalities.

Addressing specific vulnerabilities and challenges is crucial. Khandachakra and Mahabu face severe economic constraints and food insecurity. Gender inequality is notably higher in Sanfebagar and Khandachakra, highlighting the need for gender-responsive policies. Child health is a concern in Sanfebagar and Khandachakra, indicating the need for targeted interventions. Mahabu's critical vulnerability regarding access to clean water underscores the urgency of water management programmes. Krishnapur's relatively higher environmental and infrastructure capacity scores indicate better preparedness, presenting opportunities for sharing best practices and knowledge across municipalities. Prioritizing interventions that address economic challenges, food insecurity, gender inequality, child health and water access is essential for enhancing resilience, particularly in Khandachakra, Mahabu and Sanfebagar.

2.5.2. Household survey

The household survey – as distinct from qualitative methods like KIIs, in-depth interviews and FGDs – employs a structured questionnaire to systematically explore MECC trends in the four municipalities. This study focuses on households with migrants, encompassing a diverse range of migration types such as cross-border, seasonal, international, internal and individuals or households displaced as a result of various factors. The survey administration was directed at the current or acting head of the household, providing a comprehensive perspective on migration experiences and their impact. To ensure representation and relevance, the households were purposively sampled and identified through a snowballing approach, in consultation with local stakeholders. This collaborative and targeted sampling strategy aimed to capture a broad spectrum of migration scenarios, enriching the study with varied and context-specific insights.

After field enumerators were trained, quantitative data collection in the study areas started, focusing on gender dimensions, environmental stressors and the impact of climate change and environmental factors on migration.

Sample size (total and in each municipality or ward) is determined using the following relation, based on the modification from Cochran's (1977) formula.

$$\text{Sample size } (S) = \frac{\frac{z^2 \times p(1-p)}{e^2}}{1 + \left(\frac{z^2 \times p(1-p)}{e^2 \times N}\right)}$$

Where, z = the number of standard deviations a value is from the mean of a given distribution, e = margin of error, p = population proportion, and N = total population.

Table 6. Sample size and population details

Municipality	Households	Total population	Men	Women	Total wards	Number of households surveyed
Mahabu	3 968	18 059	8 262	9 797	6	98
Khandachakra	4 101	22 274	11 212	11 062	11	101
Sanfebagar	6 311	25 891	11 789	14 102	14	99
Krishnapur	15 111	71 500	33 830	37 670	9	101
Total						399

Source: These calculations are based on Cochran (1977) and United Nations (2005).

The household survey was conducted with 399 sample households with a confidence level of 95 per cent and a margin of error of 10 per cent. This combination implies that the research estimate may have more variability that would scenarios with a smaller margin of error (such as the 5 per cent preferred for quantitative studies), but it still provides a reasonable level of confidence in the generalizability of the findings to the population from which the sample was drawn. The 95:10 ratio of confidence level to margin of error is acceptable in this study because of the mixed method approach, where the quantitative findings are primarily a back up to the qualitative study that is the main focus. Time and resource constraints, as well, meant that it was impossible to achieve a better ratio.

2.5.3. Hiring and training of field enumerators

The team of researchers hired and trained eight local field enumerators, most of whom had previously worked with the NSO to conduct household surveys and similar research. Having local NSO-trained enumerators with a thorough understanding of the local context and culture ensured the efficiency of data collection and the quality of the data. Alongside this, the survey questionnaire was translated into Nepali. At times, where local languages needed to be prioritized for people who do not understand Nepali, the enumerators translated the questions and explained them in local languages. The survey was administered through the Open Data Kit tool.

The training was conducted in Sanfebagar (Achham) in early April 2024, where all eight enumerators from the four municipalities gathered with the researchers. The household survey commenced immediately after the training was satisfactorily completed. During the enumerator training, there was an in-person workshop covering research ethics, qualitative techniques, using the Open Data Kit survey tool properly, practicing mock interviews and data protection protocols. The statistician conducted a pilot testing of the household survey questionnaire with the enumerators.

2.6. DATA COLLECTION

For the household survey, the trained enumerators collected data over a period of about three weeks, during April 2024. As the ODK tool exports data on a real-time basis, the research team constantly monitored and assessed data quality daily. Although the research team had planned to request that enumerators revisit the sampled household to complete or re-conduct the survey in case of errors, no such errors were encountered during the course of data collection. Furthermore, the research thoroughly prioritized ethical considerations by obtaining informed consent from participants, ensuring data confidentiality and respecting cultural sensitivities during data collection and afterward.

The qualitative data was collected between February and May 2024. The longer period of qualitative data collection ensures data rigor and triangulation. The researchers conducted interviews with facilitation from local experts and locally hired enumerators. The qualitative data collection was completed using structured and semi-structured interviews and FGD guides that ensured standardization across the interviews.

2.7. DATA PROCESSING AND ANALYSIS

Quantitative data analysis is a crucial aspect of this research, involving the systematic examination of numerical data collected from household surveys. Utilizing statistical methods, the analysis aims to uncover patterns, trends and associations related to gender and MECC in the Sudurpashchim and Karnali provinces. This data-driven approach enables the identification of broader trends and correlations, providing a comprehensive understanding of the MECC–gender nexus on a larger scale.

The qualitative interviews and FGDs were audio recorded with the consent from the participants and subsequently transcribed verbatim to ensure accuracy and maintain the integrity of the narratives. The transcribed data were then subjected to thematic analysis, a widely used qualitative data analysis technique, which involved identifying, analysing and reporting patterns or themes within the data. This approach allowed for a systematic and structured exploration of the key issues and perspectives emerging from the interviews. The research report is informed by the themes that have emerged from the analysis.

2.8. ETHICAL CONSIDERATIONS

The research places a strong emphasis on upholding the rights and well-being of all participants involved. Informed consent was diligently sought from individuals, government stakeholders and elected representatives, ensuring they comprehended the research objectives and procedures. Confidentiality measures were rigorously implemented, safeguarding the privacy of participants and storing data securely. Voluntary participation was underscored: individuals were assured of their right to withdraw without facing adverse consequences. The research was conducted with cultural sensitivity, respecting local norms and adapting methodologies accordingly (for instance, both male and female data enumerators were selected, as well as enumerators from a variety of ethnic backgrounds; and data enumerators were trained in the use of appropriate language and operated under a code of conduct). Active community engagement was fostered, involving ongoing communication and collaboration with local leaders to align the research with community needs. Transparent reporting practices were adhered to, providing accurate representations of findings. Finally, no names of the respondents are included in the report; instead, respondents are identified by their social locations.

2.9. LIMITATIONS OF THE RESEARCH

The research findings apply only to the research sample and are not generalizable. The research focused on individuals and households from only four municipalities and only two

provinces, and there are many ways that these will not be representative of the nation as a whole. The geographic specificities of the four municipalities, for instance, do not represent the geographic variations of the entire country. The sample was selected purposively both for the quantitative and qualitative research. Consequently, personal biases maybe have shaped both the research and the information received. The researchers adopted necessary methods of data triangulation and validation to ensure that the collected data were valid and reliable.

3

EXAMINATION OF THE CURRENT POLICY LANDSCAPE

3. EXAMINATION OF THE CURRENT POLICY LANDSCAPE

3.1. INTRODUCTION

Nepal's policy landscape is largely scattered when it comes to addressing gender, migration, environmental degradation and climate change: there is not a consolidated single policy that addresses MECC. Climate change is a multistressor that affects human and non-human lives by affecting human livelihoods, triggering phenomena such as migration. For this reason, it is imperative that a consolidated policy framework that addresses the complexities of the MECC–gender nexus is in place. For this research, a total of 42 relevant policies were reviewed across the federal, provincial and municipal levels. At the national or federal level, a total of 17 policies were reviewed. Four policies from Sudurpashchim Province and three from Karnali Province were reviewed. Five policies each of Khandachakra, Mahabu and Sanfebagar, and three of Krishnapur were reviewed. Any policy that related to environment, climate, gender and migration was selected for review. Some national plans and policies – like the Sixteenth National Plan 2024/25–2028/29 – were also selected for review as they addressed climate adaptation and migration. However, the review revealed that not all were relevant to MECC and gender. As a result, only 23 policies are used in this report (see Annex 3 for the detailed policy analysis).

Laws and policies are crucial tools for governments to address environmental and social challenges. For example, the National Climate Change Policy emphasizes the development of DRR systems and social security guarantees for vulnerable groups. Similarly, the Sixteenth National Plan sets ambitious targets for gender equality and incorporates climate change adaptation into various sectors. At the provincial level, for instance, the Sudurpashchim Province Agricultural Development Strategy promotes sustainable agricultural practices and aims to empower women in the sector by providing access to equipment and training. Similarly, at the local level, Khandachakra Municipality's Disaster Risk Reduction and Management Act (2020, 2077) prioritizes the safety of vulnerable groups during disasters by mandating awareness programmes and relocation plans for at-risk communities. Well-crafted policies are important to promote environmental protection, social equity, safer migration and disaster preparedness.

However, even well-intentioned policies can have shortcomings. For example, the Sudurpashchim Province Environment Protection Act (2020, 2077), while outlining climate adaptation goals, does not specify the importance of priority climate adaptation techniques, and nor does it address the issue of climate-induced migration. Likewise, the Khandachakra's Disaster Preparedness and Response Plan, though emphasizing stakeholder coordination, does not explicitly address the unique challenges posed by slow-onset climate events, which might necessitate proactive relocation strategies. These gaps illustrate the need for continuous evaluation and improvement of policies to ensure they effectively address complex and evolving challenges.

Furthermore, while some policies promote commit the government to goals like sustainable agriculture and women's empowerment, the policies lack crucial details on implementation, particularly regarding climate adaptation techniques. These policies often overlook emerging issues such as climate-induced migration. Vulnerable groups, especially women, are frequently not given adequate consideration. The policies also show a tendency to prioritize short-term solutions over long-term strategies, with disaster relief overshadowing mitigation efforts. In

some instances, there are also unclear guidelines that lack monitoring mechanisms, which can hinder effective implementation.

3.2. NATIONAL POLICIES

In an attempt to locate the policy gaps in the existing legal and policy instruments in Nepal, this section presents a summary of the national policies relevant to MECC and gender. Annex 3 presents a more detailed and nuanced analysis of these policies. Several policies emphasize the importance of environmental protection and climate change adaptation, while others deal with aspects more related to livelihood such as migration and social and human relationships such as gender.[3]

3.2.1. National Climate Change Policy, 2076 (2019)

This policy presents a comprehensive framework aimed at mitigating climate change impacts through the development of DRR systems and management systems at federal, provincial and local levels. It emphasizes prevention, risk reduction and preparedness, promoting low-carbon energy and efficient water resource use for energy security. The policy involves community organizations and the private sector in disaster management, focusing on creating climate-friendly, resilient infrastructures in both rural and urban areas. Gender equality and social inclusion are integrated, with specific strategies for women, marginalized groups and vulnerable communities. Additionally, it promotes climate-resilient livelihood programmes, ensuring transparency, accountability and active public participation in climate change adaptation and DRR programmes. However, the policy lacks specific provisions for migrants affected by climate change or disasters, omitting even the terms "migrant" and "migrants". While Section 8.4 aims to build climate-friendly villages and cities, it does not explicitly recognize the needs of the climate-affected mobile population. Section 8.9 addresses gender equality and social inclusion but fails to mention displaced, trapped, or immobile households and communities, overlooking their unique challenges.

3.2.2. Disaster Risk Reduction and Management Act, 2074 (2017)

This Act identifies high-risk areas, implements early warning systems and coordinates international aid. It laid legal paths to establish the NDRRMA to oversee disaster activities, set relief distribution standards prioritizing women, and establish provincial and local disaster management institutions aligned with federal guidelines. The Act promotes localized laws and ensures comprehensive disaster preparedness and response nationwide. Despite these extensive provisions, the Act falls short in providing clarity on durable solutions for households displaced by slow- and rapid-onset disasters.

3.2.3. Foreign Employment Act, 2064 (2007)

This Act aims to enhance the safety, management and decency of foreign employment, protecting the rights and interests of both workers and entrepreneurs. It allows Nepalese citizens to seek employment abroad in designated countries, and it requires that Nepalese citizens who run a business related to foreign employment (that is, a business that arranges for Nepalese workers to work in other countries) have a license to do so. The Act includes provisions for personal employment, sets requirements for a minimum wage, insurance, training and orientation, and establishes a foreign employment welfare fund for workers' social security. Gender equality is ensured by preventing institutions with complaints of violence against female workers from operating, by prohibiting gender discrimination in employment processes, and by providing special facilities and reservations for women and

3 None of the policies discussed in this section address directly the needs of people of diverse genders (that is, people of any gender other than male or female). This clearly provides a strict limit to the extent to which the policies can be said to integrate gender equality. In the following analysis, as well as in Annex 3, any claims about the expression of gender equality in these policies needs to be understood with this proviso.

victims of national calamities seeking foreign employment. Despite its comprehensiveness, the Act does not address climate change-induced foreign employment, leaving a significant void for individuals displaced by climate-related factors. It also lacks provisions for the adaptation and reintegration of foreign employees returning from abroad, focusing primarily on the process of sending citizens to foreign employment.

3.2.4 Employment Policy, 2071 (2014)

This policy focuses on enhancing the rights and welfare of workers through several key measures. It mandates that contracts be signed in the presence of relevant authorities for transparency, and restructures agencies to extend services locally. It emphasizes ratifying international conventions and partnering with the international community to protect workers' rights. It aims to reduce migration risks and improve employability through awareness programmes and mandatory training, with special provisions for women and marginalized communities. Socioeconomic aspects are addressed by facilitating credit for overseas employment, simplifying the remittance system and encouraging the productive use of remittances for national development and poverty alleviation. However, the policy does not directly address how the employment of mobile populations affected by climate change and associated disasters would be supported. While it mentions promoting agricultural employment, there is scope to elaborate on climate-resilient agricultural practices and the creation of green jobs, especially for those most affected by climate change and environmental degradation.

3.2.5. National Adaptation Plan 2021–2050

This plan aims to enhance climate resilience by integrating lessons from past initiatives and engaging stakeholders extensively. Aligning with Nepal's second nationally determined contribution under the Paris Agreement, the NAP promotes coordinated climate action across all sectors and government levels. It seeks to incorporate climate adaptation into development planning, enhancing adaptive capacity in vulnerable sectors and prioritizing gender equality, social inclusion and the protection of the most vulnerable groups. The NAP outlines short-term actions up to 2030, including establishing early warning systems and improving climate data management, with a comprehensive review planned for 2031 to guide long-term strategies. It also aligns with the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction. However, the NAP has further scope for recognizing the impact of climate change on migration and displacement, exploring the unique needs of populations on the move due to climate change, and adopting a gender lens while exploring loss and damage due to climate change.

3.2.6 Environment Protection Act, 2076 (2019)

This Act represents a substantial step forward in addressing climate change and environmental protection in Nepal. It emphasizes the need to integrate future climate risks into policies and practices, reinforcing environmental compliance through mandatory environmental impact assessments (EIAs) and supplementary EIAs. The Act ensures the right to a clean and healthy environment by holding parties liable for environmental harm and mandating compensation for victims of environmental hazards. It introduces carbon trading provisions, aligning with international standards like the Kyoto Protocol, though it lacks a clear definition for carbon trading, requiring further regulations. Despite Nepal's minimal contribution to global greenhouse gas emissions, the Act acknowledges the country's vulnerability to climate change and endorses the National Climate Policy 2076 to support its implementation. However, the effectiveness of these measures depends on strict enforcement, clear regulations and apolitical leadership. The Act also has further scope to explore the MECC nexus through a gender lens.

3.2.7. Sixteenth National Plan, 2081/82–2085/86 (2024/25–2028/29)

This plan addresses climate change and gender but does not adequately integrate the aspect of migration. Climate change strategies focus on implementing adaptation plans, adopting a green economy, integrating climate considerations across various sectors such as agriculture, health and DRR, and promoting sustainable practices like clean energy and biodiversity protection. Using a gender-mainstreaming lens, it aims to provide climate adaptation strategies for marginalized and highly affected individuals and groups, as well as migration and urbanization management to harness remittance income for economic prosperity and to systematize urbanization through integrated settlements and rural employment opportunities. The plan emphasizes gender-responsive governance, budgeting and policies to ensure the economic and social empowerment of disadvantaged women and to provide access to justice. However, there is significant scope for considering migration as a climate change strategy, which the document currently lacks. While it addresses migration mainly in the context of remittances, it neglects migration concerns related to the environment and climate change, focusing more on internal migration and without offering any plans for reintegrating foreign employment returnees.

3.2.8 National Policies on Internally Displaced Persons, 2063 (2007)

The aim of these policies is to adopt preventive and curative measures to minimize displacement issues on a long-term basis. They emphasize developing integrated mechanisms involving displaced persons to protect their fundamental and human rights while minimizing negative effects on communities of destination. The policies also aim to facilitate the safe, voluntary and dignified return of displaced persons or, alternatively, to support their resettlement by constructing and rehabilitating social and economic infrastructure in new locations. However, the policies do not prioritize climate-led displacement, and nor do they address the gendered impacts of displacement. There is a need to consider the special needs of displaced groups and individuals.

3.3. PROVINCIAL POLICIES

The following is the summary of the provincial policies from Sudurpashchim and Karnali provinces.

3.3.1. Sudurpashchim Province Environment Protection Act, 2077 (2020)

This Act aims to establish a Provincial Environment Protection Fund dedicated to environmental protection, pollution prevention, climate change management and heritage protection. The Act's primary focuses include conducting environmental assessments, encouraging public engagement, establishing funds and forming a provincial council to oversee these efforts. However, it fails to address the displacement and migration issues caused by climate change. The provisions could be improved by requiring environmental assessment reports to explicitly consider potential displacement due to climate impacts and to propose measures to facilitate safe and orderly migration.

3.3.2. Sudurpashchim Province Agricultural Development Strategy, 2079/80 (2022/23)

This strategy focuses on boosting incomes and food security through sustainable practices, recognizing climate threats such as droughts and floods and promoting early warning systems and improved farming techniques. Gender equality is a significant priority, with women being granted access to food processing equipment, training and subsidies. Despite these measures, the strategy lacks details on the operation of the proposed environmental protection fund and does not specify which climate adaptation techniques are most crucial. Additionally, the strategy overlooks the need for climate-resilient crops and fails to address migration issues entirely. Provisions on training and subsidies may be ineffective due to a

lack of follow-up support, bureaucratic hurdles for women and potential discrimination in accessing financial services.

3.3.3. A bill related to Arrangement of Environment Protection, 2076 (2019)

This bill tackles climate change through various measures, including mandatory environmental assessments for projects, prohibition of pollution with government-set standards, and the regulation or banning of plastic use if it does not meet standards. It encourages provincial and local levels of government to create adaptation plans for sectors like agriculture and infrastructure, and allows for mitigation activities to reduce greenhouse gas emissions. Public awareness is promoted through mandatory information sharing on climate change risks, and an environmental protection fee is introduced to discourage pollution. Nonetheless, the bill lacks plans to address climate migration or to ensure diverse female representation. The pollution controls are vague and lack public participation, and the details for plastic waste management and environmental fee collection are insufficient, potentially hindering the effectiveness of those provisions. Additionally, while promoting inclusivity, the bill overlooks the specific needs of women from disadvantaged backgrounds.

3.3.4. Karnali Province Forest Act, 2078 (2021)

The Act aligns closely with the National Forest Act, focusing on forest types and management funds within the province. The Act promotes sustainable forestry and biodiversity but lacks specific climate change adaptation measures. Accompanying regulations are focused on practicalities such as fund management and application procedures to ensure smooth implementation within the province. However, the Act overlooks specific provisions related to climate change adaptation and cross-cutting issues like gender and migration, potentially hindering comprehensive strategies for integrating climate resilience and addressing the diverse needs of vulnerable groups.

3.4. MUNICIPAL POLICIES

The following is the summary of the municipal policies from the four local governments that are a part of this study.

3.4.1. Sanfebagar Municipality's Act for the Protection of the Environment and Natural Resources, 2077 (2020)

This Act emphasizes local environmental protection and citizen participation, with special focus on climate resilience and social equity. However, it lacks provisions for managing climate-induced migration and does not include gender-sensitive indicators for adaptation plans.

3.4.2. Sanfebagar Municipality's Disaster Risk Reduction and Management Act, 2075 (2018)

This Act addresses the needs of vulnerable groups during disasters and mandates specific relief plans and awareness programmes. However, it does not cover climate-induced migration or cross-border cooperation.

3.4.3. Sanfebagar Disaster Management Fund Operation Procedure, 2074 (2017)

This procedure focuses on emergency relief and temporary shelters but overlooks internal migrants without formal residency and lacks gender-sensitive approaches and long-term disaster mitigation funding.

3.4.4. Krishnapur Municipality's Disaster Management Fund Operation Procedure, 2074 (2017)

This procedure covers temporary shelters and debris disposal but fails to address slow-onset events, internal migrants and the specific needs of vulnerable groups like women.

3.4.5. Krishnapur Municipality's Municipal Disaster Risk Reduction and Management Act, 2075 (2018)

This Act includes provisions for the relocation of high-risk communities and targeted awareness programmes for vulnerable groups but does not address internal migrants or provide specific aid for women and girls.

3.4.6. Khandachakra Municipality's Disaster Risk Reduction and Management Act, 2077 (2020)

This Act empowers local committees to provide community relocation and includes gender-focused measures. However, it does not sufficiently address the intersection of climate change, migration and disaster management.

3.4.7. Khandachakra Municipality's Disaster Preparedness and Responses Plan, 2079 (2022)

This plan emphasizes climate resilience and the inclusion of vulnerable groups, particularly women, but lacks adequate focus on climate change and is derived heavily from neighbouring plans without addressing local needs.

3.4.8. Khandachakra Municipality Agriculture Act, 2077 (2020)

This Act promotes the restoration of irrigation infrastructure and the use of renewable energy but does not provide incentives for technology adoption or address the needs of mobile populations.

3.4.9. Mahabu Rural Municipality's Environment and Natural Resources Protection Act, 2079 (2022)

This Act supports local environmental protection with a focus on vulnerable groups and gender-specific clauses but lacks provisions for managing climate-induced migration and integrating migrants into community-based strategies.

3.4.10. Mahabu Rural Municipality's Disaster Management Fund Operation Procedure, 2077 (2020)

This procedure is focused on emergency relief and preparedness but does not allocate funds for long-term climate change mitigation, and nor does it address human mobility implications.

3.4.11. Procedure for Providing Land to Landless Dalits, Landless Squatters and Unorganized Residents, 2078 (2021)

This procedure aims to address landlessness among marginalized groups but does not account for climate-induced displacement or integrate land allocation with climate adaptation and resilience strategies.

4

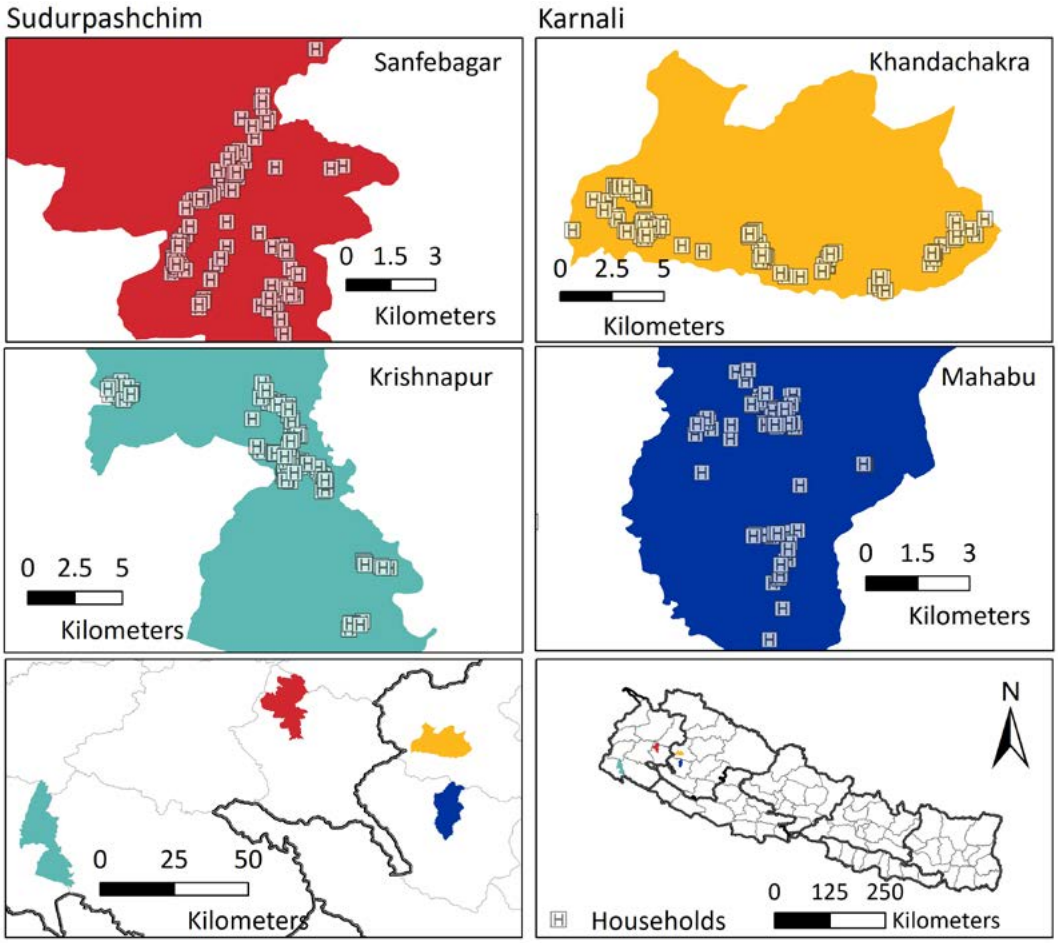
SOCIAL LOCATIONS OF THE RESEARCH AREA

4. SOCIAL LOCATIONS OF THE RESEARCH AREA

4.1. INTRODUCTION

Analysing 399 surveys, the following section highlights the social locations and socioeconomic conditions of the quantitative research participants. The analysis included data from 101 households each in Khandachakra Municipality and Krishnapur Municipality. There were 98 and 99 households from Mahabu Rural Municipality and Sanfebagar Municipality, respectively.

Figure 4. Surveyed households in the study areas of Karnali and Sudurpashchim provinces



4.2. CHARACTERISTICS OF THE RESPONDENTS

4.2.1. Age and gender

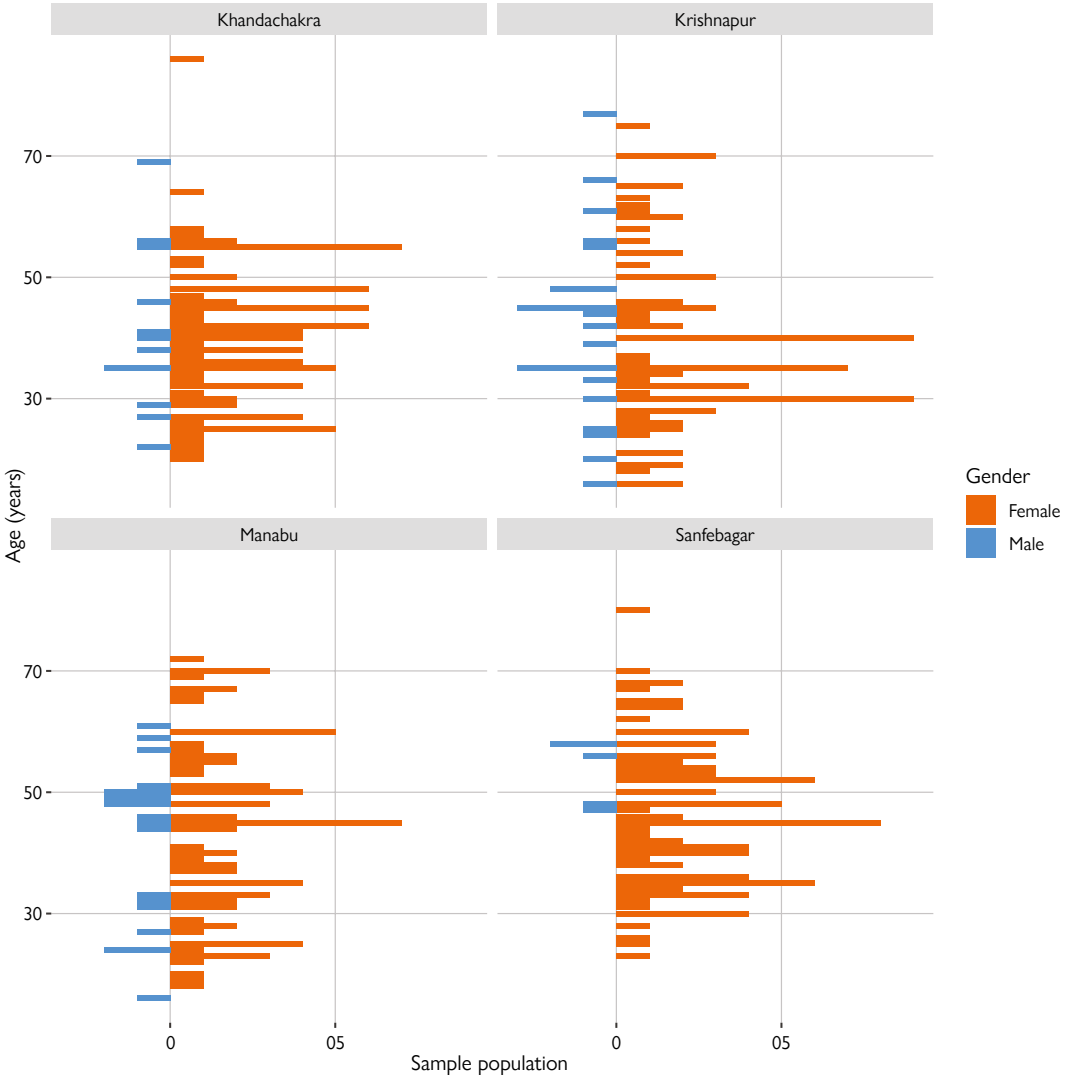
The age of the respondents ranged from 16 to 80 years; there was one respondent per surveyed household. The average age of the respondents in Khandachakra was 40; in Krishnapur, 40; in Mahabu, 43; and in Sanfebagar, 46. Among respondents, 59 (14.8%) were men and the remaining 340 (85.2%) were women.[4] The breakdown by municipality is laid out in Table 7.

4 Although the survey allowed three possible responses to the question about the respondent's gender ("male", "female", and "other"), no respondents chose to identify as "other". Therefore, the results of the survey can only be taken as representative of the male and female population.

Table 7. Age and gender of respondents, by municipality

Municipality	Female	Male	Other	Total
Sanfebagar	94	5	0	99
Mahabu	78	20	0	98
Krishnapur	79	22	0	101
Khandachakra	89	12	0	101

Figure 5. Population pyramid showing respondents age and gender



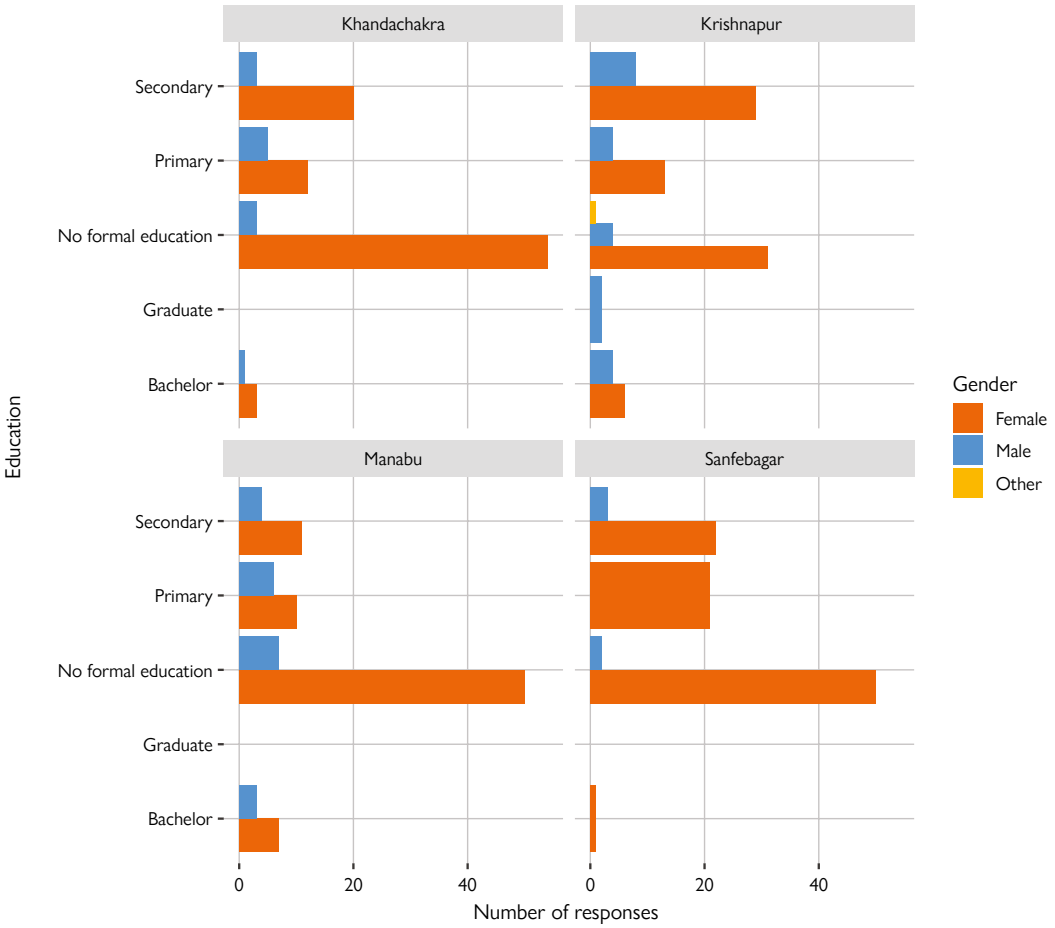
The population pyramid (Figure 5) depicts the age distribution of respondents across the four municipalities, segregated by gender. Wider bars for women compared to men at specific age groups indicate a greater number of women respondents in those age groups. The largest concentration of respondents was in the 25–45-year-old age group for both men and women. The overall shape of the pyramid indicated the survey was focused on middle-aged adults who should be economically active.

4.2.2. Educational attainment and gender disparity in surveyed households

The analysis of educational attainment among respondents reveals a concerning trend of limited formal education across all surveyed municipalities. As depicted in Figure 6, a significant percentage of respondents lack any formal education, with Mahabu having the

highest figure at 64 per cent. This pattern extends across municipalities, though, with Khandachakra at 61 per cent and Sanfebagar at a slightly lower 53 per cent for women with no formal education. A closer look reveals a gender disparity. While Krishnapur has a higher proportion of women with some education compared to other municipalities, the percentage of male respondents with no formal education is consistently lower than women across all locations. Krishnapur presents a unique case within this trend. While the overall percentage of respondents lacking formal education remains high (around 47%), a higher proportion of women in Krishnapur hold secondary education (including higher secondary) compared to other municipalities. This deviation suggests potential differences in educational access or cultural attitudes toward women's education in Krishnapur.

Figure 6. Education level of the respondents



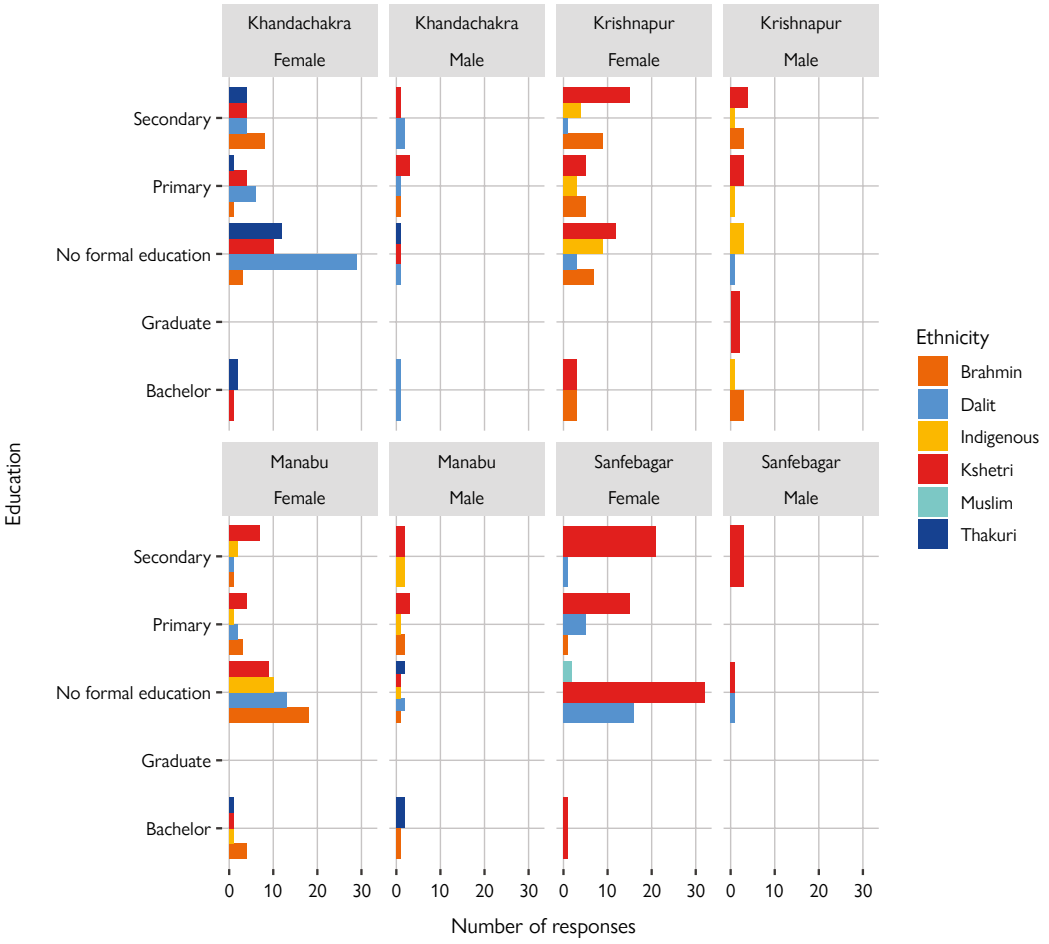
The survey reveals a scarcity of respondents with graduate or undergraduate degrees, highlighting limited opportunities for higher education in these communities. The data suggest a slightly higher proportion of men holding these degrees than women. This disparity could be attributed to various factors, including societal expectations around men's education and career paths, or potential economic constraints that prioritize male participation in higher-earning professions.

Several factors explain these overall observations. Limited access to educational institutions, particularly for women in some municipalities, could be a contributing factor. Socioeconomic considerations that prioritize immediate work opportunities over education, especially for women, also play a role. Additionally, the sampling method or target location for the survey may have captured a population with a higher illiteracy rate.

4.2.3. Education and ethnicity

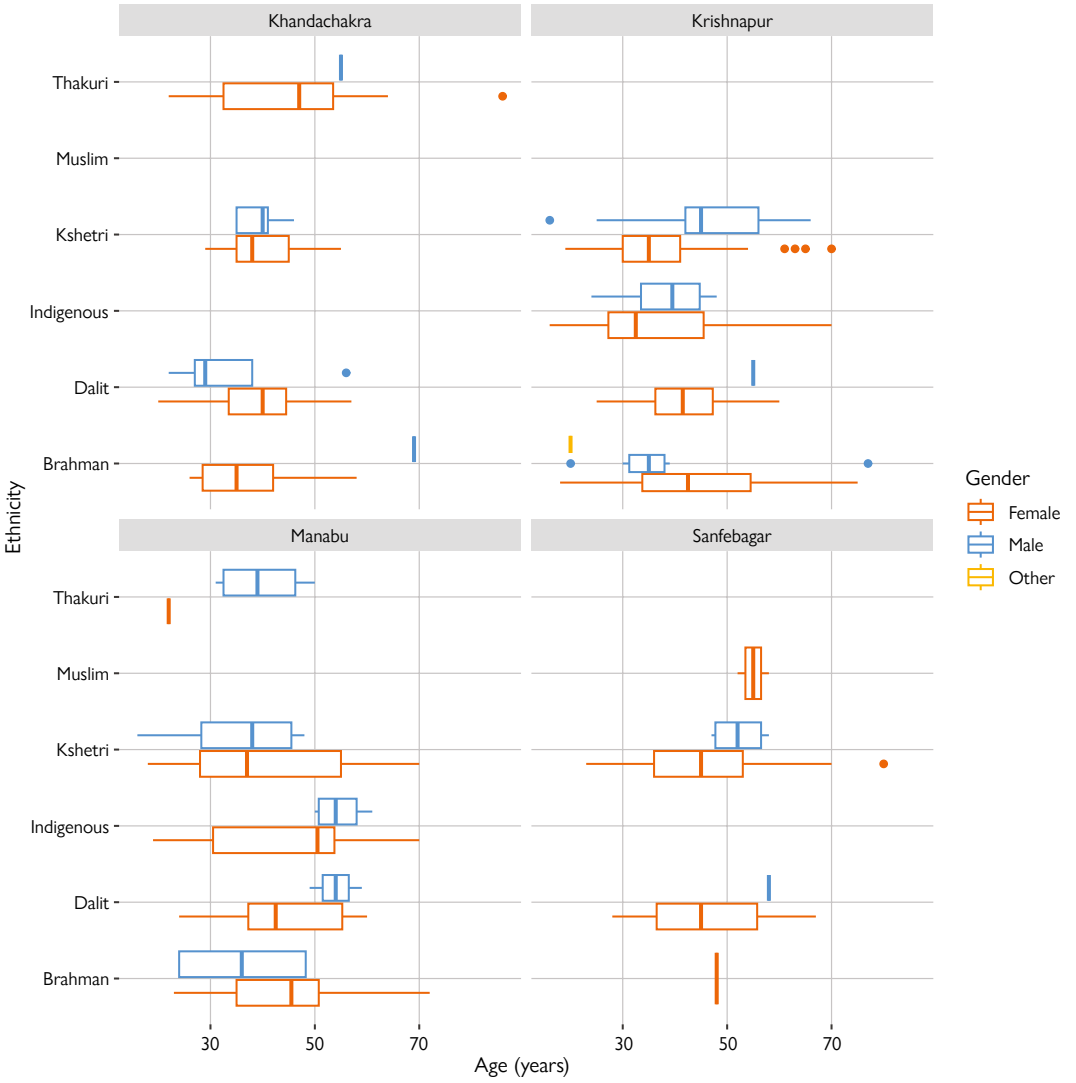
To understand education levels across different ethnic groups, we further analysed the data to produce Figure 7. This figure shows that the Dalit group has a lower proportion of respondents with formal education than do other groups like Kshetri and Brahman. These groups have a more even distribution across education levels.

Figure 7. Education level of the respondents by ethnicity and gender



Education can be a powerful tool that increases the chances of successful migration. It equips individuals with capability in terms of the skills, knowledge and adaptability necessary to thrive in a new environment. On one hand, education can enhance the capability for migration, as individuals with higher education often have access to better job opportunities and higher salaries in destination countries. Additionally, education equips individuals with skills relevant to the labour market. On the other hand, individuals with limited education might possess skills that are not in demand in destination countries' labour markets. They might also struggle to access information about migration processes, requirements and potential challenges. This can lead to uninformed decisions and increased vulnerability to exploitation. Lower levels of education for women and Dalits, and especially for Dalit women, could be lowering their capability to migrate, particularly in Khandachakra and Sanfebagar (Figure 7). Similarly, Kshetri and Dalit women have lower levels of education that could constrain their access to local opportunities as well as limit their capacity to migrate.

Figure 8. Ethnicity, age and gender of the respondents

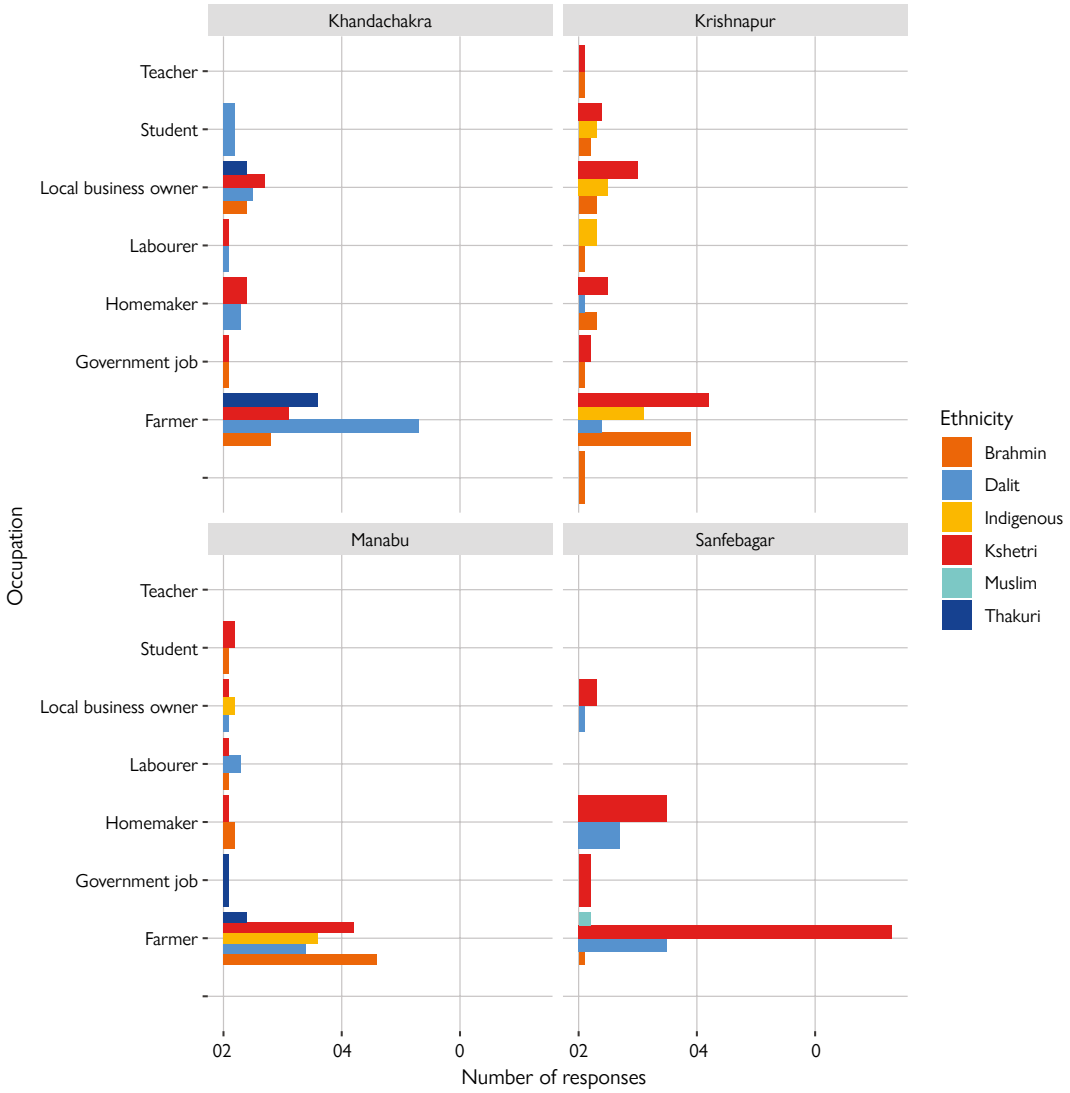


The survey data reflect the ethnic composition of the study area, with a majority of respondents belonging to Kshetri and Dalit groups (Figure 8). Sanfebagar Municipality had a higher representation of Kshetri households, while Khandachakra included a relatively larger proportion of Dalit households. Krishnapur showed a higher number of representatives from Indigenous groups, and Mahabu exhibited a more balanced distribution across Kshetri, Dalit and Indigenous groups.

4.2.4. Farming as the dominant occupation

Farming is the dominant occupation across the surveyed municipalities, with participation rates ranging from 56 per cent in Krishnapur to 81 per cent in Mahabu (Figure 9). This dominance of farming suggests a potential mismatch between the educational qualifications of the workforce and the availability of jobs requiring higher skills or even applying technologies such as climate-smart farming practices.

Figure 9. Occupation by ethnicity of the respondents



The data also indicate a limited presence of individuals engaged in local business, labour work, government jobs and teaching. This scarcity of respondents in non-agricultural sectors further reinforces the notion that limited educational opportunities might be restricting residents from pursuing diverse career paths. Khandachakra, Sanfebagar and Mahabu have fewer respondents engaged in local business and labouring than does Krishnapur. Government and teaching jobs are significantly less common in all four municipalities; government and teaching jobs seem concentrated among Kshetri and Brahman respondents. Sanfebagar had a larger proportion of housewives. Dalit respondents were primarily farmers across all municipalities, while farming was also the most common occupation for Kshetri respondents in Sanfebagar and Krishnapur. Mahabu, however, had a higher number of Brahman farmers compared to other municipalities.

4.2.5. Education, occupational and ethnic disparity

The data suggest a potential link between education, occupation and ethnicity. The observation that Dalit respondents were primarily farmers across all municipalities aligns with the finding that Dalit respondents had lower education levels than did respondents of other ethnicities. This suggests that educational disparities might translate into occupational limitations, restricting social mobility for certain groups. In contrast, Kshetri and Brahman respondents were more likely to hold government and teaching jobs, which typically

require formal and higher educational qualifications. However, it is important to note that some respondents with bachelor's degrees were also engaged in farming. These individuals might be better positioned to adopt improved farming techniques, including climate-smart practices, than farmers with no formal education. The more educated farmers could also enhance agricultural productivity and contribute to a more sustainable farming sector.

4.2.6. Expenditure pattern across the surveyed households

Spending patterns can vary significantly between households due to factors like daily life choices, geographic location and age of household members, and might not parallel income. For example, a low-income household might have high necessary expenses (such as health necessities). Although the expenditure data do not reveal the quality or quantity of goods (such as food and other basic requirements) purchased, the research used those data to understand economic status as well as the capacity to migrate or to adapt to environmental stressors.

Figure 10. Monthly expenditure of the surveyed households by gender of head of household

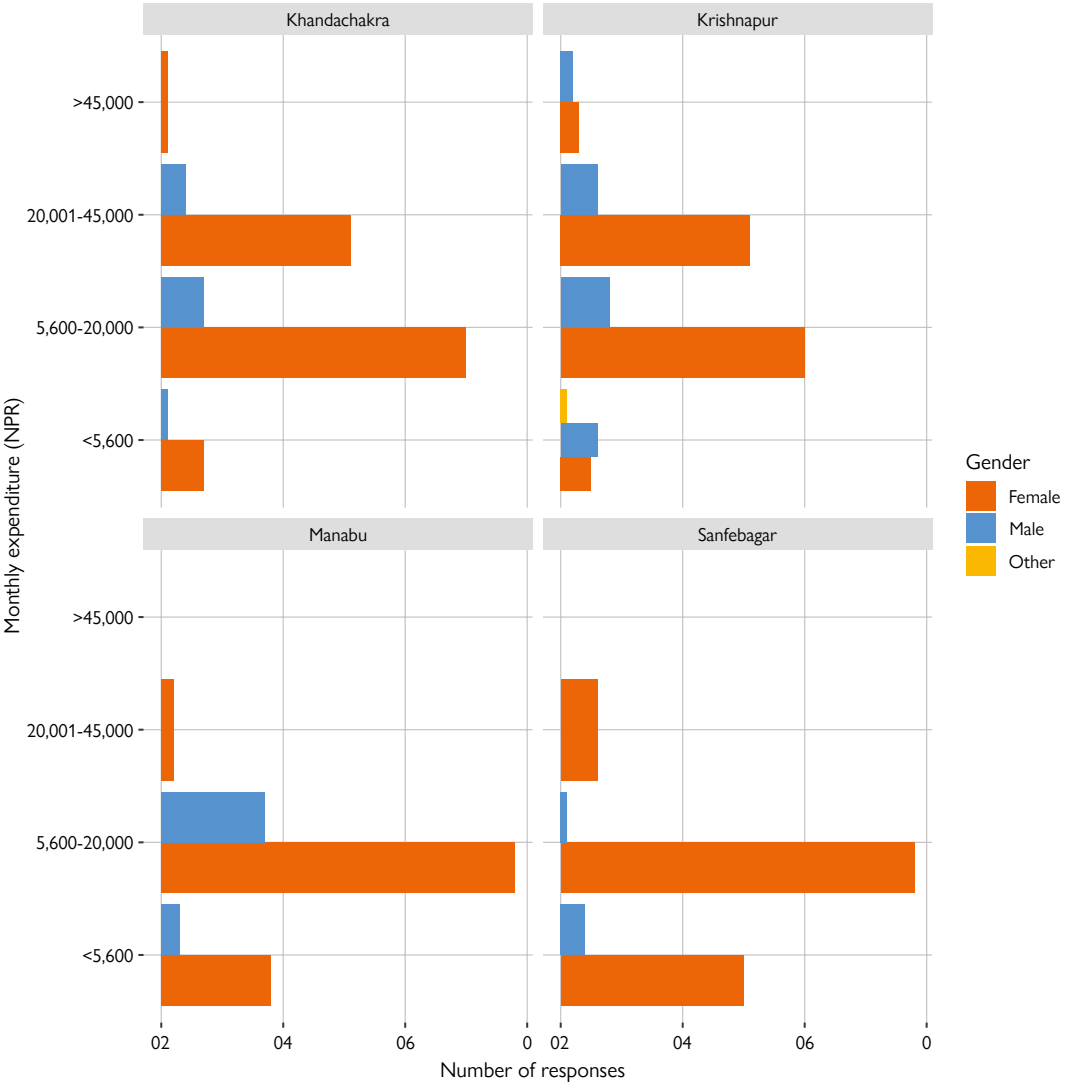


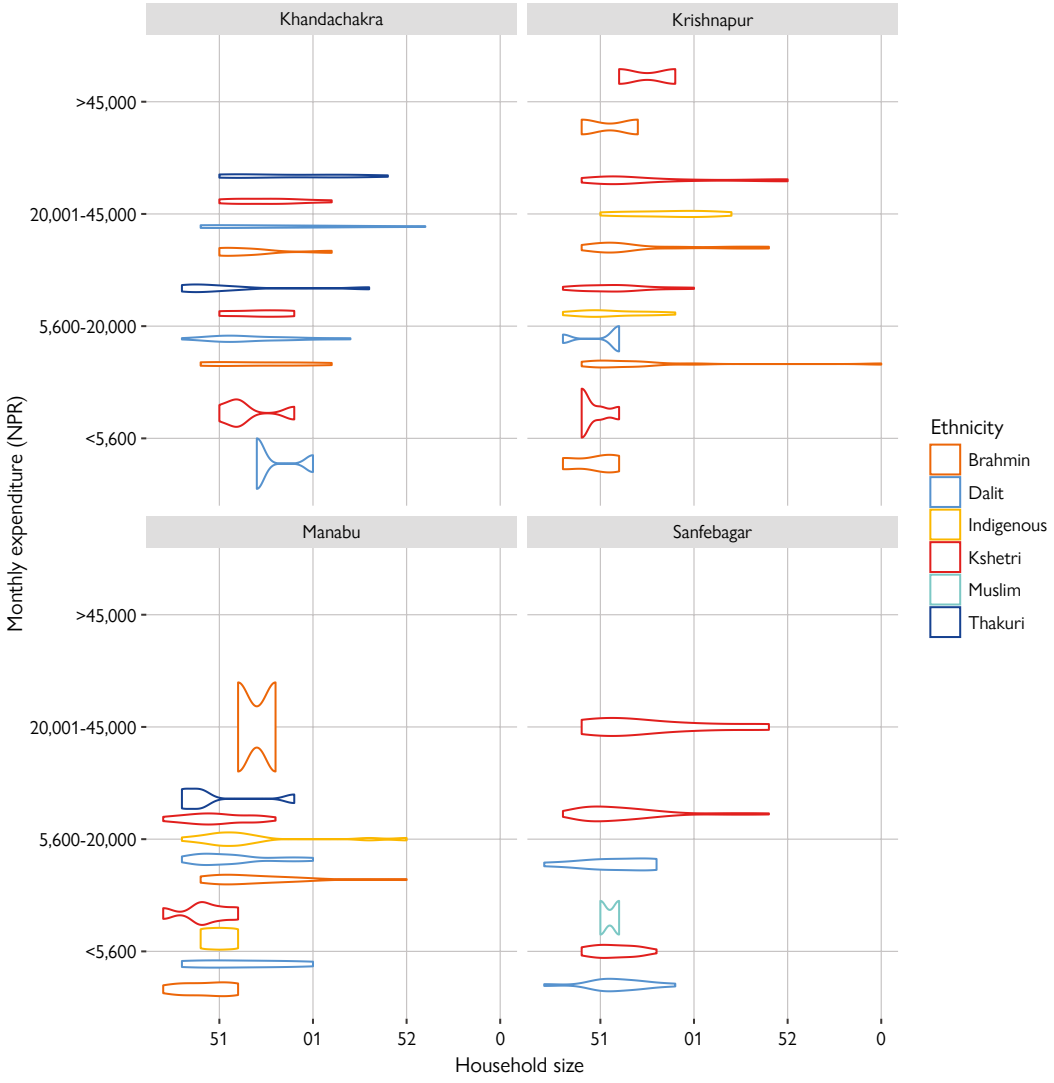
Figure 10 shows most of the surveyed households spend between NPR 5,600 and 20,000 per month. Almost one third of respondent households in Khandachakra and Krishnapur said their expenditure reached up to NPR 20,000 to 45,000 per month, while a very small number of households spend more than 45,000 per month in these two

municipalities. In contrast, a significant number of households in Mahabu and Sanfebagar spend less than NPR 5,600 per month. Less expenditure per month could indicate less income, which might force local residents to migrate, particularly to towns and to India. It is worth repeating that high expenditure does not necessarily translate to high income. As several respondents mentioned, a lack of local income opportunities in Khandachakra forced them to spend their savings or borrow money to meet their needs, leading to a perceived high expenditure despite lower income. Outmigration due to limited earning potential further strengthens this point. This part of Nepal has historically engaged in seasonal and labour migration to India, and this practice still continues.

Khandachakra's environmental challenges (see Table 4) might also contribute to higher spending. Residents might need to spend more on resources like clean water, sanitation, or health care due to environmental factors.

To understand the capacity of a household to engage in migration and to adapt to environmental stressors, it is useful to consider the size of the household alongside expenditure. Of two households with similar expenditure, one with more members might be dedicating a higher portion of their income to basic needs than would a household with fewer members, and so have less money available to meet these adaptive needs.

Figure 11. Monthly expenditure of different ethnic groups across the surveyed households about a family member



It is very important to understand the nexus of expenses, and family size to understand the adaptive capacity of the household to environmental stressors and migration. Considering family size alongside expenditure can provide a more nuanced picture. A larger family with similar expenditure to a smaller family might be dedicating a higher portion of their income to basic needs. Conversely, a smaller family with high expenditure might have more disposable income.

The relationship between family size and expenditure varies across ethnic groups and study sites (Figure 11). In Mahabu, Brahman and Dalit families generally follow a trend of increasing expenditure with larger family sizes, often falling within the NPR 20,001–45,000 range. Indigenous families in Mahabu exhibit a more diverse spending pattern, with some larger families reporting lower expenditures and others higher ones. Kshetri and Thakuri families typically spend more as their family size increases.

In Sanfebagar, a similar trend is observed among Brahman, Dalit, and Kshetri families. Indigenous and Muslim families in Sanfebagar show more varied spending patterns, with some larger families reporting lower expenditures and others higher ones.

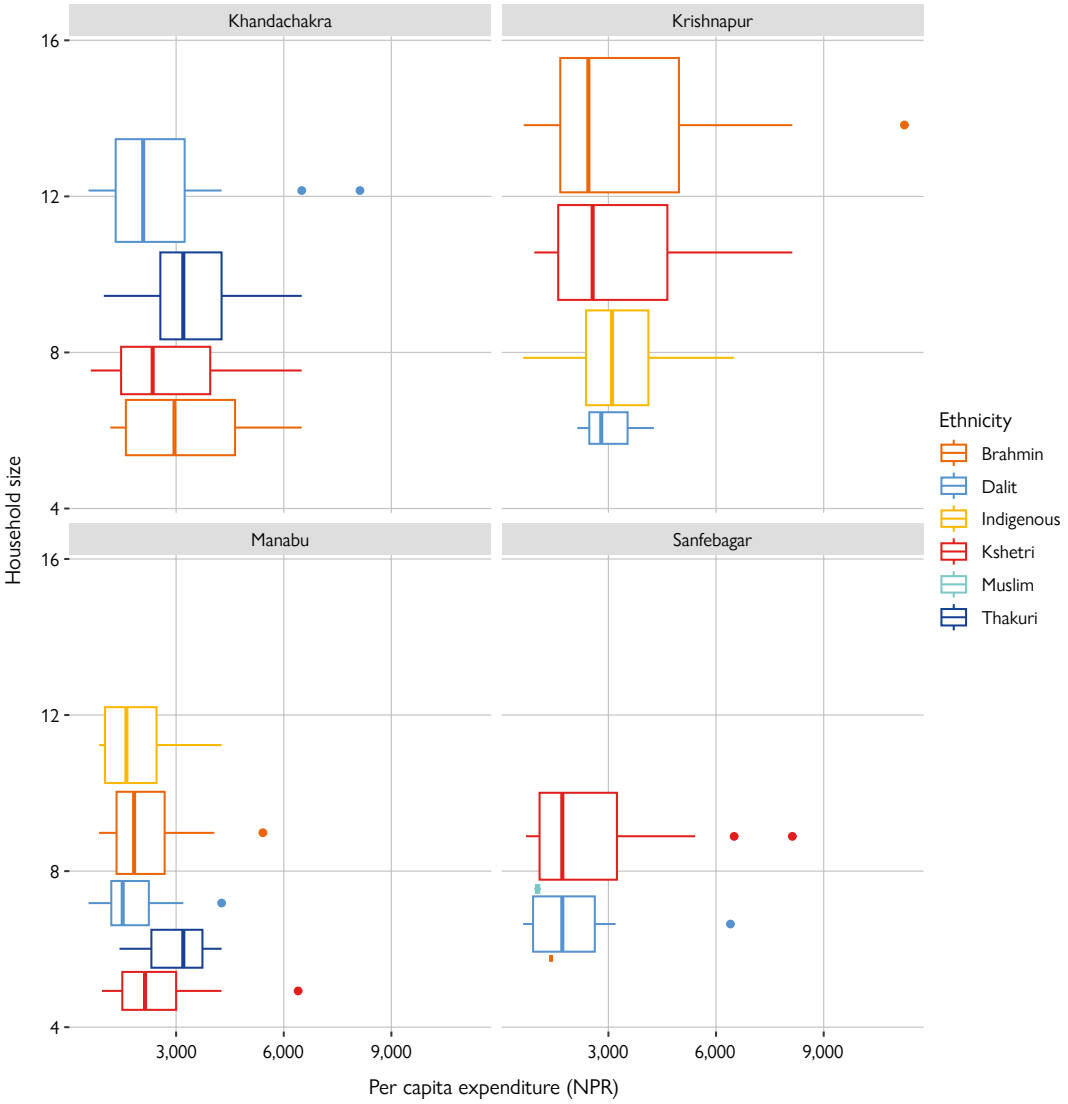
In Khandachakra, the relationship between family size and expenditure is less consistent. Brahman and Kshetri families may have some larger families in lower expenditure brackets, while Indigenous and Dalit families display wide variability in spending. Thakuri families generally have higher expenditures for larger families, but with some exceptions.

In Krishnapur, the expenditure pattern is more balanced across family sizes, particularly among Brahman and Kshetri families. Dalit and Indigenous families in Krishnapur might have larger families spread across all expenditure categories, reflecting diverse economic conditions. Muslim families show a wide range of expenditures regardless of family size, while Thakuri families generally exhibit higher spending with larger families, though some may fall into lower expenditure brackets due to specific factors.

As expected, analysis of expenditure across ethnic groups (Figure 11) reveals a general trend of increasing total expenditure with larger family sizes.[5] This is likely due to the need to provide for more basic necessities like food, clothing, and shelter within a household. To account for these variations and enable a fairer comparison across households, per capita expenditure was calculated (monthly expenditure divided by family size). This metric provides a better sense of individual economic well-being within a family.

5 The survey questionnaire did not ask whether the ethnicity of all the members of a household was the same as the ethnicity of the respondent. Though inter-ethnic marriage and cohabitation is legal in Nepal, it is not very commonly practiced.

Figure 12. Per capita expenditure per month of different ethnic groups across the surveyed households



This metric provides a better sense of individual economic well-being within a household. Figure 12 indicates a concerning amount of poverty across all municipalities. The estimated per capita expenditure ranges from below NPR 600, signifying a state of economic deprivation, to above NPR 11,250. However, we observe some variations across municipalities. In Khandachakra, Mahabu and Sanfebagar, the per capita expenditure is concentrated between NPR 1,500 and 3,000, while Krishnapur shows an average of around NPR 2,800.[6]

The analysis of per capita expenditure (Figure 12) reveals a pattern of economic disparity across ethnic groups and municipalities. Several Dalit households are concentrated in the lower end of the expenditure range, particularly in Khandachakra, Mahabu and Sanfebagar. This suggests a potential for lower income and dependence on subsistence farming for survival in these areas.

6 On 15 April 2024, the conversion rate from United States dollars to Nepalese rupees was USD 1 = NPR 133.43, or NPR 1,000 = USD 7.5.

Furthermore, Indigenous and Muslim households in Mahabu and Sanfebagar also show indications of lower per capita expenditure. Similarly, a small number of Kshetri households across all municipalities, along with Brahman and indigenous groups in Krishnapur, appear to fall within the lower expenditure range.

4.2.7. Household size and expenditure

We can prove a statistically significant association between household size and per capita expenditure by performing a chi-squared test, using the number of household members and per capita expenditure. The very low p-value that is produced (<0.000) indicates that there is a strong relationship between the number of people in a household and how much money is spent per person in that household.

For each municipality, the results of the chi-squared test between household size and per capita expenditure show a very high chi-squared value (3,000), a relatively high degree of freedom (630), and a very small p-value (and thus high significance: 2.2e−16). Therefore, the chi-squared test results strongly suggest a statistically significant association between household size and per capita expenditure. In simpler terms, the data provide concrete evidence that these two variables are not independent. There is a clear relationship between the number of people in a household and how much money is spent per person.

An abandoned house in Sanfebagar after the landowners migrated out of the municipality.
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5

ENVIRONMENTAL STRESSORS AND HUMAN MOBILITY

5. ENVIRONMENTAL STRESSORS AND HUMAN MOBILITY

5.1. INTRODUCTION

In examining the primary environmental stressors impacting human mobility, livelihoods and gender relationships in the research areas, both the qualitative and quantitative data demonstrate a complex interplay of climatic changes and agricultural decline. This section delves into the key environmental stressors and mobility patterns identified through the lived experiences of the residents of Khandachakra, Krishnapur, Mahabu and Sanfebagar.

The interviews provide evidence of how the disruption in regular rainfall patterns has decimated traditional farming practices. Once, a stable food supply could be provided by relying on rainwater for cultivation, but this regular rainwater has been compromised, leading to insufficient farm yields that cannot sustain the community even for a few months. The need to resort to pond water – although not believed by locals to be as effective as rainwater – signifies the desperate measures taken to mitigate water shortages. Moreover, the emergence of new pests and plant diseases add another layer of adversity. The necessity of pesticides, which were previously unnecessary, indicates a fundamental change in the agricultural ecosystem, likely driven by altered climatic conditions and the loss of natural pest predators due to deforestation. Livelihood strategies in these regions are limited because of low agricultural productivity, lack of industries and limited job opportunities (Thapa, 2013). The regions are also historically neglected by the State, with poor infrastructural development and lacking basic facilities. With restricted livelihood options and adverse living conditions triggered by climate change and environmental stressors impacting human security, migration remains a key mitigation strategy (Silchenko and Murray, 2023). Further details have been presented in the sections below.

5.2. ENVIRONMENTAL STRESSORS IN THE RESEARCH AREAS

This section explores the critical relationship between environmental stressors and human mobility in the study area, encompassing four municipalities. As previously discussed, these municipalities exhibit varying demographic characteristics, with Khandachakra and Krishnapur having (among other differences) larger populations than Mahabu and Sanfebagar. Understanding these population distributions becomes crucial when examining the potential impact of environmental stressors on migration patterns.

Figure 13. Perception of environmental change – setting the stage

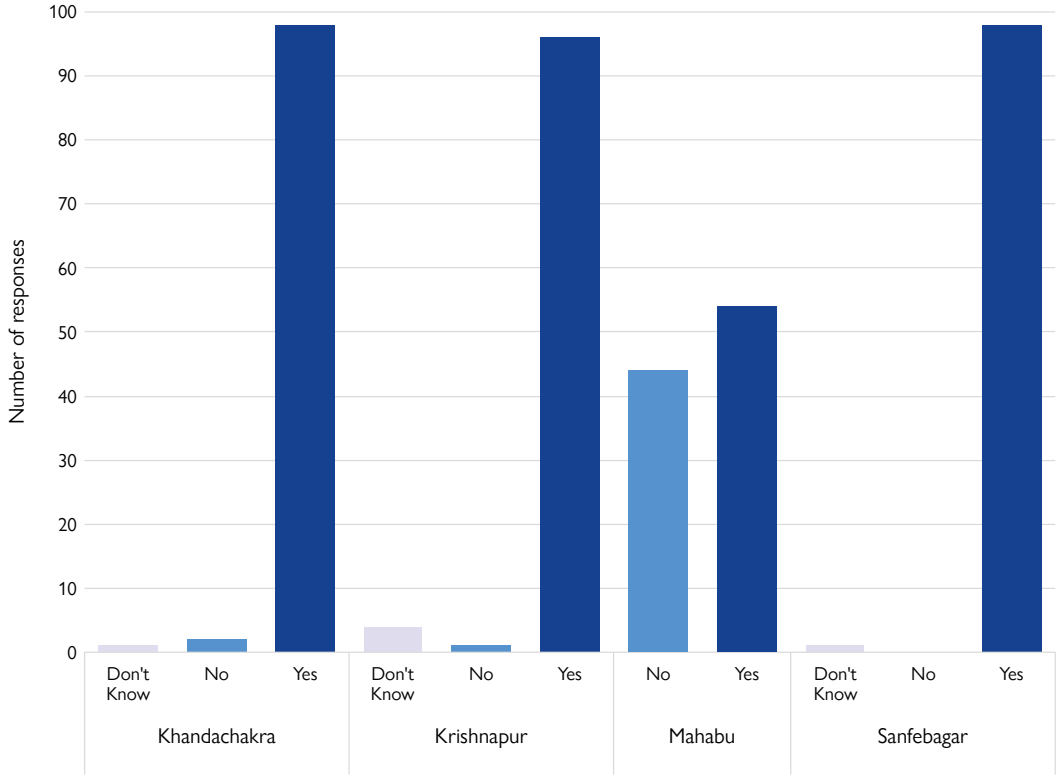
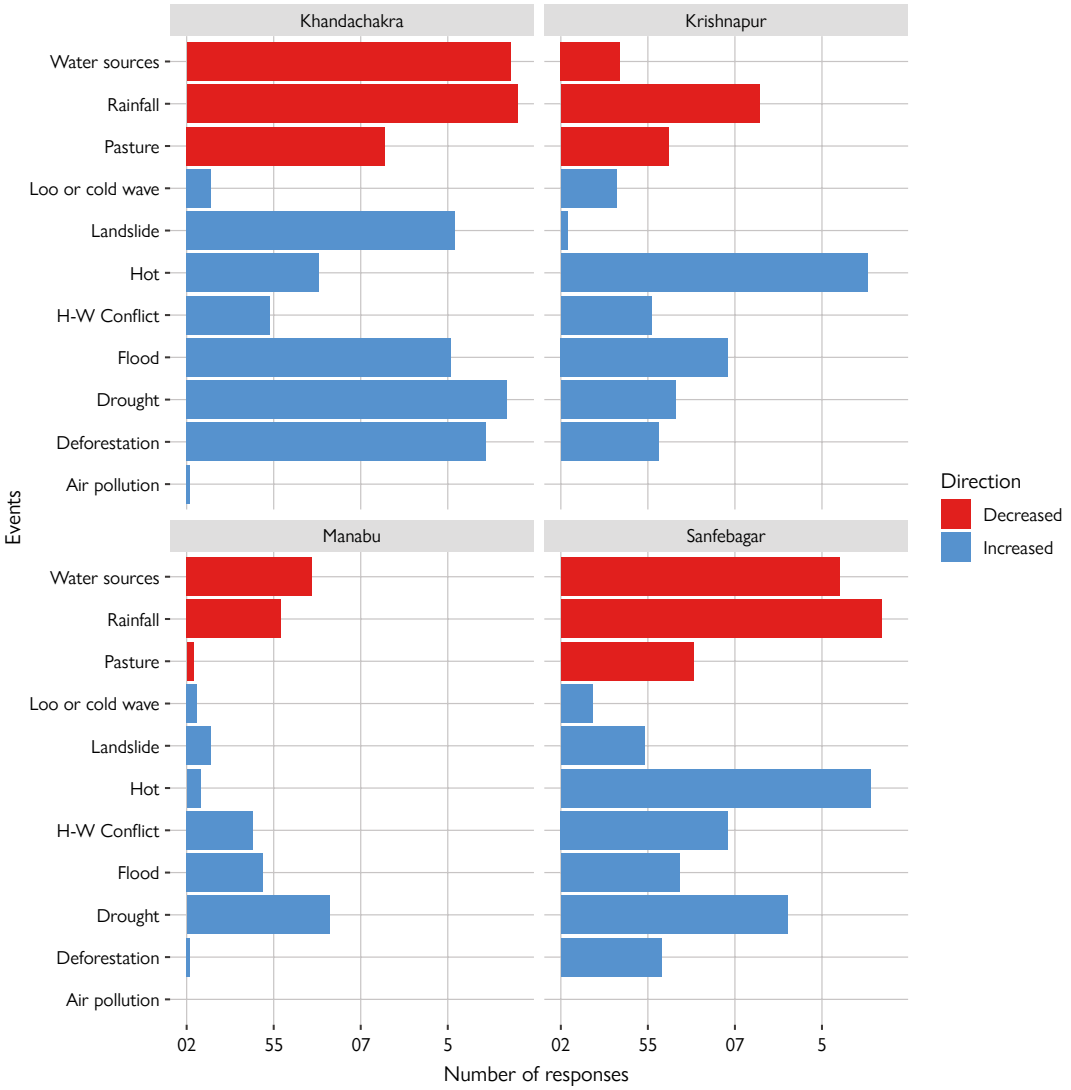


Figure 13 establishes the foundation for understanding the link between environmental degradation and human mobility. It reveals a high level of awareness about environmental changes across most municipalities, particularly Khandachakra, Krishnapur and Sanfebagar. This widespread recognition underlines the urgency and visibility of environmental issues in these regions. Notably, Mahabu exhibits a more varied perception, highlighting the need for increased awareness campaigns and education regarding environmental challenges in that specific municipality.

A significant majority of respondents in Khandachakra, Krishnapur and Sanfebagar – 98 per cent in each – reported perceiving environmental changes, indicating a high level of awareness in these areas. In contrast, Mahabu shows a more divided perception, with 54 respondents acknowledging environmental changes and 44 respondents indicating they have not noticed any changes. Notably, the "don't know" category has minimal responses, suggesting that most people have a definite opinion on the matter.

Figure 14. Perception of environmental changes across municipalities

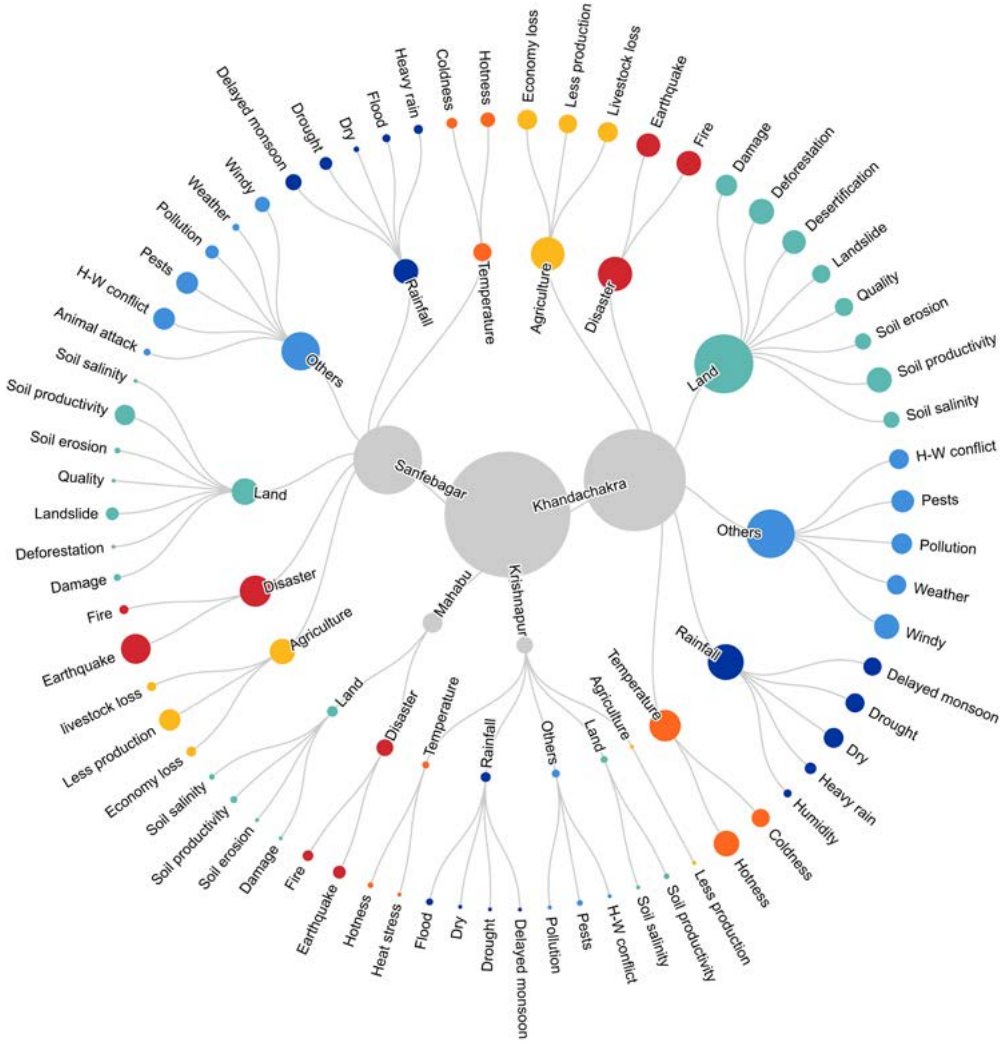


Note: H–W conflict is human–wildlife conflict.

Figure 14 offers a graphical representation of the specific environmental changes perceived by the respondents. Each event is colour coded to indicate whether the respondents perceived an increase (blue) or decrease (red) in the frequency or severity of the event or the availability of the resource. The events assessed include rapid drying up of water sources resulting in water source decrease (perceived by 226 respondents across all four municipalities), rainfall change (271), pasture area change (128), loo or cold wave according to the ecological zone of the surveyed municipality (35), landslides (110), human–wildlife conflict (117), hot temperature (219), flood (180), drought (231), deforestation (144), and others (1 perception in Khandachakra of an increase in air pollution).

Across all municipalities, we see a perceived decrease in water sources and rainfall, with Krishnapur and Sanfebagar reporting the most significant drops. There is a perceived rise in temperatures, and increases in the frequency of droughts and in the amount of land undergoing deforestation, with Khandachakra and Krishnapur showing the most substantial increases in the frequency of these events. Additionally, human–wildlife conflict and landslides are perceived to be on the rise, particularly in Khandachakra and Sanfebagar. The results suggest a widespread apprehension about the degradation of natural resources and the intensification of adverse environmental conditions across these regions.

Figure 15. Environmental stressors on the various fields that induced migration in the study area



Altogether, 959 responses were documented mentioning various stressors due to environmental changes. Agricultural impacts were prominent (109), as were concerns about economic loss (30), reduced production (50) and livestock loss (29). Disasters (147) were another major stressor, with earthquakes (98) and fires (49) being the most frequently mentioned. Land-related issues (264) were diverse, encompassing damaged land (32), deforestation (40), desertification (34), landslides (30), declining land quality (21), soil erosion (19), reduced soil productivity (68) and increased soil salinity (20). Rainfall patterns (121) also caused stress, with concerns about delayed monsoons (37), droughts (33), dry conditions (27), floods (7), heavy rain (13) and high humidity (4). Temperature fluctuations (83) were another commonly perceived environmental change, with mentions of cold spells (27), hot weather (55) and heat stress (1). Finally, other stressors (235) included animal attacks (3), human–wildlife conflict (54), pest outbreaks (62), pollution (38), unpredictable weather (26) and strong winds (52).

Figure 15 provides an intricate visualization of the environmental stressors reported by respondents in the four municipalities. Each municipality is represented by a central node, from which various categories of stressors branch out. These categories include rainfall, temperature, disasters, agriculture, land and other factors, each distinguished by a unique colour. The size of the balls representing each stressor correlates with the number of

respondents who identified it, indicating the prevalence of the perceived environmental stressor.

Throughout the research, precipitation and temperature-related stressors emerged as the key environmental stressors, manifesting through unpredictable and extreme weather patterns. The once more-or-less predictable climatic conditions have given way to anomalies that disrupt traditional farming practices and that have significantly affected livelihood options. Research participants across all four study areas highlighted changes in precipitation and temperature patterns, disrupting the agricultural calendar. For example, a 72-year-old Thakuri male respondent from Khandachakra noted a shift in seasonal patterns: "Earlier, it used to be cold and hot in time, but now it becomes very cold during winter and very hot during summer. Now different mosquitoes and new insects have appeared."

This erratic weather also brings about disaster-related stressors such as lightning, hailstorms, thunderstorms, floods and landslides, exacerbating the community's vulnerabilities. The unpredictability of rain and extreme weather events like hail further diminish crop yields, leading to economic losses and food insecurity. As a 54-year-old Dalit female respondent from Khandachakra detailed, hail and sudden landslides have become recurrent issues that destroy crops and threaten lives:

> Hail comes after the crops are ready for harvesting. All the ripe crops are crushed [by hail]. It does not come to benefit. It always comes down to making a loss. Landslides also take people's lives. In my neighbourhood, a landslide swept away an elderly woman while her husband was spared. This happens a lot during the rainy season.

In some areas (such as Mahabu), the trend of disaster-related stressors has severely increased in the form of thunderstorms and lightning causing loss-related stressors that accompany both human casualties, livestock loss and property damage (see tables 3 and 4). A 40-year-old Brahman female respondent from Mahabu told the research team about the death of her daughter-in-law due to lightning and the severe damage to her household:

> One day there was a heavy rain and thunderstorm and the whole house was flooded. My grandchildren and daughter-in-law were inside and I was sitting next to the door. Suddenly there was lightning in the house. The house collapsed. I was covered with mud. We were trapped by the rubble. It felt like being burnt on fire. I lost my voice completely because of fear. Buhari [daughter-in-law] started shouting in confusion. The lightning struck again. After the second lightning strike, everyone's voice was lost. The thunderbolt hit Buhari. She was unconscious. Everyone started crying. When the neighbours arrived, her face had completely turned black. We took her to the hospital in the city hoping that she would survive. But the doctor declared her dead.

The threat of deforestation as a result of increasing population differed across the regions, especially between more urbanized and less urbanized areas. For instance, large amounts of land have undergone deforestation along highways and near city centres. The responses of the interviewees and discussion group participants emphasize a drastic shift in the region's landscape due to deforestation. Forests played a critical role in maintaining ecological balance and agricultural productivity. As a 45-year-old Kshetri female respondent from Krishnapur reflected:

> Earlier, there was abundant forest area, various trees and plants. It used to rain on time, the climate was not bad, there was no pollution, the forests were very green, but now it is very dry. With the increased population, the forests have been destroyed.

Roads and landslides in Kalikot. © IOM 2024/Sanjay SHARMA

The depletion of forests has led to significant soil fertility decline. As the forest cover receded, the protective layer that prevented soil erosion and maintained moisture levels vanished. Consequently, the soil quality has deteriorated, leading to reduced agricultural yields. The degradation of the local environment has made it challenging for farmers to sustain their livelihoods, leading to a decline in agricultural output and pushing households to seek alternative means of income. The unpredictability of the climate, with increasingly irregular rainfall and increased instances of drought and landslides, exacerbates the situation, making farming a less viable option. As a 68-year-old Thakuri male respondent from Khandachakra observed:

> There used to be enough rain in the past and the crops were good. Now, the forest has been cleared and there is no cattle ranching area. There is no water and the crops have died out.

For other places within the study area, the relevant aspect of deforestation has not been declining soil fertility, but rather the loss of wildlife habitat. In these more marginal places, adjacent to dense forest, local wildlife would live adjacent to but independent of humans. Here, deforestation has initiated human–wildlife conflict: most of the farms in hill areas have now been affected by the regular visits of monkeys, wild boars and porcupines, forms of wildlife that inhabited the now absent forests. Recently, in late April 2024, a wild boar appeared in Bhairabi Rural Municipality (which borders Mahabu), injuring seven local farmers.[7] As wild animals destroy farm yield, there has been a big uproar to solve the issues. Various efforts have been made, including violent ones, but with limited impact (Adhikari, 2018; Baral et al., 2021). A 42-year-old Brahman female respondent from Mahabu described the decreasing agricultural productivity and increasing human–wildlife conflict in the area:

7 Please see this article on how seven people were injured while harvesting wheat due to wild boar attack in Dailekh.

> The crops are far less than before. It is all eaten up by animals and birds. Even whatever little amount grows, the monkey will eat everything and finish it, what can we do? There were no monkeys here. Maybe because Banmara [Crofton weed; ***Ageratina Adenophora***] has grown so much that the monkeys have increased. While I am sitting here the monkeys might be feeding on my farm right now. They come in numbers. Monkeys and porcupines have troubled us a lot.

The cumulative effects of environmental stressors – including these wildlife encounters, though primarily the lack of timely precipitation and irrigation facilities – have led to a noticeable decline in agricultural productivity. Interviewees lament the loss of crop diversity and yields that once supported their livelihoods. A 55-year-old Kshetri female respondent from Sanfebagar reminisces about abundance:

> There used to be beans and chilly here. There used to grow pumpkins, cucumbers, tomatoes and chichinda [snake gourd]. It used to rain. There were vegetables. There were crops. Now there are no crops, there are no vegetables. There is no rain even when you desperately need it.

Water scarcity is a recurrent theme in the qualitative interviews, highlighting its crucial role in agriculture and daily life. The diminishing forest cover and changing climate have severely impacted water availability.

The overall effect of these environmental stressors – and more importantly, the perception of them – has been to induce human mobility. As a 39-year-old Brahman female respondent from Mahabu stated:

> There is no water for people to drink, where will the water for irrigation come from? This scarcity affects both drinking water supplies and agricultural irrigation, compounding the challenges faced by the community. Environmental reasons are the number one for migration. Vegetables can be planted if the rain is timely and sold in the market. But there is no water even for drinking. It is impossible to find water for irrigation. It is not even possible to raise chickens because there is no water. People have to leave to earn.

A 35-year-old male Janajati worker for an environmentalist NGO in Mahabu had a nuanced take on the issue of water scarcity. He believed that the haphazard development works have exacerbated the problems brought about by climate change. He suggested:

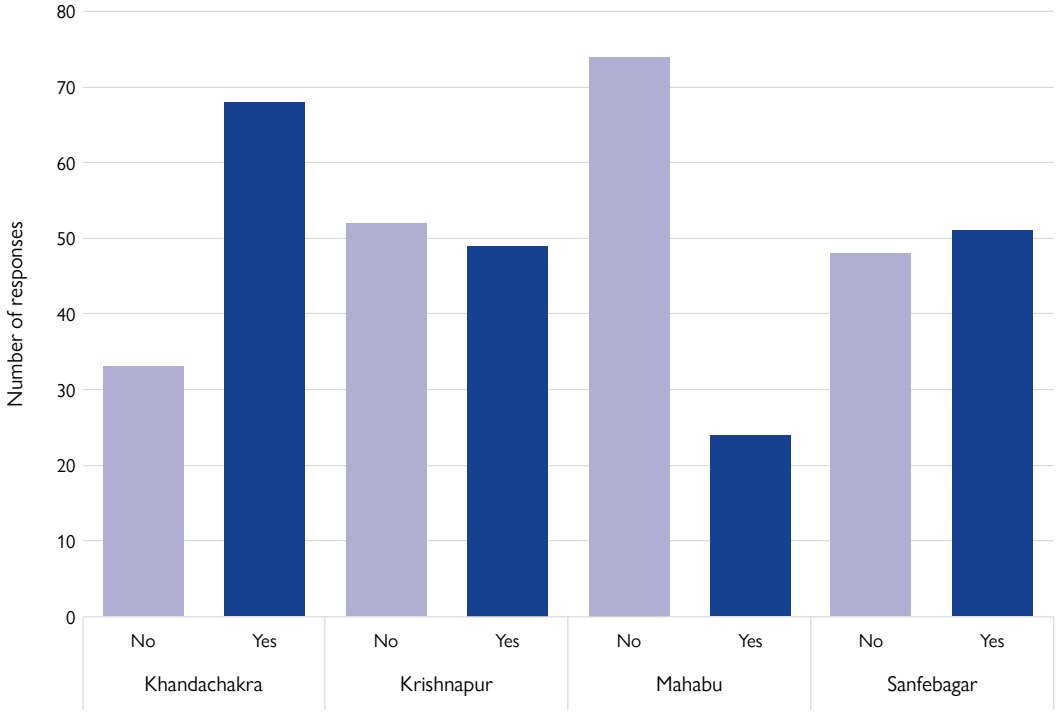
> Forest fire and lightning are the main problems in Mahabu. However, landslides are caused mainly by humans because of haphazard development works. There is a problem of soil erosion because of road construction. Water sources should be protected while carrying out road projects. Water sources are currently drying up due to climate change and that is getting more intense because of unplanned road projects. The water collection tanks are empty. Water in Mahabu is brought via pipes from sources that are very far away.

A 62-year-old Brahman male elected official from Sanfebagar also echoed this thought:

> In the past, there was no vibration when constructing roads as humans used to build them. But now, the machine bulldozes the road, and the vibration causes the soil and rock to fall off the road and cause great damage in the rain.

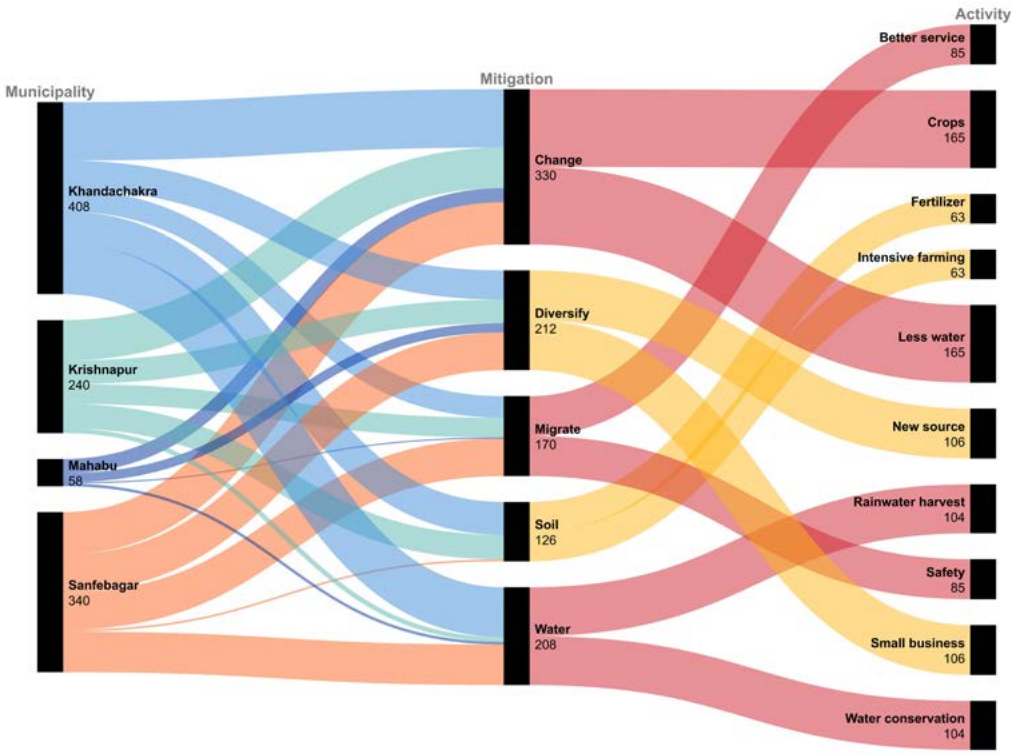
He, however, does not think there is an alternative to such development as people's access to roads is a basic right. To take development hand-in-hand with environmental measures, policies such as the Environment Protection Act enforce strict environmental compliance through mandatory EIAs and supplementary EIAs. This ensures that development projects do not compromise environmental standards, thereby protecting the right to a clean and healthy environment (see Chapter 3). The government should ensure that measures to reduce the harmful impact of road construction – such as conducting environmental examinations, safeguarding underground water channels and networks, and allocating space for stormwater and planting trees on either side of the road (Devkota et al., 2019) – are thoroughly implemented.

Figure 16. Responses regarding local mitigation measures (used or not)



So far, this section has discussed the environmental stressors perceived by respondents across the studied municipalities. Understanding the mitigation measures employed by residents is crucial for developing best practices that can be adapted for wider use. Responses (Figures 16 and 17) indicate that Khandachakra Municipality had the highest adoption rate of mitigation measures out of the four municipalities. Mahabu lags in utilizing mitigation measures, followed by Krishnapur Municipality. However, in Krishnapur and Sanfebagar, the proportion of respondents using and not using mitigation measures was relatively similar. This aligns with the earlier findings on climate change perception, where respondents in these municipalities reported less awareness of climate change as a problem, and so we would expect to find a lesser urgency to adapt.

Figure 17. Responses on how communities are adapting their farming practices to cope with various climate change impacts



Note: change = change in farming practice (crops = new crop varieties; less water = varieties that need less water); diversity = livelihood diversification (new source = new source of non-agricultural income; small business = shop, restaurant and the like); migrate = migration to urban or other areas (better service = place with better service; safety = place with better security); soil = soil conservation (fertilizer = using organic fertilizers to improve soil quality; intensive farming = maximizing land use and crop rotations); water = water management (rainwater harvest; water conservation).

Figure 17 provides an in-depth view of the mitigation measures adopted by respondents from the four municipalities in response to environmental changes. The Sankey diagram illustrates the number of responses from each municipality directed towards various mitigation strategies, such as changing farming practices, diversifying livelihoods, improving water management, migrating to other areas and implementing soil conservation techniques. Khandachakra, with 408 responses, demonstrates the most comprehensive approach, employing a wide range of measures across all five categories. Krishnapur (249 responses) and Sanfebagar (340 responses) also exhibit substantial engagement across all categories, with significant activities in changing farming practices and improving water management. In contrast, Mahabu, with only 58 responses, primarily focuses on changing farming practices and diversifying livelihoods, indicating only limited engagement with other strategies.

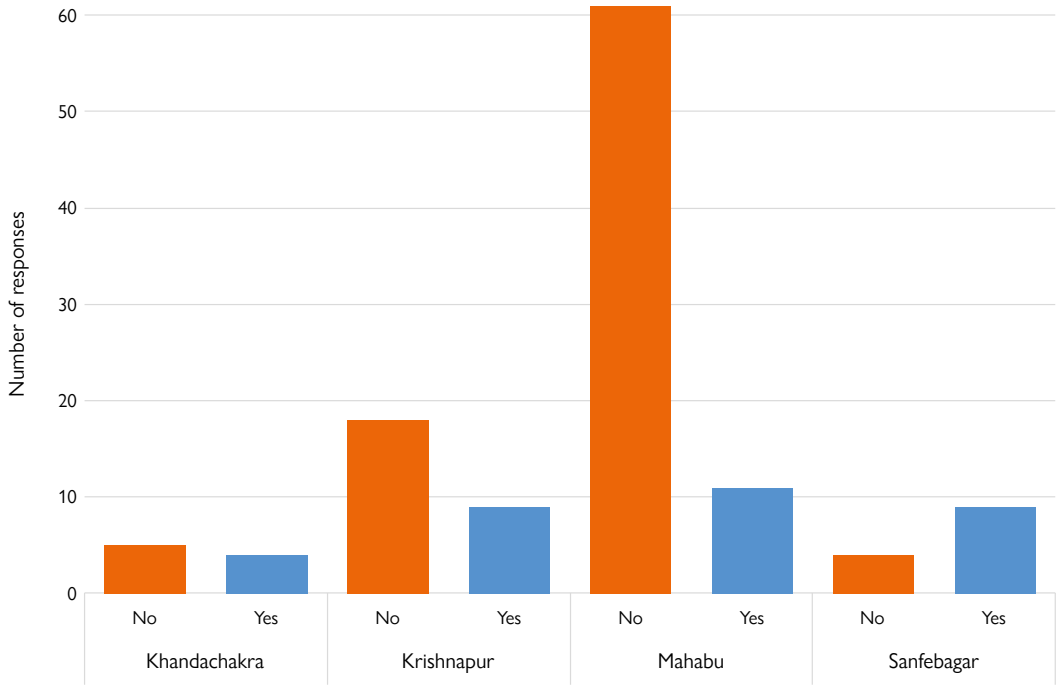
The specific activities within each category further highlight the communities' adaptive efforts. For example, changing farming practices include deep cultivation, fertilizer application and constructing rainwater harvesting systems, with a total of 330 responses. Diversifying livelihoods involves finding new sources of income and starting small businesses, accounting for 212 responses. Improving water management, which includes water conservation and using less water, is a significant focus, especially in Khandachakra and Sanfebagar. Migration to rural or safer areas and implementing soil conservation techniques, such as planting different crops, are also notable strategies. This detailed depiction underscores the varied yet strategic responses of these municipalities to mitigate the impacts of environmental changes through diverse and specific activities.

Migration emerged as a key strategy aiming to mitigate the effects of climate change, as highlighted in Figure 17 above. Furthermore, the survey responses regarding preparing to migrate or willingness to migrate (Figure 18) suggest a fascinating connection to the previously discussed demographic characteristics. Notably, households in Mahabu and Krishnapur showed a higher tendency to stay put compared to those in Khandachakra and Sanfebagar. This aligns with the earlier findings on agricultural dependence: specifically, that members of households primarily engaged in farming are less likely to migrate than members of households engaged in other economic activities.

Respondents in Mahabu specifically mentioned very good potato production. Additionally, the population size in Mahabu is relatively small. This combination of factors – strong agricultural production and a smaller population – might contribute to a sufficient local income for some families, reducing the need for outmigration for foreign employment, as compared to residents of the other three municipalities.

Krishnapur's proximity to India allows local residents to more easily access seasonal work opportunities there. During the farming season, they can return home to tend to their agricultural activities. Agriculture itself is reported to be quite productive in Krishnapur, further contributing to the potential for a sufficient livelihood within the community.

Figure 18. Household members preparing to migrate



As noted in Figure 18, the situation in Khandachakra and Sanfebagar presents quite a different picture from the situation in Krishnapur and Mahabu, in terms of household members preparing to migrate. More individuals from Krishnapur and Mahabu have successfully developed alternative livelihood options. In Sanfebagar, such alternative livelihood options might include ventures like commercial scale pine resin tapping, and in Khandachakra they could include harvesting and marketing high-value wild mushrooms and medicinal plants in Khandachakra. Such potential sources of income might not have been fully realized due to various factors like a lack of infrastructure, investment, or technical expertise.

Communities across the study areas were grappling with severe environmental stressors that interconnect and amplify each other. For instance, deforestation leads to soil degradation and water scarcity, which, combined with erratic climate patterns, devastate agricultural productivity. The resultant food insecurity and economic losses drive further environmental degradation as communities may turn to unsustainable practices to survive. The primary environmental stressors identified – change in temperature and precipitation patterns, dryness and drought, agricultural decline and human–wildlife conflict – are deeply interwoven. Moreover, these environmental stressors have forced changes in human mobility. The degradation of agricultural lands and the risks posed by extreme weather events may prompt migration in search of better living conditions. This, in turn, can lead to further socioeconomic challenges both in the communities of origin and in the destination communities.

5.3. ENVIRONMENTAL STRESSORS AND LIVELIHOOD AND MIGRATION PATTERNS

Building further on the previous section, the following analysis establishes the impact of environmental stressors on livelihood patterns and migration cycles. In some instances, migration is more visible and direct – that could be associated with forced migration, while in many other cases, the relationship is more complicated and interwoven. For example, both the disasters and the fear of possible disasters in the future, such as the flooding of the Budhiganga River in Sanfebagar, has displaced people in search of safety and stability. Some individuals were displaced because of the Budhiganga's sudden flooding because of erratic or extreme rainfall. Some individuals were forced to flee within Sanfebagar to a relatively safer location or areas beyond Sanfebagar, including India, leaving behind their land and community. The occurrences of extreme precipitation and flood events are increasing because of climate change (Tabari, 2020; Wasko et al., 2021). A 35-year-old Kshetri female respondent from Sanfebagar explained this:

> I say that the main reason [for migration] is Budhiganga. Because of Budhiganga, all of us have to live in fear. When the rain comes and Budhiganga swells, we cannot even eat our food at peace… Because of Budhiganga, even people with land left for the Tarai. Many people without land just carried their babies and fled to India.

Several comments from the research participants suggest a growing concern about the impact of climate change on traditional migration patterns. A 42-year-old Thakuri female respondent and a 45-year-old Kshetri male respondent from Sanfebagar, among several others, described that increased flooding risks due to the Budhiganga and Chhipe rivers force temporary relocations:

> Many have left for India as Budhiganga has swept away their cultivable land. Some people have [permanently] locked their houses and migrated to Tarai. The people from Pul Bazar also have to relocate to Jayakoti for two months [because of flood risks]. Sanfebagar is at high risk because Budhiganga and Chhipe Khola have destroyed the embankment.

Karnali river and Achham district. © IOM 2024/Sanjay SHARMA

Whereas some individuals believe that there are clearer links between environmental stressors and migration, several others do not establish such clear links. These individuals tend to segregate the environment from socioeconomic reasons. There is seldom a single driver of migration. Rather, migration occurs because of a variety of reasons. It could be that some factors may have a more prominent role to play while others play a more indirect and imperceptible role.

The environmental changes in the research areas drive both temporary and permanent migration, disrupting traditional lifestyles and necessitating new adaptive strategies. Relating this to the capability theory (Appadurai, 2004; de Haas, 2021; Carling and Schewel, 2018; Mallick and Schanze, 2020), it could be argued that those individuals who decide to leave have both the capability and the aspiration to do so but the relative weight of capability and aspiration depend on whether or not such migration is forced or voluntary. Migration is borne out of a complex interplay between seeking better economic opportunities and escaping environmental threats, fundamentally altering the community's demographic and social fabric. Socially and economically disadvantaged people are either trapped or forced to migrate. A 62-year-old Brahman male elected official from Sanfebagar contextualized it vividly:

> Risks vary from place to place. This municipality ranges from an altitude of four to five hundred metres above sea level to highlands in the Khaptad area. This is an area where you can feel the heat of the plains and the coolness of the mountains. Soil erosion has brought stones from the hills to the lowlands and affected farm production. The risk is still high. Disasters such as lightning, hailstorms and windstorms are rampant in the highlands. Economically disadvantaged people and families are at greater threat. Those who have money may arrange to live in another place in the Tarai or may build a house in the market areas and live there. In times of calamity, they can move and settle in safer places. But those whose situation is weak, have to work under pressure.

The cyclical nature of traditional migratory practices, such as moving to highlands in summer

and lowlands in winter for farming and cattle grazing, is now disrupted by more permanent migration due to climate change. Rising temperatures and increased landslides force families to make difficult decisions about their future. Underscores the growing unpredictability and danger of staying in their traditional homes. The interviews also suggest a traditional seasonal migration pattern known as transhumance. A 76-year-old Thakuri male respondent from Mahabu described this practice, where people move to higher pastures with their cattle during the summer and return to lower areas during the winter:

> There aren't any migrations just because of extreme heat or cold, but there's this old tradition where people head up to the highlands in the summer for cattle grazing and farming. In the winter, those places are buried in snow, so nothing grows there. But when the monsoon hits, crops can grow. The food they produce in the summer helps them get through the winter. Since you can't carry enough fodder for the cattle all the time, people go and stay in the highlands with their cattle for about six to eight months.

Similarly, in areas like Sanfebagar, people from the highlands of Karnali migrate to Sanfebagar during winter to avoid extreme cold and move back once spring hits. A 59-year-old Kshetri female respondent explained:

> People come here [Sanfebagar] from Bhot [highlands bordering Tibet]. It is very cold there. It snows and hails. The environment here is good, so they come here and stay. They come in Poush [approximately December] and leave in Falgun [approximately February]. There is [only] millet and sorghum. When they come here, they can find work, get rice and also do manual labour. That's why they come down and get some jobs and earn some money.

Such a cyclical nature of migration might not just be occurring to escape temperature differences, but also to synchronize migration across the border to India to earn money and plant crops. A 34-year-old Dalit female respondent from Khandachakra talked about seasonal migration:

> People go to India mostly in winter. They [migrants] mostly come back during planting season and during Dashain and Tihar [also the harvesting season]. Other times, they go to earn. They go to work and study.

5.4. MIGRATION PRACTICES

The decline in agricultural productivity, economic disparities, lack of local facilities and environmental stressors all contribute to the decision to migrate. Shifts in family dynamics and changing family priorities – such as towards better education and health care – further underscore the need for improved local infrastructure and opportunities. While migration provides financial benefits and enhanced living standards, it also brings about emotional and social challenges; for many households, migration (of one, some or all household members) means making sacrifices in pursuit of a better future. To address the root causes of migration and to develop sustainable solutions to support the community, each of these factors and their intersections much be understood.

Historically, community agricultural practices were deeply intertwined with the socioeconomic fabric of life. Farmers often found themselves tied to wealthy landowners, to whom they had to give a share of their crops (sharecropping). In some areas like in Mahabu, discriminatory Balighare practices based on caste-based discrimination are still sustained.[8] Because labour, under Balighare tradition, is not generally exchanged for money, it is almost impossible for workers to save. The financial strain of maintaining large families

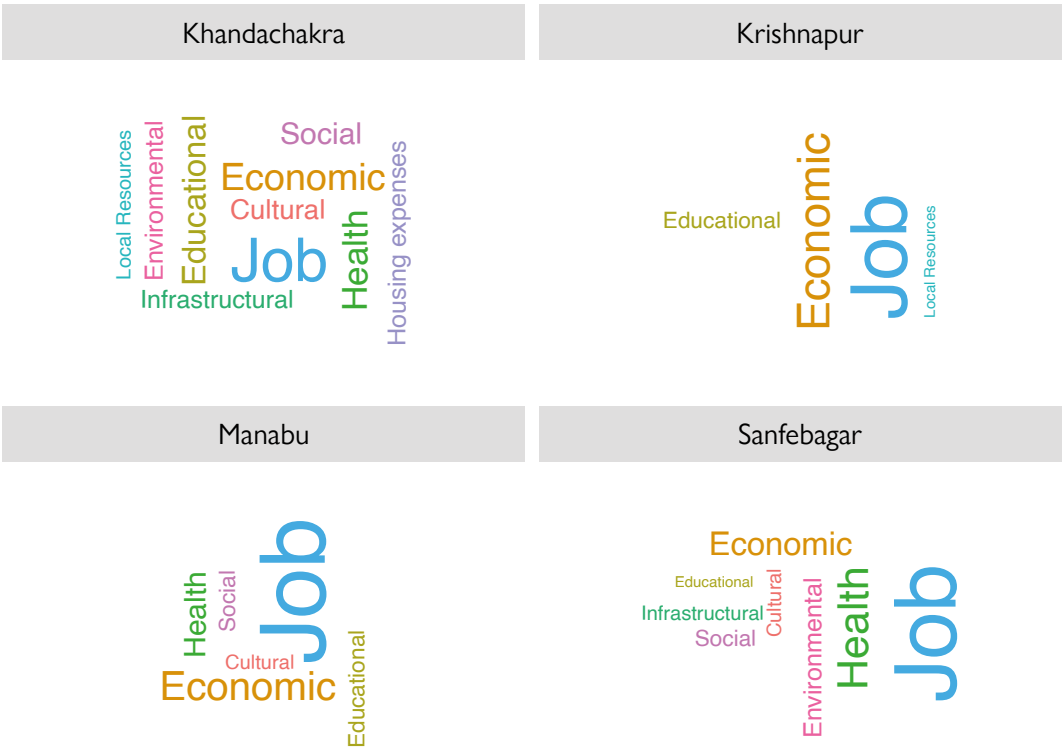
8 The Balighare system is a discriminatory and hierarchical practice involving extreme labour exploitation with minimal compensation in the form of food grains. It primarily affects Dalit workers, who receive a fixed amount of food grains annually from the households they serve, particularly those of the privileged castes. These workers are required to perform casual and irregular tasks, often with little or no wages. In many cases, they may even be forced to send their children to work to repay debt.

without significant savings mean that communities largely live hand-to-mouth, with little room for economic growth or development. Against this historical context, drastic shifts have occurred over time, especially regarding migration practices. A 43-year-old Brahman female interviewee from Mahabu noted:

> Back in the day, farmers had to go to the wealthy landowners to give their share of the crop. Sometimes they used to give money in return. Families were big back then, with many children, and savings were almost impossible. Everyone stayed close to home. But now, things have changed. Families aren't having as many kids as they used to. These days, people focus more on education and health. Instead of having lots of kids, families are having just a few and making sure they're well taken care of. The demands have increased these days, and people now invest in education and health care. They have to migrate in search of such things.

The reasons behind migration decisions are multifaceted and interconnected. While economic insecurity within households is a major driver, as shown in Figure 19, it is not the sole factor. By addressing the various challenges identified throughout this analysis, we can provide more holistic support to communities, allowing them to make informed migration decisions and fostering their well-being.

Figure 19. Factors that influence migration for foreign employment



As these word clouds (produced from the survey responses) indicate, economic insecurity is a significant driver of migration across all the studied municipalities. The lack of job opportunities within local municipality compels some residents to seek employment elsewhere, including both seasonal migration to India and long-term foreign employment. This highlights the crucial role of economic development initiatives in fostering local employment opportunities and potentially reducing the need for outmigration.

A bus that connects the Sudurpashchim Province to the Indian border. © IOM 2024/Sanjay SHARMA

Although agriculture has traditionally been the primary occupation in Nepal, it is increasingly perceived as unstable and insecure, largely due to unpredictable and extreme weather conditions. Various underlying factors contribute to economic insecurity, many of which are rooted in climate change, environmental degradation and disasters. Despite these challenges, agriculture remains the backbone of Nepal's economy, with over half of the population relying on it for their livelihood. Therefore, addressing economic insecurity necessitates governmental efforts to mitigate risks within the agricultural sector.

The economic disparity between local earnings and potential earnings abroad is another significant factor driving migration. Local jobs often do not pay enough to support families, whereas jobs abroad can offer significantly higher wages. This difference in earning potential makes migration an attractive option for many. A 47-year-old Dalit female respondent from Khandachakra noted:

> You can't make money staying here anymore. When you earn, you can use the money to buy some land. It will be useful to the children. To teach children. In Nepal, if you work for a whole month, it will be 15,000, 16,000, 18,000. That's how it is in Nepal. If you go to India, people like us, domestic workers, make up to 20, 30, 35, 40, 50 [thousand]. Even if you work hard here you do not get the benefits. That's why no one likes to work in Nepal. Young people do not want to live in Nepal. Everyone is moving out.

This economic motivation is compounded by the lack of local employment opportunities. Without adequate jobs to sustain themselves, people are forced to look elsewhere, often migrating to cities or foreign countries where they can earn a better living and support their families more effectively.

Improved transportation facilities in regions like the Tarai make it easier for people to migrate to areas with better opportunities. The availability of transportation infrastructure facilitates the movement of families seeking better education, health care and employment.

As a 39-year-old Dalit female interviewee from Sanfebagar pointed out:

> In the Tarai, there are transportation facilities, good schools and good education. Everyone has to go to the plains. There is nothing here anymore. They are living by giving their land for sharecropping. If people bring money here, it is only enough for eating.

Migration to urban areas is driven by the search for better living conditions and opportunities. The ease of access provided by transportation facilities accelerates this movement, making it feasible for more families to relocate in pursuit of improved prospects. Economic motivations are a significant driver of migration, with individuals seeking better-paying jobs to support their families and invest in their children's future. The potential for higher earnings abroad compared to local wages makes migration an attractive option.

However, migration is not solely driven by economic factors. The research found a complex interplay of economic insecurity, lack of access to education and health care, environmental stressors, social considerations and even cultural factors.

Over time, there has been a notable shift in family dynamics and priorities within Nepalese communities. Increasingly, Nepalese families are having fewer children, and investing more heavily in their education and health. The survey revealed that lack of access to higher education facilities was a common concern across all municipalities. This pushes some residents to migrate in pursuit of educational opportunities unavailable locally.

While economic insecurity and lack of education are prominent across the surveyed areas, specific municipalities face additional challenges that contribute to migration. In Krishnapur, the lack of or limited access to local resources (such as natural resources like wood, clean water and sanitation) was identified as a factor influencing migration decisions. Respondents in Mahabu identified the lack of health services and social factors as additional reasons for migration. This suggests potential disparities in health-care infrastructure and social support systems across the municipalities. Residents of both Sanfebagar and Khandachakra highlighted the lack of health services as a significant driver of migration. This reinforces the need for improved health-care accessibility within these communities. Residents in Khandachakra specifically mentioned geographical difficulties and higher environmental (climatic) stressors as factors influencing their decisions about migration. This suggests a need for targeted solutions that address the unique environmental challenges faced by this community. Residents of Sanfebagar also identified environmental stressors as one of the causes of migration.

These shifting priorities are a critical factor in the migration practices observed today. Families are increasingly willing to move to urban areas with better educational and health-care facilities to ensure a more promising future for their children. The decision to migrate is not just economic but also strategic, to enhance the quality of life and future prospects for the next generation. Many married women, whose husbands have migrated and who are living with their parents-in-law, shift to urban locations when their husbands start sending remittances. This promotes women's independence and also ensures that the family starts investing in their children's education.

One of the primary reasons for migration is the lack of local access to essential facilities such as education, health care and employment. Even if agricultural production is sufficient for some well-off families, the absence of these facilities in the locality forces people to leave their homes in search of better opportunities, either in urban centres or abroad. A 61-year-old Brahman female respondent from Mahabu addressed this issue:

> People have to migrate to earn. Those who are self-employed have to migrate for their jobs and people who are unemployed have to go find one and earn money. There are no good schools here. Those who can afford good schools now have to leave their homes to educate their children. People also leave for health care. If you don't have money when you need it, if you don't have money for your medicine, then what's the point of staying?

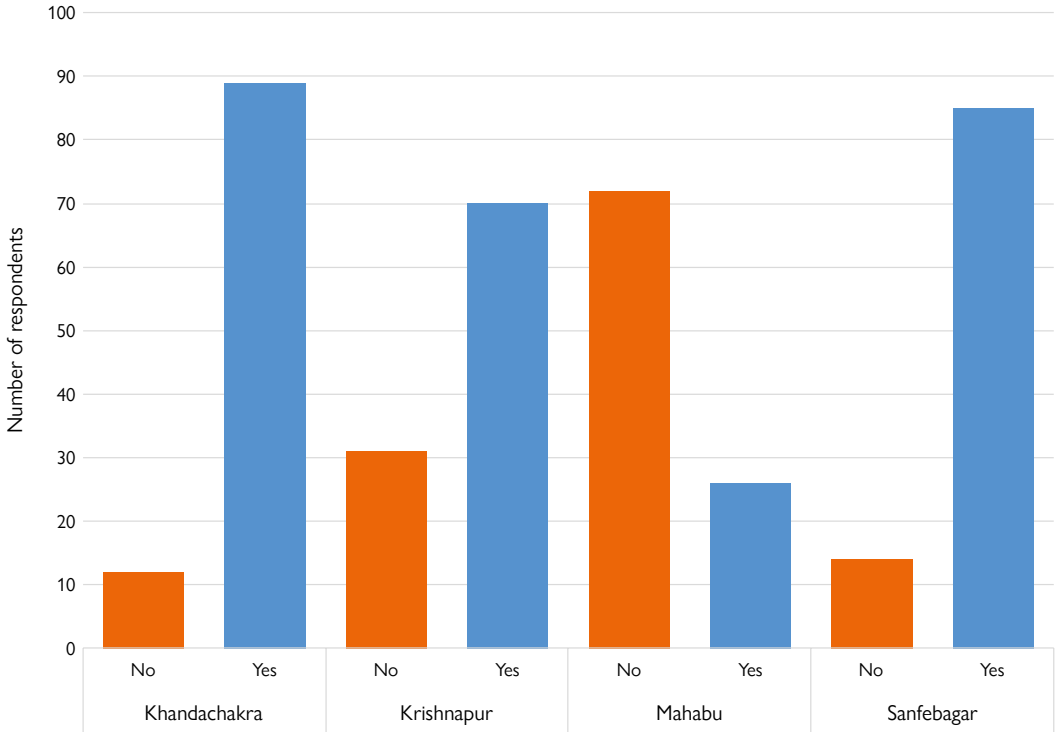
In a similar vein, a 53-year-old Dalit female respondent from Sanfebagar explained:

> Even if there was ample cultivation, there are no other facilities here. If there was a good school for the children, if there was provision for education, health and employment, people would probably stay back.

This migration for education and health care underscores the urgent need for improved local facilities. Families are willing to endure the challenges of migration to ensure their children receive a good education and have access to adequate health care, in order to provide them a better future.

Surkhet, Dhangadhi and Kathmandu are key urban areas that people migrate to for these educational and health-care reasons. Nonetheless, despite the significance of education, health and other reasons for migration, the household survey also suggested that in most households, at least one household member had migrated for foreign employment: either seasonal labour work in India or documented long migration to other countries. A higher number of respondents' in Khandachakra and Sanfebagar had household members who had migrated. The number of outmigrants for foreign employment was comparatively lower from Krishnapur, and there were even fewer such migrants from Mahabu (Figure 20).

Figure 20. Number of households with a household member who has migrated for foreign employment



The pursuit of better economic opportunities is not just about immediate financial gain but also about securing a better future for the next generation. Families invest in migration to ensure their children have access to better education, health care and overall living conditions, which are seen as critical for long-term success and well-being.

5.5. IN-MIGRATION AND OUTMIGRATION

Krishnapur attracts individuals from the hills. These migrations are primarily driven by harsh living conditions and environmental challenges in the hills. A 41-year-old Kshetri female respondent from Krishnapur explained:

> People from the hills have come to this municipality [Krishnapur]. Most of them are from Darchula and Baitadi. There are no jobs and no production in the hills. People come to Tarai because they can earn a living by doing manual labour and sharecropping.

Given that importance to Nepalese food security of agricultural productivity in the Tarai region, it is especially important that the government should focus in this region on making agricultural work more secure and resilient against climate change and disasters. A 64-year-old Brahman female respondent from Krishnapur elaborated on the dire situation in the hills:

> There is no cultivation in the hills. There is no rain. People have come here [Krishnapur] because of a lot of hardships. There are no facilities up there. Farms are destroyed by wild animals. There is no such problem in Tarai. People don't die of hunger here. There is no one in the hills anymore, there is a drought.

This paints a grim picture of life in the highlands, where environmental degradation and lack of infrastructure push people towards more hospitable areas like the Tarai. With the impacts of climate change more pronounced in the hills, people are bound to move to the plains where agricultural productivity is higher. A 32-year-old Brahman male bureaucrat of the municipality explained the trend of in-migration in Krishnapur:

> Most people migrate from the hills to the Tarai. Very few people go outside the municipality. Most of the in-migrants are from Bajhang Bajura Doti and Achham. Some have come here because of climate change too. There is no production there, it does not rain on time, there are droughts and disasters, there are financial problems, there are less opportunities and more challenges in business and finding jobs. If it's difficult to sustain with decreasing agricultural productivity, it is necessary to move. Having said this, some [people] from the Tarai also go to India and abroad to earn money.

Sanfebagar's dry river in spring that will swell during monsoon. © IOM 2024/Sanjay SHARMA

However, it is not that in-migration does not happen in other areas. People from within the municipalities, from other municipalities across the district and province and returnees from

within and outside the country keep things on the move. For instance, in Sanfebagar, the net population decreased by one fourth between 2011 and 2021; nonetheless, it also attracts people. A 41-year-old Thakuri female respondent explained:

> It [Sanfebagar] is the heart of the commercial sector of the region. Nepalese people from other districts have come here and also went out from here. People look for better services and facilities. Cultivable land is barren. Migrating in and out continues. That, maybe like 50–50. People can't stay busy in one place. Productivity is low. Many people leave saying there is no work in this place. But there are returnees too. People come here from both other districts and from other municipalities of this district. When it is difficult in places where people keep traveling, the remote areas suffer more. Wild animals are creating problems. Many people are leaving because of wild animals and only the old people and children stay back.

Sanfebagar also attracts people from the highlands, making it a vibrant commercial centre. As already quoted in Section 5.3, a 52-year-old Thakuri male respondent elaborated on transhumance in Sanfebagar, pointing out that people migrate between the Bhot highlands and Sanfebagar seasonally.

The sun sets as farmers in Krishnapur prepare for the new planting season.
© IOM 2024/Sanjay SHARMA

6

CLIMATE-SMART ADAPTATION PROGRAMMES, STRATEGIES AND TECHNOLOGIES, AND THE ENGAGEMENT OF MIGRANT AND NON-MIGRANT POPULATIONS

6. CLIMATE-SMART ADAPTATION PROGRAMMES, STRATEGIES AND TECHNOLOGIES, AND THE ENGAGEMENT OF MIGRANT AND NON-MIGRANT POPULATIONS

6.1. INTRODUCTION

In the face of multifaceted climate risks and impacts, communities, government agencies and CSOs in Karnali and Sudurpashchim region have undertaken various adaptation initiatives to enhance resilience and mitigate the adverse effects of climate change. These efforts span multiple sectors and employ a range of strategies tailored to the local contexts and available resources. This chapter delves into the specific climate-smart adaptation programmes, strategies and technologies implemented in the research areas.

6.2. THE COMPLEXITIES OF MIGRATION AND GENDER

Climate change disproportionately impacts women, who play a central role in agriculture and household management due to the strength of traditional gender roles in Nepal (Sujakhu et al., 2022; Ranjitkar et al., 2016). These roles often assign to women the responsibility for collecting water, managing crops and caring for children, making them more vulnerable to water scarcity, crop failures and food insecurity. The outmigration of men seeking work abroad has only exacerbated this situation by increasing the burden on women to perform additional domestic caretaker tasks, further straining their already substantial workloads (Ranjitkar et al., 2016).

While it is clear that environmental stressors brought about by climate change exacerbate socioeconomic challenges, leading to increased migration, women's migration, in particular, is affected by gender roles and societal attitudes. While migration offers economic opportunities and fosters self-reliance among women, it also poses significant challenges and reflects broader structural inequalities that need to be addressed to support sustainable and equitable development. Furthermore, the interviews undertaken in this study demonstrate that not only migration decisions and patterns are gendered; migration experiences are distinctly gendered, too.

Many women reported that their migration was driven by necessity, as traditional agricultural practices can no longer sustain their livelihoods. As a number of the respondents explained, the changing climate has rendered farming insufficient to meet even basic needs, compelling women to seek work elsewhere. Despite these pressures, societal norms continue to influence migration behaviours. As a 39-year-old Dalit female respondent from Sanfebagar noted, married women often migrate with their husbands (rather than alone) due to societal perceptions and safety concerns, highlighting the tussle between economic necessity and social constraints:

> Women also migrate, why won't they? The agricultural land is barren. Even the weather is against us. Women also have to go to earn. What can they do, people have to do something to survive, right? What will we eat otherwise? We can't eat dhunga maato [stone and soil]. That's why many of the women I know have also started migrating. However, there is no way that women can migrate like men. Most of them go with their husbands. When the husband is with them it's easier as there is an official person accompanying. But society views those who migrate alone differently. There is obligation on the one hand and the question of dignity on the other. They question women's character.

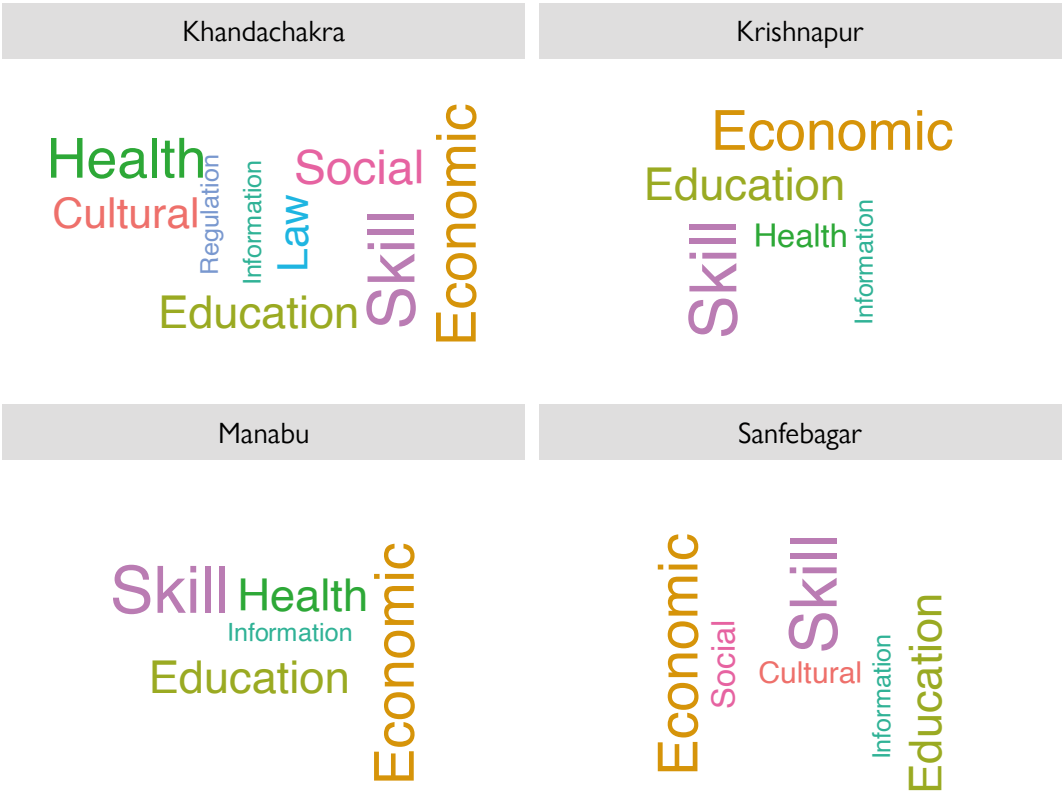
Another 48-year-old Brahman female respondent from Mahabu also echoed this view that women's mobility was severely limited and restricted in the past, and that many still want women not to migrate, relating women's dignity to their migration status. With economic hardships hitting households hard, women have a double burden: society expects or demands them to not go; economic necessity requires that they do. She explained this paradox:

> If women migrate, some people think it's a mistake. But you have to face that and do your thing. Society is like that. Those who understand don't say such things, but those who don't understand, like the elderly, think women's migration is bad. They say it as in the past. It used to be a custom for women to not leave their houses. Why would anyone leave if there were facilities? No one has the desire to leave. But you have to eat. You have to go out for your meals, for your children. There is no employment in Nepal. There is an economic recession. The economic situation must be improved. Even though both husband and wife work honestly, society views them differently [views the women negatively].

Societal constraints have severely limited women's physical mobility. The survey data suggest additional factors that hinder migration for both women and men. Figure 21 sheds light on the major constraints hindering migration, as reported by respondents without recently migrated household members. These constraints can be categorized into four key areas:

- Skills gap. The most frequently cited constraint across all municipalities was a lack of skills required for the foreign employment market. This limitation, coupled with the earlier findings on a potentially lower education level in some areas (refer to the section on social locations), suggests a crucial link between educational attainment and access to employment opportunities abroad. Investing in skill development programmes tailored to foreign employment demands could potentially empower more people to consider migration as a viable option.
- Limited education. In some ways tied to the skills gap named above (education is one of the places where skills are learned), a lack of education can inhibit migration for a range of reasons, including lack of knowledge about options, lack of qualifications to access employment opportunities, and lack of awareness of one's options. Limited education also operates in a complex interplay with limited economic resources.
- Limited economic resources. A significant portion of the surveyed population had weak economic resources, which can significantly constrain their ability to afford the upfront costs associated with migration. These costs might include travel expenses, documentation fees, or potential training programmes required for specific jobs abroad.
- Beyond the big three. While lack of skills, education and economic resources are major constraints, other factors contribute to the hesitation to migrate. For example, limited access to information regarding migration procedures and potential health concerns were mentioned by respondents from all four municipalities. This highlights the need for reliable channels to disseminate information.

Figure 21. Major factors identified by respondents that make it difficult for local residents to migrate for foreign employment



Furthermore, migration brings about a significant shift in gender roles and responsibilities. As described by various respondents, they see a situation in which when men migrate, women are left to manage not only household chores but also agricultural tasks traditionally handled by men, such as ploughing.[9] Many married female interviewees said that ploughing is the most difficult task, when it comes to doing agriculture when their husband is away. While agricultural labourers can be hired to assist married women who stay back when the husbands migrate, this possibility depends on both the availability of funds (primarily sent through remittances) and availability of human resources, as most potential labourers are also away. As a 46-year-old Dalit female respondent from Sanfebagar described:

> Ploughing is the most difficult. The big thing is for us to plough. Whom should I call [to plough]? Who will do it? Everyone is doing their own work. If he [the husband] is home, he will do it. When the husband comes home, he will do it himself. I am always worried about when to do things, how to do them, what to do. But there is also self-reliance. I prepare myself to plan. I also prepare myself for next year if my husband is not going to be around…. If money comes [remittances], I can pay someone to do the work for me. I can educate my children.

These burdens increase women's workload and stress but also enhance their self-reliance and decision-making capabilities. As a 73-year-old Thakuri female respondent from Khandachakra reflected, women develop new skills and confidence through these expanded roles, although they must continually navigate the additional responsibilities and societal expectations:

> When the men have gone, the women have more responsibilities. They [women] also have an advantage because their self-confidence increases, which is good. All the responsibilities were taken by the husband earlier and when the wife takes over, their self-confidence increases. But it also brings difficulties for women. If they suffer from illness, there is no one to look after them and they might not be able to go to work. They also have to constantly think about the added responsibilities.

9 This, as noted earlier, assumes households that follow traditional gender arrangements for relationships and labour.

The migration of women, whether accompanied by men or independently, challenges traditional gender norms. As explained by a 40-year-old Dalit female respondent from Mahabu, increased access to education and exposure to social media have empowered women to migrate more frequently than in the past:

> Why can't we [women] go abroad? We do so much work at home, rear cattle, cultivate, do household chores, cook. It is the same thing that you do outside. We can do better than men.

Another 42-year-old Janajati female respondent from Krishnapur echoed this:

> The reason why women couldn't migrate [in the past] like men was that they were illiterate. There was a belief that women were not safe outside. But now women are more educated than before in the country. New things have been developed, new social media technologies have been developed. Educated women can migrate with the information they receive from social media.

Although this shift is slow, it is gradually changing societal perceptions about women's mobility, though not uniformly. While some community members accept and support women's migration, others, particularly the elderly, view it with suspicion and disapproval.

Additionally, the interviews reveal the economic motivations behind migration. The need for remittances to sustain families back home was a recurrent theme. As a 42-year-old Kshetri female respondent from Khandachakra explained, remittances from abroad are vital for managing household expenses and debt, underscoring the economic dependency on migration. However, this financial benefit comes with emotional and logistical costs, such as the separation from loved ones and the increased burden on those staying back to manage daily life and agricultural duties:

> I have migrated before. I lived in Kathmandu for six/seven years. I ran a Panipuri selling business. The earning was good. But then corona [COVID-19] happened, and I came back…. When my husband went abroad, we got a loan. That loan has to be cleared first. My husband is abroad, and he is doing well. My children have gone [to Kathmandu] to study. I cannot go now leaving everything behind. I am [stuck] here.

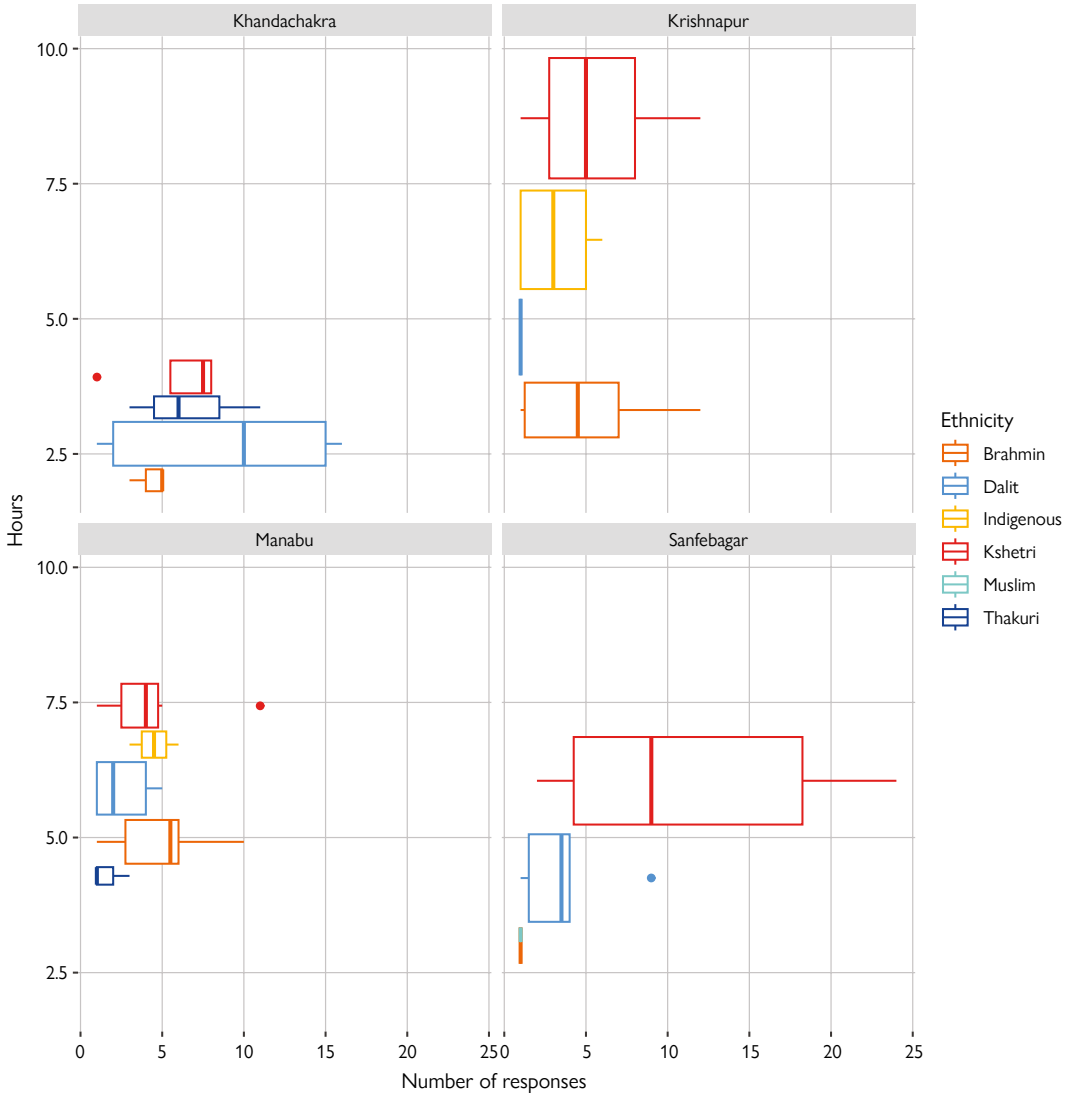
Furthermore, migration has profound social and emotional impacts on families and communities. The fragmentation of families, with members spread across different regions and countries, creates a sense of loss and emotional strain. One 42-year-old Brahman female interviewee from Sanfebagar, shared her personal experience:

> If there are two [husband and wife], it's easy to eat, easy to work. [But my] husband is away. You can't be together when he's away. I think of my husband a lot. I need him all the time, even while cooking. I think of my husband in everything I do. Maybe he thinks of us too.

The separation of family members due to migration highlights the sacrifices made in pursuit of better opportunities. While migration may provide financial benefits and improved living standards, it also brings about emotional challenges and the disruption of traditional family structures.

Household surveys conducted in the studied municipalities clearly demonstrate this significant workload increase. Respondents reported average time increases per day of 3.1 hours in Khandachakra, 4.9 hours in Krishnapur, 6 hours in Mahabu, and 4.5 hours in Sanfebagar. As shown in Figure 22, this increment is particularly pronounced among Kshetri households in all municipalities, followed by Indigenous households.

Figure 22. Increase to working time after male household members migrated



In response to these challenges, communities, government agencies and CSOs in Karnali and Sudurpashchim are actively engaged in building resilience through climate-smart adaptation initiatives. Such initiatives follow a holistic approach that aims to achieve three key objectives:

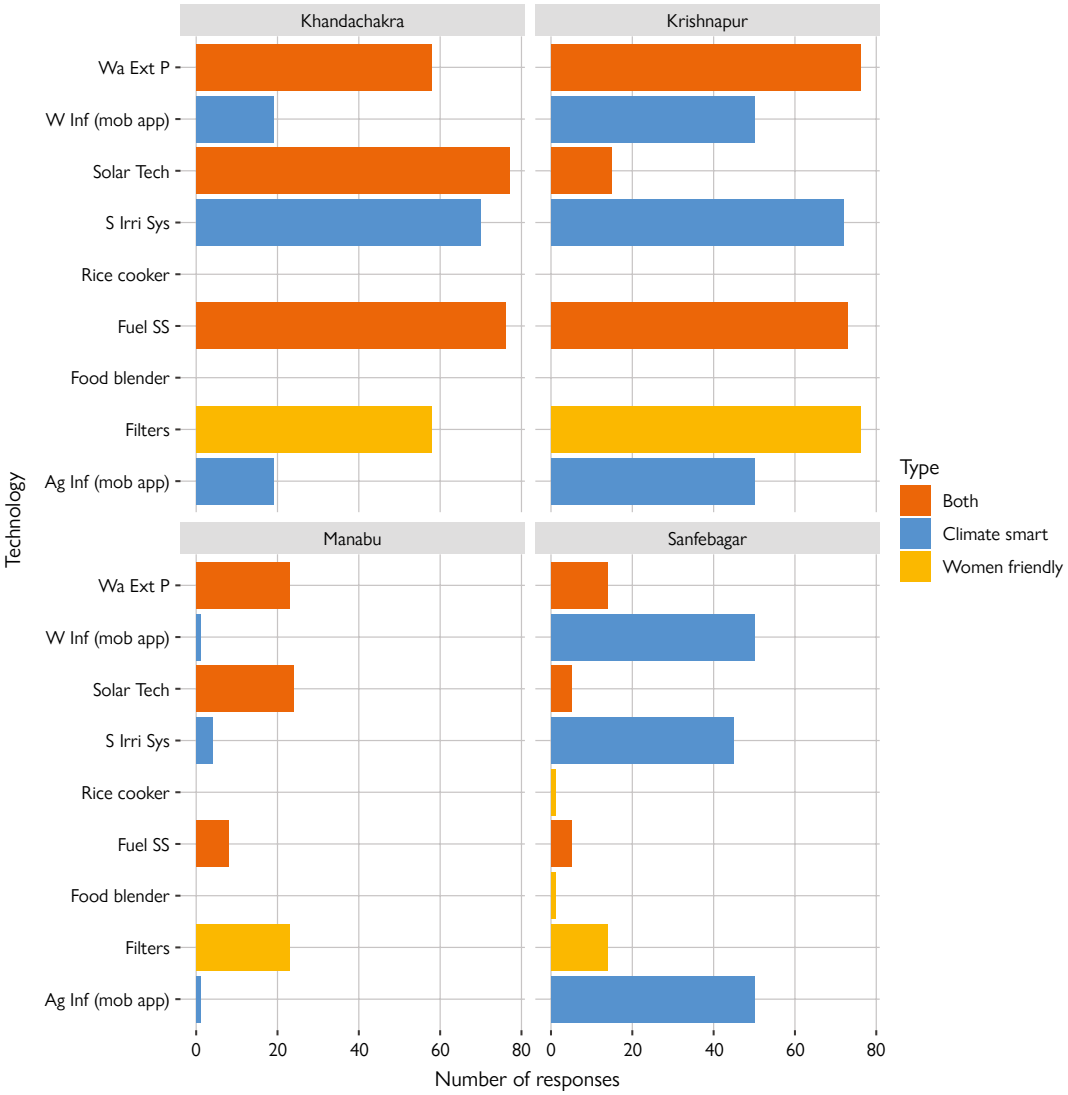
- Increase agricultural productivity and food security in the face of climate change. This involves adopting practices that improve drought tolerance, reduce reliance on rain-fed agriculture and enhance soil fertility.
- Adapt and build resilience to climate variability and extremes. This includes strategies like water management techniques, early warning systems for floods and droughts and diversifying crops and livelihoods.
- Reduce greenhouse gas emissions from agricultural practices. Sustainable land management techniques and promoting energy-efficient technologies can contribute to climate change mitigation efforts.

Government initiatives promoting climate-resilient native crops for food security. © IOM 2024/Sailesh RANJITKAR

The survey documented several climate-smart technologies that are appropriate and well-received in the studied communities. Additionally, respondents identified women-friendly technologies that help ease their workload during male outmigration such as water extraction pumps, solar technologies and small irrigation systems (see Figure 23 for more). While not directly addressing climate change, these technologies empower women and improve their livelihoods in rural areas.

Survey results suggest that Khandachakra and Krishnapur municipalities have a higher adoption rate of both climate-smart and women-friendly technologies than does Sanfebagar, and that use of such technologies appears to be even lower in Mahabu Municipality (Figure 23).

Figure 23. Adoption of climate-smart and women-friendly technologies



Note: Wa Ext P: **water extraction pump;** W Inf: **weather information;** Solar Tech: **solar lamp, energy;** S Irri Sys: **small irrigation system;** Fuel SS: **fuel saving stove;** Ag Inf: **agriculture information**.

The survey also identified other technologies that could be categorized as women-friendly, such as filters, rice cookers and possibly food blenders or mixers (depending on the local context).

6.3. CLIMATE RISK MANAGEMENT

Climate-change impacts such as water scarcity and water-related disasters like floods and landslides have emerged as critical challenges in the region, prompting the implementation of various water management strategies. The construction of embankments along rivers, such as along the Budhiganga in Sanfebagar Municipality, has been undertaken to mitigate flood risks.

Khandachakra Municipality is grappling with water scarcity. The conversion of rangelands – which once served as natural water reservoirs and provided spring water for settlements below – has depleted both the natural water source and a crucial source of fodder for livestock. Water scarcity is further exacerbated here by recent patterns of scanty and erratic rainfall. A 53-year-old Kshetri female respondent described the chronic lack of water in Khandachakra and stressed the immediate need for climate smart water management:

> We don't have enough drinking water. What will we do with agricultural seeds, where will we plant them? Even drinking water is not enough. At most 30–40 litres of water comes in a day. What to drink and what to irrigate?

Recognizing the gravity of the situation, various organizations – including USAID, local NGOs and the municipality's government itself – are actively working towards water management. Their efforts involve constructing water reservoirs, exploring the feasibility of aquaculture in these reservoirs, and recharging existing ponds. Research conducted by Narbir (2024) reinforces the importance of a strong governance strategy for ensuring long-term water security. This strategy should encompass financial stability, effective governance mechanisms, stakeholder engagement and capacity-building.

A 53-year-old Kshetri male elected official of Khandachakra Municipality emphasized the need for climate-smart techniques for proper water governance. He also highlighted the importance of technical education, including an undergraduate teaching facility focusing on agricultural technologies within Khandachakra. The municipality has already identified suitable infrastructure to house this facility and is seeking affiliation from a university to launch the programme.

In areas grappling with water scarcity, rainwater harvesting and water conservation initiatives have gained prominence. A 35-year-old Janajati male NGO representative from Dailekh (Mahabu) discussed the need for promoting rainwater harvesting through household and community ponds:

> There is general water collection for vegetable cultivation but no ponds for irrigation. Most farms depend on rainwater. We [SAHAS Nepal] have emphasized on vegetables as a part of food security measures.

These decentralized water management approaches not only address immediate water needs but also contribute to longer-term climate resilience by reducing reliance on dwindling groundwater resources.

Given the region's heavy dependence on agriculture and the sector's vulnerability to climate change, a range of adaptation strategies have been employed to enhance food security and promote sustainable agricultural practices. To combat the challenges posed by drought, pests and changing growing conditions, efforts have been made to introduce and promote the use of drought and pest-resistant seed varieties. As noted by a 42-year-old Thakuri male bureaucrat from Khandachakra, "Adaptation measures discussed are planting trees, installing meshes, promoting climate-resilient seed varieties," among others. Recognizing the importance of maintaining soil health and fertility, initiatives like soil testing and the promotion of organic inputs have been undertaken. A 34-year-old Brahman male bureaucrat from Mahabu shared, "With NGO support, we have an emphasis on soil testing, pond management and promoting local crops." In response to the increasing prevalence of pests and diseases affecting crops, some communities have revived traditional pest control methods as alternatives to chemical pesticides. A 45-year-old Kshetri male agriculturalist from Sanfebagar Municipality highlighted his use of traditional pest control methods such as ash and soap solutions, instead of pesticides:

> In the past, we did not have medicines to kill insects in off-season vegetable farming in our community. The ashes can be used to control the pest by sprinkling it on the leaves. We adopt a new method to trap those insects. I have planted 100 marigold flowers next to the farm. That way, the insects are attracted towards the flowers and help the vegetables. I have learned a lot from the Agricultural Knowledge Center. They had provided me with plastics to build plastic houses. I am happy that I am producing green vegetables in this dry season. If two people in each ward work this way, fourteen people in seven wards, Sangebagar could be self-reliant on green vegetables.

Similarly, locals in Khandachakra, Mahabu and Sanfebagar highlighted the importance of off-season vegetable farming in polyhouses. As a 79-year-old Janajati male respondent from Mahabu noted:

> Although changes have happened [in the environment], you need to adjust. There are many polyhouses [greenhouses for vegetable farming] and tractors that help plough the land faster than before.

The impacts of chronic labour shortages in the region – as a result of increasing outmigration – have been partly mitigated by climate-smart technologies that are generally financed by remittances. However, much needs to be done to ensure that the technology is inexpensive and easily accessible. A 62-year-old Janajati female respondent from Krishnapur highlighted the use of fuel-powered motors for irrigation in the field, but also highlighted that the cost of farming is higher:

> If the water sources dry up or if it does not rain in time, we buy oil [diesel] and irrigate with a motor through [deep] boring. In farming, the cost is more than the benefit. Even if you work so hard, if there is a flood, everything will be lost. Farmers have many problems.

For remittance-receiving households, arranging for additional funding for agriculture is easier than it is for households that do not receive remittances. A 42-year-old Dalit female respondent from Krishnapur stressed the importance of remittances in diversifying agriculture:

> Money earned abroad is spent on farming. Money is needed to buy seeds, fertilizers and ploughing [labour cost]. I run the household expenses with the remittances. The rest [of the remittances] is used for children's education.

Furthermore, to address the challenges posed by erratic rainfall patterns and temperature fluctuations, greenhouse cultivation and off-season vegetable farming have been promoted as adaptive strategies. As 30-year-old Brahman male bureaucrat from Mahabu noted, "Among the positive benefits of climate change is off-season farming. Vegetables are cultivated three times a year in this place." With the support of an NGO, many locals in Mahabu were practicing off-season vegetable production through greenhouse cultivation. Diversifying livelihoods through livestock rearing and animal husbandry has emerged as a complementary adaptation strategy. As 48-year-old Thakuri male elected local representative from Mahabu highlighted, "Farmers have also advanced in animal husbandry. More than 4,500 goats have been reared in this ward."

Forestry and sustainable land use practices play a crucial role in climate change adaptation, not only by enhancing carbon sequestration and mitigating environmental degradation but also by providing ecosystem services that support resilient livelihoods. Across the municipalities, afforestation and community forestry programmes have been implemented to restore and conserve forest cover. A 55-year-old Brahman male respondent from Khandachakra shared that "Tree plantation has played the role of the forest here today, not only here but also in other places where there is a lack of wood, they come here." Furthermore, to combat soil erosion and landslide risks, bioengineering techniques that employ vegetation and natural materials for slope stabilization have been adopted. As a 32-year-old Brahman male bureaucrat from Krishnapur stated, "There have been bioengineering techniques used for some time to reduce the effects of climate change".

Recognizing the negative impacts of traditional biomass fuel consumption on both environmental sustainability and human health, efforts have been made to promote alternative energy sources like biogas and improved cookstoves. As a 35-year-old Janajati

male NGO representative from Mahabu noted, "We are promoting improved cookstoves"; and a 48-year-old Thakuri male elected local representative from Mahabu explained that "Cooking with electricity, cooking with gas and using improved cookstoves if wood is used can help reduce firewood consumption and protect forests".

With the increasing frequency and intensity of climate-related disasters, enhancing disaster preparedness has become a critical component of adaptation strategies in the Karnali and Sudurpashchim regions. To mitigate the impacts of disasters like floods and landslides, early warning systems have been established in some municipalities. A 30-year-old Brahman male bureaucrat from Mahabu explained that "By coordinating with the weather prediction division, a notification will be sent to the mobile phones of the ward employees for pre-preparation before a disaster occurs." However, much needs to be done, especially in flood-prone areas such as Sanfebagar, where early warning systems could save human and non-human lives and valuable property and resources.

In the aftermath of disasters, the construction of emergency shelters and the disbursement of relief aid have been implemented to assist affected communities. A 42-year-old Thakuri male bureaucrat from Khandachakra discussed the provision of "zinc sheets, cash assistance based on damages assessed through police reports, and a rehousing scheme."

Similarly, raising public awareness about disaster preparedness and conducting mock drills have been integral components of adaptation efforts. A 32-year-old Brahman male bureaucrat from Krishnapur highlighted the importance of "conducting public awareness [campaigns] on climate change," while a 30-year-old Brahman male bureaucrat from Mahabu emphasized the need for "making people aware through schools and school curriculum, women and mother groups, and youth clubs."

In addition to sector-specific adaptation measures, initiatives focused on comprehensive climate risk management have been pursued to enhance the overall resilience of communities and systems. Several municipalities have undertaken efforts to formulate local adaptation plans and policies, such as local and national adaptation plans of action, to guide their climate change adaptation strategies. However, this is not yet as widespread as it could be: as a 35-year-old Janajati male NGO representative from Mahabu noted: "The municipality lacks specific climate change policies like LAPA [a local adaptation plan of action]." He emphasized the need for LAPA in Mahabu and other areas that are vulnerable to climate risks. Conducting climate risk assessments and vulnerability mapping exercises has been recognized as a crucial first step in informing adaptation planning, and this is already happening in some areas. As a 32-year-old Brahman male bureaucrat from Krishnapur stated: "We have made a DPRP to see how much environmental impact there is in which ward."

The interviewees shared insights into climate risks and the specified the loss of indigenous knowledge as an important risk. They highlighted that local knowledge is dying out, and stressed the need to revive local knowledge as a climate change adaptation strategy. While there is a noticeable decline in traditional practices, the enduring use of certain methods shows their potential in climate adaptation. Addressing the barriers to utilizing indigenous knowledge and promoting its integration into modern practices can enhance the resilience of agricultural communities across the Karnali and Sudurpashchim regions. This balanced approach can mitigate the impacts of climate change while preserving cultural heritage and biodiversity. As a 42-year-old Thakuri male bureaucrat from Khandachakra noted:

> Indigenous knowledge is not used. Such knowledge is disappearing. There used to be black and white varieties of rice, but you can hardly find them. As indigenous crops get easily attacked by pests and diseases, people are planting new hybrid varieties that are not indigenous to the area.

Similarly, a 35-year-old Janajati male NGO worker from Mahabhu discussed traditional practices:

> The community has the knowledge of planting Amriso [tiger grass, broom grass], bamboo, and so on, to mitigate the impacts of climate change. The management of kitchen gardens and the use of animal manure is also an indigenous measure.

6.4. MECHANISMS AND PLATFORMS FOR ENGAGING MIGRANT AND NON-MIGRANT POPULATIONS

For climate change adaptation programmes to succeed and be sustainable, they must actively involve locals. Among a range of possible local stakeholders, returnee migrants have brought back not just financial remittances (money), but also social remittances (skills). Leveraging the skills, experiences and finances of the returnees could boost the agricultural and economic development of the community. However, our research has shown that engaging migrants and local populations in climate change adaptation in Sanfebagar, Krishnapur, Khandachakra and Mahabu presents both challenges and opportunities. With the exception of Ward 5 of Mahabu, mobile populations are not involved in government-led development initiatives and climate change adaptation programmes. A 48-year-old Thakuri male elected local representative from Mahabu shared an initiative involving returnees from abroad:

> We organized a programme for a month by inviting the returnees to the ward and discussing what they have learned, and what is the possibility of being able to do this. People who went to the Gulf countries worked in a company there but similar works cannot be done here. Some returnees from India have learned tomato and pea cultivation in India and have started cultivation here. A 15-day training [course] was organized for the young women who came from abroad to become entrepreneurs in their own country. Twenty young women were trained to do agriculture. We made them aware that they should grow vegetables and raise animals. We have given the work, now we are waiting for the result.

The lack of proper flow of information related to government-led development initiatives and climate change adaptation programmes from the governmental to the community level appears to be the largest barrier to engaging migrant populations. While this elected official from Mahabu highlighted the need to leverage skills and knowledge of the locals, most of the local residents we talked to across the four municipalities were unaware of the various climate-change related programmes that their local governments were offering. For instance, a 76-year-old Thakuri male respondent from Khandachakra remarked:

> There is not much information regarding climate change adaptation being done by the government. Some gender-related work is being done by organizations but not regarding environmental change. Maybe I have not seen such work but might be doing it.

This sentiment was echoed by other interviewees, who noted the sporadic nature of such interventions. A 42-year-old Brahman female respondent from Mahabu pointed to her lack of awareness about climate adaptation programmes, which would hinder her participation:

> There is no information that any climate change and adaptation programmes have been conducted in our place by the government and non-government sectors. According to the government's policy, we have heard that they are practicing agriculture and climate change and adaptation and using indigenous crops, but in practice, such programmes have not taken place. Such programmes to minimize the effects of climate change have not come here.

Even in cases where individuals are involved in various programmes, the programmes are not necessarily targeted at individuals who would make the most out of them. For instance, especially in rural areas, women do not typically participate in such programmes. Given that

most migrants are men, climate adaptation programmes would be more likely to succeed if the women staying back are involved. Past programmes have not addressed community needs, with residents like a 63-year-old Dalit female respondent from Krishnapur feeling the programmes were irrelevant or lacked follow-up. Unequal distribution of resources is another hurdle; as one respondent pointed out, some of the residents who most benefit from such programmes are the ones who already have certain advantages, rather than the ones who most need the support:

> There should be encouragement for women who run their families through vegetable farming. However, the people who receive the services are the ones who do not want such agricultural services. Some plastic houses [greenhouses] are unused. The genuine farmers do not get such facilities. If we had a tap for each household and [running] water in each house, the women would benefit a lot.

Even in cases where migrants or remittance-receiving households are willing to invest, the business environment is lacking that would be required to offer the security of adequate return. A 42-year-old Thakuri male bureaucrat from Khandachakra was critical of the idea that any investment can be successfully made at the local level. He highlighted the need to ensure investment security for locals and returnees to be able to invest in the region:

> Although the municipality can start promoting investment from returnees, people are not ready to invest. There is no investment security. Return on investment is very difficult to come by. Even those who try get discouraged from all sectors. Just last year when the apple cherries were blossoming, the hail spoiled it. All the dreams get shattered. There's no security. Even if people want to do something, the disasters take all of it away. Even the insurance takes such a lengthy process that people do not want to go through it.

Research participants also highlighted the need for sustained and regularized programmes that cater to the needs of the community in promoting climate change adaptation and environmental education. Most of the programmes implemented at the local level exist only for a very short period of time, and without practice and follow-up, such programmes does not deliver on their objectives. A 55-year-old Janajati female respondent from Krishnapur highlighted the limited scope of past initiatives, stating:

> Organizations do programmes related to gender, about equality between men and women. Some training related to climate change, windstorms and the like are done by the [community] forest. Otherwise, I have not seen anything else. There was vegetable farming [training before]. I don't know when and how it was brought. That was 15 or 16 years ago. But I have forgotten it all.

Collaborative planning around adaptation initiatives, including community members, migrants and returnees, is essential. Workshops and farmer-to-farmer learning opportunities can be organized to facilitate knowledge exchange, where returnees can share their skills and traditional knowledge can be documented and disseminated. Targeted outreach is crucial to ensure information and resources reach all community members, especially women and marginalized groups: as one respondent emphasized the need to support women farmers who manage households. Finally, regular monitoring and evaluation is essential, so that programmes can be adapted and continued based on feedback and changing needs. By addressing these challenges and capitalizing on the opportunities, these four municipalities can create a more inclusive and effective platform for engaging both migrants and non-migrants in building a climate-resilient future, together.

7

RECOMMENDATIONS

7. RECOMMENDATIONS

Based on the interviews, FGDs, KIIs and surveys, as well as on further research and analysis, the report makes the following recommendations:

- **For people who choose to move.** As described in Sections 5.4 and 6.2, understanding the factors that hinder migration planning and developing targeted support mechanisms – such as skill development programmes, information campaigns and microfinancing options – are crucial. By doing so, the potential benefits of migration, such as improved livelihoods for families back home through remittances, can be realized by a wider segment of the population. However, it is important to recognize that migration might not be the best solution for everyone. Fostering and supporting local economic development initiatives, alongside providing information and resources for those who do choose to pursue foreign employment, can create a more comprehensive approach to supporting the aspirations of local communities. These measures should be spearheaded by the federal government in collaboration with the provincial government and implemented by the local government. The non-governmental sector can provide technical support and related expertise.

- **For people who are forced to move.** As discussed in Sections 5.2 and 5.3, implement measures to address the environmental stressors – such as deforestation, soil degradation, water scarcity and erratic weather patterns – that are driving migration in the region. This can be spearheaded by the provincial and local level governments with the support of the federal government and could include reforestation programmes, sustainable agricultural practices, water conservation initiatives and disaster risk reduction measures. Integrate migration considerations into adaptation planning, recognizing the potential for both internal and international migration as adaptation strategies. Establish mechanisms to support and protect the rights of climate migrants, ensuring their access to basic services, livelihood opportunities and social protection measures.

- **For people that choose to stay.** As suggested by respondents across the four municipalities and as explained in Sections 6.2 and 6.3, prioritize the creation of sustainable livelihood opportunities in rural areas to reduce overreliance on climate-sensitive sectors and mitigate the drivers of outmigration. This could involve promoting climate-smart agriculture, sustainable forestry and agroforestry practices, ecotourism and renewable energy enterprises. Targeted skills development programmes should be developed by the federal government and implemented by the local and provincial governments to equip returnee migrants and youth with the necessary competencies to engage in these livelihood opportunities. Such programmes can also facilitate the transfer of knowledge and expertise gained from migration experiences to support adaptation efforts. Integrate migration considerations into adaptation planning, recognizing the potential for both internal and international migration as adaptation strategies. More specifically:

    - **Adaptation plans.** Local governments and NGOs, including CSOs and CBOs, should ensure meaningful community engagement throughout adaptation processes, from vulnerability assessments and adaptation planning to implementation and monitoring.

Facilitate community-based adaptation by strengthening local institutions, groups and civil society networks, enhancing their decision-making roles and capacities. Promote the integration of indigenous knowledge systems and traditional practices into adaptation strategies, recognizing their value in building resilience.

- **Climate financing measures.** Augment financial resources for adaptation through increased domestic budgetary allocations and through access to international climate finance mechanisms, such as the Green Climate Fund, Adaptation Fund and bilateral and multilateral funding sources. Secure adequate and sustainable financing mechanisms – including government budgets, international aid and public–private partnerships – to support long-term initiatives addressing migration, environmental challenges and human security in the region.
- **Use skills of the returnees.** Support initiatives that allow individuals to acquire new skills abroad and return to apply them locally. This could be facilitated through government-supported training programmes and incentives for returning migrants.
- **Awareness campaigns.** Implement awareness-raising campaigns and promote community participation in decision-making processes related to migration, environmental management and climate change adaptation strategies. This can foster a sense of ownership and ensure that interventions are tailored to local needs and cultural contexts.
- **Promote local-level enterprises.** The governmental and private sector should work together to introduce diversified livelihood options, such as skill development programmes, small-scale industries and ecotourism initiatives, to reduce the overreliance on agriculture and provide alternative sources of income for local communities. Models such as public–private partnerships could turn out to be effective in involving the government and private sector and the general public.
- **Comprehensive analysis of climate risks.** By identifying common issues like soil erosion and pests in agriculture or drought and heavy rain related to rainfall, local authorities and concerned organizations can prioritize interventions effectively (see Sections 5.2 and 6.3). Such comprehensive analysis is crucial for designing strategies to mitigate the impacts of environmental stressors on these communities, ensuring more resilient and prepared municipalities.
- **Support farmers and agriculture entrepreneurs.** The local government and NGOs, including CSOs and CBOs, should encourage the adoption of modern farming techniques, such as the use of polyhouses and tractors, to increase productivity and reduce labour dependency (see Figure 17). Support farmers in transitioning to high-value crops and vegetables that can withstand local environmental conditions. Ensure that farm produce gets easy market access.
- **Address water scarcity.** Develop efficient water management systems and irrigation facilities, including ponds and reservoirs, rainwater harvesting systems and enhanced groundwater recharge methods (see Sections 5.2 and 6.3). As all of the study areas are affected by drought, introduce drought-resistant crops and climate-smart agricultural practices to cope with changing rainfall patterns. Ensure that such crop selection involves indigenous knowledge systems and practices rather than imposing ideas from above. Provide training on water-efficient farming techniques.
- **Reduce human–wildlife conflict.** As explained in Section 5.2, develop and implement programmes to manage wildlife populations and reduce conflicts with humans. This could include creating buffer zones, installing barriers and providing compensation or insurance for crop damages caused by wildlife.

- **Early warning systems.** Develop early warning systems (see Section 5.2 on specific environmental risks) in areas like Sanfebagar that are more prone to floods. Generate disaster preparedness plans to cope with landslides, floods and other disasters that can cause intra- and inter-municipality displacements.

- **For environment-friendly infrastructural development.** As detailed in Section 6.3, and in the testimonies of several individuals during the qualitative interviews (Section 5.2), governments should invest in improving local infrastructure, including education, health-care facilities and employment opportunities, to reduce migration driven by the lack of essential services. This would help retain those who would otherwise be forced to migrate, would improve access to services of the trapped population, and would promote sustainable development in the region. To offer development complementary with environmental measures, local government should work with the provincial and federal governments to consider measures to reduce the harmful impact of road construction (such as conducting environmental examinations, designing roads safeguarding underground water channels and networks, allocating space for stormwater, and planting trees on either side of the road). Training courses should be offered on environmentally friendly, resilient and sustainable technologies useful to developmental projects.

- **For governments.** Chapter 3 of this report suggested that the federal government should strengthen the capacities of provincial and local governments through comprehensive capacity-building programmes focused on climate adaptation. These programmes should encompass training on adaptation planning, implementation, monitoring and evaluation, as well as governance aspects such as stakeholder engagement, transparency and accountability. Government should also establish robust inter-agency coordination mechanisms to facilitate collaboration among government agencies, NGOs and communities. These mechanisms should provide platforms for information sharing, joint planning and collective action, ensuring a coherent and harmonized approach to adaptation that also empowers all three tiers of government in effective planning and implementing. Specifically, government should:

  - **Develop policies that address the MECC–gender nexus.** The governments (federal, provincial and local) should prioritize forming climate mobility-related policies that cater to the specific needs brought about by climate change and environmental degradation, and should consider migration as a mitigation strategy. Such migration particularly affects social groups, including women, that are vulnerable to climate stressors. Furthermore, local government should also identify the trapped populations and ensure that their socioeconomic needs are being met.
  - **Devise more inclusive policies.** Ensure that all local climate adaptation plans include specific provisions for gender equality. This includes conducting gender impact assessments, involving women and marginalized people in decision-making processes, and developing gender-sensitive adaptation measures. This can be implemented by providing training and resources to local governments to integrate gender perspectives into their climate action plans. Monitor and evaluate the implementation of these plans to ensure they meet gender equality objectives.
  - **Integrate gender equality, disability and social inclusion into policies and priorities.** Given that gender issues are often marginalized from climate change and migration policies, mainstreaming gender should be a priority. Develop gender-responsive migration policies that address the specific challenges and needs of women migrants,

people with disabilities and other socially disadvantaged groups, and that provide access to economic opportunities, protection from exploitation and support for both migrants for the members of their households who stay back.

- **Social protection for vulnerable and marginalized groups.** Implement social protection measures – such as effective and affordable health care and insurance schemes, and the enrolment of remittance-receiving households in the Social Security Fund – to support vulnerable households and mitigate the impacts of environmental stressors and migration on their well-being.
- **Intensify awareness campaigns.** Launch nationwide awareness campaigns and integrate MECC and gender issues into school curricula (see Section 6.4). Use various media platforms to disseminate information and engage communities in discussions about these issues. Collaborate with educational institutions, media outlets and community organizations to develop and deliver these awareness programmes.
- **Research and development.** As highlighted during the KIIs, data collection and monitoring systems could be improved to better understand the complex dynamics of migration, climate change, environmental stressors and their impact on gender roles and human security. Such data are important to inform evidence-based policymaking and targeted interventions. Explore innovative financing approaches, including forecast-based financing, risk transfer solutions and public–private partnerships. Invest in building technical capacity through human resources development, establishing scientific data infrastructure, and knowledge management systems. Collaboration with academic and research institutions can facilitate the generation and dissemination of reliable climate risk data and location-specific adaptation solutions.
- **Develop local infrastructures and industries.** As highlighted especially in 19 and 21, people migrate for better economic opportunities. It is, therefore, imperative that the government should create employment opportunities to reduce labour migration. This could include the establishment of agroprocessing units, handicraft industries and small-scale manufacturing. Furthermore, government should improve access to education, health care and other essential services in rural areas to reduce the need for outmigration. For example, enhancing service facilities can help retain local people who would otherwise migrate only because of their aspiration to access basic services.
- **Promote ecotourism targeting the population staying back.** Formulate comprehensive community-based adaptation plans that detail how tourism infrastructure and wetlands can be made resilient to climate change impacts. This should include predictive modelling, scenario planning and the use of climate-resilient infrastructure designs. Integrate these plans into local, provincial and national development projects, ensuring public–private partnership.
- **Finance programmes targeting women, marginalized people, prospective migrants and returnees.** The testimonies in Section 5.4 show that economic reasons are key to people's decisions about migration and women receiving remittances have better adaptation tools. Hence, the government should establish dedicated financial programmes and grants aimed at women entrepreneurs and marginalized groups. Provide training in financial literacy and entrepreneurship to ensure these groups can access and effectively use financial resources. These can be done by partnering with financial institutions and NGOs to create microfinance schemes and provide

business development services tailored to women and disadvantaged groups. Ensure that funding related to climate financing is not just targeted at immediate relief but also at long-term sustainability.

- **Enhance coordination.** As highlighted in the policy analysis, there is often a lack of coordination among various agencies working in the sector of MECC and gender. Hence, the government should develop a clear framework for coordination that includes regular inter-agency meetings, shared databases and joint action plans. Ensure that responsibilities and roles are clearly delineated and that there is a central authority to oversee and facilitate coordination. A multi-stakeholder coordination body should be established that includes representatives from all relevant sectors and levels of government to oversee the implementation of these frameworks.

An abandoned house in Sanfebagar after a flood displaced the owners.
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The Budhiganga River in Sanfebagar flows calmly during the dry seasons but soars heavily during the monsoon, causing havoc in the settlements it flows across.
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ANNEXES

ANNEXES

ANNEX 1. AUDIO-VISUAL CONSENT FORM

I, _____[name of individual or parent / legal guardian] [as applicable], hereby authorize _____[name of audio-visual technician] on behalf of the International Organization for Migration (hereinafter "IOM") to take photographs and/or make audio recordings, video recordings, films, quotations and/or media interviews (hereinafter "Recordings") of myself [and/or my child _____ [name of child]] [as applicable] and:

1. I agree and understand that the Recordings are being taken within the framework of the project [name of project] (hereinafter the "Project"). This Project aims to [specify objective of project].
2. I authorize IOM to use and reproduce the Recordings outside the scope of the Project for future use in its work, including to:
   - Increase knowledge and understanding of migration issues.
   - Raise awareness in campaigns, promotional activities, communication strategies and public communications.
   - Document and promote IOM's work.
   - Inform IOM's donors, partners, the media, the general public and others about IOM's programmes and activities.
3. I understand and agree that future use of the Recordings may include, but is not limited to, use in publications, promotional material, brochures, reports, articles, presentations, future exhibitions and display on the websites of IOM and other third-party electronic format media outlets.
4. I understand the intended use of the Recordings and hereby give my permission for the above-mentioned purposes. I also understand that any Recordings taken may be shown in a public environment.
5. I acknowledge that IOM is not obliged to use the Recordings.
6. I hereby release, discharge and agree to hold harmless IOM from any liability or damage caused, directly or indirectly, to me, my child or my family in connection with this authorization by virtue of the use of any of the Recordings for the purpose of the Project or for IOM's future use.
7. I understand and agree that IOM will have the copyrights and any other intellectual property rights relating to the Recordings and that IOM can use and publish them, and authorize third parties to use and publish them, without my consent.
8. I acknowledge that [neither my child nor I] will receive any remuneration for the Recordings or for the use of the Recordings and that no payment or further consideration shall be effected.
9. I understand the contents of this consent form, after:

   (a) Having read the above clauses: YES/NO

   (b) The above clauses have been read to me: YES/NO

10. I voluntarily make this declaration and freely consent to myself's / my child's recordings being taken by the audio-visual technician on the behalf of IOM.

Signed on [date] at [place]:

Signed by:

[Name] (Signature or mark of individual or parent/legal guardian)	[Name] (Signature or mark of the child) [if applicable]

Interpreter's signature [if applicable]

NOTE: The child's consent is also necessary where the child's age and maturity reasonably dictate that his/her own consent is owed consideration. The consent of the parent or legal guardian must also always be obtained. If the child declines to give his/her own consent, no Recordings shall be made notwithstanding the consent granted by the parent or legal guardian.

ANNEX 2. RESEARCH TOOLS AND QUESTIONNAIRES

A: Questions for in-depth interviews

1. Please describe your experience with environmental and climate changes in your community over the past 10 years. What specific changes have you witnessed? (Probe for specific environmental stressors like changes in temperature, precipitation, landslides, floods, etc.)
2. How have these environmental and climate changes impacted your livelihood and way of life? (Probe for agricultural productivity, plant diseases, or positive impacts such as changed vegetation, etc.)
3. In what ways have you adapted your livelihood strategies in response to shifts in these changes? (Probe for shifts in crop patterns, use of technology, use of remittances, etc.)
4. What types of migration do you commonly see in your community? In your family?
5. Do women also migrate from your community? Elaborate (for both yes and no). (Probe for factors that limit or enhance women's mobility.)
6. Are there any migrants living in your community? Or, are there any individuals who have migrated away from your community? If yes, please elaborate.
7. What environmental factors do you consider as the pull factor for in-migration (availability of grazing land, fertile land, reliable water access, etc.)?
8. Have environmental stressors affected migrations in the region?
9. To what extent has migration been used as an adaptation strategy among people in your community faced with environmental and climate changes?
10. What are the key reasons people migrate?

11. How does the absence of a family member working/living away from home impact your daily life, especially regarding livelihood and household chores?
12. Have you thought about migrating yourself with the migrant in your family or independently? Why or why not? OR How often have you migrated for work in the last five years (once, multiple times, every year)? What were the main reasons for migrating?
13. What do you know about the safe, regular, and orderly migration routes and destinations?
    - If you are using agents and recruitment agencies (or educational consultancies) for your migration, how do you ensure that they are safe, regular, and orderly?
14. What kind of government and non-government programmes that exist in your community? [What programmes do exist concerning climate change, migration, and gender?
15. What kind of government programmes would you want to see in your community that help with migrations, gender dynamics, and environmental stressors? (Probe for each.)

B: Interview guide for key informant interviews (KII)

1. How have temperature and rainfall patterns changed in the region over the last 10 years? Do these changes cause environmental stress (drought, flood risk, change in agricultural products) in Karnali/Sudupaschim?
2. How have these changes impacted the livelihood and well-being of the local community, crop health, livestock, and incomes from farming or herding?
3. Individuals/families from which regions and communities are the most affected by these environmental stressors?
4. What are the adaptation strategies implemented by the community in Karnali/Sudurpashchim to negate the impacts of environment and climate change and natural hazards?
5. Is migration common in response to environmental stress? Is this migration typically temporary or permanent? Internal or cross-border?
6. Which innovative or indigenous, climate-resilient technologies/adaptation strategies or practices have shown promise in supporting women and other groups staying behind in migrant households (e.g. stress-tolerant crops, rainwater harvesting, digging small ponds, etc.)? How could the adoption of these strategies be enabled and scaled up?
7. How would you assess the current level of engagement of mobile populations, including vulnerable groups, in government-led development initiatives and climate change adaptation programmes in Karnali/Sudurpashchim?
8. From your perspective, what existing mechanisms or platforms effectively facilitate the participation of mobile populations in these programmes, and what barriers are perceived by the community?
9. What kinds of human mobility records are maintained by this local government? Please elaborate.
    - Internal migration
    - Cross-border migration
    - Displacement
    - Relocation
    - Others
10. To what extent are considerations related to climate change-induced human mobility integrated into Nepal's existing national policies and frameworks?

11. From your understanding, what gaps or shortcomings exist in the current policies concerning the inclusion of climate-induced human mobility, and how do you suggest addressing these?
12. Are there successful models or approaches from other countries or regions that, in your opinion, could serve as benchmarks for Nepal in integrating climate-induced human mobility into its policies and frameworks?

C: Focus group discussion questions checklist for mixed group of women from migrant and non-migrant households

1. Can you elaborate on the primary environmental stressors in your area, specifically highlighting their impact on local communities?
2. How have these environmental stressors affected the livelihoods (daily life) of the locals?
3. What are the key reasons for people to migrate away from this area?
4. From your perspective, how do these environmental stressors contribute to migration within the researched areas or local governments?
5. How does the absence of a family member working/living away from home impact your daily life, (for example, regarding livelihoods, decision making and household chores)?
6. How do you deal with the impact of migration on your daily life?
7. Have you thought about migrating yourself with your family members or independently? Why or why not?
8. What climate-smart resilient technologies and adaptation measures are you currently using in your daily life, including traditional and indigenous methods?
9. What are the factors (social and cultural, etc.) hindering you from using new/traditional/indigenous climate-smart/resilient technologies and adaptation measures?
10. What new climate-smart/resilient technologies/adaptation measures could be introduced to reduce your workload when a family member or spouse is away for work?
11. When family members send you money from abroad (remittance), have you ever used any of it to help your family prepare for droughts, floods, or other extreme weather events?
    - If yes,
      What did you use the money for? (e.g. buying better seeds, fixing the roof, storing food) About how much of the money you received did you use for this purpose?
12. Have you received any training on financial literacy?

D: Focus group discussion questions checklist for mixed group of men, including returnee men and men from migrant and non-migrant households

1. How often have you migrated for work in the last five years (once, multiple times, every year)? What were the main reasons for migrating?
2. How and to whom are the chores that you do in your household transferred? Does that increase their drudgery?
3. Are there migrant women in the destination you migrate to? Tell us more.
4. What are the opportunities to work in your hometown? Are those jobs limited to only men or only women?

5. What environmental stressors do you consider as the push factor for out-migration (lack of water, crop failure, flood, landslides, drought)? How do those who stay behind adapt or deal with the drudgery, especially concerning environmental stressors?
6. What environmental factors do you consider as the pull factor for in-migration (availability of grazing land, fertile land, reliable water access, land that is not at risk of landslide or flood, etc.)?
7. For people in your community who migrate to work, approximately which of the following is higher (order them):
   - Less than 6 months
   - Between 6 months and 1 year
   - More than 1 year
8. How do you receive(d) information related to migration and what networks did you adopt to migrate?
9. Do you prefer to stay in your village/hometown if you get the opportunity to earn equal income here (for seasonal migrants)? In your view, if reliable local income was available, would more people prefer to stay instead of leaving the community?
10. What types of local employment initiatives would you like to see the government prioritize to provide viable work opportunities within the community? What kind of employment programmes do you wish to see being initiated by the local government?
11. What kind of climate-smart/resilient technologies/adaptation strategies could best support families and livelihoods affected by migration from your area (drought-resistant seeds, water harvesting systems, etc.)?

E: Focus group discussion questions checklist for mixed group of individuals displaced due to environmental stressors

1. How has your life changed since you were forced to leave your home? What are the biggest lifestyle challenges now? And any positive changes?
2. What barriers or discrimination have you faced in new workplaces (disparity between the host community and displaced people in terms of wages, availability of jobs, etc.), especially differences between men and women?
3. How have people in your new community been supportive, in terms of shelter, emotional aid, livelihoods assistance, or other forms?
   - (Question for the host community: How has the community responded to the IDPs with the necessary support, in terms of shelter, emotional aid, livelihood assistance, or other forms?)
4. Are there any community groups or activities in your new area that are helping displaced people? For example, aid groups, religious groups, women's groups, NGO, INGO, community-based organizations? What specific things are these groups doing that provide useful help or support? For instance, donations, counselling, livelihood help, or other aid? Do you find it more difficult now to access basic services like education, health care, and legal resources?
5. Do you find it more difficult now to access basic services like education, health care and legal resources?
6. If difficult, how are these difficulties with accessing services impacting you and your family currently?
7. Did you receive timely governmental support for evacuation, relocation, or rehabilitation from the disaster impacts? What were the limitations?

8. Moving forward, what specific forms of government assistance would be most helpful for the stabilized rebuilding of life and livelihoods?
9. What strategies have you and your community used to deal with the changes caused by the disaster?
10. How can communities be better prepared for such disasters in the future?
11. What do you think would help to boost your resilience?

F: Focus group discussion questions with prospective migrants

1. What kind of migration options are your looking for?
    (a) Through recruitment agencies or consultancies?
    (b) What kind of work are you seeking abroad?
2. Why do you want to migrate?
3. What are the opportunities in place in your region in terms of job opportunities and work?
4. What are the government bodies that you are using for migration?What do you know about safe, regular, and orderly migration?
5. How do you receive(d) information related to migration? What networks did you adopt to migrate?
6. Where can you get information, counselling and support related to migration, if needed (e.g. migrant resource centre)?
7. What kind of skills are you acquiring as you prepare to migrate elsewhere for employment?
8. What do you know about the safe, regular, and orderly migration routes and destinations?
9. If you are using agents and recruitment agencies (or educational consultancies) for your migration, how do you ensure that they are safe, regular, and orderly?
10. If you plan to migrate informally to destinations in India, how do you ensure that the opportunities that you get there are safe, regular, and orderly?
11. What kind of government support/policy provisions do prospective migrants wish to see being implemented?
12. What environmental stressors do you consider as the push factor for out-migration (lack of water, crop failure, flood, landslides, drought)? How do those who stay behind adapt or deal with the drudgery, especially concerning environmental stressors?
13. What environmental factors do you consider as the pull factor for in-migration (availability of grazing land, fertile land, reliable water access, land that is not at risk of landslide or flood, etc.)?

G: Household survey questionnaire

Introduction:

We are conducting research to understand the challenges faced by communities due to environmental and climate change, and migration. The responses provided will be confidential and will help us understand. We seek your verbal and written consent before we proceed with the questions. If you have any reservations in answering any of the questions or would like to quit at any point of time during the survey, please let us know and we will stop immediately.

Section 1: Introduction of participants

1. Name: _____
2. Age: _____
3. Gender: Man ___ Woman ___ Other ___
4. Occupation: Farmer ___ Laborer ___ Business Owner ___ Student ___ Government Employee ___ Other (please specify): _____
5. Place of residence: Village ___ Town ___ Suburb ___
6. Which ethnicity/caste category do you belong to? _____

Section 2: Demographic information

7. How many people live in your household? _____
8. Highest level of education: No formal education ___ Primary education ___ Secondary education ___ Bachelor's degree ___ Master's degree or higher ___
9. Household income: Below poverty line ___ Low income ___ Middle income ___ High income ___
10. Marital status: single ____ Married ____ Divorced ____ Widowed ____
11. Number of dependents: ____
12. Has anyone in your household migrated for work in the past 10 years? (Yes/No)
    (a) If yes, who manages the household when someone migrates for work? Spouse ___ Father ___ Mother ___ Son ___ Daughter ___ Daughter-in-law ___
    (b) If no, is anyone in the family willing to migrate? (Yes/No)
    (c) If yes, is there any constraints in migration?

Financial
Housing and cost of living ___
Lack of skills or education ___
Social and cultural ties ___
Cultural stigma ___
Limited access to information ___
Legal and regulatory barriers ___
Health-care access ___
Environmental factors ___

(d) Why do your family members migrate or why would you like to migrate? (Rank the following)?

Economic insecurity ___
Limited job opportunities ___
Social and cultural ties ___
Cultural stigma ___
Housing and cost of living ___
Health-care access ___
Education access ___
Inadequate infrastructure ___
Economic dependence on local resources ___
Environmental factors ___

Section 3: Understanding environmental factors and human mobility

1. Over the past 10 years, have you noticed any changes in the environment around your village? (e.g. temperature, rainfall, availability of water, forests) (Yes/No)
    (a) If yes, what changes? More droughts ___ Rapid drying up of water resources ___ Increased floods ___ Less rainfall ___ More landslides ___ High temperature ___ Increased heat and cold waves ___ Increased deforestation ___ Rapid depletion of grazing areas ___ Increase human-wildlife conflict ___ Others ___
2. Have you experienced environment stressors around your village that resulted in people migrating elsewhere? (Yes/No)
    (a) If yes, what stressors?
        (i) Disaster-related (Earthquake – 1; Forest fire – 2) ___
        (ii) Land related (Soil salinization – 1; Soil degradation – 2; Soil erosion – 3; Land quality – 4; Desertification – 5; Deforestation – 6; Damaged land – 7; Landslides – 8) ___
        (iii) Crop/Property loss–related (Property damage – 1; Livestock loss – 2; Crop yield - 3) ___
        (iv) Precipitation-related (Drought – 1; Monsoon delay – 2; Rainfall – 3; Dryness – 4; Humidity – 5; Flood – 6) ___
        (v) Temperature-related (Heat wave – 1; Cold wave – 2; Hotness – 3; Coldness – 4) ___
        (vi) Others (Wind – 1; Pollution – 2; Weather – 3; Wildlife depredation – 4; Human-wildlife conflict – 5; Agricultural pests – 6) ___
    (b) If yes, what are velocity of these stressors?
        (i) Disaster-related: Slow onset ___; Rapid onset ___
        (ii) Land related: Slow onset ___; Rapid onset ___
        (iii) Crop/Property loss–related: Slow onset ___; Rapid onset ___
        (iv) Precipitation-related: Slow onset ___; Rapid onset ___
        (v) Temperature-related: Slow onset ___; Rapid onset ___
        (vi) Others: Slow onset ___; Rapid onset ___
3. Have people in your village changed the way they do things to adjust to the changing environment and environmental stressors? (e.g. growing different crops, managing water differently) (Yes/No)
    (a) If yes, please select all that apply:
        (i) Changed farming practices (e.g. planting different crops, using less water)
        (ii) Improved water management (e.g. building rainwater harvesting systems, conserving water)
        (iii) Diversified livelihoods (e.g. exploring new income sources, starting small businesses)
        (iv) Adopted soil conservation techniques (e.g. terracing, mulching)
        (v) Migrated to different areas within the village or nearby (seeking safer locations, better access to resources)
        (vi) Other (Please specify): _____

4. Are there any organizations in your village that help prepare for or address environmental issues? (Yes/No)
    (a) If yes, please explain what they do:
        (i) Raise awareness about environmental issues (e.g. organizing workshops, distributing information)
        (ii) Organize tree planting or other conservation activities
        (iii) Promote sustainable farming practices (e.g. water conservation techniques, soil management)
        (iv) Advocate for environmental policies (e.g. working with government officials)
        (v) Provide support to communities affected by environmental problems (e.g. disaster relief, livelihood development)
        (vi) Promote nature-based livelihood opportunities (e.g. NTFPs, medicinal plants, etc.)
        (vii) Other (Please specify): _____
5. Have these changes helped people stay in your village or have they had to move away?
    (a) Stay
    (b) Move
    (c) Unsure
6. How do these environmental factors affect human mobility in your community?
    (a) Increased migration to urban areas
    (b) Internal displacement
    (c) Cross-border displacement
    (d) Planned relocation
    (e) Out-migration to foreign countries
    (f) No noticeable impact
    (g) Others (please specify) _____

Section 4: Climate smart technologies for women

7. Have you heard of technologies designed to make household chores easier, especially when household member/s are away for work? (Yes/No)
    (a) If yes, please select all that apply:
        (i) Solar lamps or lanterns
        (ii) Fuel-efficient stoves
        (iii) Water pumps or filtration systems
        (iv) Small-scale irrigation systems
        (v) Mobile phone apps for agriculture or weather information
        (vi) Other (Please specify) _____
8. Do you think any of these technologies would be helpful in your household? (Yes/No)
    (a) If yes, please select all that apply:
        (i) Solar lamps or lanterns
        (ii) Fuel-efficient stoves
        (iii) Water pumps or filtration systems
        (iv) Small-scale irrigation systems

(v) Mobile phone apps for agriculture or weather information

(vi) Other (Please specify) _____

9. Why do you think this technology would be most helpful? (Select all that apply)
   (a) Reduces effort and time spent on household chores
   (b) Improves safety and security
   (c) Helps with income generation or food security
   (d) Other (Please specify) _____
10. What percentage of remittance do you use in climate smart technologies and adaptation measures? ___
11. Have you received any training on financial literacy? ___
12. What are some challenges you face in managing household tasks and adapting to climate-related changes when men are away? (Select all that apply)
   (a) Increased workload and responsibilities
   (b) Lack of access to resources or income
   (c) Difficulty making decisions alone
   (d) Social isolation
   (e) Other (Please specify) _____
13. By how many hours does your worktime increase when the men are away? ___

Section 5: Engagement of mobile populations in development and climate change programmes

14. Have you or members of your community been involved in government led development initiatives or climate change adaptation programmes? (Yes/No)
   (a) If yes, what kind of initiatives?
   (b) If no, what constraint to involve in such initiatives?
15. What mechanisms or platforms exist to facilitate the participation of mobile populations in these programmes?
   (a) Community meetings
   (b) Outreach programmes
   (c) Social media campaigns
   (d) Others (please specify) _____
16. What barriers do you perceive that hinder effective engagement of mobile populations in development and climate change programmes?
   (a) Lack of transportation
   (b) Language barriers
   (c) Cultural insensitivity
   (d) Limited access to information
   (e) Others (please specify) _____

Section 6: Integration of climate-induced human mobility in national policies

17. Does the government provide any assistance to areas facing environmental problems or related migrations?
   (a) Yes
   (b) No

(c) Unsure

(i) If yes, what kind of assistance?

(1) Financial assistance (e.g. subsidies)

(2) Technical assistance (e.g. training on sustainable practices, infrastructure development)

(3) Food and other essential supplies

(4) Disaster relief assistance (e.g. post-disaster response, emergency shelters)

(5) Relocation assistance (e.g. for villages in high-risk areas)

(6) Other (Please specify): _____

18. Are you aware of any government rules or programmes designed to help people who have to move because of environmental changes?

(a) Yes

(b) No

(c) Unsure

(i) If yes, please explain what they are

(1) Compensation for lost land or property

(2) Relocation assistance to safer areas

(3) Livelihood development programmes in new locations

(4) Social protection programmes (e.g. food security, health care)

(5) Education and training programmes for new skills

(6) Other (Please specify) _____

19. When faced with environmental challenges, what things do people in your village typically do to avoid or minimize the need to move away? (Choose all that apply)

(a) Change farming practices

(b) Rely on help from family and friends

(c) Seek government assistance

(d) Move to a safer area within or outside the village

(e) Other (please specify): _____

20. What kind of policy provisions do you wish to see from the government regarding people affected by climate-induced human mobility? (Select all that apply)

(a) Financial assistance for displaced individuals and communities

(b) Relocation assistance to safer areas

(c) Livelihood development programmes in new locations

(d) Social protection programmes (e.g. health care, education)

(e) Skills training and employment opportunities for displaced people

(f) Compensation for lost land or property

(g) Investment in climate adaptation and mitigation projects in vulnerable communities

(h) Strengthening early warning systems and disaster preparedness programmes

(i) Promoting sustainable resource management practices

(j) Other (Please specify): _____

21. To what extent do you feel the government is currently prepared to address the challenges of climate-induced human mobility?
    (a) Very prepared
    (b) Somewhat prepared
    (c) Not well prepared
    (d) Unsure

Thank you for your participation. Your input is invaluable to our research efforts.

ANNEX 3. THE EXISTING POLICY LANDSCAPE IN THE RESEARCH AREAS

National policies			
		Existing provisions	Scope for amendments
1.	National Climate Change Policy, 2076 (2019)	The policy provides a thorough framework to mitigate climate change impacts by developing disaster risk reduction and management systems at federal, provincial and local levels. It emphasizes prevention, reduction and preparedness while promoting low-carbon energy and efficient water resource use for energy security. The policy ensures social security for highly vulnerable persons, aiding recovery from climate-induced disasters, and involves community organizations and the private sector in disaster management. It also focuses on creating climate-friendly, resilient infrastructures in rural and urban areas and integrates gender equality and social inclusion, with specific strategies for women, marginalized groups and vulnerable communities. Furthermore, it promotes climate-resilient livelihood programmes and ensures transparency, accountability and active public participation in climate change adaptation and disaster risk reduction programmes.	Despite its comprehensive framework, the policy does not include specific provisions for migrants affected by climate change or disasters, omitting even the terms "migrant" and "migrants". It lacks a legal framework to facilitate migration processes, or to ensure access to basic services for migrants affected by climate change. While Section 8.4 aims to build climate-friendly villages and cities, it does not explicitly recognize the needs of climate-affected mobile populations. Section 8.9 addresses gender equality and social inclusion but fails to mention displaced, trapped or immobile households and communities, overlooking their unique challenges.
2.	Disaster Risk Reduction and Management Act, 2074 (2017)	The Act establishes the National Council for Disaster Risk Reduction and Management, tasked with formulating policies, directing disaster management efforts and managing financial resources. Under the chairmanship of the Home Minister, an executive committee implements national policies, integrates disaster management into all sectors and enhances institutional capacities. It identifies high-risk areas, implements early warning systems and coordinates international aid. The Act envisions a National Disaster Risk Reduction and Management Authority to oversee disaster activities, set relief distribution standards prioritizing women and establish provincial and local disaster management institutions aligned with federal guidelines. It promotes localized laws and ensures comprehensive disaster preparedness and response nationwide.	The Act primarily outlines the roles and responsibilities of various committees and councils in managing disaster risks, but it does not clearly establish the mechanisms by which it will provide sustainable solutions for households displaced by slow- and rapid-onset disasters.

3.	Foreign Employment Act, 2064 (2007)	The Act aims to enhance the safety, management and decency of foreign employment, protecting the rights and interests of both workers and entrepreneurs. It allows Nepalese citizens to seek employment abroad in designated countries and prohibits conducting foreign employment business without a license. Workers must obtain a mandatory work permit, which can be denied if job conditions are unsatisfactory, affect workers' dignity, health, or safety, pose security risks, or under other specified conditions. The Act includes provisions for personal employment, sets requirements for minimum wage, insurance, training and orientation, and establishes a foreign employment welfare fund for the social security of workers and their families. Additionally, the Act ensures gender equality by preventing licensed institutions with complaints of violence against female workers from operating, prohibiting gender discrimination in employment processes, and providing special facilities and reservations for women and victims of national calamities seeking foreign employment. These measures collectively promote safe and equitable opportunities for Nepalese workers abroad while safeguarding their rights and welfare.	The Act, while comprehensive in many areas, contains several notable gaps. First, it does not address climate change-induced foreign employment, leaving a significant void in provisions for individuals displaced by climate-related factors seeking employment abroad. Second, there is a lack of specific provisions for the adaptation and reintegration of foreign employees who return from employment abroad. The Act's primary focus is on facilitating and regulating the process of sending citizens to foreign employment, with insufficient attention to the support and reintegration of returnees to create a more holistic and supportive framework for all aspects of foreign employment.
4.	Employment Policy, 2071 (2014)	The policy focuses on enhancing the rights and welfare of migrant and immigrant workers through several key measures. Section 13.1 mandates that contracts must be signed in the presence of relevant authorities to ensure transparency. Section 13.2 involves restructuring agencies to extend their services locally for better accessibility. Section 13.3 emphasizes ratifying international conventions and partnering with the international community to strengthen the legal framework protecting migrant workers' rights. Sections 13.4 and 13.5 aim to reduce migration risks and improve employability through awareness programmes and mandatory training. Special provisions under sections 13.9 and 13.10 address the needs of women and marginalized communities. Section 13.6 mobilizes Nepalese missions abroad to secure safe and credible employment opportunities. Socioeconomic aspects are addressed by facilitating credit for overseas employment (Section 13.8), simplifying the remittance system (Section 13.11) and encouraging the productive use of remittances to support national development and poverty alleviation (Section 13.13).	The policy does not directly address how the employment of mobile populations affected by climate change and associated disasters and environmental degradation would be supported. Even though climate change and migration can affect employment opportunities and market scope, these complex issues are not recognized. The policy mentions promoting agricultural employment, but there is scope to elaborate on climate-resilient agricultural practices and the creation of green jobs, especially targeting those most affected by climate change and associated disasters, and environmental degradation.

5.	National Adaptation Plan 2021–2050	The plan aims to enhance climate resilience from 2021 to 2050 by integrating lessons from past initiatives and engaging stakeholders extensively. Aligning with Nepal's Second nationally determined contribution under the Paris Agreement, the NAP promotes coordinated climate action across all sectors and government levels. It seeks to incorporate climate adaptation into development planning, enhancing adaptive capacity in vulnerable sectors and prioritizing gender equality, social inclusion, livelihood, and governance concerns. The NAP outlines short-term actions up to 2030, including establishing early warning systems and improving climate data management, with a comprehensive review planned for 2031 to guide long-term strategies. It also aligns with the 2030 Agenda for Sustainable Development and the Sendai Framework for Disaster Risk Reduction, ensuring protection for vulnerable groups through climate-resilient development and inclusive adaptation planning. The institutional framework involves various national and local committees, ensuring a comprehensive approach to climate adaptation and sustainable development in Nepal.	The NAP has further scope for (1) recognizing the impact of climate change on migration and displacement; (2) exploring the unique needs of populations on the move due to the direct and indirect impact of climate change and associated disasters, and environmental degradation; (3) adopting a gender lens while exploring climate change loss and damage.
6.	The Environment Protection Act, 2019	The EPA represents a substantial step forward in addressing climate change and environmental protection in Nepal. It emphasizes the need to integrate future climate risks into policies and practices, reinforcing environmental compliance through mandatory EIAs and supplementary EIAs. The Act ensures the right to a clean and healthy environment by holding parties liable for environmental harm and mandating compensation for victims of environmental hazards. The EPA also introduces carbon trading provisions, aligning with international standards like the Kyoto Protocol, though it lacks a clear definition of carbon trading, requiring further regulations. Despite Nepal's minimal contribution to global greenhouse gas emissions, the Act acknowledges the country's vulnerability to climate change and endorses the National Climate Policy 2076 to support its implementation.	The Act has scope to explore the migration–environment–climate change nexus through a gender lens.

7.	Sixteenth National Plan 2024/25–2028/29	Although the plan addresses climate change and gender, it does not bring these together with migration. Climate change strategies focus on implementing adaptation plans and adopting a green economy. It also plans to integrate climate considerations across various sectors like agriculture, health and DRR, and to promote sustainable practices like clean energy and biodiversity protection. Using a gender mainstreaming lens, it aims to target marginalized and highly affected individuals and groups for climate adaptation. Migration and urbanization management aims to harness remittance income for economic prosperity and systematize urbanization through integrated settlements and rural employment opportunities. The plan emphasizes gender-responsive governance, budgeting and policies to ensure the economic and social empowerment of disadvantaged women and access to justice for them.	There is large scope for considering migration as a climate change strategy, which the document does not. While the plan addresses migration mainly in the context of remittances, it neglects migration concerns related to environment and climate change, focusing more on internal migration and excluding plans for reintegrating foreign employment returnees.
8.	National Policies on Internally Displaced Persons, 2063 (2007)	These policies have three goals. First, to adopt preventive and curative measures on a long-term basis to minimize displacement issues. Second, to develop integrated mechanisms involving displaced persons to protect their fundamental and human rights, while minimizing negative effects on communities of destination. Third, to facilitate the safe, voluntary and dignified return of displaced persons or, alternatively, to support their resettlement by constructing and rehabilitating social and economic infrastructure in new locations. The aim is to provide sustainable solutions to internal displacement, ensuring dignity and stability for affected populations while fostering community resilience.	The policies do not prioritize climate-led displacement and do not attend to the gendered impacts of displacement. The policies should also consider the fact that displaced groups and individuals have special needs that need to be taken care of.
Policies in Sudurpashchim Province			
		Existing provisions	Scope for amendments
1.	Sudurpashchim Province Environment Protection Act, 2077 (2020)	The Act has provision for the establishment of a Provincial Environment Protection Fund for environmental protection, pollution prevention and control, climate change management and heritage protection (Section 14). The provisions of the Act primarily focus on environmental assessment, public engagement, fund establishment and the formation of a provincial council. While these measures are important for overall environmental and climate change management, they do not explicitly address safe and orderly migration due to climate change.	The provisions must require that environmental assessment reports explicitly consider the potential for displacement due to climate impacts and propose measures to facilitate safe and orderly migration.

2.	Sudurpashchim Province Agricultural Development Strategy, 2079–80 (2022–23)	The Sudurpaschim Province aims for a self-sufficient, climate-smart agricultural sector by 2080. Their plan focuses on boosting incomes and food security through sustainable practices. Recognizing climate threats like droughts and floods, they promote early warning systems and improved farming techniques. Gender equality is a priority, with women gaining access to food processing equipment, training and subsidies. Overall, the strategy aims for a more productive, inclusive and climate-resilient agricultural sector.	The strategy prescribes the establishment of an environmental protection fund, but lacks details on running it, and does not specify which climate adaptation techniques are most crucial. While promoting water use is important, the strategy does not mention sustainable management practices. It also overlooks the need for climate-resilient crops and the issue of migration entirely. Additionally, provisions on training and subsidies might not be effective due to a lack of follow-up support, bureaucratic hurdles for women and potential discrimination in accessing financial services.
Policies in Karnali Province			
		Existing provisions	Scope for amendments
1.	A Bill related to Arrangement of Environment Protection, 2076 (2019)	The bill tackles climate change through various measures. Projects require environmental assessments to minimize harm (Sections 3 and 4). Pollution is prohibited, with the government setting standards and enforcing them through inspections and fines (Sections 15, 16 and 17). Plastic use can be regulated or banned if it does not meet standards (Section 17). Provincial and local levels are encouraged to create adaptation plans for sectors like agriculture and infrastructure, while the bill allows for mitigation activities to reduce greenhouse gas emissions (Sections 25, 26 and 27). Public awareness is promoted through mandatory information sharing on climate change risks (Section 25). Finally, the bill allows for an environmental protection fee to discourage pollution (Section 32).	The Bill lacks a plan for climate migration or for ensuring diverse female representation. Pollution controls (Section 16) are vague and lack public participation. Plastic waste management (Section 17) and environmental fee collection (Section 32) lack crucial details, potentially hindering effectiveness. Furthermore, while promoting inclusivity, the bill overlooks the specific needs of women from disadvantaged backgrounds.
2.	Karnali Province Forest Act, 2078 (2021)	The Act mirrors the National Forest Act, focusing on forest types and management funds within the province. Initially unclear on who benefits most, it was clarified in 2080 regulations. While promoting sustainable forestry and biodiversity, it lacks specific climate change adaptation measures. Accompanying regulations focus on practicalities like fund management and application procedures, aiming for smooth implementation within Karnali Province.	The Act has overlooked specific provisions related to climate change adaptation, as well as cross-cutting issues such as gender and migration. These omissions may hinder comprehensive strategies for integrating climate resilience and for addressing the diverse needs of vulnerable groups.

Policies in Sanfebagar Municipality			
		Existing provisions	Scope for amendments
1.	An Act for the Protection of the Environment and Natural Resources, 2077 (2020)	The Act prioritizes local environmental protection by municipalities, encouraging citizen participation. It also identifies special areas for conservation and requires environmental impact studies for projects. The focus on adaptation plans (Section 12) with a priority on vulnerable groups (sections 12(2) and 50(3)) demonstrates a commitment to climate resilience and social equity.	The Act overlooks provisions for managing climate-induced migration or integrating migrants into communities (essential services, decision-making). Additionally, it does not include gender-sensitive indicators to measure adaptation plan effectiveness; nor does it consider the unique challenges faced by those experiencing multiple vulnerabilities.
2.	Disaster Risk Reduction and Management Act, 2075 (2018)	The Act acknowledges the specific needs of vulnerable groups during disasters. Provisions in Section 5 call for heightened awareness to prevent violence against, and trafficking and exploitation of women and children. This section also mandates creating plans for at-risk groups including women, children, senior citizens and disabled individuals. Section 18 ensures that relief packages cater to the specific needs of these vulnerable populations. Section 22 requires detailed records on disaster impacts that include affected people and relocated households.	Although the Act includes provisions for disaster relief, it does not specifically address the unique challenges posed by climate-induced migration. The Act does not have mechanisms for cross-border cooperation, which is essential for managing migration caused by transnational climate impacts.
3.	Sanfebagar Disaster Management Fund Operation Procedure, 2074 (2017)	The procedure was implemented to manage the fund for addressing and reducing natural and human-induced disasters. Most of its provisions pertain to fund operations, including allocation and spending procedures, with a primary focus on emergency relief, disaster preparedness and medical aid. Under this procedure, a separate fund named "Sanfebagar Municipality Disaster Fund" has been established. This fund is used for establishing and rehabilitating temporary camps or shelters for people who have lost their permanent homes due to disasters, disposing of debris and pollution caused by disasters, and post-disaster reconstruction. According to Section 12 of the procedure, priority in distributing relief materials shall be given to women, children, teenagers, senior citizens and individuals with disabilities.	The procedure fails to adequately account for internal migrants without formal residency, risking their exclusion from essential services. The procedure's lack of specificity regarding the needs of vulnerable groups, particularly women and girls, could result in inadequate aid. Additionally, it does not involve women in planning and implementation, missing gender-sensitive approaches. The procedure also overlooks sustainable funding for long-term disaster mitigation, focusing only on short-term relief.

Policies in Krishnapur Municipality			
		Existing provisions	Scope for amendments
1.	Disaster Management Fund Operation Procedure, 2074 (2017)	The provision for establishing and rehabilitating temporary camps or shelters is crucial for ensuring that individuals who have lost their homes due to disasters have a safe place to stay. Allocating funds for the disposal of debris and pollution caused by disasters is essential for creating a safe and habitable environment. As per Section 12 of the procedure, priority shall be given to women, children, senior citizens and persons with disabilities while distributing relief materials.	The procedure does not adequately address needs related to slow-onset events and planned relocation. The procedure for disaster relief does not consider internal migrants or the specific needs of vulnerable groups, including women. Women's participation in disaster planning and implementation is also not encouraged.
2.	Municipal Disaster Risk Reduction and Management Act, 2075 (2018)	The Act can play a pivotal role in disaster preparedness and response with a focus on vulnerable groups. This includes relocating communities from high-risk areas to safer places and promoting awareness about safe living conditions. In terms of gender-related responsibilities, the disaster management committee conducts targeted awareness programmes to prevent sexual violence, trafficking and exploitation during disasters, particularly for women, children and persons with disabilities. Special plans and programmes are also developed and implemented for marginalized groups and communities at risk. At the ward level, similar awareness efforts are conducted to safeguard vulnerable groups. Additionally, minimum relief standards include provisions for tailored relief packages and safe spaces specifically designed to meet the needs of women, children, senior citizens and persons with disabilities, ensuring their safety and dignity during relief operations.	The Act does not adequately account for internal migrants without formal residency, risking their exclusion from essential services. The Act's lack of specificity regarding the needs of vulnerable groups, particularly women and girls, could result in inadequate aid.
Policies in Khandachakra Municipality			
		Existing provisions	Scope for amendments
1.	Disaster Risk Reduction and Management Act, 2077 (2020)	The Act tackles migration and gender in disaster management. It empowers a committee (Section 5) to relocate communities in high-risk zones and promote safer living (Clause L). It also mandates awareness programmes to prevent violence and exploitation against women, children and people with disabilities (Clause W). Additionally, special plans are required for vulnerable groups like women and senior citizens (Clause Y). Similar initiatives are emphasized at the ward level (Section 7, Clause K). The Act highlights the municipality's focus on inclusive disaster management with a strong focus on protecting vulnerable groups and addressing gender-based concerns.	The document should, in principle, recognize the relationships between climate change, environmental degradation, disasters and human mobility.

2.	Disaster Preparedness and Responses Plan, 2079 (2022)	The plan prioritizes minimizing disaster impact on infrastructure and livelihoods, focusing on climate resilience. It outlines steps to strengthen preparedness, response and recovery through stakeholder coordination. A key focus is ensuring the inclusion and protection of vulnerable groups, especially women, throughout the process. This plan reflects the municipality's commitment to equitable disaster management. A significant priority within the plan is the inclusion and protection of vulnerable groups, particularly women, throughout the planning and implementation phases of various activities. This underscores the municipality's commitment to equitable disaster preparedness and response, ensuring all segments of the community are adequately supported and protected during crises.	The plan fails to adequately address the issue of climate change in the context of disaster management. This plan derives heavily from neighbouring Suvakalika Municipality's DRR plan, and hence fails to sufficiently realize local needs.
3.	Khandachakra Municipality Agriculture Act, 2077 (2020)	The Act ensures that the existing water springs, ponds, canals, traditional dams and lakes within the municipality will be restored and put into operation for irrigation and drinking water. Emphasis will be placed on the use of electrical and solar energy in such irrigation promotion. (Section 25 aims to develop agriculture as a respectable profession and a means of economic prosperity by developing and promoting access to agricultural technology for women and men (poor, small farmers, women, Dalits, Indigenous and youth), and to develop their ability to adopt agricultural technology, and develop agriculture as class-friendly technology.	While promoting electrical and solar energy for irrigation is positive, there is no mention of incentives or support for farmers to adopt these technologies. There is no explicit provision addressing the needs of mobile populations in the provided sections.

Policies in Mahabu Rural Municipality			
		Existing provisions	Scope for amendments
1.	Environment and Natural Resources Protection Act, 2079 (2022)	The Act states that the main responsibility to protect the environment lies within municipal jurisdiction, which ensures local accountability and the engagement of citizens in contributing to environmental protection and promotion, fostering a community-oriented approach to sustainability. Special areas for environmental protection are identified and managed with foresight, incorporating existing land use policies and ensuring that green areas are preserved during infrastructure development. The requirement for an environmental study before any project aligns with best practices for EIAs, ensuring that potential risks are identified and mitigated early. The adaptation plans mandated by Section 12 highlight the municipality's commitment to reducing the adverse effects of climate change, with a focus on prioritizing actions as per national criteria. The gender-specific clauses, particularly in Section 12(2) and Section 50(3), are significant as they ensure that adaptation plans and environmental protection initiatives give special priority to women, persons with disabilities, children, senior citizens and economically disadvantaged communities. This focus on vulnerable groups addresses social inequities and ensures that the most affected populations are not left out in climate resilience efforts.	The existing provisions do not explicitly address migration, especially in the context of climate change and disasters. There are no dedicated clauses or frameworks to manage migration flows, support the integration of migrants, or ensure migrants' access to essential services such as housing, health care and education. The current provisions do not emphasize the inclusion of migrants in community-based adaptation strategies or decision-making processes. This oversight can result in the marginalization of migrants and a lack of social cohesion.
2.	Disaster Management Fund Operation Procedure, 2077 (2020)	The procedure was enacted to operate the fund for managing and minimizing natural hazards and human-induced disasters. Most provisions relate to fund operations, including fund allocation and spending procedures. The procedure primarily focuses on emergency relief arrangements, disaster preparedness and medical relief.	The procedure does not allocate funding for long-term mitigation of disasters caused by climate change nor for disaster-related human mobility and its implications in recovery. Additionally, it does not prioritize any specific groups, such as women, for relief under this fund.

3.	Procedure for Providing Land to Landless Dalits, Landless Squatters and Unorganized Residents, 2078 (2021)	The procedure demonstrates a commitment to addressing the needs of marginalized groups, like landless Dalits, landless squatters and unorganized residents, and providing them with stable living conditions, but does not explicitly mention climate change-displaced migrants.	There is no mention of emergency response plans for individuals who lost their land because of sudden climate-related disasters or other emergencies. The document does not fully recognize the impact of climate change and associated disasters and environmental degradation as one of the causes of displacement and landlessness. Effective policies should include provisions for immediate evacuation, temporary shelter and rapid resettlement of displaced persons to ensure their safety and well-being. The procedure does not clearly integrate land allocation with broader climate adaptation and resilience strategies.

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