



## Climate change, livelihood stress and education led migration

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### Abstract

Climate change has emerged as a significant structural force reshaping livelihoods, mobility, and migration decisions across the Global South. In India, and particularly in the state of Kerala, increasing climate variability, recurrent floods, landslides, coastal erosion, and livelihood disruptions have intensified household economic insecurity and vulnerability over the past decade. At the same time, Kerala has witnessed a sharp rise in education-led international migration, driven by socio-economic conditions, especially to countries such as Canada. While existing migration literature largely explains this trend through aspirations, labour market opportunities, and immigration policies, limited attention has been paid to the role of climate-induced livelihood stress as an influential driver of international student migration.

Using secondary data from government reports, international organisations, academic literature, and policy documents, this paper examines the linkages between climate change, livelihood insecurity, and education-led migration from Kerala to Canada. The study conceptualises international student migration as a long-term adaptation strategy adopted by households facing environmental and economic uncertainty. It argues that climate stress, though rarely explicit in migration narratives, operates as a silent push factor shaping household decision-making, migration motivations, and post-migration expectations. The paper contributes to the emerging literature at the intersection of climate change, migration, and education by situating student mobility within broader environmental and livelihood contexts.

**Keywords:** Climate change, livelihood insecurity, education-led migration, Kerala, international students, Canada

### Introduction

Climate change has increasingly altered the socio-economic landscape of developing regions, influencing livelihoods, well-being, and patterns of human mobility. The Intergovernmental Panel on Climate Change (IPCC) recognises that climate-related risks interact with existing vulnerabilities to shape migration outcomes, often through indirect economic and social pathways rather than immediate displacement alone (Field *et al.*, 2012; Lee & Romero, 2023) <sup>[9, 21]</sup>. Migration is now widely understood not merely as a response to crisis but also as a proactive adaptation strategy adopted by households to manage long-term risks (Lee & Romero, 2023) <sup>[21]</sup>.

India is among the countries most vulnerable to climate change due to its dependence on climate-sensitive sectors such as agriculture, fisheries, and informal employment. Within India, Kerala represents a paradoxical case (Giridhar *et al.* 2022) <sup>[10]</sup>. Despite high human development indicators, the state faces increasing climate exposure in the form of floods, landslides, coastal erosion, and extreme rainfall events (Raj and Sofi, 2023) <sup>[24]</sup>. The floods of 2018 and 2019, recurrent monsoon variability, and rising coastal vulnerability have significantly affected livelihoods, infrastructure, and household economic security (Raj and Sofi, 2023) <sup>[24]</sup>.

Parallel to these environmental changes, Kerala has experienced a rapid rise in international migration, particularly education-led migration to countries such as Canada, USA, the UK, and Australia etc. (Jeena and Afnitha, 2025) <sup>[16]</sup>. Canada has emerged as a preferred destination for Indian students due to its relatively accessible student visa regime, post-study work opportunities, and pathways to permanent residence, even though some accounts claim reverse migration from Canada is rising (The Hindu Bureau, 2024) <sup>[30]</sup>. Existing research

explains this trend primarily through aspiration, employability, and policy frameworks. However, the broader structural changes shaping household decisions, especially environmental and livelihood stress, remain underexplored.

This paper bridges this gap by examining how climate change and livelihood insecurity in Kerala influence education-led international migration to Canada, using secondary data. The study positions international student migration as a form of planned adaptation to climate-induced uncertainty, rather than driven by purely aspirational or opportunity-related factors.

### Review of Literature

#### Climate Change and Migration

The relationship between climate change and migration has been extensively debated in academic and policy circles, even though these studies do not represent most regions in the world. Early studies framed environmental migration in deterministic terms, predicting large-scale displacement due to climate impacts. However, more recent scholarship emphasises that climate-induced migration is complex, multi-causal, and mediated by socio-economic, political, and institutional factors (Joy & Mohandas, 2026) <sup>[18]</sup>. The Foresight Report on Migration and Global Environmental Change conceptualised migration as one of several adaptation strategies available to households facing environmental stress (The Government Office for Science, London, 2011) <sup>[29]</sup>.

Empirical studies from developing countries indicate that climate change influences migration indirectly through livelihood disruption, income instability, and rising vulnerability (Almulhim *et al.*, 2024). Gupta *et al.* (2025) <sup>[1, 12]</sup> highlight that climate-induced migration in South Asia is

often gradual and planned, rather than sudden displacement. Migration decisions are shaped by household resources, social networks, and perceived future risks.

### **Climate Vulnerability and Livelihood Stress in Kerala**

Kerala's geographical features—its long coastline, Western Ghats, and dense population—make it particularly vulnerable to climate change (Government of Kerala, 2014)<sup>[11]</sup>. Studies document increasing frequency of extreme rainfall, floods, and landslides, alongside sea-level rise and coastal erosion. These changes have adversely affected agriculture, fisheries, tourism, and informal livelihoods, leading to income volatility and employment insecurity (Lal, 2022)<sup>[20]</sup>.

The economic costs of climate-related disasters in Kerala have been substantial, with repeated reconstruction expenses placing pressure on households and public finances. While government relief and local self-government initiatives have played an important role in recovery, long-term livelihood insecurity persists, particularly among rural, coastal, and lower-middle-income households or households depending on agriculture (Raj and Sofi, 2023)<sup>[24]</sup>.

### **Education-Led International Migration**

International student migration has become a major component of global mobility, with students from developing countries increasingly seeking education in the Global North (Smith *et al.* 2014). Research on student migration focuses on factors such as global inequality, labour market outcomes, and immigration policies (Jafar, 2018)<sup>[14]</sup>. Canada's international education strategy has positioned the country as a leading destination for Indian students, with Kerala contributing a significant share.

Recent studies also point towards how the underlying motivations for student migrations have changed as it is not solely driven by individual aspirations but has become embedded as household strategies for socio-economic mobility (Fathima, 2025)<sup>[16]</sup>. It is now evident that education-led migration is widely seen as an easier and effective pathway to long-term settlement, remittance generation, and risk diversification. However, the role of environmental stress in shaping these strategies remains underexplored (Fathima, 2025).

### **Research Gap**

While there is substantial literature on climate-induced migration and international student mobility separately, few studies examine their intersection. There is a notable lack of research linking climate vulnerability in origin regions with education-led international migration. This paper addresses this gap by situating Kerala–Canada student migration within a climate–livelihood framework.

### **Objectives of the Study**

The specific objectives of the study are:

1. To examine the nature of climate change and livelihood stress in Kerala using secondary data.
2. To analyse trends in education-led migration from Kerala to Canada.
3. To explore how climate-induced livelihood insecurity influences household decisions to invest in overseas education.
4. To conceptualise international student migration as a form of climate adaptation.

### **Methodology**

The study is based entirely on secondary data. Data sources include government reports from the Government of Kerala and the Government of India, publications by international organisations such as the IPCC, World Bank, and International Organization for Migration, academic journal articles, policy documents, and reports from migration and education agencies. Data on international student migration are drawn from Immigration, Refugees and Citizenship Canada (IRCC) reports and Indian education statistics.

The study adopts a descriptive and analytical approach. Content analysis is used to synthesise findings from existing literature and policy documents. The conceptual framework linking climate change, livelihood stress, and education-led migration is developed through thematic analysis of secondary sources.

### **Climate Change and Livelihood Stress in Kerala**

Climate change is attributed as a major issue contributing to livelihood vulnerability, especially among those working in vulnerable fields like agriculture, water, and forest or related sectors (Thein *et al.* 2025)<sup>[31]</sup>. Climate change and related issues have been found to have socio-economic and environmental vulnerability among people in these sectors in particular (Thein *et al.* 2025)<sup>[31]</sup>. These effects were identified to be significant in norther states of the country, mainly because of their reliance on agriculture and water source related industries, including states like Uttarakhand, which continue to experience sever issues due to climate change (Thein *et al.* 2025)<sup>[31]</sup>.

In comparison, another set of studies have examined how climate change directly affects the livelihood of farmers and similar sectors but also concluded that most sectors have developed counter-mechanisms, such as more efficient irrigation techniques, better farming strategies, and becoming more adaptive towards rapid climate change conditions in general (Jain, 2023)<sup>[15]</sup>. It has been found that climate change would lead to income plunge by 20% for farmers in Andhra Pradesh, a southern state in India, while affecting sugar cane crops yield by 25-30% in Maharashtra, and flooding affecting rice yield in Orissa to significant levels (Balasubramanian and Birundha, 2012)<sup>[4]</sup>.

Most research have examined the case for farmers. while Pradhan (2025)<sup>[23]</sup> found that climate change and related events increased socio-economic pressure on people and societies, and have direct effect on their income sources, income stability, employment opportunities, and nutritional security, which in turn lead to acerbate distress migration of people in these societies (Pradhan, 2025). Authors like Rautela and Karki (2015)<sup>[23, 25]</sup> observed additional issues like how climate change affects people, even when their livelihood is not directly linked with agriculture or farming. For example, rising temperature levels, water levels, changing rain patterns and such have resulted in drastic changes in rain falls, and on many occasions, flash floods. This has led to the loss and damage of infrastructure and property (Rautela and Karki, 2015)<sup>[25]</sup>. In other words, climate change has direct effects on increasing vulnerability of some states in the country than the other (Rautela and Karki, 2015)<sup>[25]</sup>.

Studies conducted in India has concluded that a rise in temperature has a direct negative impact on growth rate of states in India. These effects were found to be substantially higher among poorer and hotter states in the country. A rise of 1C in temperature would lead to a 4.7% decline in

economic growth rate on average (Sandhani *et al.* 2020) <sup>[26]</sup>. In effect, climate change act as a deterrent and have a hindering effect on the socio-economic development and growth of rural regions in India. When it comes to Kerala, the most Southern state in India, the situation is not different. Kerala has experienced significant climate variability over the past two decades. The increasing intensity of monsoon rainfall has resulted in recurrent floods and landslides, causing widespread damage to agriculture, housing, and infrastructure. Coastal areas face erosion and saline intrusion, affecting major sectors and related livelihoods of people living across the state (Choorapulakkal *et al.*, 2024) <sup>[7]</sup>.

Agriculture, which supports a large rural population, has become increasingly vulnerable due to erratic rainfall and declining productivity. Small and marginal farmers face rising input costs and income instability, even though there are additional factors contributing to these outcomes, apart from environmental and climate change related factors (Jacob, 2018) <sup>[13]</sup>. Similarly, the fisheries sector has been affected by changing sea temperatures, declining fish catch, and extreme weather events (Khadar, 2021) <sup>[19]</sup>. These livelihood disruptions have heightened household economic insecurity, increased indebtedness, and reduced local employment opportunities. For many households, especially in middle- and lower-middle- income groups, traditional livelihood pathways no longer guarantee long-term security. All of these factors can be linked back to climate change and related impacts.

### **Education-Led Migration from Kerala to Canada**

India has seen a twenty-fold increase in number of student migrants since the year 2000. Kerala is one of the hotspots in this area. For example, a staggering total of 7236 students migrated to Canada from Kerala in September 2024 alone (Bijulal *et al.* 2024) <sup>[5, 30]</sup>. Even though India has seen much of the migration happening from richer and wealthier states in the country, this trend has soon shifted in favour of southern states in the country, and Kerala remains in the top position in terms of international student mobility (Bijulal *et al.* 2024) <sup>[5]</sup>.

Kerala has a long history of international migration, initially dominated by labour migration to the Gulf countries (Anshad and Yesuraja, 2020) <sup>[3]</sup>. In recent years, there has been a notable shift towards education-led migration, particularly to Western countries such as Canada. According to current statistics, there has been a sharp increase in Indian student enrolment in Canada (A&M Canadian Immigration Law Corporation, 2025) <sup>[12]</sup>. Kerala has emerged as a major source region for student migration to global regions in general (Shaniba, 2024) <sup>[27]</sup>.

Several factors contribute to this trend, including limited domestic employment opportunities, intense competition in India's education and labour markets, and favourable Canadian immigration policies. Education in Canada is increasingly viewed as a pathway to permanent residence and stable employment (Shaniba, 2024) <sup>[27]</sup>. Households often invest substantial financial resources in overseas education, reflecting high expectations of future returns. This investment is frequently justified not only in terms of individual career prospects but also household security and long-term stability.

Drivers of migration among students can be seen as manifold, such as economic drivers, where not migrating students are concerned about the economic future of Kerala,

and to make and save more money, which is impossible to do in India, as identified by most students (Bijulal *et al.* 2024) <sup>[5]</sup>. On the other hand, social drivers include an urge to escape from the toxic social situations, and to move away from the orthodox and religious social norms existing in the country. In other words, most youngsters see foreign migration and education as a ticket to escape from these socio-economic pressures and constraints in India (Bijulal *et al.* 2024) <sup>[5]</sup>.

However, few critical views also exist here. For example, Skariah and Sivarenjini (2024) <sup>[28]</sup> found that the principal motivation behind student migration in Kerala is the pursuit of higher quality education and better career prospects offered by foreign markets like the UK and Canada, even though the role of higher wages and economic situations of these target countries have also influenced students' decisions to migrate to these countries, similar to the low wages and limited opportunities they experienced in their home country (Skariah and Sivarenjini, 2024) <sup>[30]</sup>.

### **Linking Climate Stress and Education-Led Migration**

Although climate change is rarely cited explicitly as a reason for student migration, secondary evidence suggests that environmental stress shapes the broader context in which migration decisions are made. Climate-induced livelihood insecurity increases household vulnerability and uncertainty about future income prospects. This could act as an unconscious influence on students, in addition to the additional socio-economic tensions they experience in their home country and region. There is a consensus among experts that environment is a major predictor and reason that prompt migration decisions among individuals and families (Martin, 2010) <sup>[22]</sup>. These influences become more pronounced when accompanied by climate and environmental effect leading to the disruption and destruction of people's livelihood and life (Martin, 2010) <sup>[22]</sup>.

Even though earlier studies and policy makers have failed to recognise these influences (Martin, 2010) <sup>[22]</sup>, more recent studies have clear understanding of the wider implications of climate change, including inter-state conflicts between two societies or countries, due to climate-induced migration (Cattaneo and Foreman, 2023) <sup>[6]</sup>, even though such effects could also be caused by unobserved variables, and not simply climate induced migration alone. The reasoning made by Cattaneo and Foreman (2023) <sup>[6]</sup> is that climate conditions, including declining rain fall could trigger international migration intentions among individuals, and higher emigration flows would lead to conflicts. Considering the above arguments, education is considered as the primary motivation behind students' international migration intentions.

In this context, overseas education could emerge as a strategic response to perceived local risks, including climatic risks. Education-led migration allows households to diversify income sources, access global labour markets, and reduce dependence on climate-sensitive local livelihoods. The expectation of remittances and long-term settlement further reinforces this strategy. For example, it has been found by Jennath and Paul (2022) <sup>[17]</sup> that migration from regions facing coastal stress, and climate-driven pressure were high, in comparison with other regions. Hence, education could be seen as a complementing factor, or a supporting factor that opens new opportunities for these candidates to escape from these stressful conditions. Thus,

education-led migration from Kerala to Canada can be understood as a form of planned adaptation to climate-induced uncertainty, particularly among households with sufficient resources to invest in international education.

### Policy Implications

The findings highlight the need to integrate climate considerations into migration and education policy frameworks. Current student migration policies rarely acknowledge environmental vulnerability as a factor shaping mobility. Similarly, climate adaptation policies often overlook migration as a legitimate adaptation strategy. In Kerala, strengthening climate-resilient livelihoods, expanding local employment opportunities, and improving adaptation planning could reduce distress-driven mobility. At the same time, destination countries such as Canada should recognise the broader structural factors influencing student migration and ensure adequate support mechanisms.

### Conclusion

This paper examined the linkages between climate change, livelihood stress, and education-led migration from Kerala to Canada using secondary data. It argued that climate-induced livelihood insecurity functions as a silent push factor shaping household decisions to invest in overseas education. By conceptualising international student migration as a form of climate adaptation, the study contributes to emerging interdisciplinary scholarship on climate change and migration.

Future research could build on this analysis using primary data to empirically test the proposed linkages and examine the lived experiences of student migrants from climate-vulnerable regions. Although current findings point towards the interconnectedness of these factors, it is clear that there is a need for further research explicitly directed towards the link between climate change and education-led migration to Canada among students from Kerala.

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