

Fleeing the Floods: Examining the Complex Realities of Climate Displacement in Thailand

By

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Internal migration in Thailand is a prevalent phenomenon, with education and employment opportunities often driving movement among the working-age population. Traditionally, migration typically involved temporary relocation for work, particularly in the agricultural sector, such as after the rice harvest. This was especially common among workers from the Northeast and North, who frequently migrated to larger cities within their regions or to Bangkok and its surroundings, fuelled by urban expansion and development. Recently, a shift has been observed in these migration patterns. Although many young workers continue to migrate to urban areas, they often do not permanently return to their rural homes. Instead, their returns tend to be seasonal, aligning with agricultural tasks such as planting and harvesting, or with significant holidays, including Songkran (Thai New Year), the New Year, and other extended holiday periods. This marks a departure from previous patterns, where rural workers returned more frequently. A 2020 study by the Bank of Thailand's Puey Ungphakorn Institute for Economic Research revealed that approximately 9.58 million individuals from farming households work outside the agricultural

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sector, with nearly 7 million originating from the Northeast.¹ The study found that 76 per cent of farming households are forced to rely on income from non-agricultural sectors and emphasised that migration serves as a means of income diversification for agricultural households. According to Tandon climate change is a key driver of displacement, with extreme weather events such as droughts and floods forcing individuals to leave rural areas.² These events cause significant damage to crop, infrastructure, and livelihoods, compelling families to seek opportunities elsewhere.

Migration is generally characterised as a voluntary movement, where individuals choose to relocate for various reasons, such as seeking better living conditions, employment, or education. In contrast, displacement involves involuntary removal of individuals from their usual or rightful place, often as a result of external forces. This process frequently entails uprooting people from their homes or communities due to factors such as conflict, natural disasters, or environmental changes. Displacement extends beyond the physical removal of individuals; it also imposes significant psychological effects. It disrupts individuals' and communities' sense of belonging and security, leading to profound emotional and social impacts. Therefore, it is essential to distinguish between displacement and migration. Displacement typically occurs under duress, driven by circumstances such as conflict or catastrophe that are beyond individuals' control, whereas migration is usually a voluntary movement prompted by aspirations for improved opportunities. While both displacement and migration involve movement, displacement is marked by urgency and compulsion due to crises, whereas migration is generally motivated by personal choice.

This study investigates internal displacement, a form of forced migration in which individuals or communities are compelled to flee their residences while remaining within national borders, driven by environmental disruptions linked to anthropogenic climate change. Although Thailand lacks nationally consolidated data on individuals displaced by natural disasters, the Global Internal Displacement Database (GIDD)—an authoritative global repository of internal displacement data, operational since 2008—has systematically compiled multi-source datasets to quantify disaster induced internal displacement within the country. The highest number of internal displacements occurred in 2011 (Figure1). This surge in displacement was primarily attributed to the severe flooding that affected extensive areas in the central region of Thailand, including Bangkok, Ayutthaya, and Pathum Thani provinces. The widespread inundation during this period led to significant disruptions, forcing a large population to relocate temporarily. The database indicates that the total accumulated number of disaster induced displacements across all types of disasters from 2008 to 2023 is 3.2 million. This study addresses the significant deficiency in official data from relevant Thai government agencies regarding disaster displacement in Thailand. Consequently, a literature review was conducted to explore academic works related to this issue. A pivotal study highlighted is the thesis by Nitsch (2020)³, which meticulously analysed four key Thai laws and plans concerning disaster

displacement. These include the Disaster Prevention and Mitigation Act 2007 (DPM Act), which serves as the foundational national law for disaster management in Thailand. Alongside this, the Disaster Risk Management Plan of Thailand 2015 (DRMP) complements the DPM Act by providing a more detailed framework for managing disaster risks. The Strategic National Action Plan on Disaster Risk Reduction (SNAP), spanning 2010–2019, focuses on reducing disaster risks and emphasises the impact of climate change in exacerbating these risks. The analysis also reveals several critical gaps in Thailand’s disaster policies.

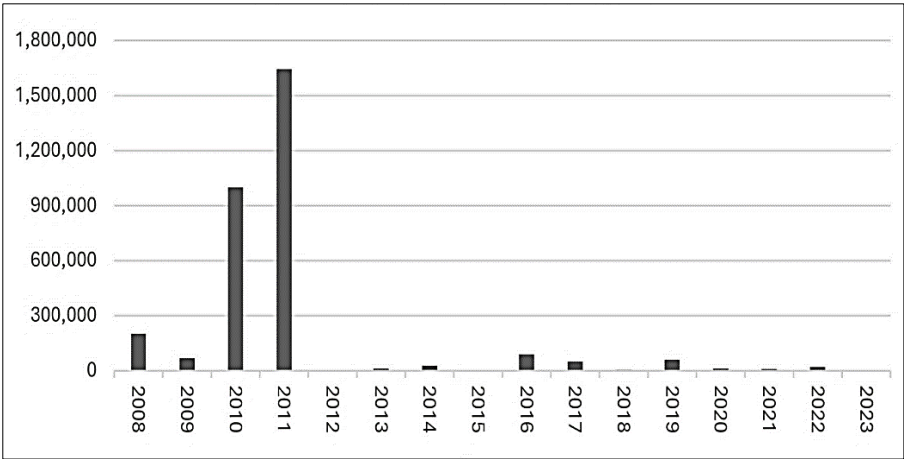


Figure.1: Thailand’s Internal Displacement due to Disasters from 2008–2023.

Source: Internal Displacements Total by Disasters, 2008 to 2023, Thailand.

Internal Displacement Monitoring Center. n.d.

“Internal Displacements Total by Disasters,”

<https://www.internal-displacement.org/database/displacement-data/>.

Firstly, there is a significant categorisation gap, as existing policies do not clearly or comprehensively define environmentally displaced persons (EDPs). These individuals face various challenges, including the loss of material assets such as land and livelihoods, inadequate government support, limited access to infrastructure, and a lack of engagement in decision making processes. Furthermore, government support for EDPs remains limited, often proving insufficient, particularly for those experiencing permanent displacement. Consequently, affected communities have largely relied on community based initiatives, such as the homestay project, to mitigate vulnerabilities and seek practical solutions. Overall, it stresses the urgent need for comprehensive policies and enhanced government support tailored to the unique needs of those facing environmental displacement in Thailand. A recent report, *Thailand National Law and Policy Report Consultation Draft 2020: Displacement in the Context of Disasters and Climate Change*, further reinforces the findings by examining Thailand’s legal and policy framework concerning displacement due to disasters and climate change.⁴ It underscores Thailand’s high vulnerability to natural

hazards such as floods, droughts, and storms, as evidenced by its high ranking on the Climate Risk Index and the significant number of people affected by recent disasters. The report calls for a human rights based approach to addressing disaster displacement, advocating for gender equality and the inclusion of marginalised groups in disaster preparedness and response.

In addition to addressing gaps in Thailand's policy landscape, this study seeks to contribute to the existing literature by examining community perceptions in the immediate aftermath of a disaster. While the literature has established a clear link between climate induced disasters and displacement, this study operates under the premise that the reality of displacement is more complex. It challenges the assumption that disasters alone are the primary drivers of displacement, suggesting instead that multiple socio-economic, infrastructural, and policy related factors may shape affected communities' decisions to relocate. This research focuses on climate induced displacement following the severe flooding that impacted Chiang Mai and Chiang Rai between September and October 2024. The severe flooding resulted in significant casualties, displacement, and widespread damage across multiple sectors. According to Dr. Opart Karnkawinpong, Permanent Secretary of Public Health, Chiang Rai suffered the highest number of casualties, with 10 fatalities, 133 injuries, and more than 24,000 households affected in Mae Sai, Mae Chan, Mueang, and Mae Fah Luang districts.⁵ Five local hospitals were temporarily disrupted but have since resumed operations. In Chiang Mai, the floods impacted 2,978 households in Mae Ai and Fang districts, leading to 6 deaths and 3 injuries, with one hospital in Ban Tha Makaeng remaining closed. Overall, the floods claimed at least 36 lives in Chiang Rai and 6 in Chiang Mai, affecting approximately 9,000 households nationwide and damaging over 34,000 homes, including 10,499 in Chiang Mai and 2,928 in Chiang Rai. The floods also severely disrupted infrastructure and economic activities. In Chiang Rai's Mae Sai district, floodwaters inundated residential and commercial areas, causing damage estimated at ฿4billion. The closure of Chiang Rai International Airport due to flooded access roads further exacerbated the economic impact by limiting transportation and commercial activities. The agricultural sector suffered extensively, with damages estimated at ฿43.4billion.⁶ Large tracts of farmland were submerged, leading to significant crop losses and severely impacting the livelihoods of farmers in both provinces. Beyond economic and infrastructural damage, the floods also had severe environmental consequences. In Chiang Mai's Mae Taeng District, the Elephant Nature Park was inundated, necessitating the evacuation of over 100 elephants and other animals to higher ground. The extensive flooding also posed long-term risks to local biodiversity and ecosystem stability.⁷ In response to the disaster, the Thai Government approved a rehabilitation budget of nearly ฿20billion to support recovery efforts in Chiang Rai and Chiang Mai. These funds were intended to restore critical infrastructure, assist affected communities, and implement long-term resilience strategies to mitigate the impact of future climate-induced disasters.

A fundamental premise of this study is that individuals affected by severe flooding will perceive their homes as unsafe and exhibit an inclination to

relocate. Moreover, vulnerable groups—including the elderly, persons with disabilities, non-citizens, and youth—may require targeted assistance both during and after disaster events. The primary objective of this research is to examine the perceptions of affected communities regarding their relocation decisions following the disaster. Specifically, the study investigates whether residents feel compelled to relocate due to safety concerns or whether they prefer to remain in their original locations despite experiencing severe flooding. Additionally, it identifies the key factors influencing their decisions. To ensure timely and accurate insights, data collection was conducted in November 2024, immediately after the floodwaters receded. A mixed method approach, combining household surveys and in-depth interviews, was employed to capture residents' experiences and perspectives while still fresh in their memories. However, the findings suggest a more complex reality. Contrary to expectations, a majority of respondents expressed a preference to remain in their homes rather than relocate, illustrating the multifaceted nature of displacement decision making. This study underscores that climate induced disasters do not result in straightforward patterns of displacement; rather, a range of interrelated socio-economic, cultural, and policy related factors influence individual and community responses to disaster events. Therefore, the study provides a nuanced understanding of the complex interplay between environmental hazards, policy responses, and socio-economic resilience. It aims to inform more effective disaster response and resettlement strategies, contributing to a more comprehensive understanding of climate-induced displacement in Thailand.

To structure this investigation, the study focuses on three key research questions: What are the key factors influencing the decision to stay or relocate among displaced farmers and urban dwellers in Chiang Mai and Chiang Rai, Thailand? How do environmental, social, economic, and policy related factors shape migration decisions following disaster events? What are the primary vulnerabilities faced by different population groups (e.g., elderly individuals, persons with disabilities, non-citizens, and youth) during and after disaster-induced displacement? Based on these questions, the study establishes the three research objectives: analyse the key determinants influencing the decision to stay or migrate following a disaster, including economic opportunities, land ownership, infrastructure availability, and government policies; examine the demographic, social, economic, and environmental characteristics of populations at risk of displacement, as well as those who choose to remain in place, in Chiang Mai and Chiang Rai provinces; and assess the vulnerabilities of different at-risk groups—including children, the elderly, persons with disabilities, bedridden patients, and non-citizens—within the context of disaster-induced displacement. This study examines populations affected by severe natural disasters, particularly flooding, in Chiang Mai and Chiang Rai provinces during September–October 2024. The research focuses on four primary areas: communities along the Mae Kha Canal and Saraphi District in Chiang Mai Province, and communities in Mae Sai District (*Wat Tham Pha-Chom*

community) and Wiang Pa Pao District (*Ban Huai Hin Lat Nai* and *Ban Huai Sai Khao* communities) in Chiang Rai Province.



Photo 1: Traces of flood levels can be observed from the soil stains on the wall in Mae Kha community area.
(Photo from the research site)



Photo 2: Logs and wood debris carried by floods and landslides in Wiang Pa Pao community area. (Photo from the research site)



Photo 3: The relocation of bedridden patients during the flooding event in Saraphi community. (Photo from the research site)



Photo 4: Damage from mud carried by floodwater, which has accumulated inside the houses of respondents in Mae Sai community. (Photo from the research site)

The study categorises participants into two main groups: household representatives, totalling 217 individuals, and vulnerable populations, with a total of 40 individuals. A mixed methods research design is employed, integrating both quantitative and qualitative approaches. For the quantitative component, data is collected from household representatives using structured questionnaires. The analysis employs descriptive statistics, chi-square analysis,

binary logistic regression analysis, and reliability analysis. For the qualitative component, data is gathered through in-depth interviews using a structured set of questions, focusing on the experiences of vulnerable populations. Qualitative data is then subjected to thematic analysis to gain deeper insights into the challenges faced by these communities. The vulnerable populations in this research are categorised into five groups: youths (aged 13–18), elderly people (aged 60 and above), persons with disabilities, bedridden patients, non-Thai citizens (ethnic groups or individuals without a Thai ID card). Additionally, a vulnerable individual may belong to multiple groups. For example, all bedridden patients are classified as persons with disabilities, and some older individuals are non-citizens without a Thai ID card. The selection of the sample was carefully conducted to ensure the highest possible level of diversity. The interview questions were specifically designed to provide a deeper understanding of the obstacles, impacts, and needs faced by vulnerable groups when confronted with disasters. These questions aim not only to gather information on the challenges these individuals encounter but also to explore the underlying factors influencing their decision to either remain in their current location or migrate. Additionally, the questions seek to identify the support mechanisms required by these individuals should they choose to relocate, including the types of assistance and resources necessary to facilitate their migration process and ensure their well-being during and after relocation. The overall goal is to gain insights into both the motivations for migration and the barriers that might prevent individuals from taking such a step.

Disasters and Climate Induced Migrants: An Explorative Category

Migration or displacement caused by climate change and its consequences has been a subject of ongoing and long standing debate. Disasters are a major cause of what is known as forced displacement, which occurs out of necessity rather than as a voluntary choice of those affected. Since natural disasters are inextricably linked to climate change, people displaced by such disasters are often classified as climate refugees, and their migration is referred to as climate induced displacement. This phenomenon is complex and influenced by various factors, including socioeconomic status of those affected, their ability to adapt and coexist with disasters, government policies and management, and legal perspectives that remain unclear and lack universal consensus. These challenges contribute to the ongoing academic debate over climate induced displacement, with no widely accepted conclusion. Studying disaster related displacement must therefore include an examination of these interconnected factors. The push and pull factors influencing migration decisions are numerous and cannot be oversimplified to suggest that all individuals affected by climate change will inevitably be forced to migrate.⁸ Additionally, even the term displacement itself lacks a universally agreed definition.⁹ Therefore, it is crucial to reassess and clearly categorise how individuals in different situations respond to climate change and its impact on their lives. When considering the scenarios leading to displacement or migration due to climate change, Walter Kälin¹⁰ categorises

them into five types: 1) Sudden-onset disasters: Events such as floods, hurricanes, typhoons, cyclones, and landslides caused by heavy rainfall can trigger mass displacement and significant economic losses. Displacement from these disasters is not necessarily permanent; once affected areas are restored, people may return. Some disasters, such as earthquakes and volcanic eruptions, are not directly linked to climate change. 2) Slow-onset environmental degradation: This includes rising sea levels, increasing soil and groundwater salinity, recurrent flooding, permafrost thawing, droughts, desertification, and water scarcity. Affected individuals may temporarily migrate for economic opportunities or relocate permanently if environmental deterioration reaches an irreversible stage, making habitation impossible. 3) Sinking islands: A specific case of slow-onset disasters caused by rising sea levels, where parts of small island nations become uninhabitable. In extreme cases, entire islands may be submerged, leading to unavoidable displacement. 4) High-risk zones: Government-designated areas identified as being at high risk of life threatening disasters. Authorities may mandate permanent evacuation and relocation of residents from these areas. 5) Conflict and instability: Climate change can exacerbate resource scarcity (e.g., water, arable land, or grazing areas), potentially fuelling violence and armed conflict. This is particularly common in regions suffering from water shortages, where resource depletion leads to prolonged conflicts, forcing people to flee. Beyond these five scenarios, Armelle Gouritin identifies an additional case specific to Mexico where displacement caused by development projects related to renewable energy.¹¹ As part of efforts to combat climate change, projects such as hydropower dam construction can have unintended consequences, leading to the displacement of affected communities. It is evident that different scenarios lead to varying patterns of human migration and present distinct challenges. For instance, internal displacement within a country may pose fewer legal issues concerning citizenship rights compared to cross border displacement. Additionally, when small island states become submerged, their citizens could instantly become stateless, further complicating legal and humanitarian responses. At present, there is no clear legal framework to support those affected by such issues.

Renaud classifies climate induced migrants into three groups. The Environmental Emergency Migrants (EEM) are individuals forced to migrate temporarily due to sudden and severe disasters (rapid-onset disasters), comparable to Kälén's (2010) sudden-onset disasters. They often have a high likelihood of returning to their original homes once conditions stabilise. The Environmentally Forced Migrants (EFM) are people compelled to leave their homes due to severe environmental degradation that makes continued habitation impossible. This category aligns with Kälén's (2010) slow-onset environmental degradation. Unlike EEMs, EFMs are often unable to return because their land has become uninhabitable. The Environmentally Motivated Migrants (EMM) are individuals who migrate proactively in response to gradual environmental degradation. Their migration is not a last resort but rather a strategic decision to avoid worsening conditions that could threaten their

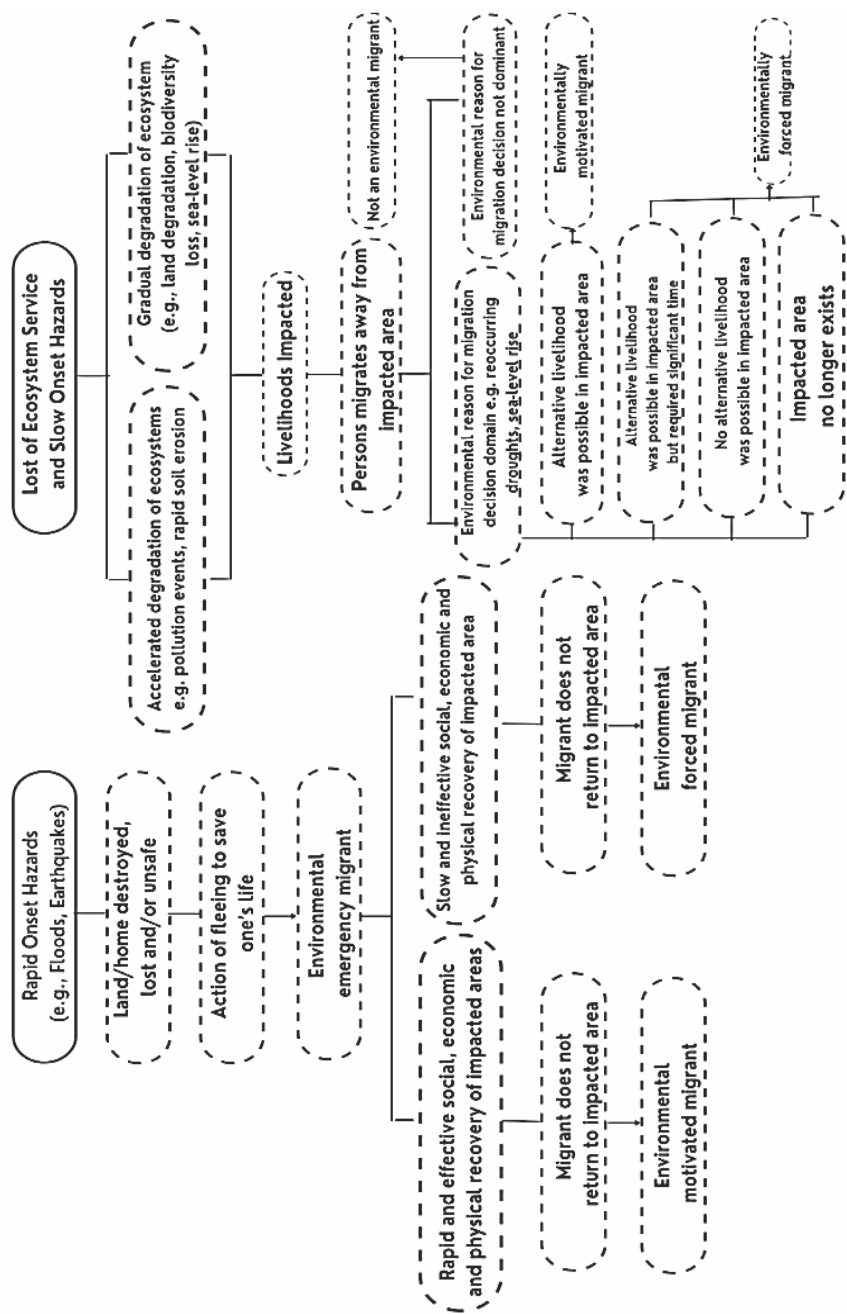


Figure 2: Renaud’s conceptual framework to categorise and explain three types of climate induced migration. Source: Fabrice G.Renaud, Olivia Dun, Koko Warner, and Janos Bogardi, “A Decision Framework for Environmentally Induced Migration,” *International Migration* 49, S1 (2011), <https://doi.org/10.1111/j.1468-2435.2010.00678.x>.

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From the Figure.2, it is evident that the starting point is the classification of natural events into two main categories: rapid-onset hazards (sudden-onset disasters) and loss of ecosystem services and slow-onset hazards. These classifications influence the way individuals and communities respond and adapt to climate-related challenges. First, considering rapid-onset hazards that lead to urgent migration (left side of the diagram), migrants can ultimately be divided into two groups: if they can return to their original location, they fall into the category of Environmentally Motivated Migrants (EMM). Although they may still be able to live in the same place, the disaster itself serves as a "trigger" prompting them to consider migration for a better and safer future; and if they cannot return to their original location, they are classified as Environmentally Forced Migrants (EFM), as they are left with no other option but to relocate permanently. On the other hand, loss of ecosystem services and slow-onset hazards (right side of the diagram) present a more complex scenario, as several factors must be taken into account. For example, if migration is not primarily driven by climate change (i.e., it plays only a minor or no role), the individuals are not classified as climate induced migrants. However, if climate change is the primary factor behind their migration, then the next consideration is whether the original location remains habitable, i.e., if it is still liveable, individuals fall into the EMM category, meaning they start planning for migration as a precautionary measure, and if environmental degradation has rendered the area uninhabitable, they are classified as EFM, where migration is no longer a choice but a necessity. It is important to note that the three categories of climate induced migrants often overlap. However, clearly distinguishing between displaced persons and climate migrants helps policymakers take action before large-scale displacement occurs. Identifying affected or at-risk populations allows for better targeted interventions, such as designing specific assistance programmes and developing legal frameworks to protect them.¹⁶

Migration as an Adaptation Strategy

The framework outlined above provides an analytical perspective on how humans adapt to climate change. However, some scholars argue that focusing on climate induced migration might overemphasise migration as an inevitable solution to climate related problems. This perspective, often referred to as alarmist, warns of mass displacement due to climate change, but critics contend that such extreme projections do not fully reflect reality. For instance, some people may choose to stay and adapt rather than migrate, and cultural perceptions of climate change vary across societies, influencing their adaptation strategies.¹⁷ Moreover, migration is not always a viable option for everyone. High financial costs, emotional attachment to their homeland, vulnerability during migration, and restrictive legal frameworks often trap individuals in climate affected areas.¹⁸ The irony is that those most affected by climate change—the poor, the marginalised, and the powerless—are often the least capable of migrating. As a result, migration should be seen as just one of many adaptation strategies, such as temporary migration for economic opportunities or seasonal work that provides financial support for those who remain in their home regions.¹⁹ Despite the ongoing debates and lack of a clear consensus regarding climate induced displacement, it is undeniable that climate change continues to displace people worldwide. As mentioned earlier, areas previously unaffected by climate disasters are now becoming more vulnerable, while high-risk areas face even greater threats. Expanding knowledge on climate-induced migration is therefore critical, especially in “new disaster zones”—areas where people never expected to be affected by climate-related hazards until it happens unexpectedly.

Research Findings

Quantitative Results

This data set had 217 cases in total with one missing value who was indecisive whether to stay or relocate. The data were collected from four research sites in two provinces: Chiang Mai (Saraphi and Mae Kha) and Chiang Rai (Wiang Pa Pao and Mae Sai). The research team collected the data from November 17, 2024, to December 21, 2024. Important demographic information was reported together with chi-square: Test of independence results below to see which variables had a statistically significant impact on the decision to relocate (Table 1). The results showed that two variables were statistically significant: Ethnicity and Insurance. Gender, Education, Land Ownership, Nature of Area, and Age were not statistically significant. To elaborate, those who would relocate are non-Thai (67 per cent), while 33 per cent of Thais would relocate, $\chi^2(1, n = 216)$

Table 1: Results of Chi-Square: Test of Independence ($n = 216$)

Variables	Levels	Stay	Relocate	χ^2	df	P	ϕ
		n (%)	n (%)				
Gender	Female	115 (59%)	12 (57%)	0.026	1	.871	.011
	Male	80 (41%)	9 (43%)				
Ethnicity	Thai	114 (58%)	7 (33%)	4.859	1	.028	.150
	Others*	81 (42%)	14 (67%)				
Education	Uneducated	38 (20%)	7 (33%)	4.234	3	.237	.141
	Primary School	61 (32%)	6 (29%)				
Elementary School	70 (36%)	8 (38%)					
	Higher Education $\pm$	23 (12%)	0 (0%)				
	Unconventional	<i>N/A</i>	<i>N/A</i>				
Land Ownership	No	123 (63%)	17 (81%)				
	Yes	72 (37%)	4 (19%)				
Insurance	No	160 (82%)	21(100%)	4.498	1	.034	.144
	Yes	35 (18%)	0 (0%)				
Nature of Area	Agricultural $\neq$	96 (49%)	12 (57%)	.475	1	.491	.047
	Urban $\neq$	99 (51%)	9 (43%)				
Age	≤ 25	7 (4%)	3 (14%)	5.806	3	.121	.164
	26–50	76 (39%)	9 (43%)				
	51–75	107 (55%)	9 (43%)				
	76–80	5 (3%)	0 (0%)				
Total		217	100				

[**Note.** The percentage is calculated by column;

* Others for example: Tai Khün, Chinese, Hmong, Akha, Not Specified Ethnicity.

$\pm$ Higher Education, for example, Associate Degree/Higher Vocational Certificate, Bachelor's Degree, Higher than Bachelor's Degree;

$\neq$ Agricultural, refers to Wiang Pa Pao and Saraphi;

$\times$ Urban refers to Mae Sai and Mae Kha.]

Table 2: Demographic Information in Wiang Pa Pao, Mae Sai, Saraphi, and Mae Kha by Decision of Relocation

Variable	Levels	Wiang Pa Pao		Mae Sai		Saraphi		Mae Kha	
		Stay	Relocate	Stay	Relocate	Stay	Relocate	Stay	Relocate
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Gender	Female	23 (52%)	7 (70%)	36 (75%)	4 (67%)	27(52%)	1 (50%)	29 (57%)	0 (0%)
	Male	21 (48%)	3 (30%)	12 (25%)	2 (33%)	25 (48%)	1 (50%)	22 (43%)	3 (100%)
		$\chi^2 = 1.037$ $p = .309$	$df = 1$ $\phi = .139$	$\chi^2 = .193$ $p = .661$	$df = 1$ $\phi = .060$	$\chi^2 = .003$ $p = .957$	$df = 1$ $\phi = .007$	$\chi^2 = 3.685$ $p = .055$	$df = 1$ $\phi = .261$
Ethnicity	Thai	2 (5%)	0 (0%)	25 (52%)	4 (67%)	52 (100%)	2 (100%)	35 (69%)	1 (33%)
	Others (Tai Khün, Chinese, Hmong, Akha, Not Specified Ethnicity)	42 (95%)	10 (100%)	23 (48%)	2 (33%)	0 (0%)	0 (0%)	16 (31%)	2 (67%)
		$\chi^2 = .472$ $p = .492$	$df = 1$ $\phi = .093$	$\chi^2 = .456$ $p = .499$	$df = 1$ $\phi = .092$	$\chi^2 = N/A$ $p = N/A$	$df = N/A$ $\phi = N/A$	$\chi^2 = 1.588$ $p = .208$	$df = 1$ $\phi = .171$
Education	Uneducated	16 (36%)	5 (50%)	15 (31%)	1 (17%)	0 (0%)	0 (0%)	7 (14%)	1 (33%)
	Primary School	5 (11%)	2 (20%)	15 (31%)	2 (33%)	24 (46%)	1 (50%)	17 (33%)	1 (33%)
	Elementary School	21 (48%)	3 (30%)	10 (21%)	3 (50%)	19 (37%)	1 (50%)	20 (39%)	1 (33%)
	Higher Education±	2 (5%)	0 (0%)	5 (10%)	0 (0%)	9 (17%)	0 (0%)	7 (14%)	0 (0%)
	Unconventional	0 (0%)	0 (0%)	3 (6%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
		$\chi^2 = 1.889$ $p = .596$	$df = 3$ $\phi = .187$	$\chi^2 = 3.275$ $p = .513$	$df = 4$ $\phi = .246$	$\chi^2 = .447$ $p = .800$	$df = 2$ $\phi = .091$	$\chi^2 = 1.172$ $p = .760$	$df = 3$ $\phi = .147$
Land Ownership	No	44 (100%)	10 (100%)	25 (52%)	4 (67%)	6 (12%)	1 (50%)	48 (94%)	2 (67%)
	Yes	0 (0%)	0 (0%)	23 (48%)	2 (33%)	46 (88%)	1 (50%)	3 (6%)	1 (33%)
		$\chi^2 = N/A$ $p = N/A$	$df = N/A$ $\phi = N/A$	$\chi^2 = .456$ $p = .499$	$df = 1$ $\phi = .092$	$\chi^2 = 2.525$ $p = .112$	$df = 1$ $\phi = -.216$	$\chi^2 = 3.113$ $p = .078$	$df = 1$ $\phi = .240$
Insurance	No	38 (86%)	10 (100%)	36 (75%)	6 (100%)	43 (83%)	2 (100%)	43 (84%)	3 (100%)
	Yes	6 (14%)	0 (0%)	12 (25%)	0 (0%)	9 (17%)	0 (0%)	8 (16%)	0 (0%)
		$\chi^2 = 1.534$ $p = .215$	$df = 1$ $\phi = .169$	$\chi^2 = 1.929$ $p = .165$	$df = 1$ $\phi = .189$	$\chi^2 = .415$ $p = .519$	$df = 1$ $\phi = .088$	$\chi^2 = .552$ $p = .457$	$df = 1$ $\phi = .101$
Age	≤ 25	3 (7%)	1 (10%)	0 (0%)	1 (17%)	0 (0%)	0 (0%)	4 (8%)	1 (33%)
	26–50	24 (55%)	6 (60%)	20 (42%)	3 (50%)	8 (15%)	0 (0%)	24 (47%)	0 (0%)
	51–75	17 (39%)	3 (30%)	26 (54%)	2 (33%)	42 (81%)	2 (100%)	22 (43%)	2 (67%)
	76–100	0 (0%)	0 (0%)	2 (4%)	0 (0%)	2 (4%)	0 (0%)	1 (2%)	0 (0%)
		$\chi^2 = 0.319$ $p = .853$	$df = 2$ $\phi = .077$	$\chi^2 = 8.783$ $p = .032$	$df = 3$ $\phi = .403$	$\chi^2 = 0.472$ $p = .790$	$df = 2$ $\phi = .093$	$\chi^2 = 3.812$ $p = .283$	$df = 3$ $\phi = .266$
Total		54 (100%)		55 (100%)		54 (100%)		54 (100%)	

[**Note.** The percentage is calculated by column; ±Higher Education: Associate Degree/Higher Vocational Certificate, Bachelor's Degree]

Table 3: Results of Reliability Analysis for Pull Factors ($n=217$)

Factors	Items	Min	Max	M	SD
Economics	5 items ($\alpha = .796$)	0.00	5.00	4.18	0.98
	1. Income or occupation is based in the current residence.	0.00	5.00	4.39	1.17
	2. The household has other occupations or sources of income in the same area.	0.00	5.00	3.71	1.70
	3. Income sustainability and stability.	0.00	5.00	4.05	1.30
	4. Convenience of continuing the same occupation without needing to adjust in a new area.	0.00	5.00	4.45	1.13
	5. Ownership of agricultural land and residential property.	0.00	5.00	4.29	1.23
Social and quality of life	4 items ($\alpha = .636$)	1.75	5.00	4.34	0.68
	1. Sense of attachment to the community and people in the original area.	1.00	5.00	4.64	0.72
	2. Safety of life and property in the current living situation.	0.00	5.00	4.09	1.14
	3. Convenience in accessing amenities and services in the current area.	1.00	5.00	4.43	0.87
	4. Concerns about adjusting to or starting a new life in a new location.	0.00	5.00	4.22	1.16
Environment	5 items ($\alpha = .918$)	0.00	5.00	4.08	1.15
	1. Abundance of water resources.	0.00	5.00	4.07	1.40
	2. Abundance of soil resources.	0.00	5.00	4.00	1.46
	3. Good air quality and safety.	0.00	5.00	4.18	1.09
	4. Biodiversity and ecosystems.	0.00	5.00	4.08	1.29
	5. Natural resources in the current area are sufficient and accessible.	0.00	5.00	4.05	1.34
Technology, infrastructure and systems	4 items ($\alpha = .751$)	0.25	5.00	4.01	0.97
	1. Having a disaster alert system in place.	0.00	5.00	3.70	1.43
	2. Strengthening the house structure and ensuring an efficient drainage system.	0.00	5.00	4.33	0.95
	3. Having tools and technology for managing flood disasters in the community.	0.00	5.00	4.14	1.14
	4. Having tools and technology for managing flood disasters in the household.	0.00	5.00	3.85	1.54
Government policies and measures	4 items ($\alpha = .826$)	0.25	5.00	4.02	0.97
	1. The government/local authorities provide prompt and adequate disaster relief.	0.00	5.00	4.21	1.04
	2. The government/local authorities have ongoing recovery plans for communities and housing post-flood.	0.00	5.00	4.06	1.22
	3. The government/local authorities provide financial or resource support to enhance housing safety.	0.00	5.00	4.24	1.10
	4. The government/local authorities offer guidance and training on disaster risk management.	0.00	5.00	3.59	1.42
Overall Pull Factor	22 items ($\alpha = .860$)	1.45	5.00	4.13	0.63

Table 4: Results of Reliability Analysis for Push Factors ($n=217$)

Factors	Items
Economics	4 items ($\alpha = .844$)
	1. Financial debt burden.
	2. Loss of production/income.
	3. The family has sufficient funds for relocation.
	4. Job opportunities in the new area.
Social and quality of life	4 items ($\alpha = .883$)
	1. Health impacts on the respondent and family during the flooding.
	2. Acquaintances, relatives, or groups with similar identity and culture from the original area in the new location.
	3. Convenience of accessing healthcare services and amenities in the new area.
	4. The new area offers a safe environment for physical and mental well-being.
Environment	5 items ($\alpha = .958$)
	1. The community faces frequent and worsening flooding.
	2. The new area has abundant water.
	3. The new area has abundant soil.
	4. Disaster safety in the new area.
	5. Accessible abundant natural resources.
Technology, infrastructure, and systems	4 items ($\alpha = .978$)
	1. Access to infrastructure in the new area, including roads, transport, and utilities.
	2. Having an effective disaster warning system.
	3. The community has flood management tools and technology.
	4. The household has flood management tools and technology.
Government policies and measures	4 items ($\alpha = .898$)
	1. Government orders or measures mandating relocation.
	2. The government/local authorities protect relocation rights during flood situations.
	3. The government/local authorities provide financial or resource support for relocation.
	4. The government/local authorities have measures to provide safe new housing.
Overall Push Factor	21 items ($\alpha = .968$)

4.859, $p = .028$, $\phi = .150$. Interestingly, those who would relocate did not have insurance (100%), $\chi^2(1, n = 216) = 4.498$, $p = .034$, $\phi = .144$. Based on the interpretation of phi or Cramer's V , effects of .150 and .144 are considered in between small (.10) and medium (.30) effect.²⁰

Next, we explore the results for each community to see which factors had an impact on the decision to relocate as each site had unique characteristics (Table 2). The results showed that only Age in Mae Sai was statistically significant, $\chi^2(3, n = 216) = 8.783$, $p = .032$, $\phi = .403$. The effect of .403 is

considered in between medium (.30) and large (.50) effect.²¹ The other variables were not statistically significant. Furthermore, the research team also collected data related to pull and push factors. The research assumed these factors play an important role on their decision whether to relocate. There were five pull factors and five push factors. Each of which consisted of items in each sub-factor elaborated in Tables 3 and 4. The study examined the impact of each pull and push factor on the decision to stay and relocate. The binary logistic regression was performed on pull factors as one model and another regression model on push factors.

Table.5: Results of Binary Logistic Regression Analysis for Predicting the Decision to Stay based on Pull Factors (n=216)

1.

Variables	B ^a	SE B		p	OR
Economics	-0.408	0.221	3.423	.064	0.665
Social	-1.417	0.370	14.701	.000	0.242
Environment	0.308	0.252	1.502	.220	1.361
Technology	0.533	0.362	2.172	.141	1.704
Government	-.037	0.353	0.011	.916	0.963

Table.6: Results of Binary Logistic Regression Analysis for Predicting the Decision to Relocate based on Push Factors (n=216)

Variables	B ^a	SE B		p	OR
Economics	-0.419	0.204	4.215	.040	0.658
Social	1.186	0.407	8.506	.004	3.275
Environment	-0.042	0.387	0.012	.913	0.959
Technology	0.119	0.413	0.083	.774	1.126
Government	0.324	0.336	0.926	.336	1.382

The regression results were reported in Table 5 and 6. The binary logistic regression model was statistically significant, $\chi^2 (5, n = 216) = 19.800, p = .001$, Nagelkerke's $R^2 = .186$. The model explained 18.6% of the variance in the decision to stay and correctly classified 90.7% of cases. After controlling the other predictors in the model, Social Pull Factor was statistically significant ($p < .001$, OR = 0.242). The odds that a person would relocate are 0.242 times as great as that the odds that a person with one fewer score on Social Pull Factor would stay. Please note that Economics Pull Factor was marginally significant ($p = .064$, OR = 0.665). The odds that a person would stay are 0.665 times as great as that the odds that a person with one fewer score on Economics Pull Factor.

The binary logistic regression model was statistically significant, $\chi^2 (5, n = 216) = 32.301, p < .001$, Nagelkerke's $R^2 = .295$. The model explained 29.5% of the variance in the decision to relocate and correctly classified 89.8% of cases. After controlling the other predictors in the model, Social Push Factor was statistically significant ($p = .004$, OR = 3.275). The odds that a person would relocate are 3.275 times greater than the odds that a person with one fewer score on Social Push Factor would relocate. Social Pull Factor was statistically

significant, but the direction was opposite. Economic Push Factor was statistically significant ($p = .040$, $OR = 0.658$). The odds that a person would relocate are 0.658 times as great as that the odds that a person with one fewer score on Economics Push Factor. The direction was similar to Economics Pull Factor.

Qualitative Results

The flood disaster that occurred between September and October 2024 in certain areas of Chiang Mai and Chiang Rai provinces, Thailand, was unprecedented in its severity. As a result, a portion of the population has experienced a sense of insecurity about continuing to live in their current locations. This has led to a growing tendency toward displacement or migration, driven by the impacts of natural disasters and climate change. Among those affected by disasters, certain groups are particularly vulnerable because they already face pre-existing difficulties and limitations in their daily lives. When disasters strike, these individuals experience compounded hardships, making their situations even more precarious. These vulnerable groups include the poor, persons with disabilities, the elderly, non-citizen individuals, and children and youth who may not yet have full autonomy in decision-making. In this study, the researcher refers to these populations as Vulnerable Groups.

When providing relief and support to vulnerable groups, it is crucial to consider their distinct needs, which differ from those of the general population, and to implement measures that prevent further negative impacts should disasters occur again. The objective of this research is to gain a deeper understanding of the challenges, needs, and coping strategies of vulnerable groups in disaster situations, the types of support that would be beneficial to them in the future, and their specific needs if they are required to permanently migrate due to climate change. The study focuses on the following vulnerable populations: children and youth (ages 13-18), elderly individuals with frail health, persons with disabilities, bedridden patients, and stateless persons. Each of these groups faces distinct challenges and has unique needs.

For children and youth, their primary difficulty is a lack of understanding of disasters, especially among younger children. They also suffer from disruptions in education, as disasters often lead to prolonged school closures and damage to educational materials. Older youth may begin to consider migration as an option due to concerns about the risks of future disasters and uncertainty about their long-term prospects. However, they often cannot make these decisions independently and must follow the choices made by their parents or guardians.

Elderly individuals often struggle with evacuation and flood response. Those living alone may face difficulties escaping in time if no one is available to assist them. Additionally, they often require regular medication for chronic illnesses, and an insufficient supply can lead to serious health complications. In terms of migration, most elderly individuals prefer to remain in their communities due to their deep-rooted connections with the people and places

around them. If they own land and a home, their reluctance to relocate is even stronger. Therefore, providing support for elderly individuals is best achieved by helping them adapt in place rather than encouraging migration. If relocation becomes necessary, it should be to areas with similar environmental and social conditions to minimize disruption to their lives.

People with disabilities and bedridden patients face some of the greatest difficulties during disasters. They are often unable to evacuate on their own, and relocation is significantly more challenging due to mobility limitations. Some require wheelchairs, while others remain bedridden at all times. A major issue is that emergency response systems are often ill prepared to provide adequate evacuation assistance due to limited personnel and specialized equipment. This is understandable, as many communities have never encountered such situations before. However, improving disaster preparedness and response strategies for people with disabilities should be a top priority. Another key factor is early warning systems, which must be highly effective. If vulnerable individuals can evacuate before floodwater rises, the process becomes significantly easier for both the affected individuals and their caregivers.

Regarding migration, individuals with disabilities often prefer to remain in their communities if they have access to strong local support systems. For example, in Chom Phoo Subdistrict, Saraphi District, Chiang Mai, a local disability service center provides ongoing assistance, including daily living support and access to mobility aids. As a result, many people with disabilities in this community feel confident in staying, despite disaster risks. However, in communities without such support systems, individuals with disabilities may consider migrating to areas where they can receive better assistance. Nevertheless, many remain hesitant due to their deep ties to their communities.

Lastly, non-Thai citizen individuals face significant legal and social barriers during disasters. They often struggle with issues related to accessing financial aid, healthcare, and the right to relocate, all of which are linked to their legal status. Many are deeply concerned about their ability to earn a living and secure land tenure due to unclear government policies. Since disaster-induced displacement is still a relatively new issue for this group of populations, there remains considerable uncertainty regarding their rights and available support mechanisms. Each of these vulnerable groups experiences disasters in unique ways, requiring tailored support strategies. While some individuals may choose to migrate to seek a safer and more stable future, others may prefer to stay due to personal, economic, or legal constraints. Therefore, disaster response and adaptation policies must account for these diverse needs, ensuring that no one is left behind.

Discussion

The findings from this study highlight the complex and multifaceted nature of disaster induced displacement among communities in Chiang Mai and Chiang Rai. While quantitative analysis provides statistical evidence of key factors

influencing relocation decisions, the qualitative findings offer a deeper understanding of how different social groups experience displacement, revealing critical vulnerabilities and policy gaps that require urgent attention.

Demographic Factors and Their Relationship to Migration

Ethnicity and Migration

Ethnicity emerged as a statistically significant determinant of migration decisions. The results indicate that non-Thai individuals were significantly more likely to relocate compared to Thai respondents, $\chi^2(1, n = 216) = 4.859, p = .028, \phi = .150$. Specifically, 67 per cent of those who chose to migrate were Thai respondents, whereas 33 per cent were non-Thai. This suggests that non-Thai populations, potentially including migrant workers or ethnic minority groups, may experience greater vulnerability and less capacity to remain in disaster-affected areas due to economic, legal, or social constraints.

Insurance Status and Migration

Insurance coverage was another significant factor influencing migration. The study found that 100% of those who migrated did not have insurance coverage, $\chi^2(1, n = 216) = 4.498, p = .034, \phi = .144$. This suggests that individuals without financial protection against disaster related losses were more likely to seek relocation as a coping strategy, possibly due to an inability to recover from damages incurred during the flooding.

Gender and Migration

The results showed no statistically significant relationship between gender and migration decisions, $\chi^2(1, n = 216) = 0.026, p = .871, \phi = .011$. This indicates that men and women were equally likely to stay or migrate, suggesting that other factors, such as economic opportunities and social networks, may have a stronger influence on decision making than gender alone.

Education and Migration

Education level did not show a statistically significant impact on migration decisions, $\chi^2(3, n = 216) = 4.234, p = .237, \phi = .141$. Although individuals with lower educational attainment might face greater economic challenges, their migration choices were not significantly different from those with higher education levels. This suggests that disaster response strategies should consider other socio-economic and structural factors beyond education in shaping migration patterns.

Land Ownership and Migration

Land ownership was not found to be a statistically significant determinant of migration, $\chi^2(1, n = 216) = 2.656, p = .103, \phi = .111$). While those without land ownership (81 per cent) were more likely to relocate than those who owned land (19 per cent), the association did not reach statistical significance. This suggests that land tenure alone may not be a primary factor in migration decisions, and other factors, such as economic stability and social networks, may play a more dominant role.

Age and Migration

Age was generally not a significant factor in migration decisions across the study sample. However, in Mae Sai, age was found to be statistically significant in predicting relocation decisions, $\chi^2(3, n = 216) = 8.783, p = .032, \phi = .403$), indicating a moderate to large effect. Individuals, particularly those aged 26 to 75 years old, were more likely to migrate than older individuals. This finding aligns with existing research suggesting that younger populations are generally more mobile and adaptable to relocation, whereas older individuals may have stronger attachments to their communities and established livelihoods.

Factors Influencing the Decision to Stay or Relocate

The decision to stay or migrate following a disaster is shaped by a combination of economic, social, environmental, technological, and governmental factors. This study, based on survey data from 217 respondents across four sites in Chiang Mai and Chiang Rai, utilized chi-square tests and logistic regression analysis to identify the statistically significant determinants influencing relocation decisions.

Economic Factors

Economic considerations played a crucial role in both staying and relocating. Ownership of agricultural land and stable income sources in the affected area were strong pull factors encouraging residents to stay. Survey results showed that economic stability ($M = 4.05, SD = 1.30$) and the convenience of maintaining current occupations ($M = 4.45, SD = 1.13$) were highly rated among those choosing to stay. Conversely, economic hardships, such as financial debt and income loss, were identified as push factors influencing migration decisions ($p = .040, OR = 0.658$), though the effect size was modest.

Social and Quality of Life Factors

Social factors emerged as the strongest determinant in the decision-making process. Attachment to the community ($M = 4.64, SD = 0.72$) and concerns about adjusting to a new environment ($M = 4.22, SD = 1.16$) significantly

influenced the decision to remain. The binary logistic regression analysis found that social pull factors were statistically significant ($p < .001$, $OR = 0.242$), indicating that strong community ties reduce the likelihood of relocation. However, social push factors, such as access to healthcare and safety concerns in a new location, increased the likelihood of migration ($p = .004$, $OR = 3.275$).

Land Ownership and Infrastructure

Contrary to expectations, land ownership was not a statistically significant determinant of relocation decisions ($p = .103$). However, infrastructure considerations, such as flood management systems and disaster preparedness, influenced decisions. Strengthening house structures ($M = 4.33$, $SD = 0.95$) and access to flood management technology ($M = 4.14$, $SD = 1.14$) were identified as important factors supporting decisions to stay. The presence of infrastructure in potential relocation sites, such as roads and utilities, also played a role in migration considerations ($M = 3.18$, $SD = 1.87$).

Government Policies and Support

Government intervention, including financial aid and relocation policies, played a moderate role in influencing decisions. The availability of disaster relief ($M = 4.21$, $SD = 1.04$) and housing safety support ($M = 4.24$, $SD = 1.10$) were noted as relevant pull factors. However, mandatory relocation policies ($M = 3.22$, $SD = 1.61$) and support for safe housing in new locations ($M = 3.37$, $SD = 1.78$) were also significant push factors in migration decisions. This study highlights that disaster-induced displacement is not solely driven by environmental hazards but is instead shaped by a complex interplay of economic stability, social cohesion, infrastructure availability, and government policies. The findings underscore the importance of community-based resilience strategies and targeted policy interventions to support vulnerable populations in disaster-prone regions.

Vulnerabilities Across Different Social Groups

The qualitative analysis reveals that different groups experience disaster induced displacement unequally, with pre-existing vulnerabilities intensifying the effects of natural disasters. Elderly individuals face mobility constraints and greater attachment to their homes and communities, making relocation a less desirable option. However, limited access to healthcare, inadequate disaster preparedness, and weak support systems leaves them highly vulnerable if they remain in disaster prone areas. People with disabilities and bedridden patients experience severe challenges during evacuation and resettlement. Many emergency response systems are not equipped to handle their needs, leading to increased dependence on family members or caregivers. Children and youth face disruptions in education and social instability, with older youth considering migration due to uncertain future prospects. However, their decisions are often

dictated by family circumstances rather than personal choice. Non-citizens and ethnic minorities face significant legal and social barriers that limit their access to financial aid, healthcare, and relocation support. Their uncertain legal status further exacerbates their vulnerability, making them more susceptible to forced displacement without adequate government protection. These findings underscore the need for targeted policy interventions that address the specific challenges of vulnerable populations, ensuring that adaptation and relocation strategies are inclusive and equitable.

Migration as an Adaptive Strategy vs. Forced Displacement

The results demonstrate that not all migration is forced, and for some individuals, relocation is a strategic response to environmental degradation rather than an immediate reaction to disaster. This aligns with Renaud's classification of Environmentally Motivated Migrants (EMM)—those who preemptively move due to gradual environmental degradation. However, for others, especially those with limited resources and social capital, migration is not a proactive choice but rather a necessity imposed by worsening living conditions (Environmentally Forced Migrants, EFM). While some scholars argue that climate change narratives often overemphasize displacement, the study's findings indicate that for many, migration remains one of the few viable adaptation strategies. However, barriers such as economic costs, legal constraints, and social ties prevent many from relocating, leading to a situation where the most vulnerable populations are also the most immobile.²² The irony is that those most affected by climate change often have the least capacity to move, reinforcing the need for stronger governmental support, legal protections, and economic incentives for relocation.

The Role of Policy and Governance in Managing Disaster Displacement

The findings highlight critical gaps in Thailand's disaster response and migration policies. Existing legal frameworks, including the Disaster Prevention and Mitigation Act (2007) and the Disaster Risk Management Plan (2015), primarily focus on short-term relief rather than long-term displacement solutions. Additionally, Thailand lacks a clear definition and legal recognition of environmentally displaced persons (EDPs), leaving many communities without adequate protection and resettlement assistance. The government's role in providing infrastructure, financial support, and relocation guidance was also identified as a key factor influencing migration decisions. The logistic regression results showed that government policies as a push factor were not statistically significant, suggesting that existing measures may be insufficient or ineffective in addressing long-term displacement needs. The lack of well structured relocation programs means that many affected communities must rely on informal social networks or community based initiatives, such as homestay projects, to mitigate their vulnerabilities. To enhance climate resilience and

disaster response, policy reforms should focus on: establishing legal recognition of climate-displaced people to ensure access to compensation and resettlement support; strengthening disaster early warning systems and ensuring that they are accessible to vulnerable populations (e.g., people with disabilities and elderly individuals); improving financial and insurance mechanisms to reduce economic burdens on displaced individuals; developing community led adaptation strategies that empower local residents to participate in decision-making processes regarding relocation and disaster preparedness.

Conclusion and Future Research Directions

This study demonstrates that disaster induced displacement in Thailand is shaped by a combination of social, economic, and environmental factors. While some groups can make voluntary migration choices, others are trapped in high-risk areas due to legal, financial, or social constraints. The evidence suggests that current policies are inadequate in addressing the complexities of disaster-induced migration, particularly for marginalized and vulnerable populations. Future research should explore the long-term social and economic impacts of displacement on affected communities; the role of climate resilient urban planning in mitigating migration pressures; and development of innovative policy frameworks to support displaced populations. Ultimately, ensuring a just and equitable approach to climate induced displacement will require integrated, multi-sectoral responses that prioritize both adaptation and resilience building strategies.

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