HOW DO CLIMATE MITIGATION POLICIES INFLUENCE INTERNAL DISPLACEMENT IN AGRICULTURALLY DEPENDENT REGIONS? A QUALITATIVE ANALYSIS

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Cover Image

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EXECUTIVE SUMMARY

Introduction

Amid a rapidly changing climate and unprecedented numbers of climate-induced displacement, this applied research project was commissioned by the OECD Development Centre to identify whether policies on climate change mitigation influence internal migration, as research on the nexus remains scarce. The main findings derived from country-specific case studies were used to formulate policy recommendations, which should inform upcoming discussions at the 28th Conference of the Parties and 2022-2023 Global Forum on Migration and Development.

Methodology

The report relies on the Internal Displacement Monitoring Centre's database and desk-based research on case studies across local geographies in Latin America, Sub-Saharan Africa, and South Asia, namely: *Córdoba* (Colombia), *Amazonas* (Brazil), *San Pedro de Macorís* (Dominican Republic), *Matam* (Senegal), *Oromia* (Ethiopia), *Uttar Pradesh* (India) and *Sylhet* (Bangladesh). These were complemented by six non-structured interviews with regional experts on climate change and human mobility.

Key Findings

The case studies revealed that climate mitigation policies themselves rarely contain internal displacement, as there are contributing factors behind the increased vulnerabilities of agriculturally dependent regions to climate-induced displacement, including:

1. Livelihood loss: Many rural communities rely on farming and agriculture as their only means of livelihood which forces them to seek other means of income through migration, particularly when faced with floods or droughts.
2. Lack of local-level policies: The top-down administration of climate mitigation policies, especially at national or transnational levels, fails to reach those most affected.
3. Dismal infrastructure: A common denominator across all regions in exacerbating extreme weather events was failing infrastructure, triggering surges in internal displacement.

Policy Recommendations

Governments should:

- Make efforts in **diversifying livelihoods of rural populations**, as this can reduce climate-induced internal displacement when paired with climate mitigation policies;
- **Localise mitigation policies** to address area-specific vulnerabilities and priorities, while also considering **indigenous knowledge** in the localization process;
- **Make critical investments towards climate-resilient infrastructure development**, as climate mitigation policies go hand in hand with infrastructure policies in containing displacement; and
- **Ensure investments also reach rural agriculturally dependent areas**, where those most vulnerable to climate change reside.

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ACRONYMS

BCCSAP	Bangladesh Climate Change Strategy and Action Plan
COP	Conference of the Parties
CO2	Carbon Dioxide
CRGE	Climate-Resilient Green Economy
GDP	Gross Domestic Product
GGWI	Great Green Wall Initiative
GHG	Greenhouse Gas
GIDD	Global Internal Displacement Database
IDMC	Internal Displacement Monitoring Centre
IDP	Internally Displaced Person
IOM	International Organization on Migration
PNQV	*Plan Nacional Quisqueya Verde*
REDD	Reducing Emissions from Deforestation and Forest Degradation in Developing Countries
SAPCC	State Action Plan on Climate Change
SDG	Sustainable Development Goal
UN	United Nations
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environmental Programme
UP	Uttar Pradesh

1. INTRODUCTION

1.1 Climate-Induced Migration

Climate-induced migration is becoming an increasingly relevant policy matter, as it brings together two major global policy agendas: addressing climate change and human displacement. Combating climate change is a key international priority, as observed from UN SDG 13 on Climate Action and its cross cutting linkages with all 16 other SDGs. Preventing forced displacement has also garnered widespread policy attention, with the dramatic rise of forcibly displaced people from 42.8 million in 2012 to 108.4 million in 2022 (UN, n.d.; UNHCR, 2023).

Having neither international protection mechanisms nor a unanimous definition, climate-induced migrants are often referred to as the "world's forgotten victims", despite their population potentially reaching 1.2 billion by 2050 (McAllister, 2023). Although contentious, environmental contribution to human mobility was identified as far back as the late 19th century (Ravenstein, 1889), while climate-induced migration as a research topic emerged after Essam El-Hinnawi, a United Nations Environment Programme (UNEP) researcher, coined the term *environmental refugee* in 1985 (El-Hinnawi, 1985). Subsequently, *environmental refugees* became increasingly discussed in earlier debates to highlight climate threats to humanity, with many policymakers promoting deterministic ideas that they were being forced to migrate solely due to environmental factors (Gemenne, 2011). While this extreme position remains present in prevailing scholarly dialogue, there has been broad agreement to consider the converging factors that mediate the climate change-migration nexus, including population growth, poverty, political governance, human security and conflict (IOM, n.d.; Klepp, 2017).

For this reason, the phenomenon also faces terminology debates, with terms such as *environmental refugees* or *climate refugees* being heavily criticised for implying a mono-causal relationship that overlooks the plurality of factors inducing climate migration (Ionesco, 2019). In order to avoid facile associations between climate change and human mobility, this paper employs the International Organization for Migration's 2007 definition of climate migrants: "persons or groups of persons who, *predominantly* for reasons of sudden or progressive change in the environment that adversely affects their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad" (IOM, 2007).

The relationship between climate change and human mobility has been extensively studied, including the broad understanding that climate-induced migration is primarily internal rather than international (Münz & Czaika, 2022). According to the Internal Displacement Monitoring Center's (IDMC) 2023 Global Report on Internal Displacement, there were 8.7 million internally displaced persons (IDPs) due to weather-related disasters at the end of 2022, marking a 45% increase since 2021. World Bank's Groundswell Reports predicts that climate change may drive this

number up to 216 million by 2050, 143 million of which are expected to originate from the highly exposed regions of Sub-Saharan Africa, Latin America, and South Asia, making climate change mitigation and adaptation of paramount importance (Rigaud et al., 2018; Clement et al., 2021).

1.2 Climate Change Mitigation and Adaptation

Accordingly, many policies on climate mitigation and adaptation have been implemented in these regions, from national Climate Change Strategy and Action Plans to REDD+ Strategies[1]. As per the definitions in Box 1, policies in climate adaptation are measures such as early warning systems that detect extreme weather events before they happen to facilitate preemptive evacuations, while policies in climate mitigation are those such as eliminating illegal deforestation, as this cuts carbon dioxide (CO2) emissions.

Climate Adaptation: Taking action to prepare and adjust for current and anticipated impacts of climate change (EPA, 2022).

Climate Mitigation: Efforts that limit the magnitude and pace of future climate change by reducing greenhouse gas (GHG) emissions (ibid.).

Box 1: Climate change mitigation and adaptation definitions

While there is substantial empirical literature vis-à-vis climate adaptation policies and its impacts on migration, those regarding climate mitigation policies and its migration outcomes remains scarce, necessitating further investigation (Kaczan & Orgill-Meyer, 2020; Ekoh et al., 2023). In fact, the only relevant study identified was by Cohen et al. (2013), who found that Mexico's mitigation policies on water quality reduced livelihood insecurity and risks from extreme climatic hazards, consequently lowering environmental migration rates. However, their research was limited in terms of policy areas and geographical scope.

1.3 Research Question

Therefore, this applied research project will attempt **to better understand how climate mitigation policies influence internal displacement in agriculturally dependent regions**, as environmental impacts on migration are felt strongest in such regions (Hoffman, 2020).

The paper will examine policies in mitigation areas beyond water, specifically soil quality and forestry, while qualitatively analysing their impacts on internal migration across three regions

[1]REDD is an acronym for "reducing emissions from deforestation and forest degradation in developing countries", while the + stands for "additional forest-related activities that protect the climate". As part of the Paris Agreement, some countries have established their own 'REDD+' framework to conserve forests (UNFCCC, n.d.).

of high human and climate vulnerability, namely: Sub-Saharan Africa, Latin America, and South Asia. It will also investigate how these policies could be improved moving forward with respect to mitigating climate change, while also considering the reduction of displacement as an objective.

We hypothesise that climate mitigation policies can reduce push factors to migrate, only when strengthened by complementary socio-political or economic policies, including those in sustainable development, livelihood diversification, local level capacity building, and infrastructure management.

2. LITERATURE REVIEW

The literature review will first explore scholarly dialogues on climate-induced migration, including its distinctions and main environmental drivers, followed by a discussion on climate mitigation policies in relation to agriculture. Finally, existing knowledge on the relationship between climate mitigation policies and human mobility will be presented.

2.1 Distinctions of Climate-Induced Migration

As illustrated in Figure 1, climate-induced migration can be distinguished across different forms, as individuals may either forcibly or voluntarily migrate within or beyond national borders, for durations ranging from temporary to long-term, depending on the environmental process or root cause in question.

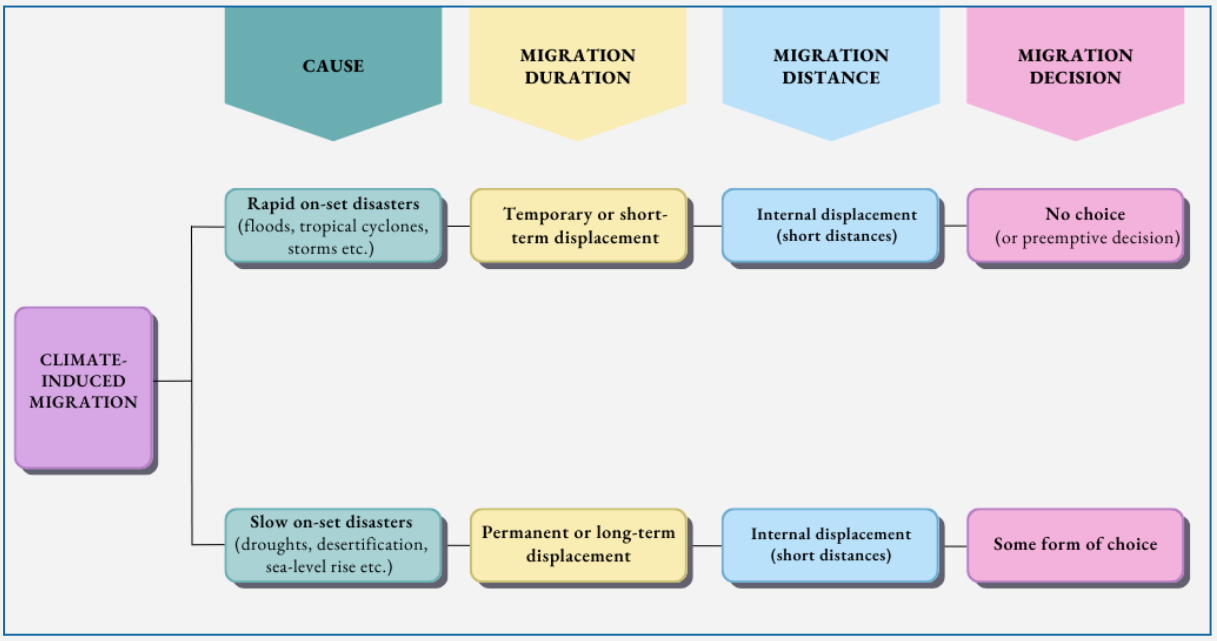

Figure 1. Types of Climate-Induced Migration (Source: Authors)

1. Cause

Types of climate-induced migration are largely determined by the environmental disaster, which can be categorised as rapid or slow on-set disasters, based on its speed (Figure 1). The former is a hazardous event that emerges suddenly in a matter of hours or days, such as flash floods, tropical storms, cyclones, and landslides, whereas the latter refers to disasters that are more gradual, including droughts, desertification, and sea-level rise (PreventionWeb, n.d.).

2. Migration duration

Climate change can cause temporary displacement, short-term or long-term, depending on the speed of climate disruption and its severity.

Term	**Length**
Temporary Displacement	Less than 3 months
Short-term Migration	3 months to 1 year
Long-term Migration	More than 1 year

Table 1. UN description of temporality of migration (UNDESA, 1998)

Rapid-onset climate disasters are more commonly associated with temporary, short-term displacement, as victims are unable to afford migrating long-term due to the lack of resources (Gemenne et al., 2021). In fact, among the annual average of 25.4 million individuals that were internally displaced due to rapid-onset climate disasters between 2008 and 2015, the majority were for short durations (Wilkinson et al., 2016). However, it should be noted that consecutive rapid-onset events can severely deplete household assets, triggering longer-term migration as well (Sherbinin, 2020).

Its slow-onset counterpart tends to generate long-term or permanent migration movements as lands become irreversibly inhabitable and employment opportunities are lost (Nishimura, 2018; Sherbinin, 2020). However, they can also trigger short-term, circular, or seasonal migration patterns, particularly in rural agricultural communities where local farmers migrate for livelihood diversification reasons (Kabir et al., 2018; Szaboova, 2023).

3. Migration distance

Substantial empirical literature on the climate change-migration nexus demonstrates that internal displacement accounts for the vast majority of climate change migration—regardless of the environmental disaster in question—with affected populations moving short distances within national borders to seek improved living conditions and economic opportunities (Hoffman, 2020; University of East Anglia, 2023). Although few individuals wish to migrate in the first place, let alone across borders, they tend to favour culturally and geographically familiar places within their own countries when forced out of their homes (Brady & Schwartzstein, 2023). In fact, IDMC (2023) reported that weather-related disasters internally displaced 32.6 million individuals in 2022 alone, marking the highest figure in a decade.

Moreover, the distance people migrate reflects their resources and financial capabilities. Since these are often depleted in times of climate emergencies, individuals seek temporary labour in

local cities as they are unable to afford moving to far locations (IOM, 2008). Among local farmers in rural areas that face livelihood loss due to environmental disasters, internal rural-to-urban migration is generally the case as wages tend to be higher in urban places (Kniveton et al., 2008; Zuber et al., 2019; Bharadwaj et al., 2021).

4. Migration decisions

While migration is highly context specific and can be either voluntary or involuntary, climate-induced migration lies towards the forced side of the population mobility continuum, which ranges from totally voluntary migration to totally forced migration (Hugo, 2008). Since these decisions depend on vulnerabilities and adaptive capabilities to climate change, those with financial resources, relevant skill sets, or social networks can make the voluntary choice to migrate, while those with fewer resources are more likely to be forced to move (Brady & Schwartzstein, 2023). Vulnerable households also tend to engage in distress migration to search for better opportunities, such as securing temporary employment during poor harvest seasons (Kaczan & Orgill-Meyer, 2020).

Furthermore, decisions to migrate are determined by environmental processes, as people usually have some form of choice when moving for slow-onset climate events, due to its protracted nature, while this choice seldom exists for rapid or sudden-onset disasters (IDMC, 2018). However, these decisions can also be preemptive, whereby communities or governments decide whether migration is necessary through early warning systems, with floods being the most common associated climate event. (Ferris & Bower, 2023).

2.2 Existing Policy Frameworks Surrounding Climate-Induced Migration

Climate migrants are not covered by the 1951 Refugee Convention, as this is reserved only for those with a well-founded fear of being persecuted on grounds related to race, religion, nationality, membership of a particular social group or political opinion, resulting in a "normative and institutional vacuum" (Piguet et al., 2011; Apap, 2019). With no access to legal protection, environmental refugees require different policy avenues, paired with relief and resilience mechanisms at the community level. Moreover, committing to an internationally binding treaty on climate migration will be challenging, due to the insufficient political will among world leaders (Klepp, 2017). For instance, although COP27 reached a historic agreement with the *loss and damage fund*[2], not only was it initially contested by multiple developed-country representatives,

[2] *Loss and damage* refers to the negative consequences of climate change, which can either be economic loss, such as infrastructure being damaged, or non-economic loss, which includes loss of community after being displaced (Thomas, 2022). Although the concept has been discussed in UN climate negotiations since the early 1990s, COP27 marked the first time a dedicated fund was allocated to *loss and damage*, hence the term: *loss and damage fund* (UNFCCC, 2022).

including the United States (US), United Kingdom (UK), and the European Union (EU), but many operational questions remain regarding its implementation (Åberg, 2023).

Nevertheless, some progress has been made, with the UN Secretary General launching the Action Agenda on Internal Displacement in 2022[3] which stands high on UN priorities, as well as the UN High Commissioner for Refugees (UNHCR) appointing a focal point for climate-induced migration in 2020. Additionally, climate change is identified as a prominent driver of migration in multiple international frameworks, including the Agenda for Humanity, the 2016 UN Summit for Refugees and Migrants, the Global Compact for Migration, and the Global Compact on Refugees (Kaczan & Orgill-Meyer, 2020).

2.3 Mitigation Policies in the Agriculture Sector

Focusing on climate mitigation measures during policy discussions on environmental migration is of paramount importance, as preventing individuals from being forcibly displaced in the future is a fundamental objective of today's generation (Ionesco, 2019). Accordingly, the European Environment Agency (EEA, 2023) highlights the significance of sustainable agriculture by asserting that agroforestry, afforestation, and reforestation are key policy areas to mitigate environmental drivers of migration. Such policies on climate mitigation will be evaluated in this paper, as environmental impacts on migration are felt strongest in agriculturally dependent states with middle-income status (Hoffman et al., 2020).

Agroforestry policies reduce land degradation and improve soil quality, allowing soil to absorb more CO2 which mitigates GHG emissions, as well as store excess water to lessen the frequency and intensity of floods and droughts (Kuyah et al., 2019; EEA, 2023). Meanwhile, afforestation policies tackle carbon emissions and enhance rainfall, subsequently strengthening economic security through increased agricultural production, as observed in northern India where farmers often remained in their rural communities without migrating due to their economic resilience (Kamble et al., 2023). Policies in reforestation enhance soil quality which decreases the severity and number of droughts and floods (Di Sacco et al., 2021).

2.4 What Do We Know About The Effects Of Mitigation Policies On Migration?

Cohen et al. (2013) found that by introducing mitigation policies on climate change in Mexico, specifically those concerning water productivity and accessibility, livelihoods of dryland populations were improved and environmental migration rates significantly decreased, while Laukkonen et al., (2009) highlighted the importance of combining mitigation strategies with

[3]The Action Agenda on Internal Displacement marked a significant milestone for ensuring the human rights of IDPs, with its three fundamental goals being: finding durable solutions; preventing new displacement-inducing crises; and providing protection and assistance for IDPs (UN, 2022).

development policies for effective local-level responses to climate change. The authors for both studies were unable to find a statistical correlation between climate change and human mobility, due to the complexity of the nexus.

Although their research suggests top-down and bottom-up approaches to build resilience among migrants, combined with climate change mitigation to effectively address climate-induced migration, there were no other studies assessing this relationship, creating a clear gap in the literature on how climate mitigation policies influence migration.

3. METHODOLOGY

3.1 Hypothesis

Although existing literature provide very few established theories on the relationship between climate mitigation policies and migration, a theoretical hypothesis can be generated drawing from the above-mentioned studies: *mitigation policies on climate change can reduce push factors to internally migrate, only when strengthened by complementary socio-political or economic policies, including those in sustainable development, livelihood diversification, local level capacity building, and infrastructure management.*

3.2 Research Method and Unit-level of Analysis

The analysis will first evaluate national and local-level climate mitigation policies implemented in the 2000s (if applicable), which allows for a long-term inquiry to reach an accurate conclusion regarding its impacts on human mobility.

Across Latin America, Sub-Saharan Africa, and South Asia, the selected countries of analysis are Colombia, Brazil, Dominican Republic, Senegal, Ethiopia, India, and Bangladesh, as lower to upper middle-income states with agriculture as their primary source of income are known to experience the strongest environmental impacts on migration (Hoffman, et al., 2020; IDMC, 2023). To better understand how a climate mitigation policy can impact internal migration, the analysis will focus on specific local geographies within these countries, namely: *Córdoba* (Colombia), *Amazonas* (Brazil), *San Pedro de Macorís* (Dominican Republic), *Matam* (Senegal), *Oromia* (Ethiopia), *Uttar Pradesh* (India) and *Sylhet* (Bangladesh).

This will be followed by assessing respective trends of climate-induced internal displacement and its root causes in each selected area to evaluate the efficacy of the climate mitigation policy in question. The findings may be used for a broader inquiry on the relationship between climate mitigation policies and internal migration flows, as the research is based on a "typical case selection", allowing for the findings to be generalised to other countries with similar characteristics (Gerring, 2008).

The research will be complemented by interviews with experts to not only strengthen the analysis, but to understand how policies in other areas, such as infrastructural development and livelihood diversification, influence the relationship between climate mitigation policies on internal migration.

3.3 Measurement of Climate-Induced Migration

The research will employ IDMC's Global Internal Displacement Database (GIDD): one of the most comprehensive datasets regarding IDPs from 2008 to 2022. The dataset measures IDPs at a given place and time, which is a stock metric that represents a static snapshot of the overall

number of IDPs (IDMC, 2023). The data is sourced from national governments, the UN and other international organisations, local NGOs, media, and non-state armed groups. The GIDD is fundamental to the research as it measures climate-induced internal displacement, based on the density of the disaster which is weighed through housing destruction data.

3.4 Interviews

Interviews were conducted with the following 6 climate change and migration experts to inform the research analysis and policy discussion:

- Vicente Anzellini (Global and Regional Analysis Manager, IDMC)
- Ryan Mitra (Monitoring Associate, IDMC)
- Bruno Conte (Assistant Professor, University of Bologna)
- Lucile Maertens (Senior Lecturer, University of Lausanne)
- Achilles Kallergis (Assistant Professor and Researcher, New School University)
- Sarah Rosengaertner (Global Lead, Global Centre for Climate Mobility; Senior Advisor, Africa Climate Mobility Initiative; Senior Fellow, Zolberg Institute on Migration and Mobility)

The interviews are unstructured, face-to-face (unless requested otherwise), and no longer than 30 minutes. They will be conducted by two people, with one asking questions and the other taking notes.

3.5 Limitations

Disaggregated data of local regions from certain years are missing in the GIDD, as the majority of data remains at the national level. Slow-onset disasters are also not assessed in the GIDD, apart from in the African region where droughts are examined. Moreover, the dataset fails to distinguish individuals that were displaced once from those who migrated several times, as well as people who migrated preemptively from those who migrated after or during a climate disaster. Not to mention, according to interviewee Anzellini (personal communication, May 15, 2023), numbers of IDPs tend to be higher in recent years, due to greater accuracy in data-gathering techniques.

Additionally, due to the impossibility of isolating relevant variables, the main challenge is evaluating the *direct* impact of mitigation policies on human mobility. Therefore, this research paper will ensure to consider the multi-faceted nature of climate-induced migration, arguing for an interdisciplinary approach of combining climate mitigation strategies with complementary policies, such as those in sustainable development, livelihood diversification and capacity building.

5. LATIN AMERICA

Key Findings

- Despite reforestation policies implemented in *Córdoba*, Colombia, its mitigation efforts have not been successful in reducing extreme weather events and IDPs, due to **problems with infrastructure**.
- The Juma project in *Amazonas,* Brazil, which aimed to prevent deforestation and mitigate climate change, did not reduce flooding and internal displacements, suggesting its **limited efficacy in addressing transboundary climate impacts**.
- The implementation of *Plan Nacional Quisqueya Verde* in *San Pedro de Macorís,* Dominican Republic has shown **promising results in mitigating the intensity of extreme weather events**, resulting in consistently low numbers of IDPs throughout recent years.

4.1 Colombia: Córdoba

1. Background

Córdoba is one of Columbia's most climate vulnerable districts, due to its geographical position that faces the Caribbean sea and the departments of *Bolívar* and *Antioquia*. Extreme weather events in *Córdoba* have risen in frequency and intensity over the last decade, due to climate change, increasingly displacing the population (Letcher, 2021). Since deforestation is a serious issue in the district, with 4,060 hectares of forest cover being lost in 2021 alone, *Córdoba* has put forward numerous reforestation policies to mitigate extreme weather events (Global Forest Watch, n.d.).

2. Climate Mitigation Policies in *Córdoba*

Córdoba, in collaboration with the districts of *Bolívar* and *Antioquia*, developed the "*Desarrollo y consolidación de la cadena productiva de las plantaciones forestales con fines comerciales como contribución a la captura de GEI"* in 2015, which aims to reforest 1.5 million hectares of forest plantations across the three districts (Gobierno de Colombia, 2022). The reforestation process can reduce the frequency and severity of extreme weather events, such as droughts, floods, and landslides, through improved crop resilience and soil quality (Robledo et al., 2004; Bradshaw et al., 2007; Di Sacco et al., 2021).

3. The Effects of Climate Mitigation Policies on IDPs

As shown in Figure 2, the data on IDPs in *Córdoba* indicates a non-linear trend. Although data from 2016 to 2018, and 2020 are missing from the GIDD, the number of IDPs in 2013, 2014, 2015 and 2019 were relatively low, particularly when compared with 2021 when 15,000 IDPs were

recorded. This sudden surge in displacements was due to northern Colombia's Cauca River overflowing, causing serious catastrophes in *Córdoba, Sucre, Bolívar* and *Antioquia*.

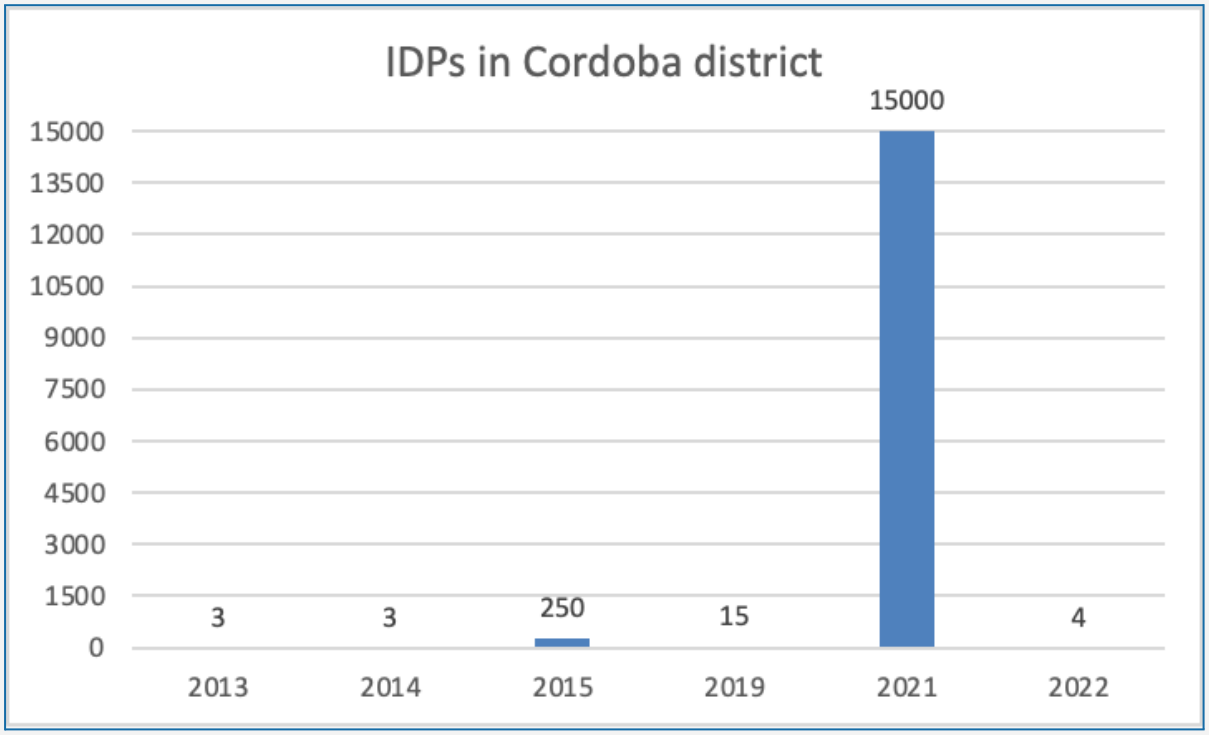

Figure 2. IDPs in Cordoba district (Source: IDMC Global Internal Displacement Database)

The massive 2021 floods stemmed from atypical rainfall patterns and the rupture of a dam, which damaged 7,000 hectares of crops and exacerbated food insecurity, ultimately forcing local populations to migrate from rural to urban areas within *Córdoba* (ACAPS, n.d). Not to mention, the dam rupture revealed defects in Colombia's infrastructure system, which remains underdeveloped relative to other Latin American countries such as Chile and Brazil (ITA, n.d.). Despite there being many infrastructure development projects in Colombia, they tend to fail due to the country's socio-economic conditions, such as poor civil engineering, lack of resources, corruption, infrastructure sabotage, and politicisation of infrastructure projects (Daheshpour & Herbert, 2018).

Thus, the above-mentioned mitigation policy itself was not successful in containing the number of IDPs, as there were other elements contributing to climate-induced displacement in *Córdoba*, namely: poor infrastructure and lack of capacity.

4.2 Brazil: *Amazonas*

1. Background

Due to its geographical location, Brazil is one of the world's most vulnerable countries to climate change (ReliefWeb, 2021). Northern Brazil's state of *Amazonas* is crossed by the Amazon and Negro rivers, making the area particularly susceptible to floods when the rivers overflow due to heavy rainfall and the *La Niña* phenomenon: a widespread phenomenon in the equatorial Pacific Ocean characterised by a negative sea surface temperature which contributes to intense flooding of rivers (Maciel et al., 2020; Alizadeh, 2022; Espinoza et al., 2022). Moreover, two thirds of the deforested area in *Amazonas* is due to the expansion of pastures and agro-business, making deforestation a major problem in the region and the primary reason people internally migrate from rural to urban areas (Pacheco, 2010; Sathler et al., 2020).

2. Climate Mitigation Policies in *Amazonas*

To mitigate GHG emissions from deforestation, *Amazonas* implemented the *"Juma Sustainable Development Reserve Project"* as part of its REDD+ strategy. The mitigation policy expects to protect 329,483 hectares of tropical forests, which would release 189 million tonnes of CO2 if deforested (Amazonas governo do estado, 2008). Furthermore, both reforestation and preventing deforestation can avert extreme weather events such as floods, droughts and soil erosion (Robledo et al., 2004; Bradshaw et al., 2007; Sendzimir et al., 2011; Di Sacco et al., 2021).

3. The Effects of Climate Mitigation Policies on IDPs

Although identifying a trend of IDPs in *Amazonas* is challenging as disaggregated data is only available for the 2019 and 2022, Figure 3 illustrates that there were over 123,000 IDPs in these 2 years alone, due to heavy rainfall and the *La Niña* phenomenon which flooded the Negro river.

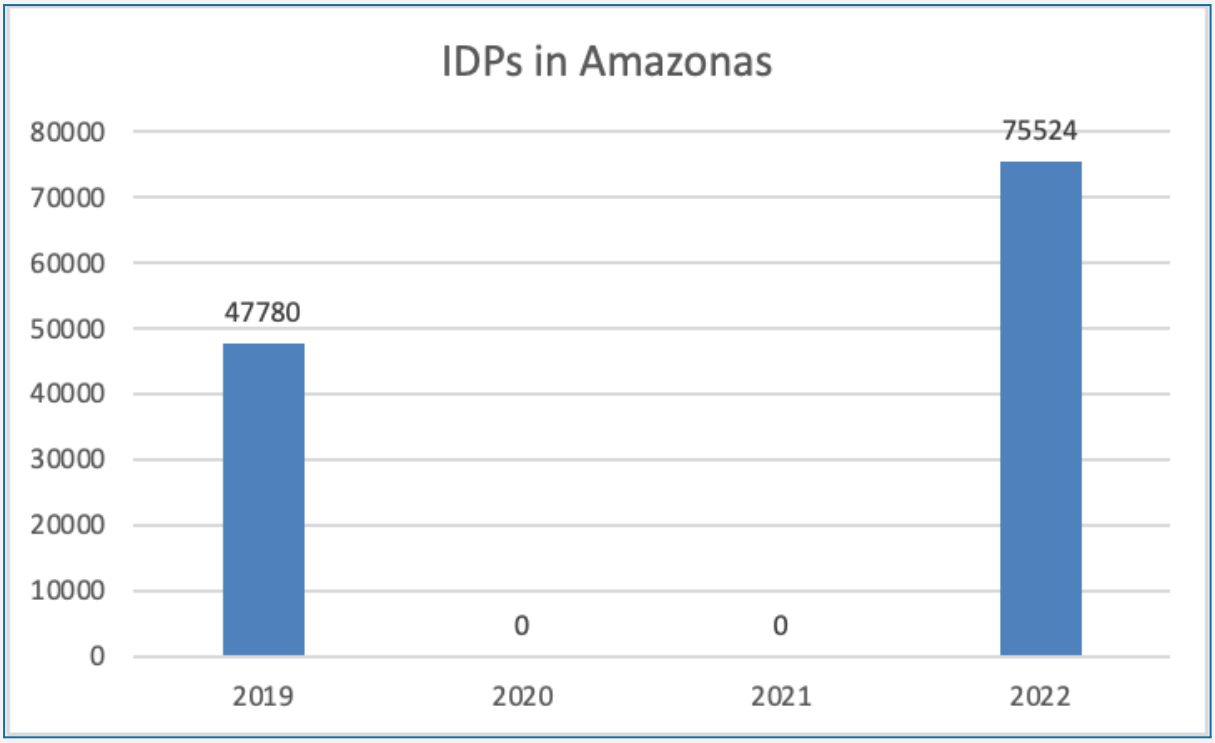

Figure 3. IDPs in Amazon region (Source: IDMC Global Internal Displacement Database)

While no mitigation policy on reforestation has been implemented in *Acre*, a neighbouring region that shares many geographical and socio-economic characteristics to the *Amazonas*, the frequency and causes of floods appears to be similar to the *Amazonas*. Although the overall number of IDPs in *Acre* is lower than *Amazonas* due to the considerable difference in population, almost 12,000 people in *Acre* were displaced due to floods in 2019 and 2022 (IDMC, 2023). Moreover, heavy rainfall and the *La Niña* phenomenon caused the floods, suggesting that whether a mitigation policy on reforestation is implemented or not, the *La Niña* phenomenon still occurs in the northern areas of Brazil, given its transnational nature (Elcacho, 2022; Davies, 2023).

As such, this analysis suggests that the Juma project itself is insufficient to mitigate floods and reduce subsequent internal displacement, due to the transboundary climate impacts such as *La Niña phenomenon.*

4.3 Dominican Republic: *San Pedro de Macorís*

1. Background

The Dominican Republic is very vulnerable to climate change, ranking as the 50th most vulnerable country to climate change (ReliefWeb, 2021). Within the Dominican Republic, *San Pedro de Macorís* is particularly exposed to extreme weather events and deforestation, due to its geographical location.

2. Climate Mitigation Policies in *San Pedro de Macorís*

San Pedro de Macorís implemented *Plan Nacional Quisqueya Verde* (PNQV) from 1997 until 2003, which aimed at improving the living conditions of the rural population through the use of natural resources and protecting the environment through reforestation (Serrano et al., 2004).

3. The Effects of Climate Mitigation Policies on IDPs

As Figure 4 reveals, *San Pedro de Macorís* did not have any climate-induced IDPs from 2008 to 2022, apart from in 2017 when a flood in the district displaced 35 people. It should be noted that disaggregated data from 2009 and 2010 were missing from the GIDD.

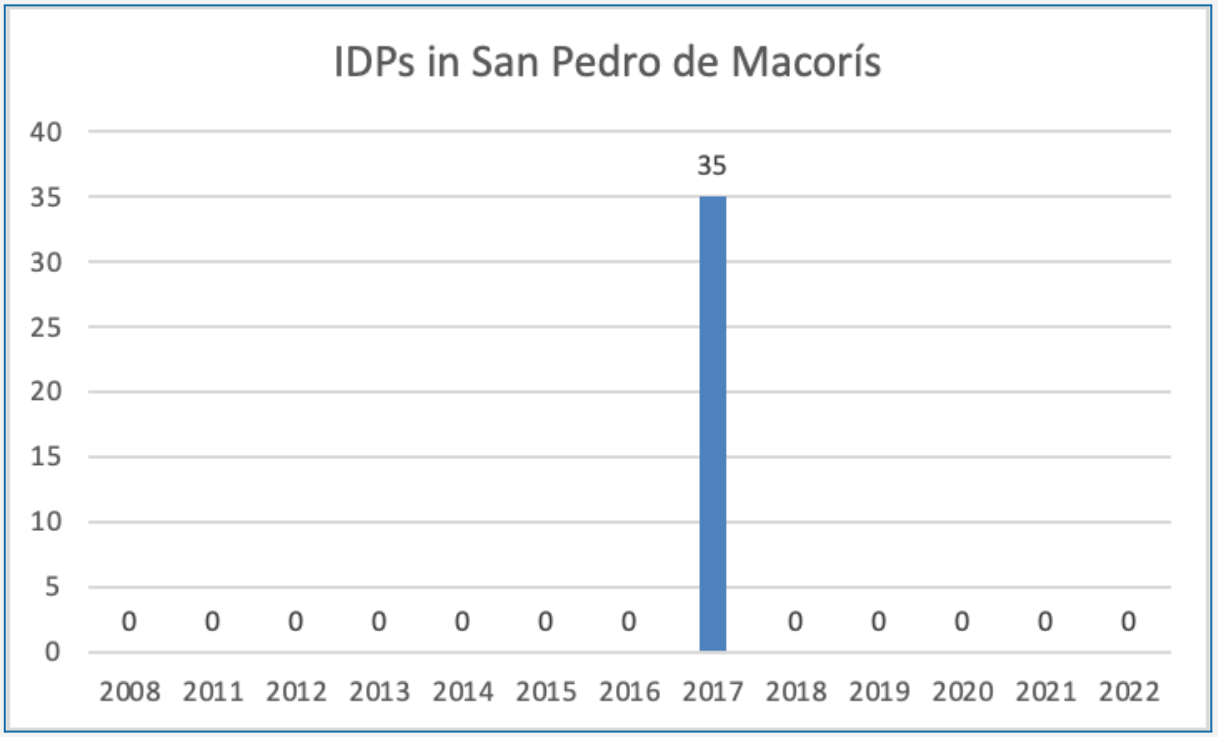

Figure 4. IDPs in San Pedro de Macorís District (Source: IDMC Global Internal Displacement Database)

This analysis suggests that the PNQV played a role in successfully reducing the intensity of weather-related events and subsequent number of IDPs, especially because this was one of the only cases where the mitigation policy emphasised improving livelihoods of rural communities through reforestation. In fact, the PQNV included many financial investments towards the local population, such as those in education and employment, which may have reduced the necessity for individuals to seek other means of income following weather-related disasters (Serrano et al., 2004).

Thus, *San Pedro de Macorís*'s case demonstrates how climate mitigation policies that also consider livelihoods of rural communities could be successful in containing IDPs.

5. SUB-SAHARAN AFRICA

Key Findings

- Although the Great Green Wall Initiative has shown promising results in Senegal, the country's **failing infrastructure, political situation, and the economic instability** have contributed to the rise in internal displacements in agricultural dependent regions such as *Matam*.
- While the Climate-Resilient Green Economy Strategy in Ethiopia has helped in achieving economic growth while mitigating GHG emissions, **political instability and financial constraints** exacerbates *Oromia*'s vulnerability to climate-induced migration.

5.1 Senegal: *Matam*

1. Background

Although Senegal's poor soil quality means that agriculture accounts for only 17.5% of Senegal's gross domestic product (GDP), the sector is one of the primary means of livelihood for the population (PIK, 2022). However, since the country is extremely vulnerable to climate disasters that tend to destroy crops, Senegal largely relies on imports to meet its food needs (PIK, 2022). Among its regions, *Matam* particularly suffers from extreme weather events, especially droughts and floods, despite having implemented one of Africa's most well-known mitigation policies: the Great Green Wall Initiative (GGWI).

2. Climate Mitigation Policies in *Matam*

The GGWI is a Sahel-wide project which aims to control deforestation and soil degradation in the region, particularly to increase the amount of arable land while preventing the Sahara desert's advancement. The initiative has been subject to criticism for its broad scope, especially having shown scarce results since its implementation in 2007, with only 15% of the reforestation goal achieved (UNCCD, 2020). However, after French President Emmanuel Macron called for an increase in donor funding in 2021, the project evolved into the Great Green Wall accelerator (UNCCD, 2021).

The project has been particularly successful in Senegal, where 850,000 hectares of land has either been restored or reforested, while more than 2000 people have been trained in food security and biodiversity maintenance (UNCCD, 2021). The success can be observed in north-eastern Senegal's *Matam* region, where planting cover crops[4] has resulted in soil erosion reduction, and covering land with vegetal and organic matter has restored soil quality to enhance agricultural production (Dia & Duponnois, 2010; UNCCD, 2020).

[4] Cover crops are plants that cover the soil to protect soil from erosion and enhance fertility (Clark, 2015).

3. The Effects of Climate Mitigation Policies on IDPs

Matam has faced several droughts and floods that have disrupted agriculture and destroyed households, leading to increased internal displacements. The frequency of these climate events result in periodical displacements, creating a circular trend of people leaving and returning (Zickgraf, 2021). Although disaggregated data from 2013 to 2017 was unavailable in the GIDD, Figure 5 illustrates a volatile trend with a recent surge of IDPs in 2022.

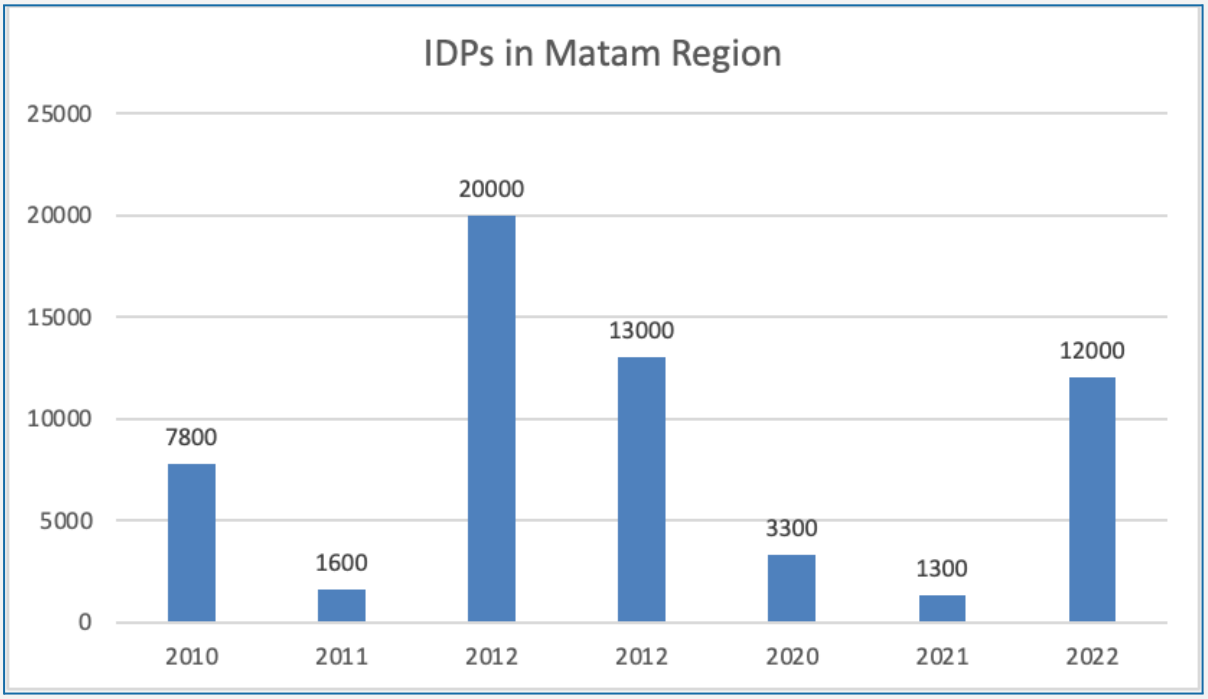

Figure 5. IDPs in the Matam region (Source: IDMC Global Internal Displacement Database)

As Figure 5 illustrates, *Matam* saw 12,000 IDPs in 2022 alone, which was largely due to severe floods in the region. However, the *Emergence* and *Keur Massar* bridges which collapsed due to the sudden flow of water and maintenance issues, were also responsible for the internal displacements as this resulted in water supply shortages that disrupted agricultural practices, forcing many to seek other livelihoods outside the region. (IFRC, 2022 ; IDMC, 2023). Not to mention, political instability and internal conflicts in Senegal are depleting resources and constraining the economy, further weakening the region's resilience to extreme weather events (Grechi & Agustoni, 2019; FAO, 2020).

For this reason, the GGWI alone cannot contain climate-induced internal displacement in *Matam*, as enhanced financial capacity is required to better construct its infrastructure and strengthen climate resilience.

5.2 Ethiopia: *Oromia*

1. Background

Ethiopia is highly dependent on its agriculture, with the sector accounting for 40% of the GDP and almost 75% of the national workforce (USAID, n.d.). As such, extreme weather events such as droughts and flooding displaces several thousands of people every year, with south-eastern Ethiopia's *Oromia* region being among the areas most affected (IDMC, 2023).

2. Climate Mitigation Policies in *Oromia*

Ethiopia implemented its USD 150 billion Climate-Resilient Green Economy (CRGE) Strategy in 2011 to improve agricultural activities through reforestation and enhanced soil quality. The CRGE managed to afforest and reforest over 2,800 hectares of land, rehabilitate over 15,000 hectares of degraded land, and commence short rotation plantation programmes on 10,000 hectares of land (UN MPTF Oce, 2021). Most of this occurred in *Oromia*, as the region has the highest forest coverage nationwide, at approximately 32 million hectares in 2020 (Abelti et al., 2022). Moreover, following the CRGE's footsteps, several other programmes were made to tackle deforestation and land degradation, such as the Green Legacy Initiative, a 2019 programme to plant 20 billion trees; the Sustainable Land Management Programme, implemented with the objective to boost local livelihoods while mitigating climate change; and the REDD+ Investment Programme, which promotes afforestation.

3. The Effects of Climate Mitigation Policies on IDPs

Figure 6 shows that the data of IDPs was irregular until 2015, primarily due to poor data collection techniques. Although the decreasing number of internal displacements from 2019 onwards suggested that the above-mentioned mitigation policies were successful, the unprecedented number of IDPs in 2022 reversed this implication.

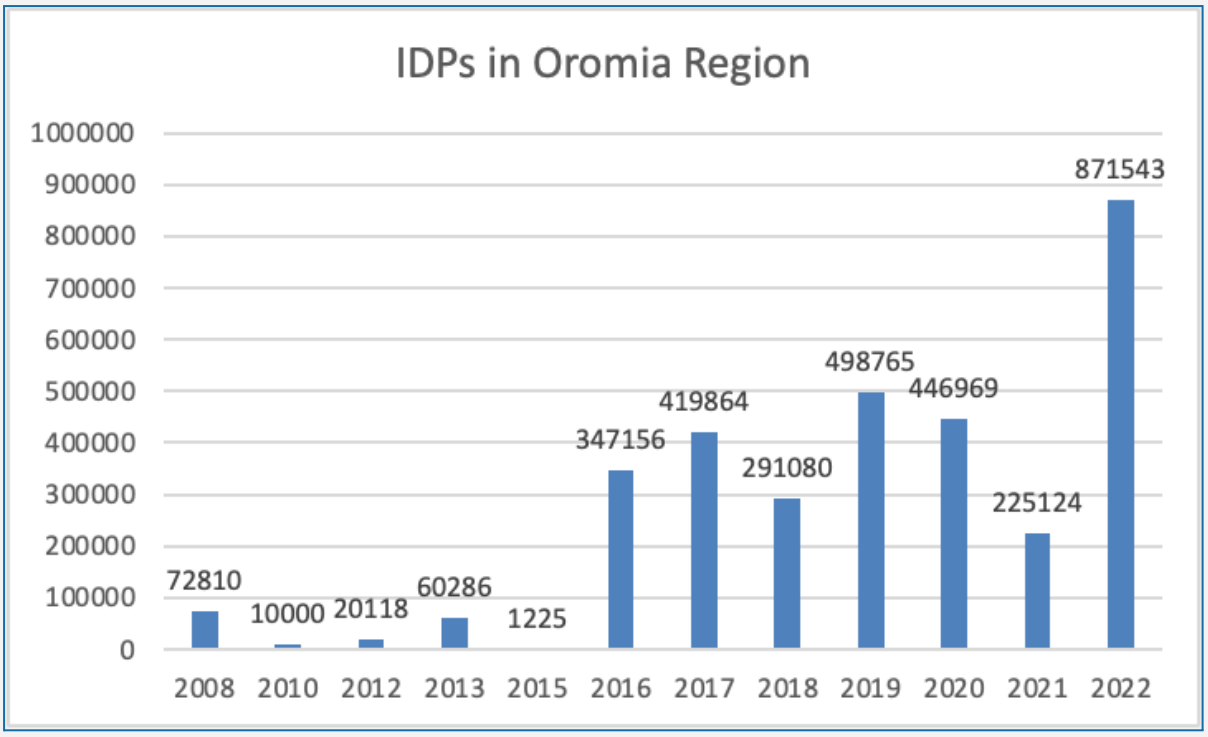

Figure 6. IDPs in Oromia Region (Source: IDMC Global Internal Displacement Database)

Figure 6 reveals that there were more than 871,000 climate-induced internal displacements in 2022, as Ethiopia is currently facing one of its longest droughts in history. The country has not had a rainy season since 2020, and 3.4 million people have been affected in *Oromia* alone, due to reduced availability of food, grassland, and water, triggering significant numbers of pastoral migration (OCHA, 2022). Moreover, such form of food insecurity is further exacerbated by the current agricultural production being ill-equipped to sustain Ethiopia's urbanisation process, with the country already facing limits in productivity due to lack of investments and internal conflicts. (USAID, n.d.).

Thus, the CRGE strategy and the climate mitigation policies that followed are inadequate in reducing internal displacements. The country's resources are mostly spent for their economic growth, pushing towards an increase in urbanised parts of the country. This results in a difficulty to support their rural population that suffers greatly from climatic extreme events.

6. SOUTH ASIA

Key Findings

- Despite *Uttar Pradesh* leading India's efforts in localising climate change mitigation, IDPs have been rapidly increasing due to **poor infrastructure management**, which has exacerbated the severity of extreme weather events.

- *Sylhet* experienced a record 482,000 internal displacements in 2022 following the monsoon floods, suggesting that **the Bangladesh Government's top-down planning of climate mitigation policies** has not reached those most affected by climate change.

6.1 India: *Uttar Pradesh*

1. Background

Housing over 250 million individuals, *Uttar Pradesh* (UP) is the most populous sub-national entity in India. UP also has the country's largest rural population, predominantly composed of small and marginal farmers, making the state especially vulnerable to climate change (Government of Uttar Pradesh, 2014; Singh & Tiwari, 2023). In fact, amid worsening climate hazards, the vast majority of India's intra-country migrants consist of UP's agriculturally dependent rural communities, illustrating the *"systemic instability"* of this sector (Hari et al., 2021).

2. Climate Mitigation Policies in *Uttar Pradesh*

Against this backdrop, climate mitigation policies are vital to avoid extreme weather events and ensure heightened agricultural productivity. As such, UP implemented its State Action Plan on Climate Change (SAPCC) in 2014, aligned with India's National Action Plan, which identified state-specific susceptibilities and outlined key priorities in agriculture to mitigate GHG emissions. Notable mitigation measures included providing resource conservation technologies and farming machinery for Climate Field Schools—an establishment which teaches small-scale farmers how to utilise climate information in managing their soil, water, and crops for higher agricultural production—to enhance soil management practices. The SAPCC also incorporated policies to popularise carbon sequestration and organic agricultural practices, such as agroforestry and the use of green manure, to increase soil productivity, water storing capacity, biodiversity, and prevent land degradation.

Moreover, after the UN Secretary General called for the Decade of Action in 2019 to achieve the 2030 SDGs, the UP Government responded with its Seven Step Rainbow Approach that synergized the aforementioned SAPCC with the SDGs (Singh & Tiwari, 2023). They set an ambitious target to create additional carbon sinks of 175 million tonnes of CO2 equivalents, to be achieved via its devised policy of planting 1.5 billion trees in the following 5 years through up-scaling agroforestry.

Although having the second lowest net state domestic product per capita may also be an attribute, senior UP Government officials maintain that UP is only responsible for 9% of India's GHG emissions despite being the most populated state (Singh & Tiwari, 2023). They also assert

that UP has spearheaded the localization of climate change mitigation in India, further suggesting the state's effective implementation of its climate mitigation policies.

3. The Effects of Climate Mitigation Policies on IDPs

Figure 7 shows the numbers of climate-induced IDPs in UP across 8 years, although it should be noted that data from 2015 and 2017 was missing from the GIDD. While internal displacements—which primarily occur due to monsoon-season floods—have fluctuated since IDMC began recording data in 2014, numbers have drastically risen in the past 3 years. This upward trend in internal migration from low-income, agriculture-intensive states such as UP is likely to continue in India (Hari et al., 2021).

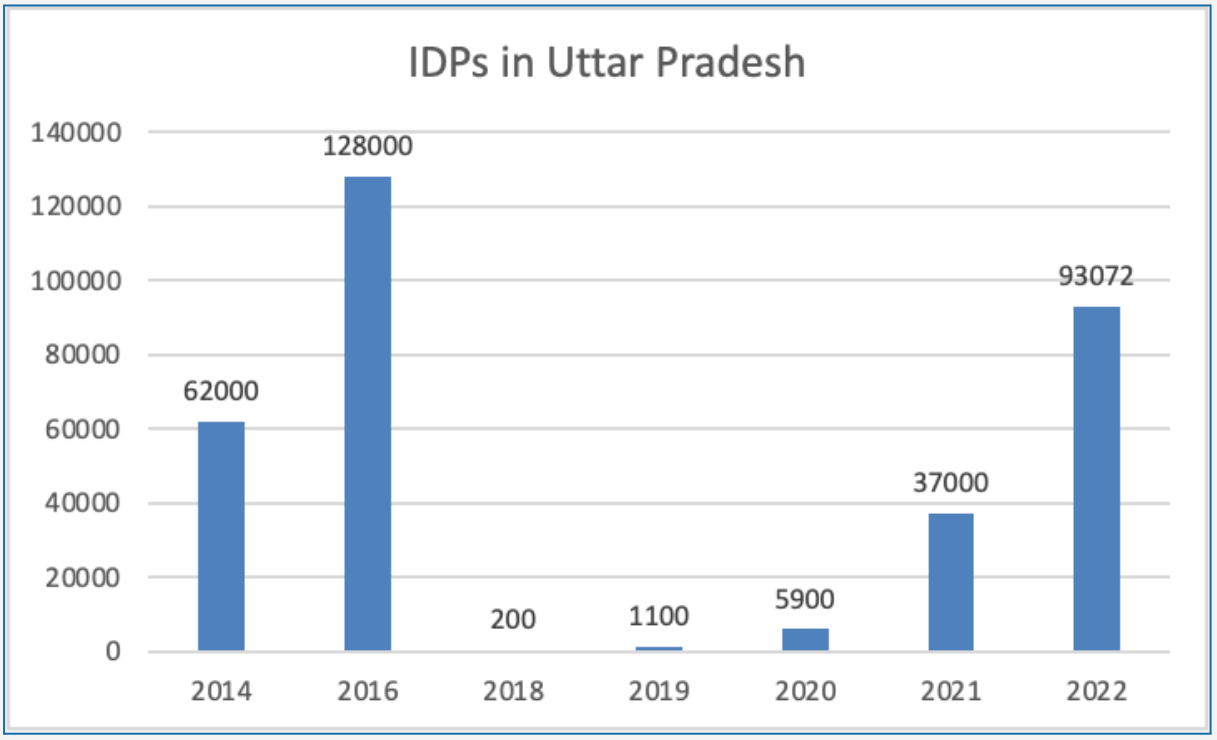

Figure 7. IDPs in Uttar Pradesh (Source: IDMC Global Internal Displacement Database)

In fact, the South-west monsoon floods internally displaced 93,000 individuals in UP last year, marking a 15-fold increase from 2020 (Figure 7; Sirur, 2022). The 2022 monsoon season—reportedly the worst of its kind since 1901—was dubbed as a "double whammy" for the state's 23 million farmers, as droughts in the initial phase destroyed rain-fed paddy farms, while the severe floods that followed further damaged vital crops such as rice and maize (Rathore, 2022).

According to UP Chief Minister Yodi Adityanath, although the rainfall was less-than-average during the monsoon season, excess water released into the Yamuna river from dams in *Rajasthan* and *Madhya Pradesh* provoked the flooding that affected 245,585 people in 5

days (Davies, 2022). Since these two states experienced higher levels of rainfall, their dams were on the verge of overflowing, explaining the decision to release excess water. This is a prime example of infrastructure deficiencies that Shagun (2019) and Kukreti (2022) point out: dams in India are ill-equipped in adapting to current realities of climate change as the majority were built in the 1970s, making them increasingly dangerous. Not to mention, dam operators in India rarely obey the internationally-practised Rule Curve which regulates how dams should be filled and emptied, resulting in sudden releases of dam water that are behind most of India's recent floods (Shagun, 2019).

Although UP may have seemingly been successful in implementing its climate mitigation policies, they have been inadequate in decreasing climate-induced IDPs, as dismal infrastructure is destroying traditional livelihoods and impoverishing local communities (Garg et al., 2021).

6.2 Bangladesh: *Sylhet*

1. Background

Among the 9.5 million people that reside in *Sylhet*, 85% live in rural areas and 51% depend on agriculture as their main source of income (Banglapedia, 2023). As such, *Sylhet* is highly vulnerable to climate events, especially when its major rivers such as *Surma* and *Kushiyara* overflow, causing intense floods that erode floodplains and result in wet mass movement. In fact, flood-induced riverbank erosion is one of Bangladesh's most catastrophic disasters, as it leaves large populations homeless and washes away farming lands (Islam & Rashid, 2012).

2. Climate Mitigation Policies in *Sylhet*

While there are no climate mitigation policies specific to *Sylhet*, the Government of Bangladesh implemented and adopted the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2009, which includes national-level commitments to a low carbon development path. The policies focus on mitigating GHG emissions, specifically Methane from rice production, by promoting sustainable agriculture and crop diversification; preventing deforestation; raising irrigation; and improving water use efficiency.

3. The Effects of Climate Mitigation Policies on IDPs

Although data from 2016, 2019, 2020, and 2021 are missing, Figure 8 shows the numbers of climate-related IDPs in *Sylhet* across 7 years, the majority of which were due to monsoon season floods.

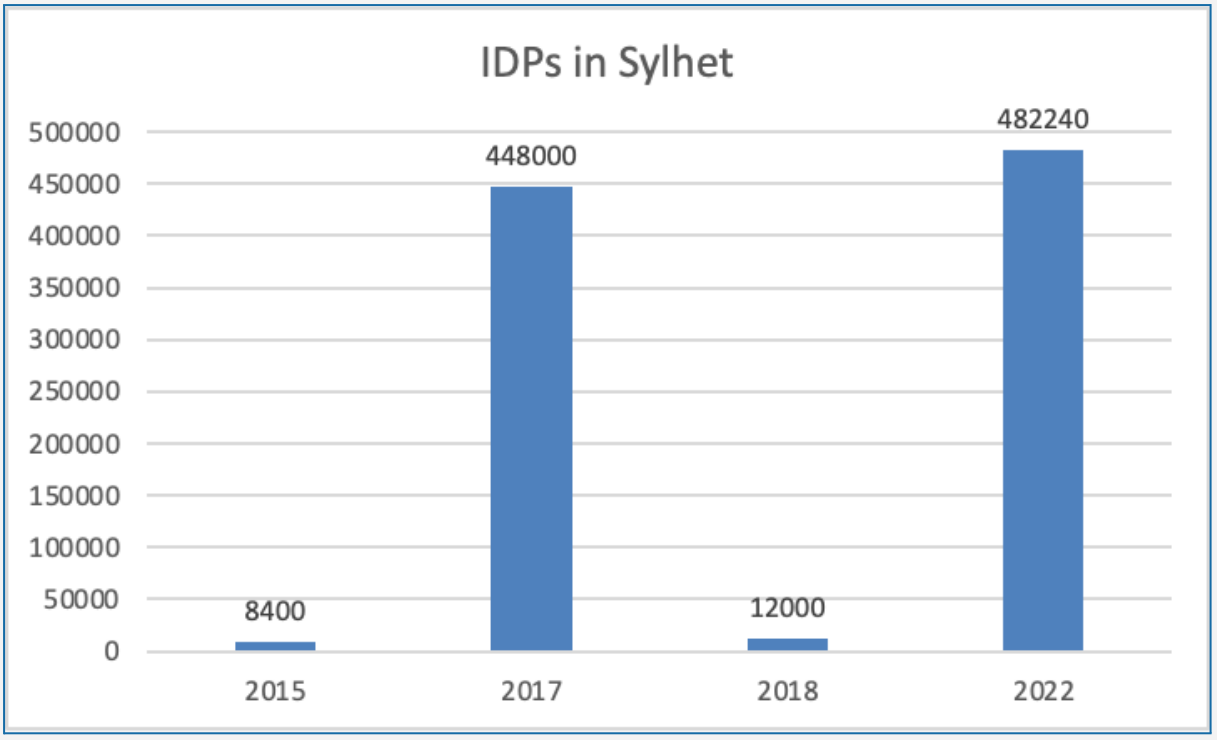

Figure 8. IDPs in Sylhet (Source: IDMC Global Internal Displacement Database)

In fact, the 2022 monsoon floods were described by the Director General of Bangladesh's Department of Disaster Management, Atiqul Hauqe, as the worst flooding *Sylhet* has experienced in 122 years, displacing a record 482,000 people (Figure 8; Paul & Hussain, 2022). However, interviewee Anzellini (personal communication, May 15, 2023) states that this unprecedented number may also include preemptive evacuations organised by the government, as IDMC does not disaggregate this data from the overall number of IDPs.

Despite national-level climate mitigation policies in place, the intensity of these floods are rising due to the poor implementation of such policies and failing infrastructure (Montu, 2022; Zahid, 2022). Ian Fry (2022), the Special Rapporteur on Human Rights and Climate Change who visited the aftermath of the 2022 monsoon floods in *Sylhet*, reported that the top-down planning of climate change policies by the Government of Bangladesh is not reaching those most affected, and implementation in practice was lacking. Inadequate implementation is also observed in *Sylhet*'s agriculture: although policies on mitigating GHG emissions through improved agronomic activities are outlined in the BCCSAP, cropping patterns and crop diversity remain below the expected level (Muttaleb et al., 2018).

Interviewee Anzellini (personal communication, May 15, 2023) maintains that such forms of unsustainable agricultural practices are concerning as they have bottom-up effects of exacerbating floods and subsequent wet mass movements. Therefore, this case not only underscores the futility of national-level mitigation policies in decreasing IDPs when poorly implemented, but

the importance of devising local-level mitigation policies to address vulnerabilities and priorities specific to *Sylhet*.

Moreover, careless infrastructure constructed on *haors*—a crucial type of wetland that can mitigate floods by receiving surface runoff from rivers—further contributed to unprecedented monsoon floods in *Sylhe*t as they obstructed the flow of water (Montu, 2022; Zahid, 2022). Not to mention, the floods also broke many poorly constructed dams and river dikes, submerging houses and croplands of surrounding areas in floodwater, highlighting the urgent need for improved infrastructure management in the division (Islam, 2022).

7. POLICY DISCUSSION

7.1 Livelihood Diversification

Key Recommendations:

- Governments should **establish policies to diversify livelihoods of rural populations**, as when they are paired with climate mitigation policies, it can contain internal displacements, or facilitate migration from inhabitable to habitable areas.

The analyses revealed the urgent need to diversify livelihoods of rural agriculturally dependent populations to contain the number of climate-induced IDPs, as they are particularly susceptible to extreme weather events. Since livelihood diversification entails providing necessary means to increase income streams and improve one's quality of life, for rural communities, this means supporting the shift from being agriculturally dependent to also engaging in non-farm activities (Biswas & Mallick, 2021). This process not only develops the rural economy but also reduces the need to migrate, as individuals secure other means of livelihood apart from agriculture, which is often destroyed after an extreme weather event. Thus, governments should ensure that its climate mitigation policies are complemented with livelihood diversification policies, in order to contain the number of internal displacements.

In fact, promising insights were found in *San Pedro de Macorís* where livelihood diversification policies were implemented. By providing communities with means of income other than agricultural production, individuals may have avoided resorting to migration when the flood occurred in 2017. Moreover, in the case of *Sylhet*, the youth were calling for increased support in education and agricultural training for livelihood opportunities, after being displaced by the 2022 floods due to the lack of income (Fry, 2022).

However, interviewee Kallergis (personal communication, May 8, 2023) importantly notes that in Sub-Saharan Africa, such as drought-ravaged Senegal or Ethiopia, livelihood diversification policies are also crucial in facilitating migration from inhabitable to habitable territories by enhancing socio-economic conditions (African Union, 2018). As such, it is paramount that governments consider the type of climate extreme disaster in question when establishing livelihood diversification policies. For instance, for the case of the Sahel or Bangladesh where droughts and rising sea levels may make areas inhabitable, livelihood diversification policies will be crucial in ensuring income when arriving to their new destination. Not to mention, these policies may also support those having to cross international borders due to climate disasters, as their acquired skills may support their grounds for asylum by facilitating employment, although it should be noted that climate-induced migrants severely lack legal policy frameworks.

To conclude, the case studies highlighted the imperative need for governments and international donors to fund livelihood diversification programmes, which should be paired with climate mitigation policies to stem internal migration. Livelihood diversification is of paramount importance, as it not only provides rural communities with climate resilience through other means of living, but can also facilitate migration for those in inhabitable conditions.

7.2 Strengthening Capacities for Policy Implementation: Local and International Levels

Key Recommendations:

- Governments should **localise mitigation policies** to address area-specific vulnerabilities and priorities, while also considering **indigenous knowledge** in the localization process.
- **International and regional cooperation** is fundamental when tackling transnational weather events that trigger high numbers of IDPs.

The research revealed the critical need to localise mitigation policies to address area-specific vulnerabilities and priorities, such as in the case of *Sylhet* where Bangladesh's top-down approach when implementing climate mitigation policies has failed to reach those most affected (Fry, 2022). While the BCCSAP outlined the reduction of GHG emissions through better agronomic activities, Bangladeshi farmers continue to face difficulties incorporating climate mitigation techniques themselves, underscoring the important role local governments and institutions must play in the implementation process (Ali et al., 2021). This also highlights the necessity for local governmental actors to be trained on how to deal with climate change mitigation, to ensure effective implementation.

Not to mention, according to the interviewee Mitra (personal communication, May, 12, 2023), indigenous knowledge should also be considered when localising mitigation policies. For example, the UNDRR (2022) promoted the traditional use of bamboo which provides for strong defence against flooding, instead of relying on man-made interventions such as dams that have aggravated, rather than mitigate floods. Similarly, countries in Africa have also turned to indigenous knowledge, including planting crops that are resistant to local climate and rejecting cost-inefficient pesticides and fertilisers to address food insecurities, many cases of which were successful due to the support from local governments (Brown, 2023).

However, climate mitigation policies at the international level are also fundamental in tackling climate events with transboundary effects. For instance, Brazil's local-level mitigation policies were insufficient in tackling transnational phenomena like *La Niña,* ultimately triggering high numbers of IDPs. As such, the analyses illustrated the necessity for better implementation of climate mitigation policies at both the local and international level, through strengthening capacity.

7.3 Improving Infrastructure Capacity

Key Recommendations:

- Since climate mitigation policies go hand in hand with infrastructure policies in containing displacement, governments should make **critical investments towards climate-resilient infrastructure development**.
- Governments should **ensure investments reach rural agriculturally dependent areas**, where those most vulnerable to climate change reside.

The analyses explicitly demonstrated that failing infrastructure is a recurring problem that exacerbates extreme weather events and subsequently triggers internal displacements across all three regions. Despite there being multiple climate mitigation policies in place, faulty infrastructure such as poorly constructed dams and dykes have negated these mitigation efforts. For example, the overflowing of *Cauca River* in Colombia due to a dam rupture, water shortages and agricultural disruptions stemming from the bridges collapsing in Ethiopia, and deadly floods triggered by released excess water from ill-equipped dams in India, respectively contributed to massive surges in IDPs. With ageing and underdeveloped infrastructure becoming increasingly dangerous amid climate change, there is an imperative need for international investments towards infrastructure development projects.

Since rebuilding or renewing infrastructure is a costly procedure that would overstretch national budgets, particularly for the analysed regions that already face socio-economic constraints, international efforts to fund these projects will be vital to mitigate extreme weather events and contain displacement. Moreover, investments must reach rural agriculturally dependent areas which house those most susceptible to climate exchange, as underscored by Senegal's case where investments to protect infrastructure were made for the capital city of *Dakar*, while rural areas were left unprotected (Kane, n.d. ; Mukeredzi, 2022).

To conclude, the case studies exemplified how climate mitigation policies go hand in hand with infrastructure policies in decreasing climate-induced internal displacement. As emphasised by Mr. Abdirahman Abdishakur, the Somali Government's Special Presidential Envoy for Drought Response, developing countries lack critical investments in agricultural and economic infrastructure (IDMC, 2023). Nevertheless, he asserts that developed countries tend to largely invest in humanitarian assistance—which is becoming an increasingly competitive space for forming long-term dependencies to exert political influence and gain access to natural resources—instead of funding climate-resilient infrastructure projects. Until countries become capable of reconstructing their infrastructure to adapt to the prevailing realities of climate change, extreme weather events will continue forcing thousands out of their homes.

8. CONCLUSION

1.2 billion individuals may be displaced due to climate change by 2050 (McAllister, 2023), making climate-induced displacement an increasingly relevant policy matter for world leaders.

This research paper has explored the multifaceted and complex relationship between climate mitigation policies and internal migration, revealing that these policies should go hand in hand with livelihood diversification, local-level capacity development, and infrastructure management, to stem internal displacement. Based on these findings, key policy recommendations have been formulated for policymakers and national governments to consider, especially with key international forums approaching, including COP28 and the GFMD.

Moving forward, further quantitative research to understand the statistical correlation between climate mitigation policies and migration will be vital, in order to complement the qualitative analyses provided in this paper. Furthermore, while national-level data on climate-induced IDPs is readily available through IDMC, there is an imperative need for comprehensive datasets at the local-level. This will not only allow policymakers to understand the severity of climate change in the context of displacement, particularly in rural agriculturally dependent regions, but will also better inform future climate mitigation policies.

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