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Introduction

"Environmental migrants are 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, 2007:33).

Climate-induced migration can only be classed as a knock-on effect, caused by the never-ending domino effect caused by climate change. It is not the root problem, and global governments should not see it as its own issue but rather a consequence of their continued negligence and ignorance towards the climate crisis. Research shows that 3.6 billion people are already living in areas highly susceptible to climate change. Between 2030 to 2050, climate change is expected to cause approximately 250,000 additional deaths per year, with causes ranging from undernutrition, malaria, diarrhoea and heat stress alone. The direct damage costs to health is estimated to be between US$ 2-4 billion per year by 2030. Currently, over 70% of refugees and displaced people worldwide come from the most climate-vulnerable countries, including Afghanistan, the Democratic Republic of the Congo, Syria and Yemen.

The top 15 countries with the most climate refugees in the world are:
1. Pakistan (8,168,000 internal displacements by disaster)
2. Philippines (5,445,000 internal displacements by disaster)
3. China (3,632,000 internal displacements by disaster)
4. India (2,507,000 internal displacements by disaster)
5. Nigeria (2,437,000 internal displacements by disaster)
6. Bangladesh (1,524,000 internal displacements by disaster)
7. Somalia (1,152,000 internal displacements by disaster)
8. Ethiopia (873,000 internal displacements by disaster)
9. Brazil (708,000 internal displacements by disaster)
10. United States of America (675,000 internal displacements by disaster)
11. South Sudan (596,000 internal displacements by disaster)
12. Democratic Republic of Congo (423,000 internal displacements by disaster)
13. Vietnam (353,000 internal displacements by disaster)
14. Indonesia (308,000 internal displacements by disaster)
15. Colombia (281,000 internal displacements by disaster)

As you can see, all but one of these countries are part of the Global South,the nations of the world which are regarded as having a relatively low level of economic and industrial development, and are typically located to the south of more industrialized nations. All of these 15 nations face catastrophic climactic events at an unprecedented annual rate. Hurricanes, typhoons, landslides, black rain, and many more life threatening events that could so easily annihlate communities.

Climate-induced stressors can lead to gradual or abrupt migration patterns and dynamics depending on their nature. Increasing temperatures and water stress are more likely to drive gradual migration patterns by eroding livelihood options for communities. It is essential to recognise that, depending on the scale of climactic changes and the response capacity at a local level, adaptation strategies and measures may fail to work. Leaving only one other option left, migration. Moving elsewhere in search of a better life away from these climate-induced stressors.

Key Terminology

Migration: The movement of a person or people from one country, locality, place of residence, etc., to settle in another; an instance of this.

Climate Change: Long-term shifts in temperatures and weather patterns.

Environmental 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.

Climate Migration: The movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border

Natural Disaster: A natural event such as a flood, earthquake, or hurricane that causes great damage or loss of life.

Diaspora: The dispersion or spread of a people from their original homeland.

Social Impact: The effect on people and communities that happens as a result of an action or inaction, an activity, project, programme or policy.

Economic Impact: The impact or effect on an economy (of a place, region, or country) of a particular activity, project, or programme.

Climate Stressors: Conditions that make hazards more frequent or severe.

The Global South: The nations of the world which are regarded as having a relatively low level of economic and industrial development, and are typically located to the south of more industrialized nations.

Global Climate Impacts

Climate Impacts in the Global South

In 2022, global greenhouse gas (GHG) emissions reached a record high of approximately 36.6 Gigatons (GT). The top contributors to these emissions were China, the United States, and the European Union, accounting for 19.3 GT, which is about 53% of the global total (China: 11.4 Gt, USA: 5.1 Gt, EU: 2.8 Gt). In contrast, LAC accounted for only about 7% of total GHG emissions. Even though Africa produces the least GHG emissions, it faces the most severe consequences of climate change. On the other hand, Southeast Asia experienced the highest increase in GHG emissions between 1990 and 2010 compared to any other region in the world. Despite the relatively low contributions of most Global South countries to GHG emissions, they are more vulnerable to climate change impacts, including sea-level rise, floods, and rising temperatures. Moreover, these countries generally have lower adaptive capacities compared to their counterparts in the Global North.

Climate Impacts in South Asia

South Asia is highly vulnerable to extreme weather events, including river flooding, sea-level rise, and extreme temperatures, which exacerbate both internal and cross-border migration. These impacts pose significant threats to food supplies, livestock, land, and crops, resulting in severe food crises that can trigger migration. In India, farms are being destroyed annually by severe heatwaves and snowstorms caused by climate change. Likewise, torrential floods are displacing thousands and causing widespread property damage in Pakistan. In 2022, the world's deadliest flood in Pakistan affected 33 million people, with 2.1 million losing their homes. Similarly, the Haor areas of Bangladesh were severely impacted by flash floods, affecting approximately 4.2 million people.

The region's increasing urbanization and economic growth further contribute to migration, placing additional strain on urban sustainability by exacerbating congestion and diverting already scarce resources to support migrants. By 2040, the demand for energy in South Asia is projected to increase by 66%. However, since most urban areas in South Asia are in low-lying coastal areas already affected by sea-level rise due to climate change, meeting the energy needs of these areas becomes increasingly challenging. Consequently, South Asian economies, including India, Sri Lanka, Bangladesh, and the Maldives, could experience a 1.8% reduction in their gross domestic product by 2050, which could rise to 8.8% by 2100. Among these countries, Nepal (2.2%), Bangladesh (2%), and India (1.8%) would be the most affected. Consequently, nearly 800 million people may experience deteriorating living conditions, potentially leading to large-scale migration.

Climate Impacts in the MENA Region

In the MENA region, climate change has already led to water scarcity, desertification, sea-level rise, and loss of biodiversity, resulting in soil degradation, food insecurity, and salt intrusion into aquifers, which have triggered the displacement of people. The Gulf Cooperation Council region currently hosts around 30 million cross-country migrants who have primarily moved due to economic hardships and work opportunities in the energy and infrastructure sectors. However, as climate change intensifies due to the increasing use of fossil fuels, it is anticipated that migration into the oil-rich Gulf region will increase. It

is important to note that projections indicate the region could become nearly uninhabitable by 2050 due to the severe impacts of rising temperatures. Saudi desert areas, for instance, are expected to face the most severe effects of global warming, including prolonged heatwaves lasting for months. Moreover, temperatures in the Middle East are projected to rise to 50 °C by 2100, posing significant health and livelihood challenges and putting 400 million individuals at risk of heatwave exposure. These compounding challenges are likely to lead to political and social strains.

Climate Impacts in Sub-Saharan Africa

In Sub-Saharan Africa, densely populated coastal cities in countries like Nigeria, Tanzania, and Mozambique are witnessing seasonal sea level rises, resulting in floods that affect many people. In West Africa, countries such as Burkina Faso, Niger, Gambia, Mali, Sudan, and Senegal are experiencing droughts caused by rising temperatures. Severe droughts in Madagascar have also forced many people to leave their homes in search of more habitable lands. Despite contributing the least to GHG emissions, Africa remains the most climate-vulnerable region globally. This vulnerability is particularly heightened because a significant portion of the population relies on rainfed agricultural systems for their livelihoods5. As these agricultural systems become increasingly unsustainable, people will be compelled to migrate. Models predict that by 2050, between 28.3 and 71.1 million people will be forced to migrate within the continent. Many of these migrants will gravitate towards urban informal settlements, where the associated safety and health risks are growing. While the link between climate change and conflict is complex, the potential for resource competition to escalate into violence and conflict is high in Africa. Furthermore, water scarcity can exacerbate ongoing conflicts and increase the vulnerability of people displaced by conflict in the region.

Climate Impacts on the Pacific Islands

The Pacific Island region is often considered the frontline of climate change due to the severity of its predicted impacts. Despite being referred to as “small” island nations, the Pacific Islands, spanning 25,000 islands, encompass approximately fifteen percent of the Earth’s surface. This region faces compounding challenges from rising sea levels, coastal flooding, erosion, and water scarcity. In Kiribati, for example, 94% of households reported being affected by natural hazards in the past decade. While migration from many Pacific Islands is inevitable in the event of complete inundation due to sea level rise, there are people living in the region who are unable to migrate due to financial constraints, raising concerns about those who may be trapped in unsafe situations. Pacific Island leaders have advocated for international agreements that promote safe migration for those affected by climate change, emphasizing the importance of “Migration with Dignity“. Planned relocation is often discussed as a potential solution to the loss of habitable land in the Pacific Islands. However, vulnerable populations are likely to face compounded risks rather than alleviation through such processes. While international migration schemes may offer a safer future for Pacific Islanders, the spiritual connection and sense of place they will lose by leaving their land cannot be regained.

Climate Impacts in Latin America and the Carribean

Latin American and the Caribbean states are highly vulnerable to climate impacts, including mega-droughts, heatwaves, melting glaciers, and torrential rains and floods. Glaciers in the Andes region have lost between thirty and fifty percent of their area in just forty years, leading to water scarcity. Approximately 27% of the population in the region lives along coastlines, where sea levels rise faster than the global average. Continued deforestation of the Amazon rainforest threatens local and global climate adaptation and mitigation efforts. Prolonged droughts have resulted in severe food insecurity and migration in several countries, such as Mexico, Ecuador, Guatemala, El Salvador, Honduras, and Nicaragua. Models predict that between 5.8 and 10.6 million people will be internally displaced within the region by 2050. Already, documented cases of out-migration from Central America to the USA due to escalating agricultural stress indicate that regional migration patterns are likely to intensify further as the impacts of climate change worsen.

The Impact of specific Climate-Stressors

Increasing Temperatures

Increasing temperatures, which feature 96 times in the Global South in 2021, are positively associated with migration. For example, a 1 oC temperature increase leads to a 1.9% increase in global migration. Over the past 15 years, the Caribbean and Latin America have experienced average temperature increases ranging from 0.5 to 1 oC, resulting in glacial melting in the tropical region of the Andes Mountains. The combination of elevated temperatures and increased floods has significantly impacted many cities in the Global South due to global warming. Mountainous countries, such as Bolivia, Peru, Ecuador, and Colombia, face significant challenges as their drinking water, agricultural production, and hydroelectric power depend on glaciers. It is projected that further temperature increases between 1oC and 6oC will exacerbate these issues, leading to increased transboundary migration.

In the Sahel region of Africa, rising temperatures caused by climate change have resulted in the shrinking of Lake Chad over the past five decades, compelling people in Nigeria, Niger, Chad, and Cameroon who rely on its water to move to urban areas. In Southeast Asia, migration due to increasing temperatures is mainly observed in Vietnam, Myanmar, Thailand, and the Philippines. The decision to migrate to these areas is influenced by factors such as social cohesion, government support to communities, level of economic development, migration barriers, and political stability. The Arabian Gulf experiences continuous temperature increases at a faster rate than the global average, negatively impacting health, labor, and agricultural production. Consequently, people migrate to nearby urban areas in search of livelihood opportunities.

Water Stress and Drought

Water stress occurs when the demand for water exceeds the available quantity within a given period or when its poor quality restricts its use. Historically, water has played a crucial role in determining the location of human settlements. In the contemporary world, as climate change continues to accelerate, global water crises are increasing, with 103 water scarcity and drought events occurring in the Global South in 2021. Consequently, migration from affected regions, particularly the Global South, is becoming more frequent. Landlocked countries and those located in arid and semi-arid lands are the most impacted by water stress. For example, Mongolia, Tajikistan, Uzbekistan, Kazakhstan, and Kyrgyzstan are situated within the Gobi Desert zone; Zambia, Zimbabwe, and parts of Botswana are affected by the Kalahari Desert; Mali, Niger, Chad, and Burkina Faso are located within the Sahel region; and Chile and Peru are in proximity to the Atacama Desert. These countries experience internal and external migrations due to water stress. However, most of these migrations are internal, as people move to more habitable areas within their countries due to restrictions on external migration in some destination countries.

Migration driven by water stress tends to occur more gradually in rural areas than in urban areas. Additionally, such migrations are a result of insufficient resources to cope with reduced agricultural productivity, income, and subsistence capacity. Some researchers agree that migration resulting from water scarcity, although often over short distances, can lead to conflicts. In high-risk areas such as coastal

regions prone to sea-level rise, large populations in Asia face water scarcity and other challenges during disasters, prompting migration. Moreover, in South Asia, migration is driven by growing social and economic disparities fueled by climate change in water-stress areas.

An emblematic example of the impact of climate change on water stress and migration can be seen in the semi-arid regions of northeastern Brazil, where subsistence farmers rely mainly on agriculture. As water scarcity intensifies, resulting in nearly an 80% loss in agricultural production, many people migrate to the south, where more favorable conditions exist. Similarly, in Potosi, Bolivia, households with farmlands over 3,500 m2 resort to seasonal migration, while those with between 1,650 and 3,000 m2 tend to move permanently when faced with water stress challenges. Many people from Guatemala, El Salvador, and Honduras, who have been affected by changes in precipitation due to climate change, have moved to the United States in search of employment and other opportunities. The Tonga people of Southern Zambia and the Maasai people of Kenya also engage in annual migration due to water stress, seeking water and pasture for their livestock.

Similarly, drought is common in most African nations, especially those within North Africa and the Sahel regions, affecting about one-third of the African population and leaving them with limited food and water for their families and livestock. For example, drought and insufficient rainfall in Western Sahara, Ghana, Senegal, and Burkina Faso have forced people to frequently migrate to urban areas. Additionally, sociodemographic dynamics, such as gender, sex, age, migration status, and household size, also influence migration decisions. In Asia, for example, heads of households are more likely to move than other household members to provide for their families. Families in the Bolivian and Ecuadorian Andes, who are primarily unemployed and heavily dependent on agriculture, have been severely affected by drought, compelling them to move to other rural areas or neighboring cities.

Moreover, a 10% reduction in agricultural production due to droughts has resulted in a 2% growth in migration from LAC to the USA. Furthermore, recent droughts in the Middle East have further strained already scarce water resources, leading to low wheat production, which sustains most families in the region, and triggering migration to cities. Recurrent droughts caused by climate change also impact South Asia, posing threats to people's livelihoods and forcing them to decide whether to migrate as a family or adapt to changing environmental conditions.

Floods and Sea-Level Rise

Floods and sea-level rise occurred 97 and 126 times, respectively, in the Global South in 202. These events are primarily associated with increased precipitation and the melting of mountains and polar glaciers, including those in the Andes of South America, Papua in New Guinea, and Puncak Jaya in Indonesia, Africa's Kilimanjaro, Kenya, and Ruwenzori Mountains, and Himalayan Nepal, India, Bhutan, China, Afghanistan, and Pakistan. Flooding is a major consequence of climate change, forcing people to flee flood-prone areas to avoid loss of life and property damage.

In Africa, Lagos and Accra are prone to recurrent flooding during heavy rains. Likewise, Nairobi is also susceptible to flooding in the rainy season, often leaving many people homeless, especially in vulnerable

slum areas where water-borne diseases and malaria are prevalent. In South Asia, floods caused by climate change expose people to diseases like dengue fever, malaria, and cholera. These disasters are a result of climate change and inadequate urban planning, which lead to flooding after prolonged downpours. Those affected are often forced to endure recurrent floods as they lack alternative places to go, other than returning to their rural homes that lack jobs and basic infrastructure. In Saudi Arabia, for instance, floods in the past decade, particularly in Jeddah coastal city, caused by storm surges, have resulted in casualties, property damage, and significant displacements. Torrential rains affecting cities in India, Pakistan, Nepal, and Bangladesh lead to flooding, affecting over 46 million individuals annually. Displacement is a common outcome in these countries, although many people have developed resilience due to the short-term nature of these floods.

Rising sea levels, like floods, are a significant driver of migration for coastal populations. It is estimated that coastal risks will increase over the 21st century due to rising sea levels, disrupting people's lives, cultural and natural heritage, livelihoods, ecosystems, food security, and infrastructure. Even if global warming were to cease, these risks would escalate, compounded by extreme sea-level rise. Coastal wetlands are also at high risk of sea-level rise, resulting in significant losses before 2100. However, in the case of rising sea levels, planned migration over a more extended period becomes possible.

Worldwide, about 450 million individuals are living at low elevations (below 20 m) and near coastlines (within 20 km). Regions most vulnerable to the adverse consequences of sea-level rise include LAC, with a significant portion of the land being used for agriculture. A 1-meter rise in sea level would affect 5–7% of the populations in the Bahamas, Guyana, and Suriname. The Ganges-Brahmaputra-Meghna delta in Bangladesh is also one of the most affected areas, leading to great displacements of people. In areas where agricultural lands have been submerged, people have been forced to relocate due to food scarcity, salinization, and reduced soil fertility. It is expected that by the end of this century, sea levels will rise by between 30 and 150 cm in the Southern Hemisphere, resulting in the submergence of most of the Maldives, as well as cities like Bangkok and Ho Chi Minh.

Timeline of Past International Actions

2001	Prepaartion and implementation of National Adaptation Programmes of Action (NAPAs) begins
October 2005	Global Commission on International Migration delivers final report
2006	Global Migration Group established
December 2008	Migration first mentioned in assembly documents, Poznań COP14
2009	The Kampala Convention
December 2010	Cancun COP16 establishes Cancun Adaptation Framework, Advisory Group on Climate Change and Migration, and National Adaptation Plans process
October 2012	Nansen Initiative launched
March 2015	Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR) adopted
September 2015	2030 Agenda for Sustainable Development (SDGs) adopted
October 2015	Endorsement of the Protection Agenda
November 2015	Intended Nationallity Determined Contributions (INDCs) submitted ahead of COP21
December 2015	Task Force on displacement established in the Paris Agreement, Paris COP21
May 2016	Platform on Disaster Displacement Launched
September 2016	Adoption of the New York Declaration for Refugees and Migrants
October 2016	New Urban Agenda Adopted

Potential Solutions

Firstly, it is essential to identify localities at risk of depopulation to effectively coordinate migration and relocation. Potential relocation areas for displaced individuals must be extensively assessed to ensure they can sustain increased populations without further hardships. Countries must share the responsibility of planning, identifying suitable relocation areas, and providing support to relocated individuals in host societies. Additionally, collaboration between origin and destination countries is crucial for planning future climate change-induced migration in a way that benefits both nations. The KMD, for instance, has enjoined East African countries to enhance cooperation, facilitate capacity building, and encourage multi-partner financing to prevent, minimize, and address the displacement of vulnerable communities caused by climate change. Similar measures can be implemented across the entire Global South to help address the challenges of climate migration.

Also, due to the limited capacity of Global South countries to address climate change impacts and the limited support from developed countries in assisting them in coping with these adverse effects, despite the obligations set forth by the Paris Agreement, public-private partnerships, philanthropic donors, and international organizations should establish and provide increased support to people living in areas prone to sea-level rise, flooding, and drought. This support should also extend to those who have limited financial and adaptive resources to avert prolonged displacement and migration. However, developing countries must still take prompt actions and measures to combat climate change and its effects, and consider climate-induced migration a critical problem that must be addressed immediately within their countries and regions.

Finally, the development and implementation of measures such as long-term planning, effective strategies for absorption of shocks and rapid recovery, and innovative adaptation solutions can contribute to enhancing the resilience of communities and avoiding the negative impacts of migration. Strengthening planning, absorption, recovery, and adaptation capacities requires concerted efforts across different sectors. These efforts should include upgrading infrastructure systems and increasing their resilience, improving household economic capacities, enhancing the efficiency of resource consumption and production, engaging local communities in planning and decision-making processes, utilizing modeling and scenario-making techniques for planning under different future scenarios, and employing smart solutions such as early warning systems to facilitate better response and absorption capacities. However, implementing these measures and strategies may present challenges, as Global South countries and communities may struggle to afford the adaptation costs, and have limited access to skilled human resources and necessary technologies. Therefore, cooperation with countries in the Global North is essential, including financial support and technology transfer. Such cooperation can strengthen partnerships and contribute to achieving global goals (SDG 17). Furthermore, considering the potential implications of large-scale migration for security, it can promote peace and justice (SDG 16). In addition to support from Global North countries, the assistance of donors and international organizations will be crucial.

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