

## The Influence of Climate Change on Migration Patterns, Displacement, and Food Insecurity in KwaZulu-Natal

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### Abstract

*Climate change, displacement, migration, and food insecurity have been among the most pressing and interconnected challenges that Africa has faced over the past few years. Even South Africa itself has been on the receiving end of the aggravating effects of climate variability, in the form of intense weather patterns, including brutal floods and, at times, snow. These climatic shocks not only pose a threat to livelihoods and infrastructure but also lead to internal displacement and heightened food insecurity. South Africa's hunger, rising food insecurity, poverty, and socio-economic issues received a significant unintended natural cause in this tragedy, without preparedness for adaptation, resilience, and development. Increased disaster preparedness, climate adaptation, and mitigation efforts are needed for the South African scenario. The frequency and magnitude of these events underscore the population's susceptibility and the importance of collective action in developing resilience in South Africa. The response to such intricacies requires concerted efforts in coping with both environmental and socioeconomic determinants. The study uses secondary data analysis to explore the research questions and argues that climate change is accelerating human displacement, internal migration, and food insecurity. This investigation concludes that supportive policy strategies should be implemented to assist vulnerable communities, as recurring floods continue to pose a significant challenge during the rainy seasons in the KwaZulu-Natal and Eastern Cape provinces. Furthermore, it provides recommendations to policymakers on climate change adaptation and strengthening resilience efforts, ensuring better preparedness for future disasters.*

### Keywords

Displacement, Climate change, Food insecurity, Internal migration, and Vulnerability.

### Introduction

Climate change factors, such as storms, floods, and unusual snowfall, have a significant impact on the most vulnerable communities, with an intense and life-threatening effect on the human population (Agboola, Dinbabo, Sithole, 2025; Mazani & Dinbabo, 2025; Kanyayi et al., 2025). Climate adaptation, displacement, migration, and food security are among the most rapidly evolving phenomena in recent years in Africa, with less attention being paid to these issues in Southern Africa, particularly in South Africa. These environmental effects, caused by climate change, include high temperatures, rising sea levels, and recurring floods. They have a significant impact on the livelihoods, both on land and below water, with extreme adverse effects on the sustainable and resilient human population (WHO, 2023). The intense and disastrous climate ills have a significant impact on exacerbating key socioeconomic challenges globally, continentally, and locally in South Africa, with the potential to degrade state well-being (Stats SA, 2023; Johnston et al., 2024). Sub-Saharan African countries are well known for having a population below the international poverty line, facing extreme

socioeconomic challenges such as malnutrition, food insecurity, and vulnerability in disaster management (Adenuga et al., 2021; Kohnert, 2025). The vulnerability has made it quite challenging to adapt and be resilient to climate change factors due to a lack of development, extreme poverty, and low standards of living. According to Mamba et al. (2025), these extreme experiences of life-threatening climate change circumstances have frequently occurred in Southern African countries, such as Zimbabwe, Mozambique, and South Africa, resulting in significant infrastructure damage, property loss, and reduced food production.

Consequently, these are one of the significant factors driving South African internal migration and population displacement in search of better climate-adaptable and resilient regions with adequate standards of living. Therefore, this study aims to establish evidence-based research for a critical review of the standard, explicit connections between climate change, displacement, migration, and food security, to promote evidence-based policy effectiveness.

Internal migration, displacement, and food security are among the key consequences of climate change in many underdeveloped areas, due to the eruption of heavy floods, unusual snowfall, and drought (Morales-Muñoz et al, 2020; Dinbabo & Mazani, 2025; Mazani & Dinbabo, 2025; Sithole et al, 2022). The most vulnerable communities are seasonal victims of such wavering crisis with intense, inhumane, escalating repercussions. Literature indicates a relatively increasing interest in the patterns and trends of climate change and international migration, but with less focus compared to internal migration relations with climate change (King, 2020; Sithole & Dinbabo, 2016). The intense internal dynamics of human mobility have been overlooked due to a broader global perspective on climate change and international migration trends. It is therefore unfair to generalise such factors within a broader scope of human mobility and climate change discourse, with a less critical review of the internal dynamics involved. It is through an overview and research of internal migration and climate change dynamics that amicable, effective policy programs designated for internal migration can be formed and developed. The key dynamics of climate change and migration in developed, developing, and underdeveloped countries should be addressed in a manner that is conducive and suitable, and well-received by all levels of government and community-based programs, for a clinically practical research application. Hence, this article aligns with the extensive body of literature, providing a critical overview of relevant and updated secondary data to understand the past and present evolution of climate change and migration from global, continental, and local perspectives.

Furthermore, the extreme investigation of disasters caused by climate change in KZN has caused lots of trauma and fear to the victims and influenced unexpected migration trends and displacement. The unusual, unplanned human mobility also presents numerous socioeconomic challenges from all spheres of government, NGOs, and local stakeholders. These are critical issues that receive less attention in most research reviews with a limited internal migration perspective (King, 2020; Moyo et al., 2021). Therefore, this knowledge gap needs to be critically examined for a clear understanding and a deeper understanding of the relationship between climate change and migration, particularly internal migration. The key findings of these trends and patterns enlighten relevant stakeholders, including government agencies and policymakers, with evidence-based policies. Moreover, the study employs an extensive data collection approach to investigate areas for further improvement, providing a critical overview of credible sources. Babapoorkamani and Ricci (2025) suggested that proactive mechanisms, active climate awareness, and modified research development can enhance the knowledge gap on evidence-based climate change programs and effective policies. Hence, this paper presents a critical review and analysis of existing data and relevant literature, focusing on the key factors of climate change, migration, displacement, and food

security. The findings should enhance the sustainability and resilience of vulnerable communities through intense, proactive, and amicable programs, which are supported by adequate policies.

## **Problem Statement**

Recently, the country's socioeconomic challenges, such as poverty, hunger, and escalating food insecurity, were exacerbated by a significant and unexpected natural disaster caused by the climate change crisis in the KwaZulu-Natal province. Since the eruption of the flood crisis, thousands of people have been displaced and migrated to neighbouring regions and provinces, such as the Eastern Cape and Gauteng, in search of better living conditions (Ngcamu, 2022; Mudefi, 2023). The Influence of climate change on migration patterns, displacement, and food insecurity has drawn attention and sparked substantial scholarly debates (see McMichael, 2013; UN, 2019; Chazalnoël & Randall, 2022; Kwanhi et al., 2024).

Climate change has arguably been one of the most pressing socioeconomic challenges of the current generation (Chomsky, 2019; Bryan, 2020; Dinbabo & Mazani, 2025; Mazani & Dinbabo, 2025; WHO, 2023). This study argues that ruthless climate change, displacement, and food insecurity are prevalent in poor and vulnerable communities without adaptation, resilience, and proactive sustainable measures. The pushing factors of migration and displacement hit the poor and vulnerable communities the hardest, and the majority of the population is subjected to a lifetime of trauma, moving from one place to another. Hence, it is crucial to invest in more sustainable and resilient programs, such as infrastructure development, emergency agencies, and effective disaster management policies within the government. Climate change has a substantial negative impact on forced migration and displacement, with massive death tolls, neglected victims without shelter, food and basic services (Gemenne et al, 2022; Kanyayi et al., 2025; Poderiagina et al., 2024).

Notably, the larger body of literature has paid more attention to international migration with less focus on how critical these focuses are in internal migration trends and patterns, which have hindered socioeconomic stability in both the original place and the destination (Bell & Edwards, 2013; Moyo et al, 2021; Sithole et al., 2022). According to Bell and Edwards (2013), "Compared with other areas of demography, particularly fertility and mortality, there is no single repository of data capturing mobility within countries, and comparisons are hindered by widespread variation in data collection practices" (Bell & Edwards, 2013, p. 1). It is precisely these gaps that have motivated the researcher to investigate the influence of climate change on migration patterns, displacement, and food insecurity in the South African province of KwaZulu-Natal, utilising a comprehensive analysis of secondary data.

This study examines how climate change drives internal migration in South Africa as communities relocate in response to increasingly harsh environmental conditions, while also assessing the extent to which climate-related factors contribute to food insecurity in vulnerable areas. It further examines the social ills that emerge from extreme events such as floods and unusual snowfall, including heightened poverty, displacement, and health risks. Additionally, it investigates the sustainable measures adopted to support climate adaptation, strengthen resilience, and enhance proactive emergency responses. The primary purpose of this research paper is to contribute to the understanding of domestic/internal migration, displacement, and food insecurity by critically analysing the most effective, adaptable, and sustainable measures to enhance the livelihoods of victims in vulnerable communities of KwaZulu-Natal.

## **Research Questions**

- What is the influence of climate change on internal migration to other regions in South Africa?
- To what extent did climate change factors impact the food security in the vulnerable communities?
- What are the key social ills brought about by the result of floods and unusual snow in the vulnerable communities?
- What are sustainable measures put in place for climate adaptation, resilience and proactive emergency programs?
- What are the key stakeholders' roles in implementing and monitoring amicable, effective policy programs?

## **Methodology**

The study employed secondary data analysis, which involved examining existing information, such as surveys, administrative records, academic publications, reports, and datasets, to answer the research questions or gain more profound insights (Dinbabo, 2011; Johnston, 2014). The critical review of literature highlighted the key fundamental developments and significant limitations that contribute to climate change and irregular migration. The study further discusses the impact of the climate crisis and the best amicable adaptation, resilient, and sustainable measures to enhance the livelihoods of victims in vulnerable communities. These amicable, effective programs are based on the existing grievances of displacement and forced migration reported by the public through various reports and publications, none of which contain primary data. Based on this methodological approach, this study provides a comprehensive and holistic overview of key indicators contributing to socioeconomic challenges, including food insecurity, displacement, vulnerability, and loss of life. Equally so, the approach also holistically highlights the global and continental perspectives on social ills of this nature, imposing a blueprint for internal migration and amicable, evidence-based strategies.

## ***Research Paradigm***

The research paradigm in the context of research comprises a philosophical framework, beliefs, and ideas that interpret and consolidate the research worldview based on the research process (Kaushik & Walsh, 2019). It is the fundamental key guide that determines the research process and how it will be conducted, consolidating the research topic, aim, objectives, questions, methodology, and data analysis (Adeoye, 2024). Most researchers believe that suitable scientific research is grounded in a relevant, selected fundamental philosophical overview that substantiates the nature of the research (Bogdan & Biklen, 2003; Park et al., 2020; Tenny et al., 2022). It is based on the positivist ontology, which posits that objective reality exists independently of the world's perceived opinions (Bogdan & Biklen, 2003). Hence, quantitative research is perceived as the most suitable methodology based on the positivist paradigm, with the ability to generalise and form values of research concepts (Tenny et al., 2022; Adeoye, 2024). For this study, positivist paradigm components have been adopted to synthesise the theories and comprehensive ideas of the research composition process. It is through the positivist paradigm that the study has enabled the use of secondary data and quantitative data analysis for a comprehensive interpretation of the connotation between climate change factors, displacement, migration and food insecurity. Climate change factors encompass a range of societal challenges that have a significant impact on migration and

displacement, particularly in underdeveloped, vulnerable communities, such as rural and township areas in KwaZulu-Natal. Hence, the positivist paradigm approach and quantitative data analysis are the most suitable methods for conducting this study, as the objective is to establish the cause-and-effect relationship between climate change factors and migration. According to Davies and Fisher (2018), the paradigm is a quantitative research worldview that bases opinions on facts, reality, and measurable static phenomena, such as climate change, which serve as push factors leading to displacement and migration.

### ***Research Design***

The research design forms the key cornerstone of this study, serving as a definitive reference for the research structure, which encompasses data collection, validity, reliability, and data analysis. Singh (2025) argues that a research design consists of an overall approach and outlines a methodological structure based on data collection and analysis, providing a clear outline of research questions and the research study's hypothesis. A well-researched design for this study has been selected due to its ability to clearly define the key research questions, utilise clear data collection tools, and provide a suitable and convincing method framework for data analysis and interpretation of results. A detailed, well-planned mixed-methods qualitative and quantitative research approach has been adopted to clearly establish the synthesis of the study's research problem, aim, objectives, significance, and research paradigm. This study employs a qualitative and quantitative research approach to establish a detailed analysis of the influence of climate change factors on domestic/internal migration, displacement, and food insecurity, utilising secondary data analysis. The qualitative secondary data utilised government reports, newspapers, and academic publications, which highlight the key fundamental developments related to the influence of climate change on migration patterns, displacement, and food insecurity in the South African province of KwaZulu-Natal. The quantitative research approach is the most reliable method for testing theories, such as the positivist paradigm, which forms and influences the research paradigm context of this study (Bryman, 2016). This study focuses on specific climate change factors that directly impact migration, displacement, and food insecurity. It is, therefore, a quantitative research approach that is considered the most direct, specific, and comprehensive methodology for consolidating concrete research conclusions (Ghanad, 2023). The study enables the identification of the key logic behind the number of trends, patterns, and driving factors that influence migration, using qualitative methods to calculate logical facts related to the identified research problem directly.

### ***Population and Sample/Study Group/Participants***

The key target population and sample of the study consist of the KwaZulu-Natal population in the Durban regional area, where most victims of floods and heavy rain reside. The KwaZulu-Natal province in South Africa has the second-largest population, after Gauteng province, with 12.3 million people (Stats SA, 2024). It is among South Africa's poorest provinces, characterised by extensive underdeveloped rural areas, inadequate infrastructure, weak transport systems, emerging small-scale agriculture, and a range of persistent socio-economic challenges (Maluleke, 2021). Its vulnerability to poor infrastructure and less developed mechanisms for climate adaptation and resilience has been exposed several times by heavy floods and unusual snowfall in recent years. The April 2022 floods caused billions of rand in damage to infrastructure, resulting in the loss of more than 450 lives and the displacement of thousands of people without homes and land for farming (Payne, 2022). The province has historically been prone to floods, similar to the Eastern Cape and Gauteng provinces. However, 2022 marks the biggest climate change highlights in the history of South Africa. Furthermore, food crops, manufacturing industries, warehouses, and food

transportation were severely affected, resulting in harsh conditions of limited access to food and hunger in most affected areas (Payne, 2022; FoodBev, 2023; Mudefi, 2023). Since then, most people have relocated to better living conditions, and this kind of human displacement has increased from 40,000 people since April 2022 in KZN (Mudefi, 2023). This study seeks to analyse the impact of climate change and heavy floods in KZN in recent years, as well as the escalating human displacement, internal migration, and food insecurity resulting from extensive damage in the KwaZulu-Natal province.

### ***Data Collection Tools/Instruments***

This research paper investigates the influence of climate change on migration patterns, displacement, and food insecurity in the South African province of KwaZulu-Natal, utilising a comprehensive analysis of secondary data. The study, based on secondary data and quantitative analysis tools, has been adopted to consolidate data from existing knowledge, government reports, newspapers, and accredited academic reports that clearly report on climate change factors and internal migration in KZN. It is through quantitative study analysis that the key purpose of this research paper and its findings have been synthesised, contributing to the understanding of domestic/internal migration, displacement, and food insecurity. Qualitative analysis guides the critical examination of the most amicable, resilient, and sustainable measures to enhance the livelihoods of victims in vulnerable communities of KwaZulu-Natal. Through a quantitative research approach, the study has conducted a detailed analysis of the influence of climate change factors on domestic/internal migration, displacement, and food insecurity, utilising secondary data analysis.

### ***Data Analysis***

The desktop data analysis approach has been used to evaluate the existing secondary data for this study. Quantitative data analysis was conducted using the Statistical Package for the Social Sciences (SPSS) version 28 for the definition, evaluation, and reliability of the data. The data analysis process involves inspecting, verifying, modelling, and transforming pieces of information into comprehensive and valuable insights (Tenny et al., 2022). It is through data analysis that scientific research studies of this nature can critically transform the information gathered into an informative conclusion. Based on the key purpose of this study, systematic descriptive statistics, illustrations, and evaluations of key trends and patterns of climate change factors that directly influence migration, displacement, and food insecurity in KZN were adopted in conjunction with amicable policy programs.

### ***Ethical Consideration***

Ethical considerations form a critical and valuable set of principles in this research study, and the study adheres to the criteria of publication ethics. This study utilised secondary data, which adhered to ethical standards, including news reports, government reports, and scholarly databases that were relevant, reliable, and acknowledged. The government report from the Office of the Presidency (2022), the Durban Climate Change Strategy (2022), and the International Federation of the Red Cross (2025) comprise large datasets for this study. The quantitative, systematic descriptive statistics, illustrations, and evaluations of key trends and patterns of climate change factors that directly influence migration, displacement, and food insecurity were adopted in amicable policy programs. This has been presented through the description of tables, figures, and graphs, providing a clear overview of the key factors influenced by climate change in KZN during the April 2022 heavy rains and floods.

### **Presentation of Results**

The presentation of data includes descriptions of tables, figures, and graphs, providing a clear overview of the key factors influenced by climate change in KZN, including human mobility, displacement, and food insecurity. The human mobility discourse has evolved over several decades, with key factors including economic, political, cultural, social, and environmental factors (Migali et al., 2018; De Haas et al., 2019). The summary of the Table shows the impact of floods due to heavy rainfall in KZN municipalities, reported by the Office of the Presidency in April 2022 and taken from the International Federation of Red Cross in 2025. The impact of climate change has destroyed houses, increased homelessness, injuries, missing people, and sudden death (The Presidency, 2022). The environmental factor encompasses climate change and other natural disasters; in this study, the data analysis focuses solely on the influence of climate change. The impact of climate change has destroyed houses, increased homelessness, injuries, missing people, and sudden death (The Presidency, 2022). The figure below provides a clear view of South Africa, the KwaZulu-Natal province, and Durban (Ethekwini municipality), where the worst heavy rainfall and extensive flooding caused significant damage.

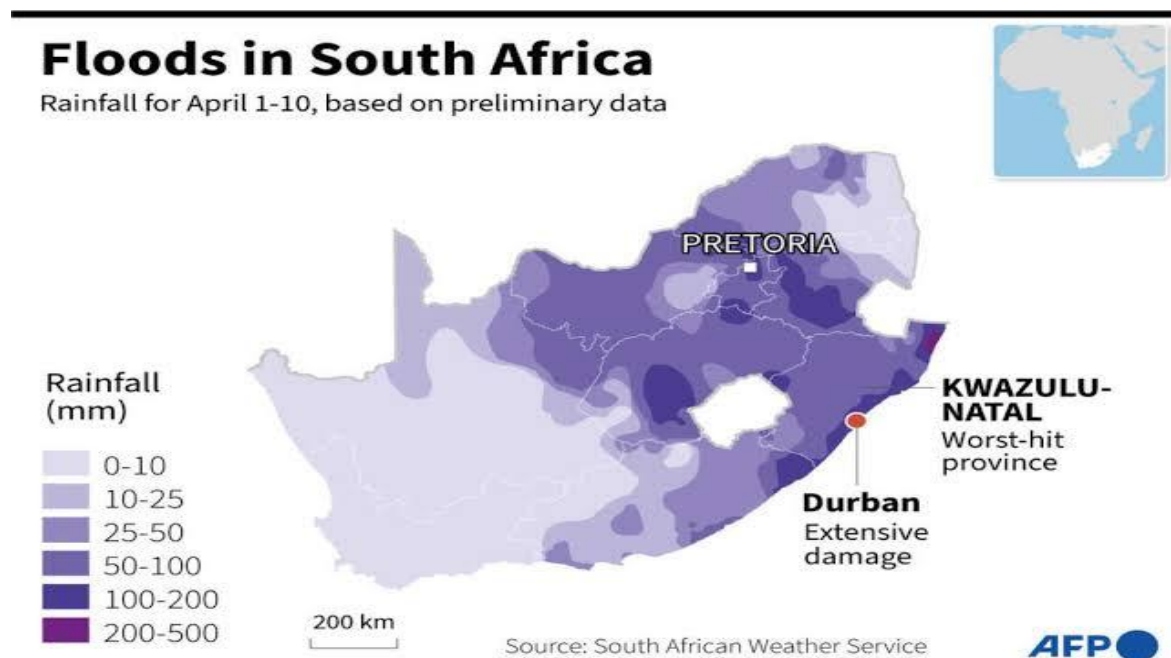


Figure 1 South Africa shows the worst and damaged areas

Source: South African Weather Service (April 2022).

According to the South African Weather Service, the KwaZulu-Natal province has experienced heavy rainfall lately, but April 2022 was more severe than previous experiences (South African Weather Service, 2022; Grab & Nash, 2024). The flood disaster claimed a total of 456 persons in KZN, and the recorded number of missing people went up to 88 (International Federation of Red Cross, 2025). Apart from that, according to Hope M. Chipungu (2024), the heavy rainfall and floods displaced more than 40,000 people, destroyed over 12,000 houses, and left 45,000 people temporarily unemployed. Furthermore, the extreme damage was primarily to the infrastructure, including roads, railways, and other public facilities, as well as 600 damaged schools and 84 healthcare facilities (Presidential Climate Commission Working Paper, 2023). The damage was extremely intense, affecting economic activities, agricultural production for food security, and disrupting basic services such as water and sanitation, electricity supply and distribution, and food supply. Over eleven municipalities were affected by the heavy floods in the KwaZulu-Natal province, and the table below shows which municipalities and the impact per district.

**Table 1: Cumulative summary of flood impacts per district. Source: Taken from the International Federation of Red Cross in 2025.**

Municipalities	Households Affected	Houses Destroyed		Homeless	People Affected	Fatalities	Injuries	Missing Person
		Totally Destroyed	Partially Damaged					
<b>uMkhanyakude</b>	86	78	08	10	430	00	01	00
<b>uThukela</b>	2,180	1,692	1,731	221	10,900	02	13	00
<b>uMzinyathi</b>	206	153	124	21	1,030	03	01	02
<b>UMgungundlovu</b>	687	242	796	97	3,435	02	04	08
<b>Zululand</b>	360	171	264	00	1,800	00	00	00
<b>EThekwini</b>	17,158	3,000	7,200	5,423	85,790	404	01	71
<b>Ilembe</b>	3,000	1,442	1,406	399	15,000	31	21	00
<b>Harry Gwala</b>	650	297	252	250	3,250	03	02	00
<b>King Cetshwayo</b>	755	349	688	172	3,775	04	03	06
<b>UGu</b>	1,769	1,049	910	288	8,845	07	04	01
<b>Amajuba</b>	218	111	157	14	1,090	00	00	00
<b>TOTAL</b>	<b>27,069</b>	<b>8,584</b>	<b>13,536</b>	<b>6,895</b>	<b>135,345</b>	<b>456</b>	<b>50</b>	<b>88</b>

The Ethekwini municipality has been the most affected district in the province, with 404 fatalities and 71 missing people, 5423 homeless and more than 17 thousand affected households. These figures exclude the agricultural sector, transport, water treatment, electrical energy supply, and manufacturing industries, where most economic activities were highly affected by an estimated R10 billion costs (FoodBev, 2023). These are key sectors where most people in KZN depend on for economic development, employment, and services, which cost R17 billion and result in a 1.8% annual loss of the city's Gross Domestic Product (GDP) (Presidential Climate Commission Working Paper, 2023). The city of Durban, within the eThekwini municipality, has estimated damages of more than R10 billion, comprising key facilities such as agriculture (R12.6 million), the manufacturing sector (R431 million), infrastructure construction (R18 million), and wholesale (R46 million), among others. These are key facilities that have significantly impacted food security in terms of accessibility and consumption, with a substantial effect on food prices during this period (Durban Climate Change Strategy, 2022; Udo et al., 2022; FoodBev, 2023). The table below shows the impact of the KZN floods on the food manufacturing sector:

**Table 2: The Impact of Floods on the Food Manufacturing Sector. Source: Taken from FoodBev, 2023.**

	No impact	Low impact	Moderate impact	Moderate to Severe	Severe
<b>Damages to premises and business equipment</b>	49%	4%	26%	10%	11%
<b>Damaged or lost stock</b>	30%	23%	12%	15%	20%
<b>Loss of income, reduced profit</b>	14%	22%	23%	14%	27%
<b>Logistics in and out delayed</b>	6%	11%	11%	40%	32%
<b>Forced reduction of the number of employees</b>	43%	27%	10%	8%	11%
<b>Loss of power, telecommunications, and water</b>	47%	2%	15%	12%	24%

McMichael (2013) stipulates that food insecurity encompasses numerous risk factors, from production to transportation; however, climate change is the central threat to food production and security. Threats such as recurring climate change, unusual food production patterns, and inaccessibility have contributed significantly to human migration (McMichael, 2013; Adjei & Oyebamiji, 2024). Furthermore, according to the FoodBev SETA (2023), the food manufacturing sector suffered significant losses due to the April 2022 floods in KZN. These include damages to business equipment, loss of stock, and disruptions to water and power supply, as well as logistics delays, resulting in a significant forced reduction of employees. The overall disruption significantly impacted the entire country's economy, as the province of KZN is a key producer and manufacturing hub in South Africa, with products such as sugar, poultry, fruit, and milk (FoodBev, 2023). These damages were estimated to be R7 billion, and over 826 food businesses were affected in the production, manufacturing and trade industry. Furthermore, the impact of food insecurity in Ethekwini municipality due to floods has had a significant impact on forced internal migration and displacement of affected individuals in such areas (Amusan et al., 2023).

The second significant challenge caused by floods is the damage to healthcare facilities that supply and assist people with medical care, especially those with chronic illnesses. These are vulnerable people who depend entirely on these health facilities, and some were hospitalised in them. The circumstances led to displacement, forcing them to relocate in search of well-functioning healthcare facilities (Naidoo et al., 2022). The third highlighted impact of climate change disasters in KZN is on schools, specifically the schooling education program, which was significantly disrupted, leaving many children and teachers without classrooms for teaching and learning. This situation found them wandering around, looking for alternative temporary schools, which had a massive impact on household expenditure and academic performance. Lastly, the significant impact on economic stability and job losses affected many households and individuals whose primary source of income was through employment and small businesses (Durban Climate Change Strategy, 2022). The damage was highly devastating to the working industry, both in the public and private sectors, with many facilities destroyed and collapsed. I allocated a substantial portion of the municipal budget to recover from such damage and job losses (Durban Climate Change Strategy, 2022). As a result, most affected people had to relocate, displaced in search of job opportunities to escape the looming poverty and food insecurity (Durban Climate Change Strategy, 2022; FoodBev, 2023).

## **Discussion of Findings**

The impact of climate change, displacement, migration, and food security are among the critical, extensive challenges that a developing country like South Africa should invest in. The heavy rain and floods in KwaZulu-Natal have been consistent, even before April 2022, with potential damages and loss of life, despite limited climate adaptation mechanisms in place (Smith et al., 2015). Recently, in September 2024, an unusual snowfall spread across certain parts of South Africa, including KwaZulu-Natal, Free State, Gauteng, and the Eastern Cape (Fazel-Rastgar & Mthembu, 2025). These unexpected weather conditions caused significant delays for travellers and commercial vehicles, resulting in substantial damage to livestock and food crops, and leading to hazardous disruptions for farmers (Fazel-Rastgar & Mthembu, 2025; SAnews, 2024). Furthermore, South Africa's socioeconomic challenges, such as poverty, hunger and escalating food insecurity, were exacerbated by the effects of climate change in recent years, with less effective developmental and amicable strategies. The overall damage from floods in the Ethekwini municipality had an impact on both KZN provincial and national economic development, resulting in a total of R17 billion and a 1.8% loss of annual city Gross Domestic Product (GDP). This had a significant impact on economic stability, employment,

health services, infrastructure, food production, and psychological and traumatic effects, among others. People and children had to walk long distances and pay more for basic services that were located near their households. Furthermore, the temporal and permanent loss of jobs had increased the level of poverty, which was already an escalating challenge even before these floods, and most members of the households had to relocate and emigrate to neighbouring areas in search of job opportunities. The massive death toll consists of school children who drowned while using alternative routes to schools, and some went missing till this day, and an alternative schooling system had to be created with proper counselling services. These escalating challenges were extensive in terms of infrastructure, and a considerable budget had been allocated for rebuilding and restoration.

Most people had been relocated to more conducive areas with temporary shelters, which has created divisions in many households that could not adapt to the changes perpetuated by climate change factors in KZN. Furthermore, the infrastructure damage had an impact on escalating health issues, such as waterborne diseases, including cholera and malaria, especially in informal settlements, with more than 200,000 households affected (Durban Climate Change Strategy, 2022). The health service department took an enormous strain during this period as floods demolished many health centres and clinics, and the temporary shelters were unable to serve the affected population. Hence, those with critical conditions had to be transferred to other regions with less damage and conducive healthcare services. Thus, the effective Disaster Management Act of 2002 requires an action strategy that involves relevant stakeholders, such as the Department of Cooperative Government for Disaster Management, Human Settlement, Health, Education, Agriculture, Land Reform, and Rural Development, for collaboration. It is also upon these stakeholders to incorporate sustainable measures in place for climate adaptation, resilience, and proactive emergency programs in times of desperate need. Lastly, the food production was one of the significantly affected sectors, from production to manufacturing and distribution. The damage caused by floods began with production equipment, crops, livestock, warehouses and storage worth millions of rand. These damages escalated to distribution centres, wholesalers, and shopping centres, where floods swept and demolished some of the buildings. According to FoodBev (2023), the significant damage caused by floods had a massive impact on logistical delays, resulting in organisations losing income and profit. This had a significant impact on food distribution, access, and food security in affected areas, as more people had to spend more to access food. Thus, the experience of climate change factors, such as heavy rain and floods in KZN, has had a significant impact on socioeconomic challenges in South Africa, a country striving to mitigate these challenges through elevation strategies. Furthermore, these challenges have had a significant impact on human displacement and internal migration, as people seek better, more conducive areas, affecting thousands of households, and some have not recovered to this day.

## **Conclusions and Recommendations**

The effects of climate change have proven to be one of the significant escalating influences on worldwide migration and major contributors to trends and patterns of internal migration. This study outlines the particular impacts of environmental shifts on trends and patterns of human mobility, which have become more widespread. The critical aspects imposed by climate change on migration patterns, displacement, and food insecurity have been a critical and urgent matter that has attracted significant scholarly debate. These scholarly contributions to the broad and complex phenomenon of climate change and human mobility represent indirect yet amicable strategies for broader societies facing similar challenges. Furthermore, the findings overview highlights that indeed the factors of climate change have

a significant influence on human displacement, migration, and food insecurity. The study of the Ethekewini municipality and the surrounding areas demonstrated a meaningful relationship between climate change factors and migration. The damage caused by the floods in April 2022 had a significant impact on the socioeconomic stability of KwaZulu-Natal and South Africa, resulting in the loss of billions of rand, lives, infrastructure, homes, and health facilities, which led to thousands of people emigrating internally for safety and survival.

The study findings also highlighted the fact that these factors have a profound and significant impact on underdeveloped, vulnerable communities, such as townships and informal settlement areas in KwaZulu-Natal, where adaptation policy strategies are most needed. The most vulnerable, poor rural, and underdeveloped areas are highly exposed to climate change pitfalls in sectors such as agriculture, which impacts food security and access to clean water. A proactive system among emergency agencies, government disaster management, and local stakeholders is needed to be well-coordinated in preventing this crisis through practical and effective programs that promote sustainable and climate adaptation. Stakeholders, including the Department of Cooperative Government for Disaster Management, Human Settlement, Health, Education, Agriculture, Land Reform, and Rural Development, should collaborate on an effective disaster management Act, such as the Disaster Management Act of 2002, with an action strategy. These amicable policy strategies and programs should be proactive measures for vulnerable communities, as floods are a consistent and recurring challenge during rainy seasons in the KwaZulu-Natal and Eastern Cape provinces.

## Declarations

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