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**The Impact of Extreme Heatwaves on the Refugees' Livelihoods; A Case Study In Dadaab Refugee Camp In Kenya.**

A Research Paper Design

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## List of Acronyms

<b>HHAP</b>	Heat Health Action Plan
<b>SDG</b>	Sustainable Development Goal
<b>NGO</b>	Non- Governmental Organisation
<b>UNDRR</b>	United Nation Disaster Risk Reduction
<b>UNHCR</b>	United Nations High Commission for Refugees
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>UNHABITAT</b>	United Nations Human Settlement Program
<b>DRR</b>	Disaster Risk Reduction
<b>MSF</b>	Médecins Sans Frontières
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>UNGA</b>	United Nations General Assembly
<b>LAPSSET</b>	Lamu Port- Southern Sudan- Ethiopia- Transport
<b>NAP</b>	National Adaptation Plan
<b>COP</b>	Conference of Parties
<b>UNFCC</b>	United Nations Framework Convention on Climate Change
<b>DRS</b>	Department of Refugees Services
<b>EW4All</b>	Early Warning for All
<b>WMO</b>	World Meteorological Organization
<b>ITU</b>	International Telecom Union
<b>IFRC</b>	International Federation of Red Cross and Red Crescent Societies
<b>LWF</b>	Lutheran World Federation
<b>IRC</b>	International Rescue Committee
<b>WFP</b>	World Food Programme
<b>NACOSTI</b>	National Commission for Science, Technology and Innovation

**NCCAP** National Climate Change Action Plan

## Abstract

As climate change intensifies, extreme weather events such as heatwaves are becoming more frequent and severe, creating uncertainty about the scale and scope of their impacts and disproportionately affecting vulnerable populations. This study examines the impact of heatwaves on the sustainable livelihoods of refugees, with a focus on their adaptive capacities. My research is inspired by the early research showing that refugee camps are vulnerable to climate change (Fransen et al., 2024).

This study concluded that the refugees are exposed to heatwaves which greatly limit them from accessing sustainable livelihoods through directly affecting their quality of life and production time. Heat waves, combined with other factors, further hinder refugees' ability to achieve sustainable livelihoods. Current heat-related policies often fail to address the complex realities of refugee experiences. Therefore, further research is needed to explore how policies can better incorporate community perspectives and focus on refugees' specific needs, drawing lessons from successful local practices. Therefore, refugee voices also need to not only be incorporated at the policy design level but the community needs to lead the process to ensure their effectiveness and accountability to the refugee community. However, the study determined that this transformative process is not guaranteed.

I apply the theoretical framework of sustainable livelihood and the concepts of vulnerability, adaptation to further understand the meanings and discourses surrounding sustainable livelihood.

The Theory of Constrained Transformational Adaptation will be used to help understand the complexity of the relationship between policy and practice to answer the main research question; *What are the impacts of heat-related policy implementation on refugees' realities of sustainable livelihoods, and how are these impacts reflected in their everyday experiences and coping strategies?* Therefore the aim of the study is to explore the absorptive, adaptive, and transformative capacity of institutional support, access and implementation to climate-responsive programs. To answer the research question, I used the qualitative method, drawing on field interviews, secondary data, and climate records from refugee settlements in Dadaab, Kenya.

## **Significance to Development Studies**

The research is important as it is in line with the SDG main goal of ‘leave no one behind’. It intersects with most SDGs especially SDG 13 on climate action and SDG 11 on sustainable cities and communities. Moreover, the findings will contribute to the broader discourse on climate justice, adaptation, and sustainable development for displaced populations. The study is expected to benefit policymakers, researchers, government, and development partners seeking to strengthen refugee adaptation in the face of growing climate challenges.

## **Keywords**

Heat waves, Refugees, Sustainable livelihoods, Vulnerability, Climate change, Adaptation, Kenya, Dadaab Refugee, Transformation .

# Chapter 1 Introduction

## 1.1 The negative effects of heatwaves

Heat waves are generally referred to as prolonged exposure to abnormally high temperatures; they are interconnected with and have a direct impact on both droughts and floods: Floods occur because of excess rainfall often attributed to excess precipitation locked in the atmosphere caused by prolonged heatwaves. Drought, on the other hand, is characterized by a deficit in precipitation with extreme heat waves that dries out natural water supply, soil and plant moisture. During the drought season, the environment becomes hotter as excess heat does not evaporate rather it is converted into excess and abnormal heat (Wang et al., 2021; Christensen et al., 2023). Based on the description, heatwaves are therefore categorized together with precipitation where Scholars have also argued that disasters result from a compound effect, caused by both heatwaves and precipitation, rather than by either factor alone. The interrelationship between heatwaves, floods, and droughts explains why they are collectively addressed within a single disaster management framework, which often prioritizes droughts and floods while overlooking heatwaves (Chiang et al., 2018). However, heatwaves present unique characteristics and impacts which are different from floods and droughts as urban areas are expected to suffer more due to the combined effect of climate and the urban heat island effect<sup>1</sup>. Dadaab Refugee Camp is not exempt, as its geographical characteristics—discussed later—along with marginalization and emerging urban features, make the region susceptible to extreme heatwaves. (Fischer et al., 2012).

Heat-related illnesses encompass both mild conditions, such as heat rashes and cramps, and severe cases like heatstroke, all of which have become more frequent due to worsening climate conditions globally. Evidence also indicates a level of uncertainty, which makes precautionary measures challenging due to the limited ability to accurately predict future conditions. (Gu et al., 2018). Exposure to high temperatures, both indoors and outdoors, has been shown to impair physical and cognitive performance worsening chronic conditions like kidney disease, heart conditions among other terminal diseases (Lee et al., 2021; Ebi et al., 2021). Heat waves also increase vulnerability to infectious diseases, such as malaria,

<sup>1</sup> The urban heat island is characterized by factors such as buildings and vehicles that increase heat, while the lack of vegetation reduces cooling and leads to greater heat retention (Fischer et al., 2012).

cholera, respiratory and diarrheal diseases contributing significantly to morbidity and mortality, especially among vulnerable populations (Notley et al., 2017)

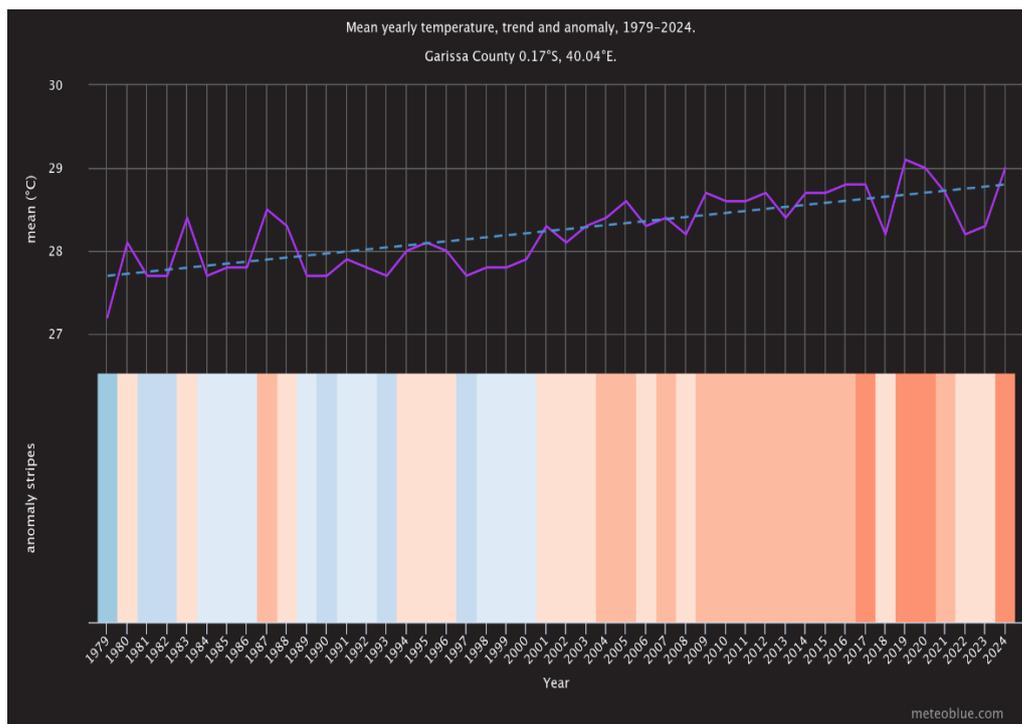
Extreme heat also contributes to cardiovascular and respiratory diseases and increases dehydration-related illnesses such as chronic kidney disease, particularly among outdoor workers (Bunker et al., 2016). Beyond health effects, heatwaves reduce labor productivity (Marinaccio, et al., 2022), affecting food production and market prices, thereby threatening livelihoods. Extreme heatwaves have been observed to decrease productivity and income among vulnerable populations. ( Zivin & Neidell, 2010; Lan, Lian & Pan, 2010).

Heat waves adversely impact human health, leading to heat stress, increased stress, and, in severe cases, death resulting from prolonged exposure to extreme temperatures. Out of all the other extreme weather events, heat waves cause the greatest rates of mortality, which are often thought to be underestimated due to its invisibility of causal linkages in everyday life, and could be up to thirty times greater than the current approximations. Moreover, the East and Horn of Africa region is expected to experience some of the greatest increase in extreme heat globally (IFRC, 2022). Most people still either underestimate the dangers posed by extreme heat or are vulnerable due to their jobs or living conditions. Health is important as it greatly affects a person's ability to pursue a decent livelihood; therefore, it has a direct link to livelihoods. (Stratfield et al.,2023).

## **1.2 Relevance and Justification of the Study**

Climate change is intensifying the frequency and severity of extreme weather events, with heatwaves emerging as a growing threat to vulnerable populations worldwide. (UN DRR, 2025). This is particularly relevant in regions like northeastern Kenya, where Dadaab Refugee Camp is located and where heatwaves are increasing in intensity and frequency, directly impacting refugee settlements with limited resources (Fransen, 2024).

Figure 1.1: Mean Yearly temperature trend and anomaly for Garissa County from 1974-2024



Source; Meteoblue, (2024). Climate Change Garissa County. Available; [https://www.meteoblue.com/en/climate-change/garissa-county\\_kenya\\_197744](https://www.meteoblue.com/en/climate-change/garissa-county_kenya_197744). Accessed on 6/14/2025.

The figure above illustrates the historical temperature trends for Garissa, where the Dadaab Refugee Camp is located. It clearly shows a consistent rise in temperatures over the years, indicating a rapid warming trend in the region. This is a cause for concern, as rising temperatures indicate a higher frequency of heatwaves.

Despite increasing global focus on impacts of climate change, refugees' voices are not present on the decision-making table during policy design and implementation. Heat waves are often overlooked, with extensive research focused on the effects of heatwaves in developed countries, while their intensity and impact in developing countries, particularly in refugee camp settings, remain largely under-explored. (Fransen et al., 2024). However, extending sustainable livelihoods to refugees is a complex task, shaped by the interplay of social, political, economic, and ecological challenges, which together make the situation even more difficult to address (United Nations High Commission for Refugees, 2019).

This study is therefore timely and necessary, as it focuses on refugee's views, perceptions and experience. By exploring the coping mechanisms, adaptive strategies, and support

systems available to refugees, the research will generate insights that can inform climate-responsive policies and humanitarian programming.

Narrowing the research focus to heatwaves, rather than the broader topic of climate change, hence allows for a more in-depth and manageable study highlighting heatwaves as a significant concern in their own right for refugees in the Dadaab Refugee Camp.

### **1.3 Background and Context**

Global warming has caused an increase in temperature, leading to extreme heat conditions. The global average temperature shows a warming of approximately 1°C, over the period 1880 to 2012. (IPCC, 2013., Pg 4,6) However, recent evidence shows a higher value than the global average with all of them anticipating more increase in the future (Chiang et al., 2018).

In Dadaab refugee complex in Kenya, temperatures often reach about 40°C (Fransen et al., 2024), furthermore, an anomaly of 2.4°C was recorded in April 2019 by Meteoblue (2024) above the 1980–2010 pre-industrial average for the Dadaab region indicating a temperature level capable of triggering intense and prolonged heatwaves.

In Kenya, the available heat-related mortality data is based on localized study instead of a comprehensive national registry. Despite limited data for Dadaab region, J. Kimutai (2022) study showed the highest mean mortality rate due to heatwaves in Nairobi, where evidence suggests that heatwaves do not always cause immediate deaths; in some cases, the effects appear after some time. However, in other instances, the impact is either immediate or not noticeable at all (Kimutai, 2022).

Nevertheless, heatwaves have a significant impact, as demonstrated by the record-breaking European heatwave of 2003, which caused approximately 40,000 fatalities where the temperature was 0.53°C warmer than the 1991-2020 average. This is due to the fact that the human body has difficulty regulating itself at temperatures around 35°C (Copernicus, 2023; Meteoblue, 2024; Wang et al.,2021).

One thing that stands out is that the area of Dadaab has always experienced extreme heat waves even before climate-related policies were developed as seen from figure 1 above,

therefore, one of the main aims of this paper is to explore the severity of heatwaves on refugees exploring how they affect the refugee's ability to pursue sustainable livelihoods and their quality of life.

## 1.5 Research Objectives

This study aims to examine how the refugees are exposed to the effects of heatwaves in their daily pursuit for livelihoods and how heat-related policies reflect on the lived realities of refugees' sustainable livelihoods. Specifically, it explores the extent to which such policies address refugees' actual experiences, needs, and coping strategies in the face of increasing heat stress. The research seeks to uncover potential gaps between policy intentions and on-the-ground realities, contributing to a deeper understanding of climate adaptation in refugee settings.

The remainder of this paper is structured as follows: Chapter 2 explains how the camp has evolved over the years, the geographical characteristics that position it as an area of economic potential, the key actors involved, and the heat-related policies implemented in the region. It is important to note that this study does not aim to conduct a policy analysis but rather to explore how heat-related policies intersect with the lived realities of refugees.

Chapter 3 covers the literature used to explain and understand the complexities of heatwaves on refugee's livelihoods. Chapter 4 covers the research methodology and chapter 5 analyzes the key findings, conclusion and recommendations.

The research objectives are;

1. To assess the impact of recurring heatwaves on the livelihoods of refugees in Dadaab Refugee Camp.
2. To examine the coping strategies and adaptive responses used by refugees to deal with heat-related stress and resource scarcity.
3. To evaluate the role of heatwaves-related policies in supporting refugees during periods of extreme heat.
4. To identify barriers and enablers to building climate resilience among refugee populations in Dadaab.
5. To explore how heatwaves influence long-term sustainability and the resilience capacity of refugee livelihoods.

## *1.6 Research Questions*

The main question of the study is; *What are the impacts of heat-related policy implementation on refugees' realities of sustainable livelihoods, and how are these impacts reflected in their everyday experiences and coping strategies?*

### **1.6.1 Sub-Questions**

1. Do heat waves affect the choice of and access to livelihoods of refugees aged 18 and above living in Dadaab Refugee Camp, Kenya? With access means the ability to extract benefits from a resource
2. What are the vulnerabilities that the refugees face as they pursue sustainable livelihoods?
3. What kinds of adaptations have they implemented, and how effective have they been?
4. To what extent do existing policies support the individual or communal adaptation practices?

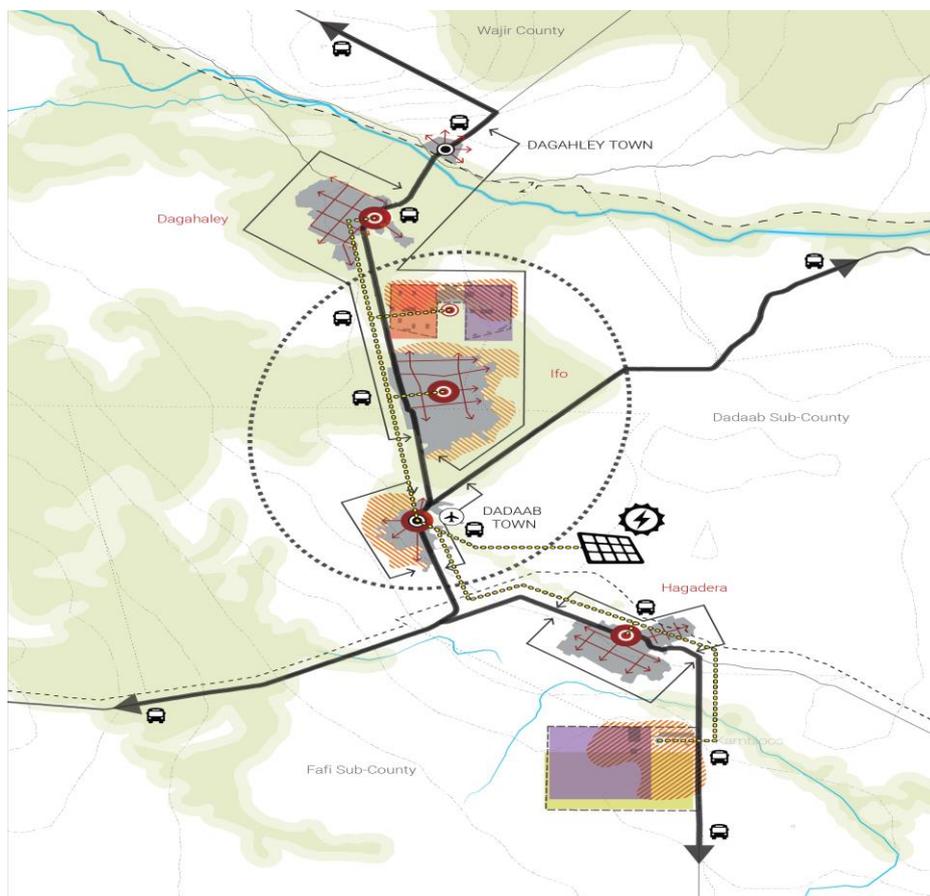
## **CHAPTER 2 About Dadaab Refugee Camp**

### **2.1 History of the camp**

Dadaab is situated in Kenya's Northeastern Province, which borders Somalia's Lower Juba and Gedo regions. The camp was established in 1991 following the wars in the Horn of Africa and the political instability that occurred in the great lakes region of Africa namely; Burundi, Rwanda, Uganda, and the Democratic Republic of Congo that happened during the 1990s and early 2000s. The state felt overwhelmed by the influx of asylum eventually leading to a takeover by UNHCR, NGOs and international agencies. Following the initial perception of refugee camps during their inception in the Cold War era, these camps were often associated with war and security concerns. As a result, the government saw the need to

separate them from the rest of the population rather than integrate them. This led to the establishment of camps in remote areas, far from urban centres and on unproductive land. The takeover by humanitarian organisations attempted to restore their rights and increase their welfare. Moreover, the camps were also regarded as temporary settlements. (Kagwanja and Montclos, 2002; Sidiqqi, 2024).

*Map 1.1: A spatial representation of the Dadaab Refugee Camp*



Source: UN-Habitat. Available at [https://unhabitat.org/sites/default/files/2022/12/221130\\_visioning\\_report\\_final.pdf](https://unhabitat.org/sites/default/files/2022/12/221130_visioning_report_final.pdf). Accessed on 15/May/2025.

According to map 1.1, There are three main camps in the Dadaab Refugee Complex: Ifo 1 and Dagaahley, located approximately 108 km and 124 km from Garissa Town, respectively, and Hagadera, situated in the neighboring Fafi District about 110 km from Garissa Town. In addition, two newer camps — Ifo 2 and Kambioos — were established in 2011 to

accommodate the growing number of arriving refugees. These are located approximately 108 km and 95 km from Garissa Town, respectively.

*Table 1.1: Demographic characteristics of Dadaab Refugee Camp*

Camp name	Established	population	Households	size
Kambioos	2011	20,748	4,360	5 km <sup>2</sup>
Ifo 1	1991	87,703	22,448	12.3 km <sup>2</sup>
Hagadera	1992	107,666	28,107	8.7 km <sup>2</sup>
Dagahaley	1992	91,947	22,247	8.2 km <sup>2</sup>

**Source;** Author’s own construction based on UNHCR (2025). Available at:

<https://data.unhcr.org/en/documents/details/32025>. Accessed on 15/May/2025

The table above summarises the geographical features of the Dadaab refugee camps as of 2015. This is an approximation as there is often a significant movement in and out of the camps with part of the population not yet accounted for<sup>2</sup> (MSF, 2023). Based on the combined population and land area data shown in the table, the average population density across the four camps is therefore, approximately 10,877 people per km<sup>2</sup>. Fitting the Organisation for Economic Co-operation and Development (Dijkstra, 2019) definition of an urban setting as areas with  $\geq 1,500$  people per km<sup>2</sup> and a population  $\geq 50,000$  (Dijkstra, 2019).

In Kambioos, the government prohibited the construction of permanent structures, citing its designation as a temporary settlement. Kambioos and Ifo 2 camps in 2017 and 2018 respectively were closed as the government sought to control the growth of the complex, citing national security concerns and claiming it had become a hideout for militant groups from Somalia. The closure was also part of an agreement between UNHCR, the Kenyan government, and Somalia to facilitate the voluntary repatriation of refugees- as stability improved in Somalia and reduce operational costs (UN-Habitat, 2021).

In recent years, these camps have gradually started to be reoccupied due to increased pressure from international organisations to reopen them, driven by a rising influx of refugees fleeing the prolonged droughts and floods in Somalia, which continue to worsen an already

<sup>2</sup> In 2022 alone, over 50,000 people arrived in Dadaab, yet to be officially registered as refugees (MSF, 2023).

protracted humanitarian crisis (MSF,2023). This highlights the complex realities within the camp and underscores the importance of state commitment, which can either facilitate or limit the survival of the ever-expanding camp, especially in the face of climate change. It also emphasizes the crucial role of international organisations in ensuring the camp's stability (Montclos et al., 2000).

## **2.2 From temporary to permanent life in the camp**

The remainder of this section discusses the progress Dadaab Refugee Camp has made in transitioning from an emergency setting to a long-term settlement, thereby calling for sustainable solutions.

The camp's permanence emerged because humanitarian aid was provisional<sup>3</sup> and unable to sustain the long-term economic dynamics of the economy and business networks created by the influx of refugees; Montclos et al (2000) argue that humanitarian aid is limited when it comes to permanent settlement, however, they suggest that durable effects can be attained by an urban cultural integration and endogenous economic dynamics which comes within a system rather than external forces. This is important as it determines the sustainability of refugees' livelihoods. A good example is the refugee camp in Mombasa where after humanitarian aid stopped, the refugees were assisted through Muslim aid who helped them integrate into the community while another portion were sent to Kakuma Refugee camp. This showed a viable source of trade when humanitarian aid stops (Montclos et al., 2000).

As a result of long-term strategies, the government has developed the shirika plan- which will be discussed in details and which aims to integrate heatwave-related policies into the basic public services. This initiative also follows the Global Compact on Refugees framework that advocates for locally based solutions aimed at improving refugees' livelihoods. (United Nations General Assembly- UNGA, 2018).

Despite the colonial boundaries established, there is a complex and undistinguishable relationship between the refugees and the host community in terms of language where they both speak Somali, Boran and Kiswahili, with Islam as the main religion. The two

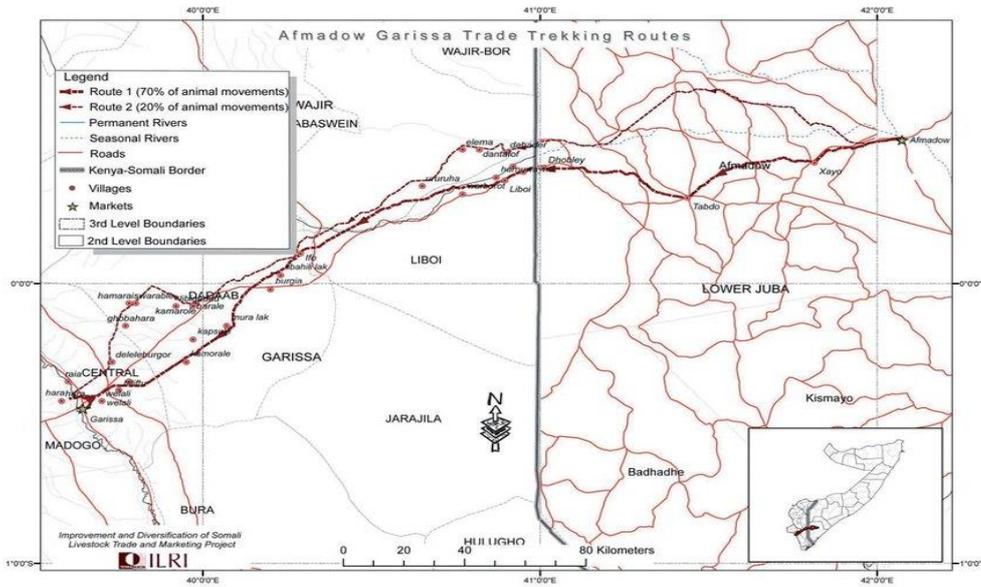
<sup>3</sup> By provisional I mean something short-term, changeable, or dependent on circumstances until a permanent or final decision is made.

groups hold similar cultural beliefs and possess the same geneological features (Siddiqi, 2024). Despite the similarity, cultural integration is important as it shows the good or bad relations which language and religion cannot reveal; Prior to the establishment of refugee camps, the town of Dadaab, with a population of around 5,000, served as an important centre for pastoralist communities where a large portion of the local Kenyan Somalis settled inside the camp due to availability of water, low prices of food and opportunity to sell cattle and milk, mixing with the refugees. This strengthened interactions between refugees and the host community, but it is not without its shortcomings (Montclos et al., 2000).

By 2010, sources showed that their investments accounted for an approximately \$100 million (UN- Habitat, 2025). The region has recorded a diverse and vibrant informal market and a strong community economy where both the refugees and host community buy and sell inside the camp developing a robust economy, this shows how the refugees navigate its obstacles to attain a decent livelihood (Hyndman, (1997); Montclos et al., 2000).

The region of Dadaab as a whole serve as a key transit point for goods from Dubai on their way to the Eastleigh area of Nairobi, a well-known commercial hub with large malls and diverse merchandise. Positioned along the highway linking Nairobi to Mogadishu in Somalia and the Lamu Port in Kenya's South Coast, Dadaab is strategically located on a major trade route. The corridor links the 10 km Lamu Port Access Road to Garissa County (home to the Dadaab refugee complex) and extends further to South Sudan and Ethiopia. This enables easier offloading of cargo to trucks heading to various destinations. (UN-Habitat, 2021; LAPSSSET, 2024).

Map 2.1: Map of major trade routes in Dadaab Refugee Camp



Source; LAPSSET Corridor Development Authority (2024) Available at: <https://lapsset.go.ke/2024/01/30/testing-news/> Accessed on 12/May/2025.

Map 2.2. Map of Major infrastructure in Dadaab Refugee Camp.



Source; LAPSSET Corridor Development Authority (2024) Available at: <https://lapsset.go.ke/2024/01/30/testing-news/> Accessed on 12/May/2025.

Map 2.1 and 2.2 illustrate the strategic importance of Dadaab as a major trade route linking Nairobi, Kenya, to Mogadishu, Somalia. Figure 2.2 shows Dadaab's strategic linkages to Kenya's port and to neighbouring countries, including Ethiopia and South Sudan. This highlights Dadaab Camp's potential for growth if these routes become accessible.

Moreover, although it varies with the camp's population the camp has adequate health centres where refugees consult a doctor more frequently than an average citizen and they remain stable despite periodic epidemics especially during rainy season. The camp is now connected to the electricity and a running water system with a good schooling system. (Montclos and Mwangi, 2000). The above features and the vibrant market have placed Dadaab Refugee Camp from an emergency setting characterized by temporary aid to a long term, urban setting requiring sustainable solutions (Montclos and Mwangi, 2000). However, the transition is accompanied by a set of challenges that are not adequately reflected in existing analyses; it is uncertain whether all population groups benefit equally from the associated advantages and Montclos et al (2000) cast doubt on whether the camp showcases a viable and authentic urban centre or it just represents a temporary and artificial virtual town.

## 2.3 Donors and actors involved

Refugees fall under different regimes as described by Betts and Milner (2019). Moreover, various actors contribute to the design and delivery of services for the refugees, the actors include international organisations, national governments, and civil society at both international and local levels. However, the diversity of actors also brings certain limitations, as they operate under different principles and mandates, making coordination more complex. Hillhorst and Jansen (2010), describes this space as an “arena” describing how different actors converge to achieve common goals.

Since the 1990s, humanitarian activities in the camp focused on immediate response through provision of food, protection and shelter. Lately there has been a shift in humanitarian action to long term programmes incorporating effects of climate change and rebuilding livelihoods (UN-Habitat, 2025), consequently, there has been a shift from NGO-led to government-led programs, which has positioned the Kenyan government as the primary actor responsible for formulating and implementing policies. NGOs and other stakeholders are, therefore, expected to collaborate with the government including UNHCR which assumes the central leadership role in implementation.

The major humanitarian actors in Dadaab include UNHCR as the lead agency, coordinating overall camp management with an annual budget of approximately \$50 million for Kenya operations. The World Food Programme (WFP) manages food assistance programs with a budget allocation of \$35 million annually. Key implementing partners include the Danish Refugee Council (DRC), which operates education and livelihood programs with over 200 staff members; the Lutheran World Federation (LWF), managing water and sanitation infrastructure; and the International Rescue Committee (IRC), providing health services through 4 clinics with approximately 150 healthcare workers. The Kenyan government, through the Department of Refugee Services (DRS), employs approximately 80 staff members for administrative and protection services. Major donors include the United States (contributing \$45 million annually), the European Union (\$30 million), and Germany (\$15 million). Programs implemented span education (operating 13 primary and 4 secondary schools), healthcare (providing services to over 300,000 refugees), livelihoods training (reaching 5,000 beneficiaries annually), and protection services (UNHCR, 2023).

## 2.4 Livelihood and Heat- Related Policies

The Shirika plan which builds on the 2021 Refugee Act, aims to grant refugees the right to work, own property, and access public services. With an aim of promoting sustainable livelihoods and socio-economic inclusion. Structured over an eleven-year period (2025–2036), it has three phases; transition, stabilisation and sustainability. Transitioning from humanitarian aid to development strategies like economic empowerment, strengthening of integrated services and infrastructure and promoting the livelihood independence of refugees, hence promoting socio-economic to host refugees. Inclusion (DRS, 2023).

The Department of Refugees Services which is a branch of the Kenyan government, tasked with managing all administrative matters, protection and among other assistance in the camp. According to DRS, (2023), the shirika plan is still in progress and has a long way to go, as it was only launched this year. In relation to sustainable livelihood, it seeks to: Reduce business obstacles through legal regulatory like issuing refugees with refugee identification cards, secondly, to boost trade through product and market development, to facilitate MSMEs growth by stimulating the growth of new and existing MSMEs. However, it is worth noting that records show that only a third of the population have been issued with refugee identification cards as of this year with the other part remains in the ‘asylum’ status. This raises concerns of access to sustainable livelihoods because the refugee Identification card is very important for movements out of the camp including operating a business and accessing national services like health (UNHCR (2025)). Although Kenya has not explicitly stated that the Shirika Plan was created in exchange for any gains, there is strong evidence that the plan is designated to attract donor funding, which follows a well-documented global trend where demonstrating refugee inclusion can unlock substantial financial and diplomatic benefits (DRS, 2023)

Additionally, the Shirika plan seeks to prepare an urban development framework to guide urbanization plans within the camp. It also integrates the climate action plan, including heat-related policies, to create sustainable solutions for refugees (DRS, 205), therefore, reviewing the relationship between these frameworks, broader heatwaves, in relation to the lived experiences of refugees is essential for identifying early gaps, anticipating future needs, and ensuring that policy is effectively translated into practice (Perry, 2024).

The Kenya National Cooling Action Plan, coordinated by the United Nations, outlines how the country aims to make cooling, such as refrigeration, air conditioning, and food storage, more accessible to everyone and environmentally friendly. The aim of the plan is to provide sustainable cooling for all Kenyans, particularly in workplaces, home and food storage facilities. The plan encourages improved designs for buildings to stay cool naturally without using air cooling machines such as air conditioners. Additionally, it seeks to improve cold storage of clinical supplies including agricultural cold chains which aim to keep perishable farm products, such as fruits, vegetables, meat and dairy, safe and fresh from the point of harvest to the final consumer. It involves a series of coordinated processes, from initial cooling after harvest and refrigerated storage, to cold transportation and temperature-regulated distribution. It is done through maintaining an ideal temperature throughout the supply chain to preserve product quality and nutritional value, and support farmers and markets by ensuring that food reaches consumers in good condition (Sustainable Energy for All, 2024). For refugees living in Dadaab Refugee Camp, although the plan covers urban areas, it has yet to be included in the refugees' policy.

A Heat Health Action Plan is a policy developed to protect people from vulnerability due to by heatwaves. The plan outlines actions for health systems, governments and communities that follow careful coordination. to prepare for, respond to, and recover from heatwaves. The plan typically includes early warning systems to alert the public before heat events occur, awareness campaigns during hot weather, and measures to strengthen the capacity of hospitals and clinics for management of heat related illnesses. It also focuses on supporting vulnerable groups such as the children, the elderly, and outdoor workers from adverse effects of heat, while promoting long-term solutions like promoting sustainable livelihoods and improving urban design to reduce heat exposure and build community's ability to adapt to heatwaves (Hales, 2008). Kenya does not have a single HHAP, rather, the coordinated actions are incorporated and implemented by different bodies for example, the early warning system is coordinated by Early Warning System for All (UNDRR, 2025).

The Early Warnings for All initiative is founded on four key pillars designed to help Kenya develop and maintain effective and inclusive early warning systems (WMO, 2025). According to the World Meteorological Organisation, the system is divided into distinct components, each led by a specific organisation. The first pillar, disaster risk knowledge, is led by the United Nations Office for Disaster Risk Reduction UNDRR which plays a key role in

evaluating vulnerabilities, and exposure through detailed risk assessments. It also develops a range of resources, such as reports, and global platforms, to guide and inform stakeholders, government and communities in implementing effective strategies to deal with impacts of climate change. The second, detection, observation, monitoring, analysis, and forecasting, is coordinated by the Kenya Meteorological Department which is government owned. World Meteorological Organisation collaborates with Kenya Meteorological Department to provide information about the atmosphere, weather forecasts, and supports the creation of early warning systems to help protect people and their property. International Telecommunication Union. oversee the, warning, dissemination and communication, of early warning system, lastly, preparedness and response capabilities, are managed by the IFRC, which coordinates the local communities. Together, these pillars aim to ensure that early warning systems are not only technically sound but also accessible, coordinated, and responsive to the needs of vulnerable populations (DRS, 2023).

In conclusion, all policies in the refugee camp are implemented through DRS and the Shirika Plan, while other international agencies coordinate with the Government of Kenya. However, how these policies meet the refugees reality is a gap that needs to be explored to ensure that they meet the needs of the vulnerable. The next chapter describes the literature used to analyse heatwaves and heatwave policies in relation to livelihoods.

## CHAPTER 3 Literature Review

### 3.1 Introduction

This chapter examines the key concepts applied in the study, it outlines theories and conceptual framework, highlighting major literature on heatwaves, vulnerability and adaptation within the development context.

### 3.2 Conceptual review: Livelihood of Refugees in Dadaab Refugee Camp

Understanding livelihood is important as it helps us understand how the refugees respond to poverty, exclusion, and earning a living. In the 1980s, Neo-Marxist thinkers looked at livelihoods in terms of unequal power and access to resources, while modernization theory focused more on income and consumption as signs of progress. By the 1990s, the idea of *sustainable livelihoods* became popular, meaning people's ability to cope with and recover from livelihood challenges, improve their assets and skills, and do so without harming the environment (Scoones, 2009).

Chambers and Conway (1992) explained a livelihood as the different ways people make a living using both physical assets (like land or tools) and non-physical ones (like skills and social connections). Later, De Haan and Zoomers (2005; 2007) identified five key types of capital—human, natural, physical, social, and financial—that shape how people build and maintain their livelihoods. Bourdieu (1984) also added the idea of *cultural capital*, referring to social assets that help individuals, such as refugees, achieve social mobility and succeed, including education, social manners that facilitate communication with the host community, and familiarity with the cultural norms of the host society. Together, these forms of capital help people survive and make changes in their lives and communities. The livelihood aspect is particularly important, given the camp's transition from a temporary to a permanent settlement, as the prevalence of heatwaves and integration to the community are major concerns.

Recent studies link livelihoods with climate adaptability, showing how people try to secure food and income despite environmental challenges (Chaya & Gheewala, 2022). Jacobsen (2014) notes that although livelihood frameworks focus on adaptability, they often miss the full reality of people's daily struggles, especially for many refugees who have to start from scratch and are not citizens of the country they currently live in. In reality not all refugees arrive in camps equally poor- some bring savings, skills, or business assets that can help them restart their lives but extreme heat and other climate shocks can quickly destroy these gains, making it harder to survive or plan for the future (UN-Habitat, 2021; Montclos et al., 2000).

Livelihood research also looks at larger systems- like policies, institutions, and power relations—that affect how people survive. Tao and Wall (2009) describes this by arguing that livelihoods are not just about individual effort, but also about how outside forces shape vulnerabilities. This is especially relevant for heatwaves and heatwave related policies, which affect the displaced people the most. Studies such as those by Tawsif et al (2022), Li et al,(2019), Lee et al., (2021) and Kiarsi (2023) have explored heat exposure and adaption in relation to the urbanization agenda. This research builds on their work by focusing on the experiences of refugees in Dadaab Camp- showing how heatwaves affect refugees' income, quality of life, and assets, thereby impacting their ability to sustain livelihoods and how heat-wave policies address refugees' lived experiences.

## **3.3 Theoretical Review**

### ***3.3.1 Modernisation Theory***

Modernisation and dependency theories still help explain many development and policy challenges and patterns observed today, both at the local and international levels. The main argument of modernisation theory is that countries remain poor because they maintain traditional ways of life instead of adopting modern attitudes, technologies, and institutions (Benedicte and morten, 2012).

Modernisation theory took an important lead from parson's theory which revolves around the social systems capacity to respond to changes in its environment, in this case it is the ability of the refugees, networks and institutions to organize, respond and adapt to challenges associated with heatwaves and sustainable livelihood, however, It was largely dominated by western notions of economic, social and political transformation as they stressed correct policies as an effect, policy formulation has focused more on using the correct language and standards, making assumptions about the people who are to benefit from them. (Nisbet, 1966). It emphasised that development took a linear trajectory as it assumed that all societies should follow the same path of progress taken by Western Europe and North America, making their experience the model for the rest of the world. It also viewed traditional society as backward. (Pieterse, 2010 ).

As a result, policies, including heatwaves related policies take on a universal approach and uses standard frameworks regardless of the context where even policies that are tailored to different regions look more or less the same as the original one. Modernization promoted the idea that elites and experts should lead development and that only scientifically proven ideas were deemed rational. Industrialization was thought of by the elites in the political and economic sphere, as the key to development. The idea suppressed community voices on deci-

sion making table as elites determined the needs of the community, creating power inequalities as the focus was towards technology and investment (Benedicte and Morten, 2012; Rostow, 1960: 17-92).

Modernization theory has changed over time because of political shifts, new ideas, and practical experiences. The problem is that new approach often tried to replace the old one, which sometimes led to losing valuable insights from earlier theories. Today, many of the same debates and contradictions in development thinking have reappeared, showing that these issues were never fully covered (Benedicte and Morten, 2012).

Despite modernization being criticized since its inception, we cannot ignore the fact that it is still ingrained in policies. It still influences how many governments think about development. Within the humanitarian sector, privatization once positioned NGOs at the forefront of interventions, but the focus has recently shifted toward modernization-oriented ideologies of the state-led intervention. Unfortunately, some countries using these models today ignore past lessons- such as the need for sustainability, social inclusion, and context. (Benedicte and Morten, 2012).

However, this theory is limited because it emphasizes the economic dimension while disregarding social and political aspects. It also overlooks local voices and the contextual factors that determine the success of a policy. Modernisation theory focuses on policies more than addressing the root causes of vulnerability.

### ***3.3.2 Dependency Theory***

This theory differs from the modernization theory as from a humanitarian perspective, modernization theory advocates aid as a tool for development. Dependency theory argues that modernisation creates dependencies, exerts political and economic influence, and misaligns local priorities with donor interests. It argues that global systems can undermine local capacity, increase inequality and hinder the means to sustainable livelihoods. However, It can be too deterministic, as it overstates the obstacles that refugees face in achieving a sustainable livelihood. (Grugel and Hammet 2016; Benedicte and Morten, 2012).

Dependency argues that lack of progress is due to ongoing process driven by unequal global relationships causing livelihoods to follow a nonlinear trajectory, however, It overlooks the complex realities like internal factors and agency (Matunhu, 2011). As an effect, scholars in the humanitarian sector have argued that refugees have become so reliant on foreign aid that they have, in many cases, forgotten how to sustain themselves independently (Itai, 2017). While this may be the case, it ignores the fact that other forces come into play to render the refugee's dependent on this aid.

Although scholars within the dependency school hold varying perspectives, they generally agree that persistent unsustainable livelihood cannot be understood without considering the global economic system (Benedicte and Morten, 2012).

In terms of sustainable livelihoods, this perspective sees the global economy as constantly changing rather than fixed. Livelihood opportunities and vulnerabilities are not permanently determined by a country's current position; instead, they fluctuate over time. Communities, including refugees, can experience periods of improvement or decline in their access to resources, income, and assets. There is no single, linear path to prosperity, therefore, sustainable livelihoods must be understood as dynamic, shaped by long-term cycles of opportunity, risk, and adaptation (Matunhu, 2011).

Dependency theory acknowledges the importance of local context in relation to global dynamics and recognizes inequality, politics, and other root causes that shape vulnerability. However, it remains broad, and its consideration of local aspects is limited, as it does not extend fully to the grassroots level

### ***3.3.4 Vulnerability***

The definition of vulnerability in this study takes on Wisner et al. (2004, pp.11) definition as “characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard.” Wisner, argues that there is no natural disaster. This means that heat waves are natural but for heat waves to become a disaster it will depend on an individual's ability to cope, withstand and recover. This explains why the impact of heat waves can be high in one geographical region compared to another. For instance, Europe's record high summer temperature of about 35 °C

in 2022 (Copernicus, 2023) was linked to over 60,000 heat-related deaths, whereas India's 2016 record-breaking high of 51.0 °C resulted in more than 1,100 fatalities.

Hillhorst and Bankoff (2013) proposes two levels of vulnerability; the simple and complex level of vulnerability. The simple level relates to resource- depletion, poverty and marginalization. Vulnerability at this level intersects with sustainable livelihoods, illustrating how individuals and communities navigate the daily insecurity, risk and uncertainty. The complex relates to Cannon's (2013) argument that social processes make some people more prone to disasters than others and that it is related to power relations in societies. This level describes the diverse exposure that arise from the interplay between local and global processes including the daily coping mechanism.

### ***3.3.5 Adaptation and Transformation***

Adaptation has a range of definition depending on the context. It is, however, important as it deals with the root causes of vulnerability. This is because, for a long time, adaptation had focused on managing climate impacts rather than questioning the social and political structures that produce vulnerability. (Pelling, 2011; Smit and Wandel 2006).

Adaptation is conceptualised through three layers of analysis: At the individual or household level ( involves how people and small communities respond to change through behavioural adjustments and livelihood choices), The institutional level focuses on how organisations and governments create policies and programs to support adaptation and at the structural level where broader systems are considered, such as political, economic, and environmental frameworks, as they influence and shape adaptation efforts (Pelling, 2011).

Therefore, the issues around climate change and heatwaves- adaptation present an opportunity to challenge the values that sustain inequality and environmental unsustainability and to promote social reforms especially for refugee camps that are transitioning from emergency settings to urban areas or towns like Dadaab Refugee Camp. However, Pelling (2011) fears that this outcome is far from guaranteed,

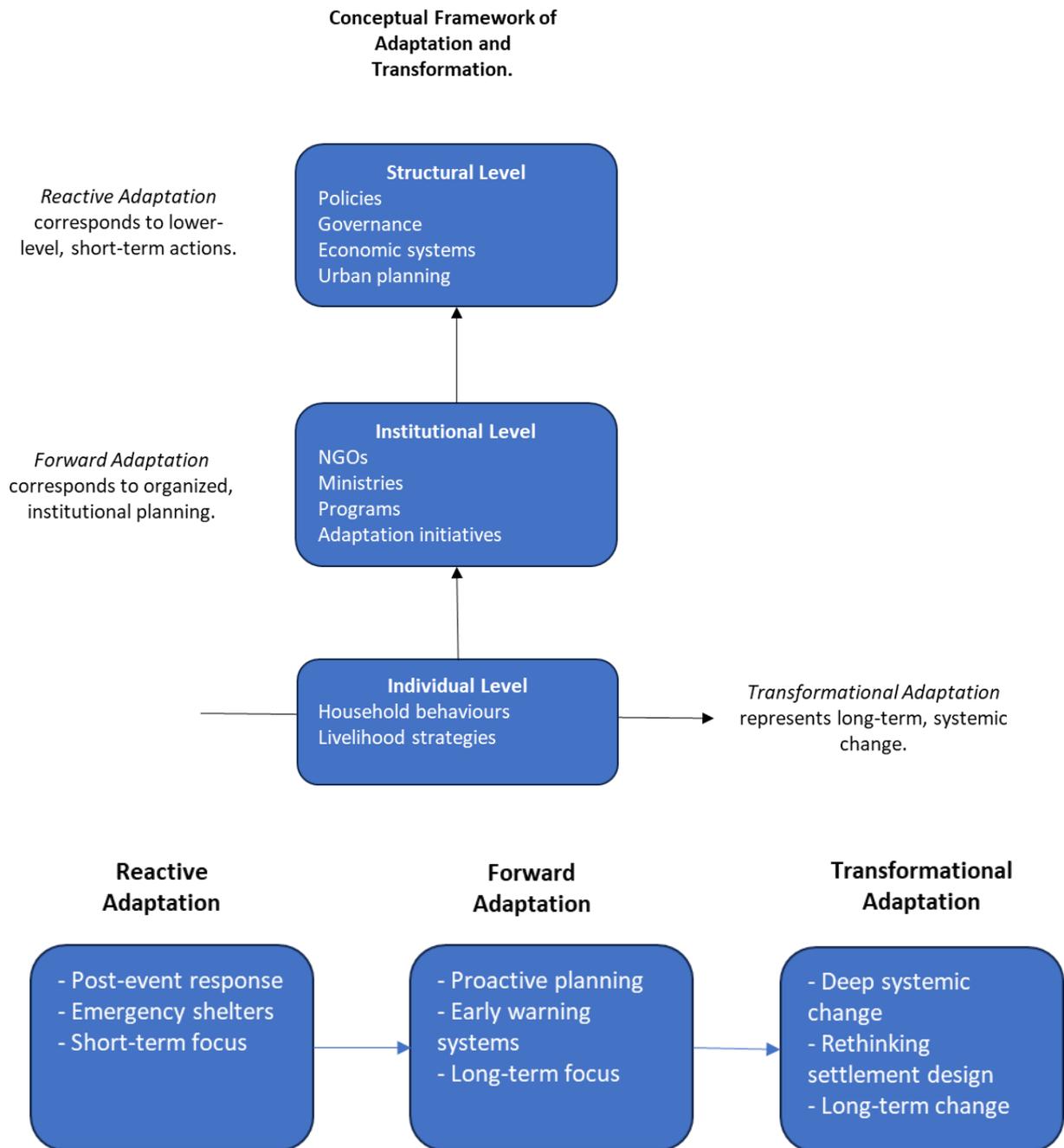
Forward adaptation has become more popular than reactive adaptation with the latter focusing on taking action after heatwaves has hit, the former entails building governance, systems and infrastructure to cope with future projected heatwaves effects given the uncertainty on the scale and frequency of future heatwaves (Pelling, 2011)

Transformational adaptation is based on forward adaptation which advocates for deep, long-term changes made to reduce vulnerability and build long-term adaptation to climate

change- going beyond minor improvements like using drought resistant seeds to initiatives like redesigning urban infrastructure to handle extreme heat. Transformational adaptation entails making deep changes in systems, policies, and behaviours to tackle the underlying causes of climate-related risks (Pelling, 2011). As discussed in the policy description in Chapter 2, most policies have adopted this approach, with heatwave policies now being integrated into government ministries. This marks a shift from NGO-led initiatives to state-led ownership. In relation to refugees, this trajectory creates opportunities to achieve sustainable livelihoods by addressing the root causes of vulnerability and promoting sustainability. However, there is still a need to explore the effectiveness of these transformational policies to analyse how they enhance the adaptive capacity of refugees in achieving sustainable livelihoods in relation to heatwaves.

This shift is driven by the argument that adaptation is inherently a political domain, where questions such as who benefits, who decides, and who bears the costs are fundamentally political rather than merely technical concerns about helping people adjust. The earlier apolitical perspective of modernisation theory was criticized as it was believed to prioritize preserving an inequality instead of supporting broader cultural, social, and economic development or sustainability especially for marginalized groups. This framing reinforced the notion of adaptation as a technical service-delivery issue rather than a matter of justice, governance, or rights (Smit and Wandel, 2006).

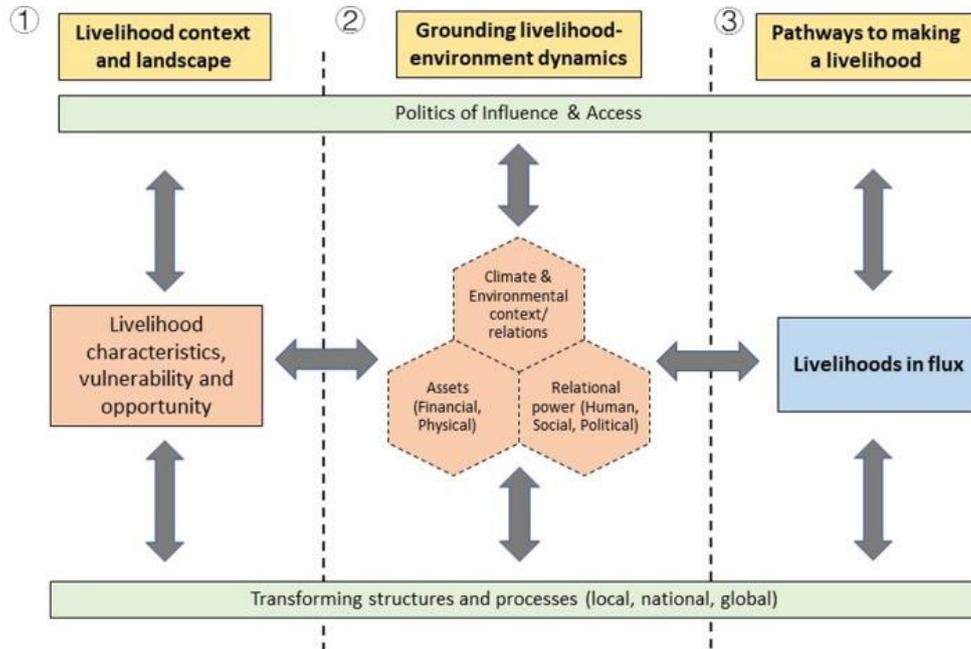
**Figure 2.1: Conceptual Framework of Adaptation and Transformation:** This diagram organizes adaptation across three levels of interaction; individual, institutional, and structural, showing how they support one another.



Source: Author's own construction based on adaptation

### 3.3.6 Sustainable Livelihood

Figure 3.1: Sustainable Livelihood Framework



Source; (Natarajan, 2022. Pp 12)

Over the years, sustainable livelihood could not be categorized strictly as a methodology, concept, theory, or framework. It did not fit into a single box but instead incorporated characteristics from all of them; The framework narrows the focus of assets to financial and physical capital, while incorporating relational power (like Class and gender) and climate, environmental aspects as additional key aspects shaping and sustaining livelihoods. It includes how power relations in the household are shaped by external forces like social, political and environmental. Climate is understood both at the local level and in relation to larger, external forces, recognizing how they influence rural livelihoods and are, in turn, influenced by broader political, economic, and ecological dynamics. This emerged from the need to place climate change at the centre of rural livelihood analysis, that is, how they shape rural livelihoods. The framework provides local climate conditions and explore how they connect to broader elements, such as ‘Transforming Structures and Processes’ represented in dotted lines to show their embeddedness and interrelations with each other and which can be built, transformed or eroded any time. Hence livelihoods can't be understood simply by adding up assets without considering how they are shaped by human actions and broader systems of power and environment. The framework also incorporates the connections between livelihood assets

and the transforming structures and processes; they are usually the dynamic and frequently power-influenced factors that largely explain why different groups experience unequal livelihood outcomes. It effectively serves as the key explanatory point between these sections, not only describing what and where livelihoods are, but also revealing who is involved, how they operate, and why they occur. (Natarajan, 2022)

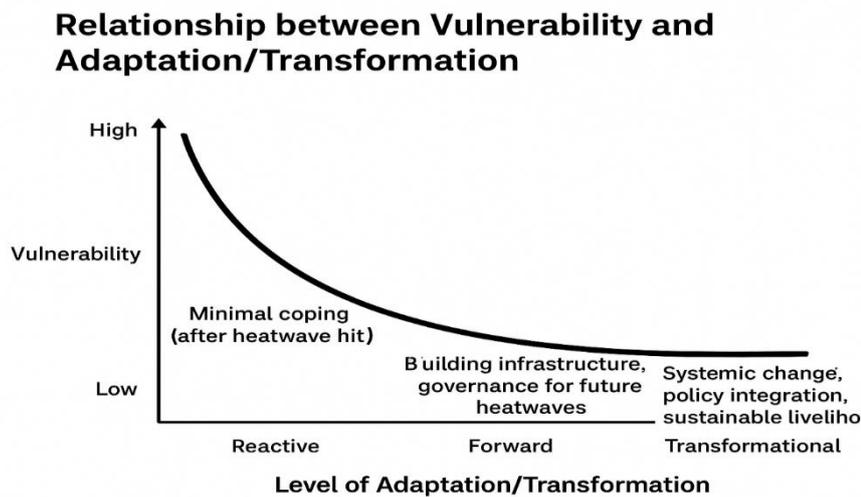
### ***3.3.7 The Theory of Constrained Transformational Adaptation among Refugees***

To summarise the relationship between the concept of vulnerability, adaptation and the sustainable livelihood framework, the theory of constrained adaptation was developed to further understand the complex relationship between heatwaves and the refugees' livelihoods. Refugees posit that refugees' vulnerability to environmental stressors, such as heatwaves, remain higher than their adaptive capacity due to a complex interplay of systemic, institutional, and policy-level barriers. Refugees often rely on minimal coping strategies to manage immediate risks, and while forward-looking measures such as early warning systems may provide some relief, these interventions are largely insufficient for achieving sustainable adaptation. The limitations of such measures stem from the fact that the effects of heatwaves are primarily treated as technical problems, which leads to solutions that are largely technical in nature (Small, 2007:36), the problems are often assessed using geospatial data like the works of Miller et al., (2021) and the solutions offered include forecasts, heatwave advisories, and technological interventions, as demonstrated in this study. They frequently overlook the lived experiences, socio-economic conditions, and cultural realities of the refugee population. Transformational adaptation—the type of change that fundamentally alters vulnerability and enhances long-term resilience, is constrained by structural and institutional factors, including restrictive government mandates, policies that are misaligned with broader development strategies, and socio-political exclusion that prevents refugees from fully participating in economic and social systems. As a result, while informal forms of integration, such as urban, cultural, and economic assimilation, may occur, they do not replace the need for comprehensive institutional reforms that facilitate systemic change. The theory further suggests that without addressing the root causes of vulnerability, adaptation remains partial and reactive, rather than proactive and sustainable. Therefore, effective adaptation for refugees requires a multi-dimensional approach that combines technical interventions with systemic reforms aimed at promoting inclusion, supporting sustainable livelihoods, and integrating refugees

into national governance, social, and economic structures. By recognizing the interplay between immediate coping strategies, forward-looking adaptation measures, and the structural barriers to transformational change, this theory provides a framework for understanding why vulnerability persists and highlights pathways for more effective, holistic adaptation strategies.

The figure below is developed to analyse the relationship between adaptation and vulnerability and sustainable livelihood. The figure illustrates the relationship between vulnerability and transformational adaptation, highlighting two key dynamics. When adaptation is reactive, adaptation can increase vulnerability over time. This is because reactive measures often address symptoms rather than root causes, leaving systems exposed to future hazards. In contrast, transformational adaptation, which involves fundamental changes to behaviours, structures or systems, reduces vulnerability by addressing underlying causes and building resilience proactively. Overall, the graph suggests an inverse relationship between transformational adaptation and vulnerability: as transformational adaptation increases, vulnerability decreases, whereas reliance on reactive adaptation tends to exacerbate it.

*Figure 3.2: Relationship between vulnerability and transformational adaptation*



Source; Author’s own construction of the Relationship between vulnerability and adaptation.

### **3.7 Relevance**

This study draws on the theory of constrained transformational adaptation and the relationship between vulnerability and adaptation to examine how refugees in Dadaab respond to provide a holistic understanding of how heatwaves and heatwave policies shape refugees' livelihoods within the social, economic, political, and ecological contexts and from local to international level.

## **CHAPTER 4 Research Methodology**

This section presents the methods used to examine the impact of heatwaves on the livelihoods of refugees in Dadaab Refugee Camp. It describes in details the qualitative approach adopted.

### **4.1 Study Population and Sampling**

Building on Chapter 2's description of the Dadaab Refugee Camp as exhibiting urban characteristics, experiencing rising temperature fluctuations, and occupying a strategic location, the camp serves as a compelling case study for examining the effects of heatwaves on refugees' sustainable livelihood.

The study population comprised refugees aged 18 and above, engaged in diverse forms of livelihoods, providing a comprehensive view of how heatwaves affect different livelihood activities and ensuring that the research remains relevant to those most impacted. (King et al., 2019 Pg 93-113).

### **4.2 Sources of Data and Study Participants**

The study employed triangulation methodology to ensure data validity and to provide comprehensive insights into how heatwaves impact sustainable livelihoods. The method used multiple approaches: individual interviews to capture human experiences, challenges and coping strategies; direct observation and participant feedback to validate the research findings and to critically represent respondents' experiences with heat-related livelihood challenges (Maxwell, 2013); and secondary data from relevant sources, with the main materials coming

from UNHCR and UN-Habitat reports and climate data from the Kenya Meteorological Department (Taherdoost, 2021, p.13).

A total of fourteen participants were interviewed between August 7 and September 5, 2025, comprising eight refugees and six staff members (including NGO workers and government officials). The participant selection deliberately sought diversity across multiple dimensions including nationality, gender, age, occupation, duration of stay in the camp, and educational background to ensure a comprehensive understanding of how heatwaves affect different population groups and livelihood categories.

The table below provides detailed demographic characteristics of all study participants:

**Table 4.1: Demographic Characteristics of Study Participants**

<b>Date</b>	<b>Code</b>	<b>Age</b>	<b>Gender</b>	<b>Nationality</b>	<b>Role/Status</b>	<b>Duration in Camp (Years)</b>	<b>Education Level</b>	<b>Occupation/Role Description</b>
07/08/2025	Ref 1	32	F	South Sudanese	Refugee	19	Diploma	Incentive worker; recycling metals & plastics
08/08/2025	Staff 1	46	M	Kenyan	NGO Staff	20	Degree	NGO staff member
08/08/2025	Ref 2	--	M	Somali	PWD Staff	--	--	Youth leader
08/08/2025	Ref 3	31	F	Ethiopian	Refugee	--	--	NGO worker
09/08/2025	Staff 3	31	M	Kenyan	NGO Staff	2	Degree	NGO staff member
09/08/2025	Ref 4	38	M	Somali	Refugee	33	High School Certificate	Tailor; computer repairer; offloader; firewood seller
09/08/2025	Staff 4	41	M	Kenyan	Government Official	10	Diploma	Government officer
10/08/2025	Ref 5	38	M	Somali	Refugee	3	Bachelor's Degree	Teacher; business owner
10/08/2025	Staff 5	28	F	Somali	Refugee	15	Secondary Certificate	NGO worker; businesswoman

10/08/2025	Ref 6	27	M	Somali	Refugee	14	Univer- sity Graduate	NGO worker; retail shop owner
11/08/2025	Ref 7	33	M	Somali	Refugee	30	Bache- lor's De- gree	NGO worker; bookshop & cyber owner
11/08/2025	Staff 6	37	M	Somali	Govern- ment Offi- cial	15	Bache- lor's De- gree	Government officer
05/09/2025	Ref 7	50	F	South Suda- nese	Refugee	20	Basic Educa- tion	Grocery seller
05/09/2025	Ref 8	38	F	South Suda- nese	Refugee	30	College	Self-employed

Source: Author's own construction based on field data

#### ***4.3-2 Data Collection Tools***

A qualitative approach was used to gather data on the impact of heat waves on refugees' sustainable livelihood. Face to face interviews lasting 30- 45 minutes provided detailed personal accounts on how heatwaves impact individual livelihood rebuilding efforts. A semi-structured interview guide containing open-ended questions was used to help guide the conversation. and prevent it from going off topic, while ensuring that the questions remained neither too specific nor too narrow. (see appendix 1) <sup>4</sup>. (Taherdoost, 2021, p.18) The time was selected by the participant to make it convenient and comfortable for them.

During the research period, a security alert was in effect due to car hijackings, violent robberies, and heightened political tensions linked to national strikes and the sudden suspension of food aid and social protection programs, all of which increased unrest within the camp.

As a result, a research assistant with the necessary skills and experience was recruited to support the achievement of the study's objectives. The assistant was a graduate student familiar with the terrain of Dadaab but with limited knowledge of activities within the camp.

<sup>4</sup> The guide covered: heat wave livelihood activities, specific heat- related disruptions experienced, adaptation strategies employed, support systems accessed and in private spaces within the camp like community centres and quiet outdoor areas to ensure confidentiality while remaining culturally appropriate.

This was important to ensure that he could navigate security issues effectively while avoiding any influence on the direction of the interviews.

The first permit to conduct the study in the country was obtained through NACOSTI, and the second permit to access the camp was obtained from the Department of Refugee Services. Access to the camp was facilitated by a senior UNHCR official, who also assisted in mobilizing the first phase of interviewees before proceeding with snowballing.

To ensure the assistant's security, air travel was used as the means of transport, as it was safer than traveling by bus and helped avoid potential incidents of car hijacking. Additionally, following standard practice in Kenya for research in high-risk areas, a plainclothes security officer was assigned through official channels to provide protection during fieldwork. In Kenya, it is legally permissible and commonly practiced for researchers working in sensitive areas to be assigned government security personnel, particularly in regions with security concerns like northeastern Kenya. This arrangement was coordinated through the Department of Refugee Services and local authorities. A private security guard was not feasible as they lack the legal authority to operate within the camp and across regional boundaries. The officer maintained close proximity but did not attend interviews to avoid creating an intimidating environment for participants.

Training of the assistant was done to understand the ethical issues, research objectives and how to conduct the interviews and how to handle sensitive topics and respond appropriately if participants exhibited emotional distress. Finally, a brief supervised pilot interview was conducted with a resident living outside the camp to observe the assistant's performance and provide real-time feedback. I joined the session via WhatsApp to monitor the process and offer guidance. This exercise helped prepare for the upcoming interviews. I muted my WhatsApp video call during the session to allow the assistant to facilitate the interview independently. The exercise reinforced good practices and ensured readiness for independent fieldwork.

To minimize bias, note-taking procedures were emphasized, including the use of non-leading questions to allow respondents to answer freely without influence or guidance toward a particular response. A journal was also maintained by the assistant to record all activities and observations, which served as a reference to guide the subsequent discussions.

Informed consent was obtained from all participants before data collection. Each participant received an information sheet explaining the study's purpose, procedures, potential

risks and benefits, and confidentiality measures, translated into Somali and Swahili. After reviewing the information, participants provided written or verbal consent, with a witness present for some participants. They were also informed of their right to withdraw at any time without consequences and encouraged to ask questions. Interviews were conducted in participants' preferred languages (Somali, Swahili, or English), with interpreters as needed, and were audio-recorded with consent.

Effective follow-up was maintained after each interview through regular WhatsApp video check-ins with the assistant to review progress, address field challenges, and ensure adherence to the interview guide and ethical standards. This real-time oversight enabled timely adjustments and thorough documentation of data collection activities. After each session, I received the recordings and a detailed briefing from the assistant, allowing me to refine the questionnaire, provide additional probing questions, and request follow-ups when necessary. This process helped identify challenges, address ethical or procedural issues, and improve the quality of subsequent interviews.

To ensure consistency and data quality throughout the research process, I developed a tracking system to monitor all interviews (see appendix ).

## **4.4 Data Analysis**

The research examines the impact of heatwaves on the economic activities of refugees in Dadaab Refugee Camp. The process started with transcription of interviews followed by data familiarization through repeated reading of transcripts. The transcripts were coded according to recurring themes and important phrases.

I used Atlas.Ti for coding purposes. Although it showed some bias in automatic coding suggestions, I still used it as a supportive tool to guide the classification of codes. The software helped identify potential patterns and themes, which I then manually reviewed and refined to ensure that the final coding reflected the participants' authentic voices and contextual meanings. The themes were further labeled for easier access.

Data analysis established the connection between the topics and the wider body of literature building on the formulation of conclusions.

Figure 4.1: Snapshot of how ATLAS.TI was used

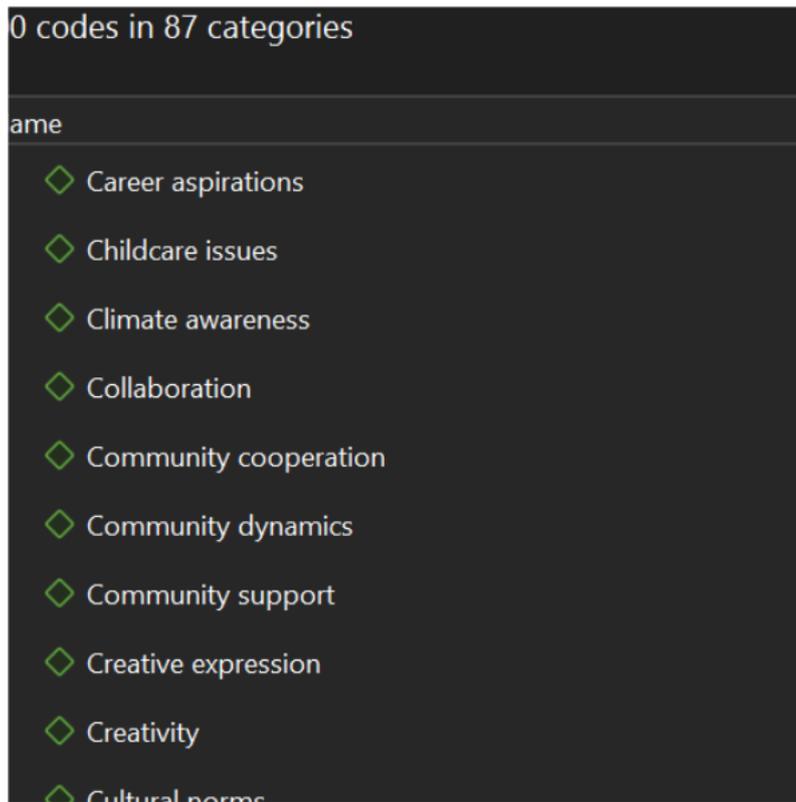


Figure 4.1: source; Author's snapshot of how ATLAS.TI was used

The figure above represents a snapshot of the coding framework I developed using ATLAS.ti, illustrating the categories and themes that emerged during the data analysis process (see annex. I used some of the existing coding to guide my analysis, eventually developing my own codes. These codes were then grouped in relation to the literature review

## 4.5 Ethical Consideration

To maintain confidentiality, all participant information was anonymized, pseudonyms were used in transcripts, and sensitive topics were handled carefully to prevent emotional distress. Data were securely stored on encrypted, password-protected systems accessible only to the researcher. These measures aligned with the ethical standards approved by the International Institute of Social Studies Ethics Board, Erasmus University Rotterdam (King et al, 2019).

## **4.6 Limitation and Delimitation**

This section outlines the methodological challenges that influenced data collection and participant engagement, emphasizing the need for caution when interpreting and generalizing the study's findings beyond Dadaab Refugee Camp.

During fieldwork in August 2025, Dadaab Refugee Camp faced unprecedented financial pressures due to sharp reductions in donor contributions and the suspension of many humanitarian and development programs, resulting in scaled-back or suspended food aid and social protection initiatives. This created widespread anxiety and tension among refugees, some of whom received aid while others did not; among NGO workers, who were concerned about the continuation of their programs; and among government officials, who remained vigilant for any outbreak of violence. These conditions influenced the research environment and participants' willingness to speak openly, potentially introducing response, selection, and interviewer biases. Despite these constraints, the challenging context provided unique insights into the fragility of support systems and the volatility of livelihoods in the camp. The research approach, combining ethical protocols, triangulation, and reflexive awareness of positionality, aimed to maximize data quality and analytical rigor. Building on this framework, the following chapter presents empirical findings on how refugees experience and respond to heatwave impacts on their livelihoods, including vulnerabilities, adaptation strategies, and the effectiveness of existing policies and support systems.

## **4.7 Positionality**

I had to hire a research assistant for security reasons, as discussed in the limitations section. Initially the interviews lacked the same depth as would have if I conducted them myself; During a mock interview to train my assistant and identify needed adjustments, I noticed the approach was too rigid and lacked probing. To address this, I reviewed each interview recording, identified unclear or underexplored themes, and scheduled immediate follow-ups to ensure greater depth and clarity.

# CHAPTER 5 Results, Analysis and Discussion

## 5.1 Introduction

The results are based on the research questions formulated earlier. Consequently, sub-questions were developed to further elaborate on the main question. The findings are organised according to the research questions they address and are further grouped and discussed in relation to the Sustainable Livelihood Framework

The main research question, *what are the impacts of heat-related policy implementation on refugees' realities of sustainable livelihoods, and how are these impacts reflected in their everyday experiences and coping strategies?* will be addressed under the section on Transforming Structures and Processes.

The framework described will be used as a tool to group the responses and explore the dynamic nature of the impact of heatwaves to the refugee's sustainable livelihood. The first sub-question concerning the impact of heatwaves on livelihood choices and access will be answered under the climate and environmental relations . The second sub-question, *what are the vulnerabilities that refugees face as they pursue sustainable livelihoods?* and the third sub-question, *what kinds of adaptations have they implemented, and how effective have they been?* will be discussed under Livelihood Vulnerabilities and Opportunities, respectively. Finally, the fourth sub-question, *To what extent do existing policies support individual or communal adaptation practices?* will be analyzed under Transforming Structures and Processes at the local, national, and global levels.

## 5.2 Heatwaves impact

The Dadaab camp experiences episodes of extreme temperatures which is evident from the reactions from the participants who expressed concern on the intensity and their impact. This validates the findings of Fransen et al. (2024) that the camp is exposed to extreme heatwaves.

*"Ref 8: It is always hot; it has been like that for 30 years. The ground is so hot that we pour water and put a mattress on top and lie...but it is hard to sleep because of the heat"*

*"Staff 5: The weather is always too hot that I just remove all my clothes and remain with a vest and short."*

Heatwaves directly compromise refugees' health through multiple pathways, creating a cascade of effects that fundamentally undermine their productive capacity. Respiratory complications emerge as a particularly prevalent concern, with participants reporting chronic conditions exacerbated by the combination of extreme heat and dust. The arid environment of Dadaab, intensified by rising temperatures, generates fine dust particles that infiltrate living spaces and workplaces, leading to persistent respiratory distress. These health impacts are not merely temporary discomforts but represent ongoing medical conditions that require repeated treatment and limit refugees' ability to engage in sustained economic activities.

*Ref 1: "There is a lot of dust that gets in my throat that I can't breathe well. My chest is constantly blocking due to the dust and I have to constantly go to the hospital for medical assistance."*

*Ref 5: "The heat made me have gastric issues; my gastric problems worsen during hot days."*

Beyond respiratory issues, participants described experiencing heat exhaustion, dehydration, and general physical weakness during peak temperature periods, typically between 9:00 AM and 4:00 PM. These health effects directly reduce the number of hours refugees can work productively, forcing them to either cease activities during the hottest parts of the day or

continue working while experiencing significant physical distress. This dilemma is particularly acute for those engaged in outdoor activities such as market trading, construction work, or livestock management. The cumulative effect of repeated heat exposure over days, weeks, and months creates a cycle where health deteriorates, productive capacity diminishes, income decreases, and the ability to invest in protective measures or healthcare becomes increasingly constrained. This confirms the findings of Ebi et al. (2021) regarding how heatwaves reduce individual productivity, and validates Notley et al.'s (2017) research on the effects of heatwaves on respiratory diseases.

Heatwaves also function as a catalyst for resource-based conflicts between refugee and host communities, particularly among pastoralist populations who depend on livestock for their livelihoods. These conflicts manifest primarily as disputes over grazing territories and water access points, issues that have intensified as heat-induced environmental degradation diminishes the availability of these critical resources. The conflicts typically occur during the dry season when temperatures peak and vegetation becomes increasingly scarce within and immediately surrounding the camp boundaries. Refugees, particularly those from Somali pastoralist backgrounds who maintain livestock as both economic assets and cultural heritage, find themselves compelled to venture beyond designated camp areas in search of grazing land that can sustain their herds.

These movements into territories claimed by host communities trigger confrontations that range from verbal disputes to physical altercations, occasionally escalating to involve local authorities or traditional conflict resolution mechanisms. The conflicts are not random or spontaneous but follow predictable seasonal patterns aligned with temperature fluctuations and resource availability. During extreme heat periods the frequency and intensity of these disputes increase markedly. Host community members, who themselves face similar environmental pressures, view refugee incursions as territorial violations and competition for already scarce resources. They argue that refugees benefit from humanitarian assistance and therefore should not need to access communal grazing lands, while refugees counter that aid provisions are insufficient to sustain their livestock, which represent crucial livelihood assets and cultural significance.

*Ref 1: "Heatwaves force us to take our herds outside the camp in search of greener pastures and water. When we do so, it creates conflict with the host community, who feel that*

*we are trespassing, as they have marked these areas as their territory and do not allow us to graze there."*

These conflicts carry significant implications beyond immediate resource access. They strain the social fabric between refugee and host communities, undermining the cultural integration that chapter two identified as crucial for the camp's long-term sustainability. The tensions contradict the broader policy objective, articulated in the Shirika Plan, of fostering harmonious coexistence and local integration. Moreover, these disputes create additional vulnerabilities for refugees, who may face retaliation, legal consequences for unauthorized movement, or complete loss of livestock if animals are confiscated by authorities or host community members. The conflicts also reinforce negative stereotypes and deepen divisions along lines of citizenship status, ethnicity, and resource entitlement, making collaborative adaptation to shared environmental challenges increasingly difficult.

The economic dimensions of heatwave impacts extend beyond direct health effects to fundamentally reshape market dynamics and business viability within the camp. Perishable goods, particularly fruits and vegetables, become increasingly expensive and scarce during intense heat periods as the entire supply chain from production through transportation to retail sale faces heat-related challenges. Suppliers prioritize their most reliable customers, typically members of the host community with established relationships and purchasing power, leaving refugee traders to receive lower-quality products that have already begun to deteriorate. These inferior goods arrive at the camp wilted, discolored, or partially spoiled, forcing traders to sell them at significantly reduced prices or accept complete losses.

The transportation process itself exacerbates these challenges, as vehicles traveling from regional markets to Dadaab expose produce to prolonged heat without adequate cooling systems. Refugee traders, operating with minimal capital and lacking cold storage facilities, cannot invest in the protective measures that might preserve product quality. They face a double burden: paying premium prices for goods that are already heat-damaged, then absorbing additional losses when forced to sell these products at throwaway prices to avoid total spoilage. This cycle erodes profit margins, depletes working capital, and threatens business sustainability.

*Ref 7: "Due to heatwaves, prices for perishable goods like fruits and vegetables are very expensive given their scarcity and the sensitivity of transporting them. They cannot be*

*bundled into the car but rather they need a lot of care in handling and transportation. Most of the time they get into the camp in a bad state due to heat; vegetable having turned colour, fruits squashed and therefore we are forced to sell them at throw away price, making losses."*

Beyond perishable goods, heatwaves reshape the temporal rhythms of commercial activity. Customer behaviour shifts dramatically during peak heat, with market traffic declining precipitously between mid-morning and late afternoon as residents seek shelter from extreme temperatures. Traders must balance the need to maintain visible presence to retain customer loyalty against the health risks and discomfort of extended heat exposure. Those who close their businesses during hot hours risk losing regular customers who may interpret closure as permanent unavailability and shift their patronage to competitors. Yet those who remain open face reduced sales volumes while incurring the personal costs of heat exposure, creating an economically irrational but socially necessary practice.

Heatwaves also drive refugees toward livelihood strategies that, while economically necessary in the short term, contribute to environmental degradation and undermine long-term sustainability. The firewood trade exemplifies this paradox, as approximately 80,000 households in the camp rely primarily on wood fuel for cooking, creating sustained demand that incentivizes deforestation. Refugees facing economic pressure turn to cutting and selling firewood as a readily accessible income source that requires minimal capital investment. The practice intensifies during periods when other livelihood options become untenable due to heat, as firewood collection and sales can be conducted during cooler morning and evening hours.

However, this coping strategy accelerates deforestation in an already arid environment, reducing tree cover that might otherwise provide shade and moderate temperatures through evapotranspiration. The removal of vegetation exposes more soil to direct sunlight, increasing surface temperatures and contributing to the broader urban heat island effect discussed in chapter one. This creates a feedback loop where heat-driven livelihood choices exacerbate environmental conditions that intensify heat impacts, further limiting sustainable livelihood options. The practice also positions refugees as environmental degraders in the eyes of host communities and authorities, complicating efforts toward integration and potentially inviting sanctions or restrictions that further constrain livelihood options.

*Ref 3: "When my tailoring business is slow, I borrow an axe from my neighbour, cut trees, sell the firewood, and share the proceeds with them. Firewood is in high demand in the camp, as it is the main source of cooking fuel, and hotels also buy it to prepare food for their customers. I am even considering making charcoal to sell, as it is highly profitable, but my main concern is how to secure enough capital to start."*

This progression from health impacts through resource conflicts and economic disruptions to environmental degradation reveals how heatwaves function as a multiplier of existing vulnerabilities. The effects cascade through interconnected systems—individual bodies, household economies, community relations, and environmental conditions—demonstrating that heat impacts cannot be understood or addressed in isolation. The sustainable livelihood framework proves valuable here in showing how climate factors interact with assets, social relations, and broader economic and ecological dynamics to create complex, mutually reinforcing patterns of vulnerability. Each impact area influences and intensifies the others, creating a web of challenges that demands comprehensive, integrated responses rather than piecemeal technical interventions.

## **5.3 Livelihoods and Adaptation Measures**

### ***5.3.1 Financial and physical capital***

Heatwaves also affected the source of livelihoods for business owners in terms of limited movement and duration in which they can engage in a decent livelihood. Exposure to heatwaves is eminent due to the market competition where business owners engage in similar businesses. For example, a grocery vendor operating in a small shop, the overhead covering does little to shield her and the groceries from direct sunlight and heat. *She spoke.*

*Ref 7: "You can see how my duka looks like, customers avoid walking during the day so there are few customers, they prefer coming in the evening. The heat sometimes forces me to stay home especially between 9:00 and 16:00. But I can't just close my kibanda because the customers will not come in the evening as they think you are not available. I still need to be present all the time; customers don't like sellers who are not always available. Therefore, I constantly sprinkle water on my vegetables and cover with a sack for my vegetables to remain fresh"*

Heat waves limit the type of business that the refugees can venture in since it increases the cost of doing business. It also hinders some livelihoods that refugees are quite passionate about or that they used to engage in back in their countries.

*Ref 4: "I had my own clinic back in Somali...i can't put a clinic here because some drugs need to be stored in cold temperatures. And buying such equipment is very expensive"*

*Staff 1: "Here we can't farm, but there are a few who practise the climate smart farming (through use of heat-resistant crops and greenhouses) but due to water scarcity, they only do it for consumption and not for selling."*

Moreover, from the responses, it is eminent about the nature of livelihoods as not all businesses thrive, some fail, others take longer to stand and not everyone is good in business.

*Ref 1: "The Somalis are the ones good in business, for me I prefer employment.....I have tried several businesses but failed."*

### **5.3.2 Human Capital**

The refugees engage in other livelihoods as a means of adapting to the limitations brought about by heatwaves, and which have a promising future. Refugees have engaged in skills training (like computer and tailoring, higher education (diplomas and degrees especially as teachers).

*Staff 2: "Being employed is better since I don't have the spirit of doing business like others, it also helps me earn better than business owners and without spending a lot of time in the sun."*

An NGO staff member explained how these skills are helpful even to those who have gone abroad.

*Staff 3: "They tell you how the skills they learnt here have helped them abroad, if it were not for those skills they would be stuck."*

However, most of the work they obtain through these skills are temporary, with those employed in schools and NGOs working on short-term contracts ranging from three months to one year.

Refugees with vocational training also explain that the jobs where they apply these skills are temporary, as they are only available when requested by customers.

Staff 5: *“I am employed with one of the NGOs here and I am on contract....my contract is for 6 months, after that I am not always sure that it will be renewed and sometimes it takes a longer time for them to sign another contract.”*

Ref 3: *“When I get orders from customers, I put my tailoring machine in the shade .... I also have a certificate in computer packages....not everyone is computer literate, so I help them when they request and I get something in return (I am paid) in return.”*

Ref 4: *“Sometimes the pupils fail to come back to class after lunch due to excess heat and if the education inspector visits your class and finds out, we are made answerable and in many cases a teacher is expelled. The heat affects the concentration of the students, decreasing their performance which is really demotivating for us teachers.”*

### **5.3.3 Social Capital**

Drawing on Bourdieu's concept of social capital discussed in Chapter 3, social cohesion emerges as a critical adaptive strategy. Social capital, defined as the networks and relationships that enable refugees to access resources and support, plays a vital role in how refugees navigate heat-related livelihood challenges.

Due to movement restrictions that hinder the refugees from undertaking sustainable livelihoods in the wake of heat related challenges, they rely on friends from the host community to help them buy stock from outside, if they want to purchase a car, and register for business.

Ref 4: *“The movement permit process takes too long since it is only done on Thursdays, meaning if you miss, you must wait until the following week. As a result, many of us rely on friends outside the camp to help us bring in stock, but without refugee identification, we cannot own a car or operate a business ourselves—leaving us vulnerable to being swindled by those we depend on”*

The Somalis are the majority in the camp, and they are culturally a close-knit community. “Qabil” is a community-based collective for saving, lending, and supporting members financially. These social structures have helped the Somali refugees to support each other in terms of livelihoods.

In conclusion, due to heatwave-related challenges, refugees also pursue multiple sources of livelihood to sustain themselves. :

*Ref 4: "I am a teacher....I have 2 other businesses because my salary is not enough. This helps me meet the needs of my family that would not have happened if I had one source of income.*

*Staff 3: "Here the refugees are hardworking, and they do not give up easily, if plan A fails, then they initiate plan B, C, D and so on."*

## **Relational inequalities**

Due to their protracted situation, heatwaves are the least of their concerns. This increases the vulnerability of breadwinners, as families still need their basic needs met, forcing them to work in the scorching heat to make ends meet. Despite the knowledge of heatwaves, the demands of meeting daily survival needs often force them to keep working despite the potential dangers.

*Ref 7: "My family still needs to eat at the end of the day...other than food, there is also soap, books for school, clothes and many others that my family needs."*

Another respondent added that as man he couldn't talk about heat waves, it sounded like a feminine topic- something that girls would talk about

*Ref 3: Translated " Heatwaves? You won't find a man talking about the sun; that sounds feminine)*

Mostly men are the ones receiving the money for food assistance in the household raising cultural issues that render women more vulnerable.

*Ref 2: "Men are seen as the head of the houses and therefore they are the ones who receive the money."*

From the responses, it was clear that women empowerment was an issue, as most men were the breadwinners while women stayed at home taking care of the household or engaged in menial jobs.

*Ref 3: "sometimes the business is down. My wife does menial jobs like washing clothes or fetching water for others to earn more income for the family."*

This also shows that some women are vulnerable to the impacts of heatwaves on decent livelihoods because of their expanded care taking roles and they have more difficulty recovering from them, in part because they provide support to others. Their families are usually bigger, which worsens the situation. Women often lack agency in adapting to the effects of heatwaves on livelihoods. They are expected to take care of their families, frequently marry at a young age, and, in the case of single mothers, the absence of a male partner limits their voice in accessing aid and doing business. Culturally, women in the camp are often viewed as the ‘inferior other,’ further constraining their ability to influence decisions.

*Staff 3: “Aid has excluded some needy people especially women, like my neighbor who is a single mother with 7 children, she was told that she falls in group 3, therefore she is will not get the aid. She also doesn’t have a man who can escalate this issue and defend her.”*

However, men are also vulnerable due to the patriarchal system, which expects them to provide for their households. As a result, they are often forced to take on hard labour, including supporting their parents and other relatives, and to work through extreme heat to earn enough to meet the family’s basic needs.

*Ref 6: So, you mean I go and tell my family that the sun was too hot and that’s why couldn’t work? No one will buy that.”*

Following heat adaptation measures, social class categories have emerged to access the limited resources available. Heatwaves limit the types of products refugees can sell, as perishable goods like fruits and vegetables become expensive and scarce, reducing their profits. Additionally, refugees engaged in such businesses often face inequalities, as defective or damaged items are given to them while the host community receives priority, further exacerbating disparities

*Ref 7: “The cost of vegetables is high, and it is hard to get them, they (suppliers) end up giving their friends- who are the host counterparts. We end up getting fruits and vegetables that are defective or damaged which we end up selling at a lower price.”*

From the study, Not everyone has the same opportunity to access livelihoods in the wake of heatwaves. Inequalities interact with heatwaves to worsen vulnerability, limiting refugees’ adaptation and access to sustainable livelihoods.

*Staff 6: “The Somali are business oriented and help each other a lot. You find that the camp is Somali- dominated and not all groups are equal. Ffor example, the Ethiopians, Ugandans, Congolese and the South Sudanese lack this access.”*

For the refugees privileged to be employed as teachers also face inequalities and marginalisation, they are not recognised by the Teachers Service Commission (TSC) which gives a teacher the license to teach in public schools, therefore, they are paid differently from a normal teacher as one respondent said.

Ref 4: *“As a refugee teacher, we only earn 8,000 KSH (€55) per month but a teacher on the government payroll who has been sent to work here is paid over 50,000 KSH (€345) and you are more qualified than them, knowing the needs of the students in the area. Due to movement restrictions, we are not allowed to teach outside the camp, so we are not able to be transferred or promoted to other regions”*

The participants were able to sustain their livelihoods despite these challenges but all of them were on a short-term basis.

Due to the temporary nature of livelihoods, the findings highlighted two contrasting aspects: vulnerability and opportunity. These were shaped by dynamic, interacting forces that constantly shifted the balance, creating a complex network of influences.

The government, citing security concerns, confines the refugees within the camp, and movements outside the camp are restricted and monitored. Since the refugees were initially considered temporary camp dwellers, they are not allowed to own land (Montclos and Mwangi, 2002). Therefore, Despite the opportunity’s heatwaves may present, other factors come into play that render refugees vulnerable. Policy restrictions like movement, identification documents and restricted land ownership hinder the refugees to carry out. One respondent expressed this;

Ref 1: *“We cannot carry out long term business in a constrained area. It is hard to expand my business outside the camp as we are cannot move freely ”*

#### ***5.4.1 Transforming structures and processes (local, national and international)***

The camp has gained its urban features through informal markets and not through the modernist ideologies of an industrial path characterized by industrialized manufacturing sector and advanced technology. However, despite the developments in the camp, sustainability remains a concern, as heatwaves continue to challenge the urban notion.

Staff 3: *“Dadaab camp itself is a market.... any sector that you can think of it is here in Dadaab.it is now categorized as a municipality because of its growth.”*

*Figure 5.1: Part of a Market in Dadaab Refugee Camp.*



Sources: <https://medium.com/samuel-hall-stories/trapped-in-camps-or-struggling-in-the-city-the-realities-facing-somali-refugee-women-in-kenya-6786982e18e>

The figure above shows one of the markets in Dadaab Refugee Camp located in Dagahaley. The dukas (stalls) are partly constructed from iron sheets, which do not insulate heat effectively. As a result, the interiors become very hot during the day exposing the business owners to extreme heatwaves.

Another problem with sustainable livelihoods and the urban agenda is that they require a very high budget, both for NGOs, government and for the refugees;

One NGO staff said that.

Staff 1: *“to be self-reliant needs the organisation to pull them (refugees) from aid-dependency by meeting all their basic needs then work towards self-reliance which needs a lot of funds which we do not have at the moment.”*

Another refugee responded that:

Ref 1: *“to make a business thrive we need more capital which we lack at the moment”*

Staff 1: *“ There has been a recent shift in the camp, where nearly all programmes previously implemented by NGOs have been transferred to the national government in line*

*with global policy changes. Our organisation's funding has been cut by up to 90%, creating significant uncertainty about our work and future presence in the camp. If this continues, there may soon be no NGOs operating in Dadaab, All NGOs are now required to work through the respective government ministries."*

Due to the drastic changes following the government's takeover of camp management, this development confirms the urban agenda mentioned earlier, which seeks to transition from NGO-led interventions to state-led ones. As a result, UNHCR and other humanitarian organisations are in a position of uncertainty. Since major assistance programs have ended, it remains unclear whether there will be a complete withdrawal of NGOs and international agencies, including UNHCR, or if humanitarian organisations will retain limited access to the camp. This also raises concerns about refugees' sustainable livelihoods. Given the state's position on the camp, it is unclear whether the camp may be closed in the future. It is also uncertain whether the Shirika Plan will succeed in integrating refugees into the host community, or if the camp will be closed and the refugees repatriated to their countries of origin citing "voluntary return" either way this raises Montclos et al (2000) concern that the countries of origin may not have the "economic pull" (Kagwanja and Montclos, 2002) needed for a sustainable livelihood. This shows the fluctuating and uncertain status of the sustainable livelihood that the refugees are facing.

Most of the participants were unaware of the early warning messages from the meteorological department, and those who were aware did not find them relevant. This highlights an issue with modernization theory, where policies are rooted in modernist ideologies. As a result, early warning systems are formulated by meteorology experts who design solutions based on assumptions about the people meant to benefit. These early warning systems are disseminated through mobile phone messages, newspapers, or television news broadcasts.

*Ref 7: "I have not seen those messages."*

*Ref 3: "Yes, I get the messages and even the advisories, but we are used to this heat since I came here 30 years ago. For me, it is normal, so I don't pay attention to the messages."*

The early warnings and heatwaves advisories raise concerns about access, as having a mobile phone does not guarantee that individuals will receive or act on the information.

There are other factors that come to play, as the two respondents who were aware of the messages had some form of literacy, nonetheless, they also did not act on the message with another respondent ignoring the message all together.

*Ref 5: “Here it is about 39 or 40 degrees (uh-uh) I know because I have internet. ...., I just buy bundles 20 bop per day if I want to follow a certain story like politics.... .... lately it has become so hot, so I just want to know, also it is on my phone screen.”*

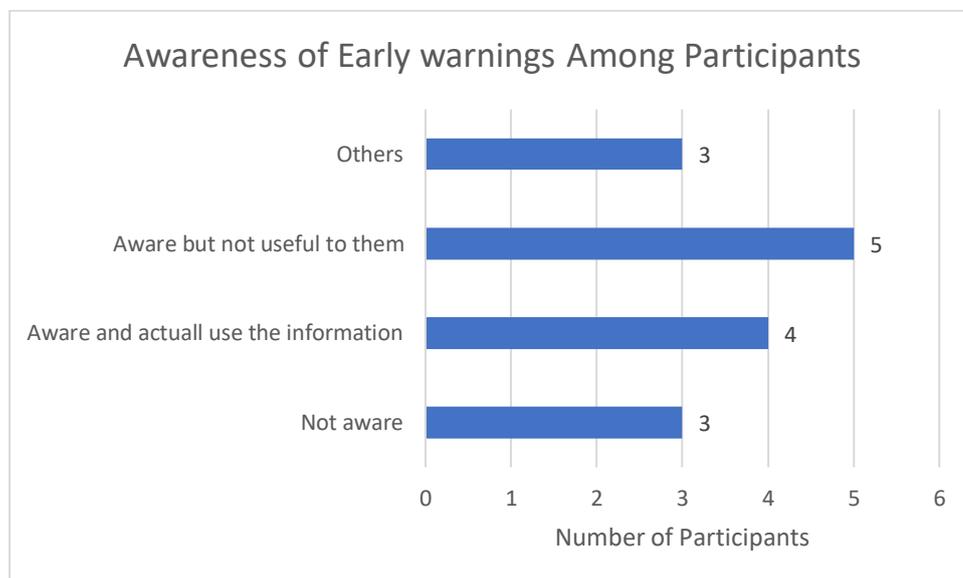
Other respondents answered;

*Ref 8: “I am not aware. The children are always with my phone. They are even waiting for me to finish talking to you so they can use the phone.”*

*Ref 5: “I also remember I read about heat problems in the gazette where they were telling us what to do like drink a lot of water, stay in shade, avoid going out and areas to avoid going like Turkana.”*

*Ref 7: “Not sure but I have seen messages from the government, but I don’t remember when.”*

*Figure 6.1: Awareness of early warnings among the 14 participants*



source; analysis based on the findings from the interviews.

Although the government is responsible for promoting Heat-related policies, its stability is more crucial. There has been a lot of instability as one respondent expressed;

*Staff 3: “The government is very unpredictable; you find that one day a president wakes up and orders the camp to be closed so we are constantly worried about the stability of the camp. .... the next elections will be in 2027, we are not sure which government will come to power and if they will interfere with the ongoing progress.”*

The government sits between two options: fulfilling its mandate of maintaining law and order, tax collection- which are the key pillars of the government objectives and pursuing development goals on the other hand. One government official expressed the level of distrust the government has towards the refugees, noting that the authorities are merely waiting for one wrong move before acting.

*Staff 6: “We have brought huduma centre<sup>5</sup> to the camp, the refugees can file their taxes and access government services easily .....but we (government representatives) are looking at them(refugees) with very long binoculars( Meaning that their actions are closely being monitored).”*

Although dependency theory advocates for local solutions, we have seen a shift in policy implementation from NGOs to the local level, namely the state. However, context matters, which is why dependency theory cannot guarantee the success of policy implementation. However, it raises the concern about what is truly ‘local,’ as the state still cannot fully meet the specific needs of local communities, leaving gaps that may hinder effective policy implementation.

There is also a sense of distrust and uncertainty among the refugees, as they doubt the government’s ability to live up to its mandate following the transition of responsibilities from NGOs to state authorities.

*Ref 4: “we are not sure what will happen to the camp now that it is in the hands of the government. We prefer NGOs more than the government. It is really disheartening. The aid that we were getting is not there now, only few individuals are getting it but we are still surviving but I don’t know for how long.”*

### **5.5.1 Traditional knowledge and belief as a substitute of heatwave policies**

Based on these results, respondent prefer traditional knowledge to cope with heatwaves, which reflects the limited impact of early warning messages. Heatwaves are a con-

<sup>5</sup> Huduma centre is generally a one stop center where citizens can access public services like public health insurance, identification, business registration among other services (DRS, 2023).

cern, and participants attached different meanings to them. One participant, for instance, expressed concerns about heatwaves by drawing on social meanings. This highlights that indigenous knowledge plays a significant role in shaping how heatwaves are understood and addressed.”

*Ref 3: “The weather is always an act of God.”*

*Ref 1: “I feel like I don’t have enough blood, I heard that ‘strungi’ (black tea) is not good for my health because it ‘dries out my blood,’ but I can’t afford milk to make [mix with the] tea.... Camel milk is very good, when the body is very hot.”*

The participant attributes and perceptions on the effects of heatwaves as associated to drinking “strungi” meaning “black tea.” This brings out the knowledge of foods that increases an individual’s risk of heatwaves but is also restricted to available financial resources. Financial issues are determinants of vulnerability to heatwaves with another respondent stating;

*Ref 4: “When I buy food, I prioritize on what is important rather than luxury. Luxury is like fruits, milk, meat and lately the price of sugar has become too high so sometimes we have to drink tea ‘ndubia’ (without sugar).”*

Others associated the topic of heatwaves to the rich

*Staff 1: “why heat waves and why Dadaab? The title to me sounds so elite. The elite are the ones who can be affected by the heat waves, for us it’s normal.”*

The refugees live in either semi-permanent houses, or the Tuqul- which is a temporary shelter made of bent sticks covered with nylon papers forming a dome-shaped structure. The absence of permanent housing can be attributed to various issues like restricted land ownership and the uncertainty that come with their situation as they are not viewed as Kenyan nationals neither are they citizens of their own countries. However, it is not all about marginalisation and poverty as Siddiqi (2024) argues. The tuqul holds a cultural significance especially for the Somali who are nomadic pastoralist who move from one area to another in search of greener pastures. They build the tuqul as temporary housing as it allows them to be able to move easily. It is designed to mitigate heat through its thick mud walls, which absorb heat during the day and release it slowly at night to maintain stable indoor temperatures. The small vents that promote cross-ventilation, allowing air circulation to cool the interior during hot periods. Unfortunately, due to lack of building materials, they end up making it as a makeshift shelter as seen below.

*Figure 7.1. A picture of a traditional housing called tuqul*



Source; photo taken by the Assistant during the interviews

## **Politics of influence and access**

The study reveals that the politics of influence and access play a significant role in shaping livelihood outcomes in Dadaab Refugee Camp. Power relations determine who gains access to resources, opportunities, and decision-making spaces, often favouring certain

groups over others. Conversely, other groups with limited social or political influence face greater barriers to participation and resource allocation. This demonstrates that access to livelihoods in the camp is not solely determined by need or capacity, but is deeply influenced by existing power structures and social relations within and beyond the refugee community.

For instance, the Somali refugee community, due to its strong social networks and established connections with local actors, is often better positioned to influence livelihood programs and access formal markets.

Refugees generally face exclusion, which supports dependency theory's critique of modernization theory. Modernization ideologies are so deeply ingrained in the minds of experts that they unconsciously dismiss the actual needs of refugees, believing they know what refugees need better than the refugees themselves.

The NGO staff argue that they involve the community in project designs and implementation, however, some participants expressed their concerns with one saying that;

*Ref 3: "We are always invited at the decision-making table, but our concerns and views remain on the table."*

This is evident since one NGO staff member revealed that;

*Staff 1: "We sit down with the community representatives to determine what they want to do and 'guide' them since we know how the market is out there."* This shows that despite involving the refugees, they still feel like they are experts, and they know what is best for the refugees. Moreover, the selection of these community representatives poses a concern if all groups in the community are represented and the criterion of choosing them.

# Chapter 6 Summary of Findings, Recommendations and Conclusion

## 6.1 Introduction

The final section of the study presents a summary of the key findings and results.

### *6.1.1 The effect of heat waves on refugee's quality of life and livelihood*

The findings reveal that refugees are significantly exposed to extreme heatwaves, primarily due to expectations from their dependents and customers, which leads to prolonged working hours in the heat. Consequently, this exposure results in various health complications, including dehydration, heat exhaustion, respiratory infections, and gastric illnesses, all of which directly compromise their ability to sustain their livelihoods.

Moreover, heatwaves substantially reduce refugees' capacity to pursue sustainable livelihoods by limiting their productive working hours, particularly during the most economically viable times of the day. This temporal constraint is further compounded by changes in customer behaviour, as clients tend to avoid shopping during peak heat hours, thereby reducing business opportunities. Additionally, the quality of perishable goods, especially fruits and vegetables, deteriorates due to heat-induced inequalities in the supply chain, with refugees often receiving inferior products. This situation is worsened when businesses are perceived as closed during hot periods, leading to a loss of regular customers who assume unavailability.

Beyond economic impacts, heatwaves also serve as a catalyst for social tensions and conflicts. Specifically, when refugees seek greener pastures for their livestock due to heat-related environmental degradation, they inevitably encroach on areas claimed by host communities, thus creating territorial disputes and straining community relations.

Furthermore, the study reveals that heatwaves exacerbate existing inequalities within the camp. For instance, host communities often receive preferential treatment in accessing

quality goods during shortages, while ethnic divisions become more pronounced, with Somali refugees generally having greater access to resources and opportunities compared to Ethiopians, Congolese, South Sudanese, and Ugandans. Simultaneously, gender dynamics play a complex role in vulnerability, with both men and women experiencing heat-related challenges, albeit in different ways—men through the pressure of being primary breadwinners and women through restricted access to decision-making and resources.

The physical infrastructure of the camp itself intensifies heat exposure. Most shops and dwellings are constructed from corrugated iron sheets, which are poor insulators and significantly amplify indoor temperatures, thereby creating an environment where refugees must work and live under consistently oppressive heat conditions. This structural vulnerability underscores how heatwaves interact with multiple factors, health, economic, social, and infrastructural, to comprehensively undermine refugees' quality of life and their pursuit of sustainable livelihoods.

### ***6.1.2 How Refugees adapt to the effects of heatwaves on their livelihoods***

Businesses open early in the morning and operate until late in the evening, adapting to the routines of their customers. Traders employ improvised cooling methods, such as constantly sprinkling water on fruits and vegetables or covering them with sack cloth, to maintain freshness, while the traditional *tuqul* helps keep the environment cool. Refugees engaged in business increase their water intake to stay hydrated and prevent heat exhaustion, and many diversify their sources of livelihood to sustain themselves over a longer period. Increasingly, refugees are pursuing skills training and higher education, moving away from agriculture as the primary means of income. They also build strong social cohesion and establish loan services, supporting one another to achieve sustainable livelihoods. Refugees are aware of foods that increase their vulnerability to heatwaves, such as black tea, and of those that help the body cope with heat, like camel milk. To navigate uncertainties, they prepare multiple contingency plans, labelled A, B, C, and beyond.

### ***6.1.3 Relevance of heat- related policies and the role of the government on the refugees***

The refugees express their experience on having skepticism towards government assistance, often referring to past experience of corruption, instability and ineffectiveness. Refugees prioritise their own strategies and community support networks rather than adopting heat- related policies like early warning systems, cooling systems or seeking government assistance. It shows their level of independence and a belief that they can manage their challenges better without external interference. Perceptions, attitudes and beliefs build a social construct towards how the refugees interpret heat waves.

There is mistrust by the government on refugees mainly due to security concerns and which is also attributed to the government clashing mandate of maintaining law and order versus promoting development policies.

Government unstable decisions threaten refugees' sustainable livelihoods and collaboration strategies towards achieving inclusive heatwaves policies.

## **6.2 Discussion**

The sustainable livelihoods framework proves valuable in demonstrating how climate factors interact with assets, social relations, and transforming structures to shape livelihood outcomes. However, the research suggests the framework could be strengthened by more explicitly incorporating cultural capital, which plays a crucial role in refugees' ability to navigate challenges and access opportunities. The framework successfully captures the dynamic, fluctuating nature of refugee livelihoods, where heatwaves, policies, power relations, and individual agency continuously interact to create both vulnerabilities and possibilities for adaptation.

Critically, the study establishes that current approaches to addressing heatwaves in refugee contexts remain predominantly reactive and technical, focusing on forecasts, advisories, and infrastructure interventions while overlooking the social, political, and cultural dimensions that fundamentally shape vulnerability and adaptive capacity. Refugees possess valuable traditional knowledge about heat management and maintain sophisticated social support systems, yet these assets are rarely recognized or integrated into formal policy and programming.

The research reveals that achieving transformational adaptation, the kind of fundamental change necessary to address root causes of vulnerability and build genuine adaptation, requires moving beyond technical fixes to confront deeper structural issues. These include legal and policy barriers that restrict refugees' rights and mobility, power inequalities that limit their voice in decision-making, inadequate recognition of their knowledge and capacities, and institutional fragmentation that hampers coordinated responses. Without addressing these underlying factors, adaptation efforts will remain partial and superficial, leaving refugees perpetually vulnerable to the intensifying impacts of climate change.

The implications extend beyond Dadaab to broader debates about climate adaptation in contexts of forced displacement. The intersection of these phenomena demands urgent attention and innovative approaches. The study demonstrates that effective adaptation cannot be imposed from above but must emerge from genuine partnership with affected communities, recognition of their agency and knowledge, and commitment to addressing the structural inequalities that constrain their options and amplify their vulnerabilities.

### **6.3 Conclusion**

In conclusion, this study reveals that while heatwaves pose significant threats to refugee livelihoods in Dadaab, the ultimate barriers to sustainable adaptation lie not in climate conditions themselves but in the social, political, and institutional structures that constrain refugees' options, suppress their voices, and perpetuate their marginalization. Refugees demonstrate remarkable adaptable strategies and creativity in navigating these challenges, yet their adaptive capacity remains fundamentally limited by factors beyond their control. Achieving genuine climate resilience in contexts of displacement requires acknowledging and addressing these structural constraints, recognizing refugees as capable agents rather than passive recipients of aid, and committing to transformational changes that extend beyond technical interventions to encompass rights, participation, equity, and justice. As climate change intensifies and displacement situations become increasingly protracted, the urgency of this agenda only grows. The experiences and insights from Dadaab offer valuable lessons not only for refugee policy and programming but for climate adaptation more broadly, demonstrating that effective responses must be grounded in local realities, attentive to power dynamics, and committed to addressing root causes rather than merely managing symptoms.

Only through such comprehensive, transformational approaches can we hope to support truly sustainable livelihoods for refugees and other vulnerable populations facing the compounding challenges of displacement and climate change.

The main objective of SDG 11 is to promote inclusive, safe, adaptive, and sustainable cities through effective urban planning, infrastructure development, and management. (Global Goals, 2025). However, this study questions the applicability of urbanization in a refugee context, as the conditions faced by refugees differ greatly from those of ordinary citizens, raising concerns about sustainability amid heatwaves. The findings reveal that urbanization has done little to improve refugees' livelihoods, failing to address key challenges affecting sustainability in Dadaab Refugee Camp.

Looking forward, several critical areas demand attention from policymakers, practitioners, and researchers. First, heat-related policies must be redesigned to reflect refugees' actual experiences, needs, and capabilities rather than technical assumptions about what they should need. This requires meaningful participation that goes beyond consultation to genuine co-design and community leadership in adaptation initiatives. Second, legal and policy frameworks must be reformed to grant refugees the rights, mobility, and resources necessary to pursue sustainable livelihoods and make long-term investments in their futures. Third, adaptation strategies must integrate multiple scales and actors, from individual and household practices to community networks, institutional support, and national policy frameworks, recognizing that transformation requires coordinated action across these levels. Fourth, research must continue to document and analyse refugees' experiences, innovations, and perspectives to build evidence for more effective and equitable adaptation approaches. This includes longitudinal studies that track how vulnerabilities and adaptive capacities evolve over time, comparative research across different refugee contexts, and participatory research methodologies that centre refugee voices and knowledge.

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## APPENDICES

### Appendix a: INTERVIEW GUIDE : Refugee Respondents

#### The Impact of Extreme Heatwaves on the Rebuilding of Refugees' Sustainable Live-

#### livelihoods; A Case Study In Dadaab Refugee Camp In Kenya.

##### Section A: Participant Information (Demographics)

1. Age: \_\_\_\_\_
2. Gender:  
 Male     Female     Other     Prefer not to say
3. Country of Origin: \_\_\_\_\_
4. Current Location: \_\_\_\_\_
5. Duration of Stay in the Host Country or camp:  
 Less than 1 year     1–3 years     4–6 years     More than 6 years
6. What is your education Level? (*No formal education, Primary, Secondary, Tertiary or others*)

---

**Section B: Sustainable Livelihoods**

7. How do you currently support yourself and your family?

*Please describe whether you rely on aid, formal, informal or small business, or other means. is it one or you have several sources)*

---

8. Have your livelihood activities changed since arriving in the camp?

Yes     No

If yes, please explain: \_\_\_\_\_

*Probing questions;*

- Are there alternatives that you can pursue and is there anything that hinders you from pursuing them?
- 

9. Can you describe what a typical hot day looks like for you?

*(Consider mentioning how it feels, what you do during the day, any challenges you face, and how you cope.)*

---

10. What is the hardest things you face due to heatwaves and is there a way you tackle these issues?

---

*Probing Questions;*

- Are there any other challenges you face in sustaining your livelihood in the hot season?
  - How do you receive support?
  - Is your current work or livelihood something you can rely on in the long term, or is it just helping you get by for now?
- 

**Section C: Perceptions of Adaptation and Vulnerability**

11. How would you describe your ability to adapt to your current environment?

---

*Probing questions;*

(What factors help you adapt? *Family/community support, skills/training, access to information, religious/faith-based support or Others*)

---

12. In your view, what are the biggest risks or vulnerabilities you face today? (do you see any in the future?)

---

13. What changes would improve your livelihood situation?

---

**Section D: Policies and structure**

14. Are there any assistance, like cash transfers, soft loans, among others you receive either from the government, NGO or other institution? (please give a description)

---

*Probing questions;*

- What can you say is the strengths?

---

- What can you say about the weakness

---

- What can you suggest as strategies that would improve the above issues?

---

**Section E: Additional Comments**

15. Do you have any other comments or questions ?

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**Appendix b: INTERVIEW GUIDE : Humanitarian Workers**

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### **Section 1: Background and Role**

1. Can you describe your role in implementation of the social protection projects and how it relates to climate change or livelihoods?

---

2. What is the main goal or focus of the social protection projects you're working on?

---

### **Section 2. Understanding of the Community and Context**

3. What are the main livelihood challenges faced by the community or refugees you work with?

---

4. How has climate change affected the livelihoods in this region, in your view?

---

### **Section 3. Strategies and Interventions**

5. What other interventions or support does your organization provide to improve sustainable livelihoods?

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*Probing questions;*

- What kinds of interventions or support does your organization provide to improve sustainable livelihoods?

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- How do your programs take climate risks and environmental changes into account?

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- What strategies have worked best in helping people adapt their livelihoods to changing conditions?

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#### **Section 4. Collaboration and Participation**

6. How do you involve local communities or refugees in the planning and implementation of projects?

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7. Do you work in collaboration with other agencies or government departments? If so, how?

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- **Section 5. Monitoring, Impact, and Learning**

8. How do you measure the success or sustainability of the livelihoods your projects support?

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9. Have you seen long-term improvements in people's self-reliance or economic resilience?

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10. What challenges or limitations have you encountered in delivering or scaling your programs?

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**Section 6. Policy and Institutional Environment**

11. What role do government policies or legal frameworks play in enabling or hindering your work?

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12. Are there any policy changes you believe are necessary to support sustainable livelihoods more effectively?

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**Section 7. Reflections and Future Outlook**

13. What lessons have you learned from this work so far?

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14. What would you do differently if given more resources or flexibility?

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15. What do you see as the biggest opportunities or threats for livelihoods in this region over the next 5–10 years?

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