INITIATIVE ON
Climate Resilience

FACTSHEET 2023/10

How does climate exacerbate root causes of conflict in Zambia?

Climate Security Pathway Analysis

Niklas Sax, Leonardo Medina, Ignacio Madurga Lopez, Theresa Liebig, Giulia Caroli, Joram Tarusarira, Gracsious Maviza, Grazia Pacillo.

This factsheet gives answers on how climate exacerbates root causes of conflict in Zambia using a pathway analysis. Three main pathways are identified:

1. Resource Availability and Access: Despite Zambia's abundant water resources, uneven rainfall due to climate variability, coupled with inadequate infrastructure, leads to local water scarcities during droughts. These scarcities result in small-scale conflicts over water sources during the dry season. Internationally, disproportionate sharing of water resources among riparian nations in the Zambezi River Basin has the potential for violent conflict within the region, fueled by climate change and population growth affecting water supply and demand. Land conflicts, driven by unclear land rights within a dual tenure system, are compounded by climate impacts, diminishing the availability of arable land.

2. Livelihood and Food Insecurity: Climate change adversely impacts agriculture and pastoralism in Zambia, especially the staple crop maize, distributed to regions with projected declining yields due to its sensitivity to climatic impacts. Migration trends reveal a young population leaving rural areas due to limited economic opportunities, connected to reduced agricultural production and socio-economic challenges. Overburdened livelihoods prompt some to resort to maladaptive strategies, like deforestation and poaching, negatively affecting ecological resilience and social cohesion within communities.

3. Human Mobility: Climate pressures drive increasing out-migration for opportunities and fertile land. This leads to conflicts with host communities, fueled by resource competition and agricultural practice differences. Urban migration results in increased crime and illegal activities due to inadequate social services and job opportunities. Internationally, outward migration creates pressures in countries like South Africa, while inward migration causes xenophobic tensions in Lusaka.

CGIAR FOCUS Climate Security

CGIAR INITIATIVE ON Fragility, Conflict, and Migration

This publication is part of a factsheet series reporting on the findings of the CGIAR FOCUS Climate Security Observatory work. The research is centered around 5 questions*:

1. **How does climate exacerbate root causes of conflict?**
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2. **Where are the climate insecurities hotspots?**
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Questions 1, 2, 3, 5 are analyzed at country level through a Climate Risk Lens (impact pathways, economic, spatial, network and social media analyses). The policy coherence and scopus analyses are at continental level.

*Scopus is one of the largest curated abstract and citation databases, with a wide global and regional coverage of scientific journals, conference proceedings, and books. We used Scopus data for analyzing: (1) how global climate research addresses the dynamics between climate, socio-economic factors, and conflict, and (2) how the countries studied are represented in the database.

For more information please contact: p.laderach@CGIAR.ORG

1. CONTEXT

Climate profile

Zambia features a predominantly sub-tropical climate, marked by a hot and dry season (mid-August to mid-November), a wet rainy season (mid-November to April), and a cool dry season (May to mid-August) (UNFCCC 2020). The country comprises three agro-ecological regions (AER) with distinct precipitation patterns (UNFCCC 2020; Wineman 2016): AER I, covering Southern, Eastern, and Western provinces, stands as the driest and most drought-prone region, receiving less than 800mm of low, unpredictable, and poorly distributed rainfall annually. AER II, encompassing the Central and parts of Southern and Eastern provinces, boasts the most favorable conditions for agriculture, with an annual rainfall range of 800 to 1000mm. AER III, spanning the Copperbelt, Northern, and North-Western provinces, experiences erratic rains and longer rain seasons, with an annual rainfall of 1000 to 1500mm. Vulnerability levels differ across these agro-ecological regions, with the South and West being relatively dry, characterized by unpredictable, poor rainfall, and droughts; the North facing erratic rains and floods; and the Central/East standing out as the most favorable agricultural region (Wineman 2016). The climate correlates with the El Niño – Southern Oscillation (ENSO), where El Niño years tend to lead to an increase in dry spells, while La Niña years result in increased wet-spell frequency (Hachigonta & Reason 2006).

Historical climate data reveals that since 1960, there has been a notable increase in mean temperature (+1.3°C), a rise in the average numbers of hot days and nights (by 43 respectively) and a decrease in average rainfall throughout the year (2.3% per month per decade) (USAID 2016). Future climate change trends in Zambia suggest a projected temperature increase of 1.5 - 3°C by 2050 (AFDB 2018). While the entire country is witnessing a temperature increase, the southern and western regions experience the most significant rise (Detelinova et al. 2023). Consensus among most climate models is seen in rainfall variability projections, indicating prolonged dry phases and an increase in the number and intensity of extreme precipitation events (Gannon et al. 2014). This is anticipated to worsen extreme weather events such as floods and droughts (Gannon et al. 2014; USAID 2016; UNFCCC 2020). With substantial geographic variations, the overall decline in rainfall is expected to result in a 13% national reduction in water availability by 2100 (Hamududu and Ngoma 2019).

Conflict and fragility

Zambia is considered a politically stable country that, unlike most of its neighbors, has successfully avoided armed conflict in the post-colonial era (Burnell 2011). For this reason, Zambia has been framed a “Zone of Peace” in Southern Africa together with Malawi and Botswana (Brosché & Höglund 2017). The post-independence government led by the United Nation Independence Party (UNIP) promoted a strong sentiment of national unity over ethnic identity, balancing ethnic representation in political representation (Brosché et al. 2020; Lindemann 2011). Despite these efforts, ethnic and tribal identities never fully disappeared in the political sphere, as illustrated by the recurrent tensions with the secessionist movement of the ancestral Lozi Kingdom in Western Zambia (Zeller & Melber 2019; Roberts & Silwamba 2017)) and have become more prominent in the politics of the Patriotic Front (Nondo 2016). Despite being considered a stable country, Zambia has also faced episodes of political turmoil. In 1990 and 1997 it faced attempt of military coups (Burnell 2011). Riots such as in 2016 in the capital Lusaka,

when Rwandan shops were looted in two days of violence, occur occasionally showing a xenophobic tendency within the country. The underlying causes of these riots can be traced to the decline in copper prices, unequal wealth distribution, and dissatisfaction with former President Edward Lungu (BBC 2016; ACCLED 2016). In response, the Lungu administration escalated the repression of dissent through an excessive use of police force, resulting in a decline in human rights, particularly in the areas of freedom of expression and assembly (Amnesty International 2021). In 2021 there was a change in government after the long-time opposition leader Hakainde Hichilema of the United Party for National Development (UPND) won election in a landslide (Busari 2021). Even though Zambia is facing potential threats due to a deterioration of social and economic conditions, it needs to be emphasized that the country remains relatively stable and peaceful (Burnell 2011).

Socio-economic context

Zambia is a landlocked country that strongly relies on natural resources, making it particularly vulnerable to the changing climate (Tembo et al. 2020). Despite substantial economic growth between 2004 and 2014, the nation experienced stagnation when global copper prices declined (World Bank 2021), underscoring Zambia's economic reliance on mining, contributing about 12% to the GDP and offering direct and indirect employment for the local population (Kolala & Dokowe 2021). While mining is still a key industry for the country, the economy is now being diversified towards agriculture, energy, transportation, construction and tourism (UNFCCC 2020). Challenges persist due to years of underinvestment in the rural economy and agricultural infrastructure, hindering improvements in agricultural production (IFAD 2019). Although agriculture, forestry, and fisheries contributed 3.4% to the GDP in 2021, the sector employs 50% of the Zambian population (World Bank 2021; FAO 2022). Hydro-power dominates the country's energy landscape, with 90% generated through two projects, Kariba North and Kafue George (Tembo et al. 2020). However, the increasing frequency and intensity of droughts in the region pose significant challenges to the energy sector (Fant et al. 2015).

Zambia grapples with significant socio-economic vulnerabilities (OECD 2019). Despite the economic growth, only a small urban minority profited from it while most population barely reaped any profits (Tembo et al. 2020). For 85% of the rural population, agriculture remains the main source of income and employment (Detelinova et al. 2023). However, the agriculture sector is mostly characterized by low-productivity rainfed and subsistent farming with insufficient resources, inadequate farming practices, inaccessible agro-meteorological information and incapacity to develop the irrigation potential (CCAFS 2017; UNFCCC 2020). Poverty levels in rural areas are significant at 77%, while urban areas exhibit comparatively higher wealth with a poverty rate of 23% (AfDB 2023). In 2021, the rural population faced heightened exposure due to irregular rainfall, price shocks, and locust pests, leading to an estimated 1.73 million people experiencing high levels of acute food insecurity, requiring urgent humanitarian assistance for approximately 240,000 people (IPC 2021). Additionally, since 2019, extreme events, primarily floods, have displaced around 13,000 people (IDMC). Socio-economic drivers of a population growth rate of 2,8% together with high unemployment rates further compound the challenges of an increasing number of young and often unskilled people struggling to find employment (BBC 2021; UNFCCC 2020).

2. CLIMATE SECURITY PATHWAYS

In Zambia, climatic and environmental factors pose threats to food systems, livelihoods, community relations, institutional capacity, and public trust. As such, the subsequent analysis is elaborating on three climate security pathways, which are analysing climate and societal interactions, that reinforce existing vulnerabilities and can negatively shape peace and conflict outcomes, such as reduced social cohesion and increased risk of tensions and conflict. The analysis is based on a literature desk review. The findings from this review were validated and enhanced through engagement with international, national, and civil society experts from Zambia in a workshop held in Lusaka in July 2023 (Caroli et al. 2023). Results of fieldwork conducted in the Southern Province of Zambia are included as case studies of the identified pathways (Medina et al. 2023).

PATHWAY #1: Resource availability and access

Resource conflicts in Zambia, specifically regarding land and water access, persist. Despite ample water resources, climate variability and inadequate infrastructure lead to local water scarcities, particularly in the Southern Province during droughts, causing small-scale conflicts. Control over existing boreholes by local elites and disputes over newly constructed ones without established power structures exacerbate issues. Internationally, imbalances in water resources allocation within the Zambezi River Basin among riparian nations pose a potential for violent conflicts, intensified by climate change and population growth altering water supply and demand.Land conflicts, driven by unclear land right within a dual tenure system are compounding through climate impact diminishing the availability of arable land.

Zambia boasts abundant natural resources, including copper and extensive water reserves from its large river basins (Hamududu & Ngoma, 2019). While this condition provides ample water during regular rainy seasons, climate variability, insufficient storage infrastructure, and resource management contribute to water scarcity in low rainfall years, particularly in the southern and western provinces (Hamududu & Ngoma, 2019). Recurring droughts, such as those in the 1991/92, 1994/95, and 1997/98 seasons, along with partial droughts between 2001-2006 and 2011-2015, have adversely impacted rural communities, leading to widespread crop failures, loss of livestock, grass and water shortage and loss of income (Kalapula & Mweemba 2020).

The interplay of climatic impacts, population growth, and inequality is fueling heightened competition for water access in Zambia (Funder et al. 2015; IFRC, 2021; Simatele, 2015). With a constant rise in cattle numbers, the demand for water provision intensifies, particularly during the dry season when over 80% of water sources dry up (Kalapula & Mweemba, 2020). This situation adversely affects pastoralists, compelling them to guide their cattle to outposts along Kafue Flats for water and pasture, both of reduced quality and quantity (Kalapula & Mweemba, 2020). The compounding effects of droughts and increased livestock numbers have decreased the hectare per cow from 3.8 to 1.7 between 2005 and 2017, resulting in overgrazing in many areas and a decline in the nutritional status of traditional herds (Kalapula & Mweemba, 2020).

Water (mis)management has implications both at the local and international levels. Local water management is marked by insufficient infrastructure, especially in rural areas, where only 58% of households have access to clean water compared to almost 92% in urban areas (Maunganidze, 2021; FAO, 2022). The Southern Province faces particular challenges in water supply, being most affected by droughts (Simatele, 2015). As climate variability is altering rainfall patterns and increasing temperatures in the region, the food security of farmers and pastoralists depending on natural resources is threatened (Hamududu & Ngoma 2019). Boreholes are a crucial for adaptation as they facilitate the access to groundwater resources (Hamududu & Ngoma 2019). However, boreholes are either very hard to access in remote rural areas, dried up during the dry spells or destroyed by extreme weather events (Funder et al. 2010). In order to avoid walking long distances to wait in cues and compete for water, many rural Zambians are using the water from small wells, but these are often prone to containing water-borne diseases (Marcantonio 2020). Long distances to boreholes have further implications for gender dynamics, as cultural roles presume women and girls to take over this task, exposing them to sexual violence and leaving them less time to for education (Tanner et al. 2022).

Findings from Namwala District in the Southern Province indicate that existing boreholes are being monopolized by local elites who restrict access to water resources (Funder et al. 2015). Control exerted by different pastoralist clans and elites over access to water resources in the region's plains has created a system where payment or implicit support is demanded from poorer households for access (Funder et al. 2015). This places poorer households in a challenging situation where those they compete with for water sources are also their patrons, complicating their ability to oppose them (Funder et al. 2015). This has led to a situation in which the important construction of new boreholes is often accompanied by conflicts because they are seen as unsettled fields in which pre-existing rules can be challenged and access secured (Cold-Ravnkilde 2011). Conflicts over access to water resources are primarily inter-group conflicts arising from competing livelihoods, often overlapping with ethnic divisions (Funder et al. 2010). These conflicts involve ethnic tension between Ila pastoralists and Tonga farmers and include gender components, with women needing water for their fields while powerful men claim it for their cattle (Funder et al. 2015). With few irrigation systems in place, the pressure on water points increases tension during dry spells (Funder et al. 2010). Ila elites have exploited the narrative of sustaining traditional pastoralism against forms of development for their personal gains, while fellow impoverished tribe members have long lost their cattle through drought and disease, needing to search for alternative livelihoods (Funder et al 2015). Unsustainable water use, limited infrastructure and weak governance are compounding the scarcity of water, increasing competition around water resources, which mostly do not escalate into violence, yet erode social cohesion and amplify grievances (Caroli et al. 2023).

BOX. Community voices on water-related disputes in the Southern province of Zambia

Conflicts concerning access to water resources and decision-making authority related to infrastructure management are pervasive across Zambia´s Southern Province. These conflicts are typically localized in nature and tend not to manifest as physical violence but rather as forms of structural exclusion and reduced social cohesion. Moreover, water-related disputes primarily occur within the community itself, rather than extending to conflicts between different communities or across district boundaries. Due to their small-scale and localized nature, the majority of these conflicts often go unreported to official authorities.

The majority of water conflicts take place during the dry season, spanning from May to October, and predominantly revolve around competition for water resources to support activities such as subsistence food production, cattle herding, and farming. These conflicts underscore the existence of divergent interests related to livelihood strategies, as well as distinct and often gender-specific interests within households. Most of these conflicts can be categorized into two main areas: Conflicts around public or communal water points, that are mostly managed by the community, upon which the poorer households are heavily reliant or disputes around the access to water infrastructure developments, such as boreholes, and the decision-making processes determining their locations.

Collaborative endeavours for water resource management are a common practice at the community level. For example, neighbouring households often come together to apply for new boreholes from their district council or international NGOs operating in the area. Furthermore, the operation and maintenance of each borehole is overseen by a committee composed of community members, often with equal representation of both men and women. However, it's important to note that decision-making processes within these committees are often dominated by village elites, which can result in the exclusion of the poorest and most marginalized members of the community. Water-related conflicts exhibit both a social class and gendered dimension. The social class aspect is evident in the influence of local elites determining the prioritized uses of water resources (such as farming versus small-scale cattle herding), the overall access to water infrastructure and resources for poorer households, and the co-optation of the demands for water access by poorer households through market dynamics and employment arrangements that leave them with little bargaining power. The gender dimension is revealed in the differing priorities for water use at the household level. Women typically prioritize water for subsistence food production, drinking, and cooking, while men focus on maintaining livelihoods and employment opportunities through, for example, cattle.

(Medina et al. 2024)

The Zambezi River Basin, as the largest river system in the South African Development Community (SADC), holds crucial international relevance. Shared by eight countries, Zambia has the largest stake (Beck & Bernauer 2011). Water has been a contentious issue in the SADC region, with historical tensions in the relationship between Zambia and Zimbabwe over their shared water resources (Al-Essawi & Ntuli 2007; Petersen-Perlman 2016). Climate change significantly impacts the socio-economic livelihoods of millions in the Zambezi River Basin, but whether these impacts lead to conflict depends on the quality of governance, particularly the role of elites, institutions, and social identities (Swain et al. 2012). Modelling of climate change scenarios combined with the national consumptive water demand of the respective countries shows that Zambia's share has been continuously growing at the expense of Zimbabwe and Mozambique which can contribute to political conflict (Beck & Bernauer 2011). Inadequate enforcement of international treaties for governing water resources may contribute to tension between countries with the potential of large-scale violent conflict in the SADC region (Adaawen 2019). Cooperative efforts to manage the Zambezi River Basin have yielded slow incremental effects through international agreements like the Zambezi River Action Plan (ZACPLAN) or the SADC Revised Protocol on Shared Watercourse Systems. However, these agreements were flawed in resolving conflicts among riparian countries and at the substate level (Petersen-Perlman 2016). The Zambezi Watercourse Commission (ZAMCOM), joined by Zambia after some delay, and new projects such as DAFNE indicate a promising direction in addressing transboundary water conflicts in the region (Salmoral et al. 2019). Challenges persist with disagreements over water transfer projects both inside and outside the basin with controversies around new dams such as the Batoka Gorge or Gwayi-Shangani, as well as more generally over drivers of rapid economic growth, new developments of water resources and climate change which will reshape the dynamics of the Zambezi River Basin´s water availability (Petersen-Perlman 2016).

In the Kafue Flats, access to natural resources such as pasture or fish has been curtailed due to resource mismanagement (Merten & Haller 2008). Ineffective monitoring of property rights and sustainable resources creates opportunities for exclusionary practices by politically powerful, kinship-based customary institutions, and commercial actors. This exclusion puts weaker groups or individuals at risk of food insecurity (Merten & Haller 2008). Such vulnerabilities are heightened during extreme events, such as after the 2001–2002 drought when many households lacked coping options. Commercial fishing jeopardized the customary rights of local fishers, leading to conflicts between sedentary fishers and temporary migrants seeking to benefit from unclear usufruct rights (Merten & Haller 2008).

Zambia is moreover considered to be a country with a high frequency of land conflicts (Mushinge 2017). In Zambia 94% of the land is deemed as customary land belonging to the communities (Mudenda 2006). The Land Act of 1995, while providing a framework to convert customary land into private leasehold land, has resulted in a dual land tenure system with contested claims and disputes (Hall et al. 2017). Land under customary tenure relies mostly on oral agreements with traditional leaders permitting land use. However, this arrangement implies weak tenure security and the potential for eviction if investors claim the land, discouraging people from conserving the land for future generations (Caroli et al. 2023). Conversely, the process of land formalization increases risks for poor, vulnerable, and women-led households to lose out in the process (Umar and Nyanga 2022). Although Zambia generally has abundant land resources, inconsistent land management systems, coupled

with increasing pressure on the land due to population growth and climate change, compound tensions around land (Caroli et al. 2023). The lack of clear demarcations is a primary driver of land conflicts, leading to disputes over boundaries between farmers and exacerbating farmer-herder conflicts (Caroli et al. 2023).

BOX - Community voices on land-based conflict

Farmers in the Southern Province reported conflicts over access to land and farmer-herder disputes as the most common forms of intra-community conflicts. These conflicts typically revolve around:

1. Unclear land boundaries and encroachment: Disagreements between neighbours concerning unclear land boundaries and intentional encroachment onto each other's land.
2. Demarcation of government and customary land: Disputes arise over the demarcation of government and customary land, often driven by individuals, particularly for pastoral purposes.
3. Farmer-Herder conflicts: Conflicts emerge due to the destruction of crops by animals or farmer encroachments into pasture areas used by herders.

Reduced agricultural productivity has compelled people to expand their land use into areas owned by other community members, traditional authorities, or the government. Land shortages and unproductive soils push farmers to seek fertile lands or expand their existing plots to increase crop yields. They often attempt to adjust land boundaries in their favour, leading to conflicts over land boundaries. The absence of permanent boundary markers further complicates the situation, as community members cannot precisely determine the exact boundaries of their fields. While boundary conflicts have historically been present, these have been exacerbated by changing climate conditions. Declining and erratic rainfall patterns have increased the demand for fertile land to ensure family subsistence, prompting farmers to shift boundaries in pursuit of more fertile lands. These boundary disputes are exacerbated by the need for increased agricultural productivity in the face of climate-related challenges. Participants in the study have reported that in certain cases, wealth plays a significant role in shaping the conflict management process, with the most affluent party often using financial resources to influence traditional authorities or the legal system in their favour. This practice can lead to the disenfranchisement of vulnerable community members, including women, widows, and orphaned children, restricting their access to land for agricultural purposes.

(Medina et al. 2024)

PATHWAY #2: Livelihood and food insecurity

Climate change and variability is negatively affecting agriculture and pastoralism in Zambia. The primary impact is on the production of the staple crop maize, which is currently distributed to regions projected to experience declining yields due to its sensitivity to climatic impacts. Migration trends indicate a young population moving from rural areas due to a lack of economic opportunities, which can be linked to diminished agricultural production and further socio-economic challenges. When livelihoods become overburdened, some affected populations may resort to maladaptive strategies, such as deforestation or poaching, and engage in illegal activities that adversely affect ecological resilience and social cohesion within communities.

Zambia is a landlocked country with 50% of its population being employed in agriculture and approximately 1.6 million small scale farmers who produce around 85% of the country´s food crops (Ngoma et al. 2021; CCAFS 2017; FAO 2022). Most farmers are relying on rainfed agriculture which is making them vulnerable to climatic changes due to the high exposure on precipitation patterns with limited resources for adaptation or diversifying their livelihood (Ngoma et al. 2021). Zambia is attributed high vulnerability and low readiness on the ND-GAIN matrix with alarming scores on agricultural capacity and projected change of cereal yields (ND-GAIN 2020). Another significant impact to be considered is on infrastructure, as roads are affected by the higher frequency of floods, predicting substantial expenses for maintenance (Tembo et al. 2020). The heightened vulnerability of energy and physical infrastructure to extreme rainfall events not only undermines food production but also impedes access due to disrupted markets and the mobility of people (USAID 2016).

Current climate variability has been shown to negatively impact food security and put pressure on livelihoods (Simatele 2015; Maungadnize et al. 2021; Diao et al. 2011). Extreme events such as droughts and floods have increased in frequency in the past three decades, which costs Zambia an estimated 0.4% annual economic growth and undermines efforts to achieve food security and eliminate hunger (Ngoma et al. 2021; Kalapula & Mweemba 2020). The agricultural output is expected to decrease due to climate change meaning that Zambia may become more dependent on imports of major agricultural commodities (CCAFS 2017). Without appropriate adaptation mechanisms, rainfall variability alone may push an additional 300,000 people below the poverty line and reduce the total annual GDP growth by 0.9% in the coming decade (Kalapula & Mweemba 2020). Despite high public expenditure on agricultural input subsidies, moderate or severe food insecurity prevails in the country, affecting 51.4% of the population (FAO 2022). It's not only agricultural livelihoods, which experience the climate impact most directly, that are affected, but also increased prices of basic food commodities exacerbate food insecurity for large parts of society (Caroli et al. 2023). In 1990, rises in food prices led to riots in some major cities (Simutanyi 1996). While those food riots could be more attributed to structural drivers and economic recession, they illustrate the potential threat that climate-induced food insecurity can pose to insecurity dynamics.

The most consumed crop in Zambia is maize, constituting 79% of the total output of major food crops and contributing to 49.4% of the average daily calorie intake in the country. However, the lack of diversification and the impacts of climate change affect its outputs and national food security (FAO 2022; FAO 2013). Low agricultural diversification is driven by subsidy programs that primarily target maize production, negatively impacting dietary diversity, smallholder farm incomes, resilience to climate change-induced shocks, market risks, and disease outbreaks (FAO 2022). Maize is highly

vulnerable to climatic variability due to its sensitivity towards changes in moisture and temperature (Kanyanga et al. 2013). While some climatic models suggest increasing outputs of maize in some parts of the country, the current distribution, with the majority of maize production in the southern and eastern parts, correlates with regions expected to experience reduced maize production under climatic scenarios (Kanyanga et al. 2013). This has long-term implications at the national level that need to be observed. Climate models predict an increase in rainfall in the North and a decrease in the South, imposing different pressures on the respective river basins, water storage systems and overall water availability (Hamududu & Ngoma 2019). However, these findings have a high level of uncertainty as other studies suggest different future precipitation patterns (UNFCCC 2020). Nevertheless, it is projected that the current focus on agricultural production of maize in the South may not be viable for the future, due to the different levels of water availability and agricultural outputs with gains in the Northern region but losses in the rest of the country (Kanyanga et al. 2013). The high dependency on maize together with the current distribution can jeopardize food security and impoverish the livelihood of rural population which rely entirely on the agricultural output (CCAFS 2017). This is already altering migration patterns from the southern region into other parts of Zambia, which will be discussed more closely in the next pathway. Moreover, the differing subnational levels of vulnerability to climatic impacts on agriculture and other economic sectors may have further implications on national stability if not addressed accordingly.

The livestock subsector in Zambia is becoming increasingly important for the economy as a whole, accounting for 42% of the agricultural GDP and 50% of rural employment (Besa & Deka-Zulu 2020). The majority of rural population is using livestock as an insurance in the case of crop failure (Besa & Deka-Zulu 2020). Despite its large potential for economic growth and alleviating poverty, the development of the subsector has been restrained by barriers among which climate vulnerability is one (Kalapula & Mweemba 2020). The largest decrease of livestock is repeatedly induced by diseases, such as the massive outbreak of the corridor disease between 1989 till 1992 transmitted by ticks which is limiting the draught power of farmers (Mubaya et al. 2012; Haller & Merten 2010). Diseases can also be linked back to the poor nutritional status of livestock, that is induced by the shortage of water during the dry season which normally last for six months (Kalapula & Mweemba 2020). Livestock not only serves as the essential economic asset for pastoralists but also holds strong social and cultural values for pastoral communities in Zambia, giving their loss multidimensional meaning (Tarusariara et al. 2023). Climate variability is affecting pastoralists and the way they utilize indigenous pasture. Without the appropriate knowledge of pasture improvement practices, it does not provide sufficient fodder for livestock during periods of drought (Chibinga et al. 2010). As adaptive mechanisms, pastoralist move to upland pastures during floods and lowland pastures during droughts, however due to increasing livestock and human population these areas are often overcrowded (Chibinga et al. 2010). Within many of the communal grazing lands the high density of livestock together with the degradation driven by climatic impacts is increasing the competition around pastures (Caroli et al. 2023).

The vulnerability of farming and pastoral communities to climate impacts, coupled with the inability to secure alternative incomes, is leading to maladaptive behavior, particularly charcoal production. This has negative feedback effects on biodiversity and land capacities (Chibinga et al. 2010). These negative coping strategies also encompass illegal hunting and fishing, compounding threats to the natural resource base and ecological resilience in Zambia (Caroli et al. 2023). Other forms of negative coping strategies have adverse effects on social structures, cohesion and trust in the communities.

Taking a valued based approach, analysing what is considered important to preserve and pursue, it can be seen how climate induced food insecurity is eroding the peace, harmony and unity within communities (Tarusarira et al. 2023). Negative social coping strategies can include resorting to criminal activities, such as theft of livestock or crops, engaging in transactional sex, and, in some cases, even forms of interpersonal violence with tensions rising between neighbours (Caroli et al. 2023).

PATHWAY #3: Human Mobility

As climate pressure intensifies on rural livelihoods, particularly in the Southern Province, out-migration dynamics are increasing as people search for opportunities or fertile land in other parts of the country. When migrating to other rural areas, conflicts have arisen with host communities, where competition for resources and differences in agricultural practices have become drivers of tensions. Migration towards urban areas, such as the capital Lusaka or mining towns in the Copperbelt, has shown an increase in crime and illegal activities due to a lack of sufficient social services and job opportunities. At an international scale, outward migration has contributed to pressures in other countries, such as South Africa, while inward migration has led to xenophobic tensions in Lusaka.

Climatic pressures are exacerbating other socio-economic challenges, such as increasing population, high economic disparity and inequality, poor access to health and education, high unemployment, poverty and food insecurity rates, compounding challenges Zambians are facing in both rural and urban areas (Maungadnize et al. 2021). This socio-economic hardship coupled with biophysical vulnerability caused by climate variability and extreme weather events is leading to slowly increasing rates of internal rural-rural and rural-urban migration, feeding into pre-existing migration dynamics but also creating new displacement trends. There are cases of displacement due to increasing extreme events of flooding (IFRC 2021; IFRC 2022) as well as gradual migration trends as an adaptation strategy to slow-onset events linked to climate change (Simatele 2015).

In the southern region, farming and pastoral livelihoods are dependent on a rich ecosystem that is nourished by seasonal flooding of the Kafue River, whereas pastoralists follow the flooding for their dry season grazing and farmers practice recession agriculture to grow more than one crop a year (Kalapula & Mweemba 2020). However, floods in Zambia are also showing adverse effects by damaging crops as well as destroying pasture and forcing cattle to move to higher ground (Kalapula & Mweemba 2020). Floods are induced by human factors namely due to the constructions of dams which affect the hydrological cycle but also due to environmental factors of heavy rain leading to flash floods, like in the beginning of 2022, which displaced 500 household and destroyed field crops and infrastructure (Kalapula & Mweemba 2020; IFRC 2022).

Due to the regional difference in climate vulnerability, most studies indicate migration patterns from the South to the Central Province (Marcantonio 2020; Makondo & Thomas 2019). Particularly strong impacts of climate in the Southern Provinces have led many people to move northwards in the search for pasture and arable land (Caroli et al. 2023). The most affected livelihoods are however often “trapped population” due to holding powers in places that can be connected to persistent poverty and lack of access to migrant networks (Nawrotzki & DeWaard 2018). Moreover, some people may also choose to remain in areas, even if climate is rendering it unproductive, as the sense of belonging

to their land as home and place of their ancestors, are prevailing in the decision process (Caroli et al. 2023). Those who can and choose to use migration as an adaptation strategy are in some cases comparatively wealthier than the community in the destination area, which is leading to tensions with the host community regarding the economic and political influence of migrants and has the potential to spark conflict in the future (Makondo & Thomas 2020). This has for instance been the case when migrants from the South were accused to inaugurate their own village headman in Chibwe village in the Central Province and wanting to change its name after a traditional chief rainmaker from their home plateau (Makondo & Thomas 2020). Besides, when investigations revealed that 75% of the beneficiaries of subsidised farming inputs directed at farmer cooperatives were migrants, this led to tensions and resentment towards southern migrants (Makondo & Thomas 2020). Different cultural values and practices of agriculture between southern migrants and host communities in the central region have also compounded tensions. The less sustainable slash and burn method that is practiced in the south has contributed to conflicts with host communities in receiving areas (Caroli et al. 2023).

The potential of Zambia's mineral resources has made mining a favourable option of income opportunity, not only within the official mining companies but also for rural population from all parts of the country migrating temporarily to the Copperbelt, using small scale artisanal mining as a strategy to compensate for losses in agricultural production (Siwale 2019; Gilberthorpe et al. 2016). Barriers into the formal sector of mining are often too high, requiring qualification, license and operating equipment, therefore illegal mining of so-called lootable resources such as gemstones is very common (Gilberthorpe et al. 2016). Many of those who are framed as illegals are teaming up in groups of over 50 people to steal from mining companies and encounters of the trespasser with security personnel are happening on a weekly basis (Gilberthorpe et al. 2016). The areas of mines have shown to induce further negative social effects on residents living there, such as crime, prostitution and diseases, which is mostly blamed on the migrants, contributing to create a polarising narrative that increases tensions between migrants and host communities (Kolala and Umar 2019).

Urban livelihoods in Zambia are shaped by certain factors, such as migration pattern, poverty and food security, in which climate plays an intermediate component. Due to the lack of economic opportunity and decreased agricultural output, urban livelihoods are especially vulnerable in their food security (Blekking et al. 2022). However, the trend of urbanization is steadily growing in Zambia with migration being a decisive factor (Crankshaw and Borel-Saladin 2019). Internal migration, particularly rural to urban migration, is often motivated by the search for better economic opportunities and living conditions (IOM 2019). When considering that in rural areas the majority of livelihoods and income generation are based on agriculture and pastoralism, which are affected by climate variability, it can be concluded that climate plays a role within the decision to migrate (Ngoma et al. 2021). The competition in urban areas between migrants and hosts over the access to resources, jobs and services have contributed to social tensions (Caroli et al. 2023). Most commonly migrants can be found under the group of young males trying to look for income within the urban areas, in a situation where youth unemployment is currently at 26.1% (Mueller et al. 2020; ILO 2021). Within urban areas such as Lusaka, especially among the young population, a lack of economic opportunities has left many in an insecure state, leading them to turn towards illegal alternatives to sustain their livelihoods (Gough et al. 2016). Zambia's socioeconomic challenges, including economic development, social fragmentation, unemployment, and systemic poverty, have also been shown to increase crime

BOX - Community voices on mobility and displacement in Lusitu

Many individuals opt to relocate to areas considered to have more fertile land and a higher likelihood of consistent rainfall. These migrants typically initiate the process by approaching village heads in their intended destination and requesting land allocation. Migration only occurs once they have secured land in the new location. However, as customary institutions become increasingly market-oriented, acquiring land in other areas becomes more expensive, disproportionately favoring the wealthy and resource-endowed individuals who can afford such moves. Consequently, households with fewer resources find it challenging to migrate, a condition frequently observed across the community.

The emergence of economic inequality, exacerbated by the commercialization of customary institutions, leads to unequal access to land resources. This inequality, in turn, fosters grievances and envy among community members. Witchcraft practices were reported to be prevalent and are associated with instances of violence and even fatalities, highlighting the deep-seated tensions and complexities within the community. Furthermore, the historical legacy of forced resettlement has profoundly influenced the contemporary socio-economic and political landscape, particularly in areas along the shores of the Zambezi River following the construction of the Kariba Dam. The ancestors of the present-day populations in Chipepo chiefdom, currently residing in Lusitu, originally inhabited the Gwembwe River Valley along the Zambezi River. Their traditional way of life underwent a drastic transformation with the construction of the Kariba Dam under colonial authorities.

The forced eviction of approximately 80,000 people in 1958 resulted in violent conflicts and the disruption of traditional lifestyles. This forced displacement also had a profound impact on tightly-knit social structures within the affected communities, although some elements of these structures were preserved through the retention of village names and population distribution in the relocation site. Following their displacement, populations from Chipepo chiefdom were allocated land within Chirundu district, where they would coexist with members of the Sikoonga chiefdom. Descendants from both chiefdoms continue to inhabit this shared land today. While their coexistence is generally peaceful, a dispute has been escalating between the Chipepo and Sikoonga chiefs over control of this land in recent decades.

Tensions have occasionally erupted into violent confrontations between members of both chiefdoms, often revolving around issues related to land demarcation through the burial of traditional authorities. The land-based dispute between chiefdoms primarily manifests in the interactions between chiefs, often mediated by government authorities, as reported by participants. However,there are discriminatory relations and the active exclusion of certain populations from accessing local resources within these communities. For instance, women shared their experiences of being prevented from accessing boreholes by women from the opposing chiefdom.

(Medina et al. 2024).

rates in Lusaka, particularly among urban youth (Twambo & Mbetwa 2017).Regarding international migration, climate-related migrants leaving Zambia and other SADC countries due to drought have been accused of overburdening economies in Botswana, Namibia, and South Africa (Maungadnize et al. 2021). South Africa is by far the most favored destination for Zambian migrants (IOM 2019). However, sentiments of xenophobia also occur towards international migrants within Zambia (Bbaala & Mate 2016). Xenophobic resentment, particularly in Lusaka, has already led to riots and looting of migrant-owned shops (BBC 2016).

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About CGIAR FOCUS Climate Security

CGIAR aims to address gaps in knowledge about climate change and food security for peace and security policies and operations through a unique multidisciplinary approach. Our main objective is to align evidence from the realms of climate, land, and food systems science with peacebuilding efforts already underway that address conflict through evidence-based environmental, political, and socio-economic solutions.