



ENVIRONMENT AND CLIMATE CHANGE IN TANZANIA



November, 2025



The United Republic of Tanzania

Environment and Climate Change in Tanzania

**National Bureau of Statistics
Ministry of Finance
Dodoma**

and

**Office of the Chief Government Statistician
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Maps and land area used in this publication are derived from the 2022 Population and Housing Census (PHC) cartographic work; therefore, they are for statistical use only.

The 2022 Population and Housing Census (PHC) for the United Republic of Tanzania was conducted with a reference date of midnight between August 22 and 23, 2022. This marked both the sixth census since the Union of Tanganyika and Zanzibar in 1964, and the first digital census in Tanzania's history. The previous censuses took place in 1967, 1978, 1988, 2002, and 2012. The Sixth Phase Government of Tanzania, led by Her Excellency Dr. Samia Suluhu Hassan, along with the Eighth Phase Government of Zanzibar, under Dr. Hussein Ali Mwinyi, fulfilled their obligation to conduct the 2022 PHC in accordance with the United Nations Principles and Recommendations for Population and Housing Census. Their commitment and support throughout the census implementation deserve our gratitude.

The Government of the United Republic of Tanzania, through the Ministry of Finance in collaboration with the National Bureau of Statistics (NBS) and the Office of the Chief Government Statistician in Zanzibar (OCGS), successfully conducted the 2022 Population and Housing Census (PHC) in accordance with the Statistics Act Cap 351 and international standards set by the United Nations. This marked Tanzania's first fully digital census, utilizing advanced ICT tools for mapping, enumeration, data transmission, and processing.

The results of the 2022 PHC informs integrated planning, resource allocation, and monitoring of key development frameworks, including the Tanzania and Zanzibar Development Visions 2050, the Third National Five-Year Development Plans, regional strategies such as the EAC and SADC Visions 2050, and global agendas like the African Development Agenda 2063 and the UN Sustainable Development Goals (Agenda 2030). Census data will also support calculation of vital indicators such as literacy, maternal and infant mortality, and unemployment rates.

The "Environment and Climate Change in Tanzania" monograph is the eighteenth in a series of significant publications related to the 2022 PHC. Major reports produced so far include the Administrative Units Population Distribution Reports, Age and Sex Reports, the Tanzania Basic Demographic and Socio-economic Profile, Ripoti ya Idadi ya Watu katika Majimbo ya Uchaguzi (Constituency Population Distribution Reports) in two volumes for the United Republic of Tanzania and Tanzania Zanzibar and other Thematic Reports.

We extend sincere appreciation to all government leaders, including Ministers, Members of Parliament, Members of the House of Representatives, Councillors/Sheha, and the Regional and District Census Committees. Special thanks go to Census Coordinators, Supervisors, Enumerators, local leaders, and all respondents for their active participation.

We are deeply grateful to our development partners United Nations Population Fund (UNFPA), the World Bank (WB), the United Nations Children's Fund (UNICEF), UN-Women, the International Organization for Migration (IOM), the International Labour Organization (ILO), the United States

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Finally, We would like to extend our heartfelt gratitude to all the experts who contributed their time and effort to this report, including Dr. Rutasha Dadi, the consultant in producing this report; Prof. Noah Makula Pauline, Lead Author; Dr. Ruth Davison Minja, Director of Population Census and Demographic Statistics; Fahima Mohamed Issa, Director of the Social Statistics Department, OCGS; Seif Ahmad Kuchengo, Manager of Population Census and Vital Statistics; Abdul-majid Jecha Ramadhan, Zanzibar Census Coordinator; Steven Lwendo, IT Expert for data processing; and the dedicated National Census Technical Team along with all the statisticians, demographers, IT specialists, and GIS officers. Their commitment played a crucial role in the success of producing this Thematic report.

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Executive Summary

Tanzania, a nation renowned for its remarkable ecological diversity and resilient communities, is at a critical juncture. Rapid population growth, coupled with intensifying climate risks, is reshaping the country's environment, economy, and social fabric. The 2022 Population and Housing Census (PHC), provides unprecedented insights into the links between population dynamics, environmental pressures, and climate vulnerabilities. For the first time, census data go beyond demographic and housing trends to integrate environment and climate change, transforming the PHC into a powerful tool for evidence-based decision-making and long-term sustainability planning.

This report offers a comprehensive analysis of Tanzania's population–environment–climate nexus. It examines demographic trends, migration and settlement patterns, land use and tenure, natural resource dependence, housing quality, infrastructure access, and community awareness of climate risks. The findings provide both a sobering picture of vulnerabilities and a roadmap of opportunities for environmental and climate-resilient development.

Population, Environment and Climate Nexus

Tanzania's population has grown nearly fivefold since 1967, intensifying pressure on land, forests, water, and energy resources. This growth has been accompanied by widespread deforestation, land degradation, and water scarcity. Climate change compounds these pressures, with more frequent droughts, floods, heatwaves, and unpredictable rainfall cycles threatening livelihoods and food security.

Migration and urbanisation further reshape the landscape. Driven by economic opportunities, education, family ties, and climate stress, migration is swelling cities such as Dar es Salaam. Census data show that 46.3% of respondents nationally report drought as their most pressing hazard, with Mainland regions like Arusha (90% rainfall decrease) and Simiyu (up to 88.9%) among the hardest hit. Rapid urbanisation generates new risks, including overcrowded informal settlements, inadequate sanitation, and ineffective waste management systems, which place both people and ecosystems at risk.

Disparities and Vulnerabilities

The census highlights deep inequalities in access to land, housing, and basic services. Two-thirds of buildings (67.1%) remain unsurveyed, especially in rural areas, limiting secure land tenure and discouraging investment in climate-resilient interventions. Housing disparities

are stark: while urban areas rely more on cement bricks (56.5%) and iron sheets (84.8%), rural areas still depend heavily on fragile materials like poles, mud, and grass (up to 18% of roofing), leaving millions vulnerable to storms and floods.

Access to services also reflects inequality. About 70.1% of households use improved drinking water sources, yet over 79% of rural households rely on firewood for cooking, accelerating deforestation and health risks. Electricity access has improved, rising from 21.3% in 2012 to 37.4% in 2022, but rural–urban divides persist. Solid waste disposal remains inadequate, with 40.1% of households burning waste as the primary method.

The report also underscores gendered and generational vulnerabilities. Women are concentrated in informal, resource-dependent work, while youth aged 15–35 form the majority of informal non-agricultural workers (59.6% of those 15+). Both groups face insecure livelihoods and heightened exposure to environmental risks.

Climate Change Awareness and Regional Risks

Encouragingly, climate change awareness is high: 88% of Tanzanians recognise climate change impacts, with Zanzibar (90.3%) and regions like Iringa (94.2%) and Songwe (93.9%) leading, compared to lower awareness in Kigoma (80.6%) and Geita (81.1%). Communities overwhelmingly report experiencing decreased rainfall (76.5%), shifting rain seasons (74.5%), and rising temperatures (60.5%). However, regional risks vary significantly:

- **Mainland regions** (Arusha, Simiyu, Mara, Dodoma) face severe drought.
- **Zanzibar** reports higher exposure to floods (13.7%) and sea-level rise (up to 56.5%).
- **Songwe (27.2%) and Rukwa (22.6%)** report cyclones.
- **Mbeya (10.8%)** faces landslides.
- **Dar es Salaam (23.4%)** records significant earthquake exposure.

These localised risks demand region-specific strategies, supported by early warning systems and targeted community interventions.

Policy Recommendations

The 2022 PHC provides a strong foundation for evidence-based policy and action. To secure a climate-resilient future, Tanzania must:

1. **Promote sustainable land management:** Expand climate-smart agriculture, agroforestry, drought-resistant crops, and sustainable irrigation to protect soils, watersheds, and biodiversity.
2. **Develop resilient infrastructure:** Invest in climate-resilient housing, clean water and sanitation, renewable energy, and waste management, with tailored solutions for rural and urban settings.
3. **Empower local actors:** Strengthen local governments and communities with data and resources to lead adaptation and disaster preparedness.
4. **Foster inclusive governance:** Ensure women, youth, and marginalized groups are central to planning, decision-making, and benefit-sharing.
5. **Leverage awareness and data:** Use high-awareness regions as pilots for adaptation, while addressing data gaps on hazards, loss and damage, gendered vulnerabilities, and health–environment links through complementary surveys and geospatial tools.

Conclusion

The 2022 PHC demonstrates that Tanzania's future development is deeply linked to its environmental and climate realities. The report highlights both urgent risks and opportunities for resilience. By leveraging comprehensive data and addressing identified gaps, Tanzania can develop policies that safeguard natural resources, improve livelihoods, reduce inequality, and bolster resilience against climate shocks. The challenge is pressing, but with decisive, inclusive, and data-driven actions, the country can protect its environment while promoting sustainable growth for future generations. The 2022 PHC stresses the vital connection between Tanzania's development and its environmental and climate issues. It highlights both significant risks and opportunities, emphasizing the need for measures that preserve natural resources and address socioeconomic disparities. By ensuring fair access to resources, promoting gender inclusion, and investing in clean energy and sustainable housing, Tanzania can enhance its resilience to climate change and support the livelihoods of its communities. Additionally, adopting a comprehensive One Health approach, integrating human, animal, and ecosystem health, is crucial for addressing interconnected challenges such as infectious diseases, food safety, and environmental sustainability. This approach recognizes the key links between human and animal health, as well as ecosystem integrity. Through improved cross-sector collaboration and the adoption of decisive, inclusive, and data-driven strategies, Tanzania can protect its environment and secure sustainable prosperity for future generations, thereby creating a healthier and more equitable society for all its citizens.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the 2022 Population and Housing Census

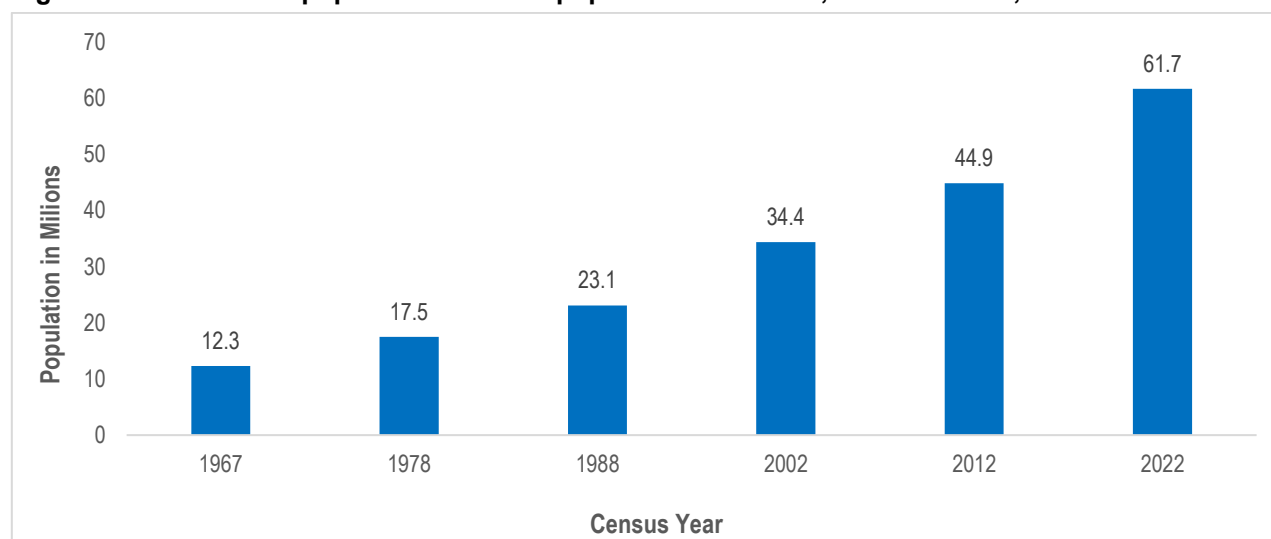
The 2022 Population and Housing Census (PHC) was conducted in accordance with the Statistics Act, which mandates that the National Bureau of Statistics (NBS), in collaboration with the Office of the Chief Government Statistician (OCGS), Zanzibar, carry out comprehensive population and housing censuses within the United Republic of Tanzania every ten years. This marked the sixth census since the formation of the Union of Tanganyika and Zanzibar in 1964. The PHC followed the United Nations Principles and Recommendations for population counts, ensuring accuracy and reliability. The previous five censuses took place in 1967, 1978, 1988, 2002, and 2012, each contributing vital data for national planning and development, and reflecting demographic changes over time.

The census was undertaken on a *de-facto* basis, and the reference date was the night of 22nd/23rd August 2022. Similar to previous censuses, the 2022 Population and Housing Census (PHC) counted individuals based on their place of residence on the night of the census. Every person present in the country was included in the enumeration, regardless of nationality or citizenship. While the enumeration was initially scheduled to last for seven days, it ultimately took nine days to complete. Notably, the 2022 PHC was the first digital census in Tanzania, utilising mobile technology for data collection and information gathering.

Data collected from national censuses highlights a significant increase in Tanzania's population, rising from 12.3 million in 1967 to an impressive 61.7 million in 2022. This remarkable growth is reflected in the annual population growth rates, which escalated from 2.7 per cent during the 2002-2012 period to 3.2 per cent between 2012 and 2022 (Figure 1.1). This upward trend indicates not only a surge in population but also suggests potential implications for resource allocation, urban planning, and economic development in the country.

Furthermore, the 2022 Population and Housing Census (PHC) included environmental and climate change data for the first time, highlighting the increasing relevance of these issues amid rapid population growth. The impact of climate change on resources, agriculture, and housing will be essential for governmental and community planning, as the population pressures are likely to exacerbate vulnerabilities to environmental challenges. Addressing these aspects will be crucial for sustainable development in Tanzania moving forward.

Figure 1.1 : Official population count in population censuses, Tanzania total, 1967 - 2022



1.2 Objectives of the 2022 Population and Housing Census

The main objective of conducting the 2022 PHC was to provide the government with detailed information on the size, distribution, composition, and other socio-economic characteristics, including housing conditions of the population, as well as data on the environment and climate change. This information aims to enhance the quality of life for Tanzanians by providing current and reliable data for policy formulation, development planning, evidence-based decision-making, and service delivery. It will also assist in monitoring and evaluating population, socio-economic, environmental and climate change programmes throughout the country.

The specific objectives of the 2022 PHC were to:

- a) Enhance the availability and accessibility of accurate, timely, and reliable data on demographic, socio-economic characteristics and the environment;
- b) Promote better knowledge management on Tanzanian socio-economic, demographic characteristics and environment as well as patterns and trends of population growth;
- c) Increase utilisation of socio-economic, demographic and environmental data disaggregated to lower administrative levels;
- d) Strengthening the capacity of NBS and OCGS in carrying out population and housing censuses, in areas of planning, collecting, processing, analysing, disseminating, utilising and archiving population and housing census and other statistical data; and

- e) Establish a comprehensive buildings and National Physical Addresses database to facilitate making evidence-based decisions towards improving the provision of social services, expansion of the tax base and to inform development programmes in general.

1.3 Objectives of the Environment and Climate Change Monograph

Sustainable environmental management and climate resilience are one of the three pillars of the *Dira* 2050, aiming to position Tanzania among Africa's top ten in environmental performance. This vision promotes sustainable resource use, ecosystem restoration, and the adoption of green technologies, with a focus on inclusive and gender-responsive approaches. Key priorities include sustainable natural resource management, enhancing climate adaptation and mitigation, and strengthening early warning systems to ensure ecological integrity, socio-economic stability, and inclusive prosperity.

The main objective of this monograph is to establish a statistical and analytical foundation linking population characteristics to environmental pressures and climate risks. This foundation aims to guide policy, planning, and sustainable development in Tanzania.

Specifically, to:

- a) Highlight geographic and social patterns of environmental and climate change vulnerability and resilience;
- b) Assess access to and use of natural resources and social services;
- c) Link census data with national and international policy frameworks;
- d) Support evidence-based planning and investment in environmental sustainability; and
- e) Promote awareness and capacity-building in environment and climate change statistics.

1.4 Relevance of the Environment and Climate Change Monograph

The preparation of a monograph on environment and climate change using the 2022 PHC data is crucial for Tanzania. It establishes a spatial link between human geography and environmental pressures, enhancing national planning and resilience-building. By connecting demographic data with environmental vulnerabilities and adaptive capacity, it provides a strong evidence base for policy and investment. Analysing the census data from an environment and climate change perspective helps decision-makers identify at-risk

populations, areas of concentrated risk, and prioritise necessary infrastructure and services. The monograph is relevant in many ways, among others.:

- a) **Informed policy making:** Governments and policymakers depend on accurate, timely environmental and climate change data to develop targeted programmes addressing related issues. This data set helps identify vulnerabilities, such as pollution hotspots and flood-prone areas, guiding the development of effective interventions. Additionally, it plays a crucial role in assessing risks, designing mitigation strategies, and monitoring the effectiveness of policies aimed at achieving conservation and emissions targets.
- b) **Managing natural resources and disaster risk:** Effective management of natural resources is crucial for building resilience to climate change impacts in Tanzania. As agriculture, water, forests, and biodiversity underpin livelihoods and the economy, the increasing frequency of droughts, floods, and coastal erosion poses significant threats. Reliable environmental data is essential for identifying high-risk areas, enhancing early warning systems, and guiding disaster preparedness, ultimately reducing community vulnerability and economic losses.
- c) **Vulnerability and targeted response:** The census provides essential disaggregated data on demographics (age, sex, household size, disability, occupation, and migration), crucial for understanding vulnerability and resilience. For instance, identifying the number and location of the elderly, children, or individuals with disabilities in flood-prone areas enables targeted social protection and evacuation planning. Disaggregated household data also supports inclusive adaptation measures, ensuring that interventions reach those who are most in need.
- d) **Exposure and adaptive capacity:** Census data on housing characteristics, such as roof materials, electricity access, sanitation, and density, indicate exposure and adaptive capacity. These factors help assess the impacts of heatwaves, storms, and air pollution, guiding investments in resilient housing and clean energy.
- e) **Spatial planning and prioritisation:** Spatial granularity in census data enables the mapping of vulnerabilities and the identification of hotspots at subnational levels. Planners can combine census geographies with climate projections and other relevant data to prioritise adaptation actions across different levels. This approach facilitates cost-effective infrastructure upgrades, nature-based solutions, and measures for disaster risk reduction.

- f) **Cross-sectoral coordination and monitoring:** The monograph enhances sector planning and promotes coordination across different sectors. Health, education, water, agriculture, and transport sectors can utilise consistent population baselines to evaluate service deficiencies under various climate scenarios and to plan resilient investments. Additionally, it aids in monitoring national commitments (NDCs) and global goals (SDGs) by providing baseline indicators and population-weighted exposure metrics.
- g) **Investment Prioritisation and financing:** The census-based monograph aids fiscal decisions by providing credible population and housing data for donors and budget planners. This information helps allocate funds, design finance instruments, and assess cost-benefit ratios for adaptation projects, as well as informing insurance and social protection strategies by quantifying asset exposure and risk.
- h) **Accessibility, capacity, and uptake:** The monograph advocates for data-driven governance and transparency, making analyses accessible to local governments and communities. This approach enhances local ownership, improves preparedness, and supports climate-smart urban and rural planning.
- i) **International collaboration and climate advocacy:** Tanzania is an active member of the Climate Vulnerable Forum (V8), emphasising the importance of international support. By utilising accurate environmental and climate data, the nation amplifies its call for funding and urgent global action to combat climate change.

1.5 Overview of Census questions related to environment and climate change characteristics in the 2022 PHC

The 2022 Population and Housing Census (PHC) in Tanzania introduced a notable expansion in its coverage of environment and climate change characteristics, aligning with national and international standards like:

- i) The UN Principles and Recommendations for Population and Housing Censuses;
- ii) The Framework for the Development of Environment Statistics (FDES 2013);
- iii) The Third National Five-Year Development Plan (FYDP III) for Tanzania, covering 2021/22 to 2025/26;
- iv) The Global Sustainable Development Goals 2030; and
- v) The Africa Development Agenda 2063; etc.

Environment and climate change-related questions were included in the main census, community, and building questionnaires:

Questions about the main source of drinking water, energy used for cooking and lighting, sanitation, and waste management (including the primary type of toilet facility used, methods of solid waste disposal by households, sorting of kitchen waste, plastic, glass, metal, and electronic waste by households, and how waste is collected by authorities) were conducted at household level.

The Community Questionnaire was administered at the Hamlet/Mtaa/Shehia level, focusing on local environmental conditions and perceptions. These questions were specifically designed for the community to understand community-level responses to climate change awareness, assess public understanding of climate risks, guide targeted education campaigns, and evaluate the effectiveness of previous outreach efforts. These insights are crucial for developing behavioural interventions and community-based adaptation strategies.

Community questions also examined perceptions of environmental changes (deforestation, alterations in rainfall, temperature rises, etc.) by the community and identified the main sources of information about climate change, such as radio, TV, newspapers, campaigns, local authorities, the internet, and others.

The Buildings Questionnaire was used to assess environmental infrastructure, such as building materials, energy efficiency, and physical address systems, to support spatial analysis and environmental planning.

The environment and climate change questions in the 2022 PHC go beyond mere data, serving as strategic indicators that inform policy development, environmental planning, and assessments of climate resilience. They also assist in monitoring progress towards SDGs (e.g., SDG 6 on water and sanitation, SDG 7 on energy, and SDG 11 on settlements). Additionally, they are integrated with other data systems such as Environmental Statistics Systems (FDES, SEEA), administrative data (e.g., from LGAs or ministries), and geospatial datasets related to land use, deforestation, or flood risk. These integrations support multi-sectoral analysis, like linking energy poverty to deforestation or mapping climate vulnerability.

1.6 The link between population, environment and climate change

Box 1.1: Key Points

- Tanzania's population has grown nearly fivefold since 1967, intensifying demand for natural resources
- Environmental pressures, including deforestation, land degradation, and water scarcity, have risen alongside population growth
- Climate vulnerability has increased, with more frequent and severe droughts, floods, and heatwaves impacting livelihoods.
- Census data has evolved to capture not only demographic trends but also environmental and housing indicators, providing richer insights.
- The 2022 Census offers a unique opportunity to link population data with environmental and climate change planning for sustainable development.

The relationship between population dynamics, environmental sustainability, and climate change is central to Tanzania's development trajectory. As the population increases, the demand for land, water, forests, and energy rises, exerting pressure on the environment and ecosystems that sustain livelihoods. At the same time, environmental degradation and climate variability undermine the resilience of communities, creating a cycle of vulnerability that affects both rural and urban populations.

Evidence from successive national population and housing censuses provides a clear picture of this linkage. The 1967 Census recorded a population of 12.3 million, which rose steadily to over 61.7 million by 2022. This rapid population growth has coincided with increased demand for agricultural land, deforestation for fuelwood, and the expansion of settlements into environmentally fragile areas. These trends exacerbate challenges such as soil erosion, water scarcity, and inadequate waste management, while also increasing exposure to climate-related risks, including droughts, floods, and temperature increases.

Over time, census data reveal a steady strengthening of the interlinkages between population growth, environmental pressure, and climate vulnerability. Earlier censuses focused more on demographic characteristics, but in recent years, additional indicators, such as access to clean water, sanitation, energy sources, and housing materials, have allowed for a deeper understanding of how environmental factors intersect with population well-being. The 2022 Census provides a unique opportunity to integrate these dimensions and track long-term trends, informing both national development strategies and international climate commitments.

Figure 1.2 below illustrates the trend across census years, showing how Tanzania's population growth has been accompanied by rising environmental pressure and climate vulnerability. This demonstrates the urgent need to mainstream environmental and climate considerations into population and development planning.

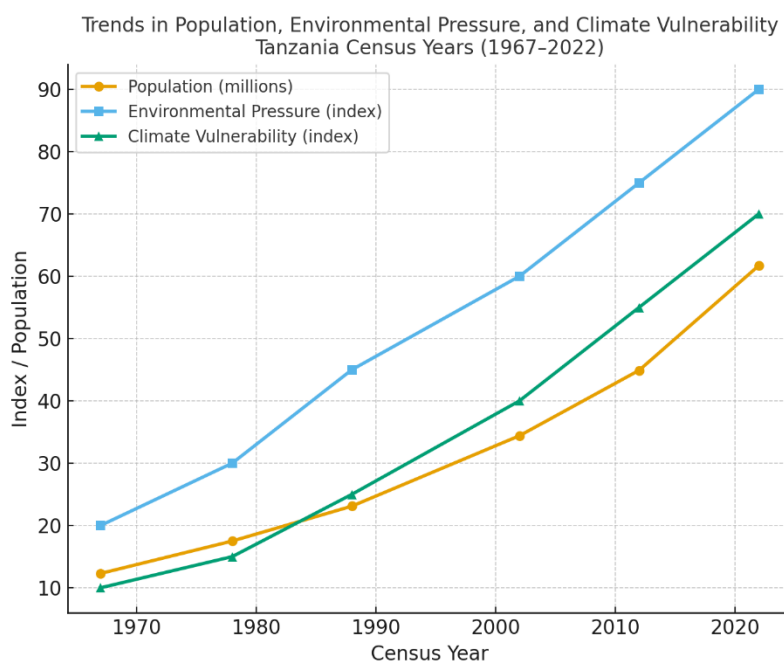
The chart highlights how Tanzania's population, environmental pressure, and climate vulnerability have moved in parallel from 1967 to 2022. The population grew nearly fivefold, from approximately 12 million to over 61 million, resulting in increased demand for land, water, and energy. This has intensified environmental pressures, including deforestation, land degradation, and waste accumulation. At the same time, climate vulnerability has risen, with more people and livelihoods exposed to floods, droughts, and other extreme events. Together, these trends show that as the population expands, environmental strain increases and climate risks become more severe, underscoring the need for integrated planning and resilience strategies.

Furthermore, Figure 1.2 indicates that the combined effects of population growth and environmental degradation are increasing the country's exposure to climate-related risks such as droughts, floods, and extreme weather events. These trends have direct health implications, including higher risks of waterborne and vector-borne diseases, food insecurity, respiratory illnesses from air pollution, and malnutrition caused by agricultural disruptions. Overall, the rising trends underscore a compounding effect, where rapid population growth and increasing environmental pressures exacerbate climate vulnerability, underscoring the urgent need for sustainable resource management, effective climate adaptation strategies, and proactive public health measures.

The trends shown in Figure 1.2 reveal that the combined impact of population growth and environmental degradation significantly increases the country's vulnerability to climate-related risks, such as droughts, floods, and extreme weather. These environmental challenges have serious public health implications, as they increase the risk of waterborne and vector-borne diseases, worsen food insecurity, and intensify respiratory issues due to air pollution. For example, higher levels of air pollutants and allergens resulting from environmental degradation can lead to an increase in asthma and other respiratory conditions, significantly impacting community health and productivity. Additionally, malnutrition resulting from agricultural disruptions exacerbates health disparities, particularly among vulnerable populations. This combined effect highlights the importance of integrated strategies that focus on sustainable resource management and climate adaptation. The One Health approach is a vital framework here, encouraging collaboration

across human, animal, and environmental health sectors to effectively address these linked challenges while protecting ecosystem health for a healthier future.

Figure 1.2 Trends in Population, Environmental Pressure, and Climate Vulnerability (NBS, 1967–2022)¹



1.7 Environmental and Climate Change Governance: Global, Regional and National Policies and Frameworks

1.7.1 Introduction

Tanzania possesses rich environmental resources that account for over 70% of its GDP and support the livelihoods of many citizens. Key resources include arable land, forests, freshwater and marine ecosystems, wildlife, mountains, natural gas, and minerals. However, the country faces significant environmental challenges, including land degradation, deforestation, biodiversity loss, climate change, deterioration of water sources, degradation of coastal and marine ecosystems, waste management issues, pollution, and

¹ Population figures (1967, 1978, 1988, 2002, 2012, 2022) are drawn from official reports of the **Tanzania National Population and Housing Census**, published by the **National Bureau of Statistics (NBS)**. The trend lines for environmental pressure and climate vulnerability are *illustrative indices* developed for this monograph to demonstrate the relationship between population growth, environmental stress, and climate risks. They are not direct outputs of the census but conceptual proxies to show the strengthening linkage over time.

a lack of awareness regarding the benefits of biodiversity and the impacts of invasive species.

1.7.2 National Policies

To promote environmental conservation and sustainable resource use, the Tanzanian government has implemented several key initiatives aimed at achieving these goals. Notable among these are the Environmental Management Act (EMA, 2004) and the National Environment Policy (NEP, 2021), which provide a framework for addressing environmental challenges.

In response to climate change, Tanzania has introduced several policy instruments, including the National Climate Change Response Strategy (NCCRS, 2021-2026), which prioritises climate issues for adaptation and mitigation. The National Environmental Master Plan for Strategic Interventions (NEMPSI, 2022-2032) aims to tackle land degradation, deforestation, and waste management, engaging various stakeholders in sustainable development efforts. Additionally, the Nationally Determined Contribution (NDC) for 2022-2025 outlines the country's commitment to reducing greenhouse gas emissions.

To combat biodiversity loss, Tanzania has established guidelines for Access and Benefit Sharing of Genetic Resources (ABS, 2024) and the National Biodiversity Strategy and Action Plan (NBSAP, 2025-2030), promoting the integration of biodiversity considerations into planning.

For waste management, the National Waste Management Strategy (2025-2030) aims to raise public awareness on waste minimisation and recovery through integrated planning across sectors. Moreover, the *Dira* 2050 emphasises environmental stewardship as a fundamental pillar for positioning Tanzania as a leader in sustainable resource management and climate resilience, benefiting both current and future generations.

1.7.3 International and Regional Policies

Environmental degradation knows no boundaries, which is why the Global 2030 Sustainable Development Goals (SDGs) aim to encourage individuals to protect the planet by sustainably managing its natural resources and taking urgent action on climate change (i.e., SDG 13). To support this initiative, Tanzania has ratified several Multilateral Environmental Agreements, joining regional and international efforts toward environmental sustainability.

The relevant agreements, their objectives, and the years in which Tanzania ratified them are presented in Table 1.1.

By ratifying various environmental conventions, Tanzania is actively contributing to regional and global efforts to protect the planet. As a member of the African Union (AU), the East African Community (EAC), and the Southern African Development Community (SADC), Tanzania has the opportunity to develop and implement key initiatives, such as the African Biodiversity Strategic Plan and the EAC and SADC Biodiversity Action Plans.

Table 1.1: Multilateral Environmental Agreements that Tanzania ratified

No	CONVENTION	OBJECTIVE
1.	Convention on Biological Diversity (CBD) (Ratified- 1996)	To promote the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of benefits arising from the utilisation of genetic resources.
2.	Ramsar Convention on Wetlands (Ratified - 1975)	Provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.
3.	Nairobi Convention for the Protection, Management and Development of the Marine and Coastal Environment of the Western Indian Ocean Region (Ratified – 1996)	Protect, manage, and develop their coastal and marine environment sustainably. Facilitate inter-governmental discussions that enhance understanding of regional environmental issues and the strategies required to address them; and promote sharing of information and experiences within the WIO region and with the broader community.
4.	Convention on Sustainable Management of Lake Tanganyika (Ratified – 2004)	To ensure the protection and conservation of biological diversity and the sustainable use of natural resources of Lake Tanganyika and its environment by the Contracting States through integrated and co-operative management.
5.	United Nations Framework Convention on Climate Change (UNFCCC) (Ratified - 1996)	To mitigate and adapt to climate change, ensuring that food production remains secure and that economic development can continue sustainably.
6.	The United Nations Convention to Combat Desertification (UNCCD) (Ratified - 1997)	To combat desertification and mitigate the effects of droughts in countries experiencing severe drought and/or desertification, especially in Africa.
7.	Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Ratified - 1992)	Establish a framework for regulating the movement of hazardous wastes across international borders
8.	Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Ratified - 2004)	Promotes shared responsibility and collaboration in the international trade of certain hazardous chemicals to safeguard human health and the environment.
9.	Stockholm Convention on Persistent Organic Pollutants POPs (Ratified - 2004)	Protect human health and the environment from persistent organic pollutants, mainly by managing the use, emissions of POPs, and handling POP waste in developing countries.

No	CONVENTION	OBJECTIVE
10.	Vienna convention for the protection of Ozone layer (Ratified 1993)	Protect human health and the environment from adverse effects resulting from, or likely to result from, human activities that modify or are likely to modify the ozone layer.
11.	Bamako convention on the Ban of the Import into Africa and the control of Transboundary Movements of Hazardous Wastes within Africa (Ratified - 1990)	protect human health of the African population and the environment against the adverse effects that may result from the generation of hazardous wastes
12.	Minamata convention on mercury (Ratified 2020)	Reduce mercury emissions and releases into air, water, and land by managing the entire lifecycle of mercury, including mining, import/export, and waste management.
13.	WHO One Health Policy	One Health is a comprehensive approach that seeks to harmonize and enhance the health of humans, animals, and ecosystems. It acknowledges the intricate connections between human and animal health, plant vitality, and environmental sustainability. By fostering collaboration across various sectors, One Health effectively tackles critical issues such as infectious diseases, antimicrobial resistance, and food safety, while simultaneously promoting ecosystem integrity. In Tanzania, this approach has been institutionalized through the One Health strategic plan for 2022-2027, overseen by the Prime Minister's office.

1.8 Concepts and Definitions

- a) **Adaptation:** Adaptation means adjusting lifestyles, practices, and systems to cope with the impacts of climate change, such as building flood defences or shifting to drought-resistant crops.
- b) **Climate Change:** Climate change describes long-term changes in temperature, rainfall, and extreme events, often linked to human activities such as deforestation, energy use, and industrial emissions.
- c) **Community Perceptions:** Community perceptions capture how households and local groups understand and respond to environmental and climate change issues in their daily lives.
- d) **Deforestation:** Deforestation is the large-scale cutting down or loss of forests, which reduces biodiversity, disrupts ecosystems, and contributes to climate change.
- e) **Disaster Risk Reduction (DRR):** Disaster risk reduction includes measures that help prevent or lessen the impacts of hazards such as floods, droughts, and storms.
- f) **Ecosystem:** An ecosystem is a community of plants, animals, and people interacting with each other and their physical environment, such as forests, lakes, or coastal areas.

- g) **Energy Access:** Energy access means that households and communities can obtain affordable, reliable, and clean energy for lighting, cooking, and production.
- h) **Environment:** The environment refers to the natural and human-made surroundings in which people live, including land, water, air, and ecosystems that support life and livelihoods.
- i) **Environmental Degradation:** Environmental degradation is the damage or decline of the natural environment due to pollution, overuse of resources, or destruction of ecosystems.
- j) **Greenhouse Gases (GHGs):** Greenhouse gases are gases like carbon dioxide and methane that trap heat in the atmosphere and contribute to global warming.
- k) **Mitigation:** Mitigation involves actions taken to reduce greenhouse gas emissions, for example by using renewable energy, protecting forests, or improving energy efficiency.
- l) **Natural Resources:** Natural resources are materials and features from the environment, like water, forests, minerals, and wildlife, which people use for survival and economic activities.
- m) **Renewable Energy:** Renewable energy comes from sources that naturally replenish, such as solar, wind, water, and biomass, providing sustainable alternatives to fossil fuels.
- n) **Resilience:** Resilience is the capacity of people, communities, and ecosystems to prepare for, withstand, and recover from environmental shocks such as floods, droughts, or storms.
- o) **Sustainability:** Sustainability means meeting today's needs without reducing the ability of future generations to meet theirs, by balancing economic growth, social well-being, and environmental care.
- p) **Urbanisation:** Urbanisation is the growth of towns and cities as more people move from rural to urban areas, often creating both opportunities and environmental pressures.

- q) **Vulnerability:** Vulnerability describes the extent to which people or communities are at risk from environmental or climate threats, as well as their capacity to cope or adapt to these challenges.
- r) **Waste Management:** Waste management is the process of collecting, treating, recycling, and safely disposing of waste to reduce harm to people and the environment.
- s) **Water Security:** Water security is about ensuring enough safe and clean water is available for people, ecosystems, and economic use, now and in the future.

1.9 Data Collection and Quality Assurance on Housing Condition

1.9.1 Methodology

Tanzania's 2022 Population and Housing Census was groundbreaking as it utilised mobile technology for data collection, aligning with UN recommendations for the 2020 census round. This marked Tanzania's first use of mobile technology for mapping and enumeration. The implementation occurred in two phases: first, mobile GIS technology was used to demarcate enumeration areas and transmit cartographic data to the NBS/OCGS headquarters. In the second phase, Computer-Assisted Personal Interviews (CAPI) facilitated data capture and transmission from the field using tablets programmed with a CS Entry system on Android.

The third phase of the Census implementation focuses on advanced technologies for data processing, analysis, and dissemination, utilising mobile phones for broadcasting results and iterative dashboards for data sharing. Ensuring data quality relied on effectively managing errors, human, instrumental, and others, at every stage, ultimately enhanced the quality of the 2022 PHC data.

This initiative aligns with the Strategic Themes of the Strategy for the Harmonization of Statistics in Africa (2017-2026) (SHaSA2), focusing on the production and coordination of quality statistics. It supports the Vision of the African Statistical System (ASS), which aims to establish a robust system that generates reliable, harmonized, and timely statistical information across political, economic, social, environmental, and cultural dimensions in Africa.

1.9.2 Quality Assurance

Quality assurance was integrated throughout the census planning and implementation processes. This included clear questionnaires, guidelines, field supervision, regular feedback, and timely resolution of issues. A monitoring team was established to oversee technical, logistic, and administrative aspects in each region. A Quality Control Procedure Handbook was utilised to standardise practices across all stages: pre-enumeration, enumeration, and post-enumeration. Additionally, international observers and development partners provided oversight and technical advice at all stages.

Remedial actions were taken when significant discrepancies arose between plans and ground realities. Census data provide valuable insights into living conditions and housing, but they also have limitations. It frequently overlooks current environmental and climate issues, as well as rapid urban expansion, climate-induced migration, and heightened natural disaster risks.

Specific Limitations:

- i. **Simplified reasons for migration:** While reasons for migration are captured, they may not fully explain complex drivers (i.e., climate change, environmental degradation).
- ii. **Recall bias:** Questions on previous residence in 2012 rely on memory, which may be inaccurate.
- iii. **Quality of education:** The census captures only education levels, not the quality of learning. This limits the analysis of education's impact on climate awareness and sustainable practices, potentially underestimating the influence of education quality on resilience to environmental challenges.
- iv. **ICT access:** The census records ICT ownership and usage but lacks assessments of affordability, service quality, and digital literacy, limiting insight into how households access climate information systems and use digital platforms for climate-smart practices.
- v. **Granularity:** Most environment questions are at the community level, making it hard to analyse household-level vulnerabilities.
- vi. **Data quality challenges:** Enumerator training, respondent bias, and misreporting (especially in sensitive questions like land ownership or income) can affect accuracy.

1.10 Organisation of the Monograph

This monograph is structured into eight chapters. Chapter One serves as an introduction, providing the background of the 2022 PHC and outlining the objectives of both the Census and the Environment and Climate Change Monograph. It highlights the importance of environment and climate change data, presents the census questions related to environmental characteristics, and discusses the link between population, environment, and climate change. The chapter also reviews global, regional, and national governance frameworks, introduces key concepts and definitions, and explains the methodology and quality assurance in data collection.

Chapter Two focuses on migration, land ownership, housing, and infrastructure, analysing their environmental implications and sustainability dimensions. Chapter Three examines economic activities and natural resource use, with emphasis on agriculture, livestock, fisheries, forestry, mining, quarrying, and informal economic activities, and their contribution to environmental change. Chapter Four addresses energy, water, sanitation, and waste management, assessing the sustainability and environmental impact of household practices.

Chapter Five explores education, awareness, and knowledge about climate change, including perceptions of climate variability and experiences with major climatic events. Chapter Six discusses disaster risks and vulnerability, focusing on settlements in hazard-prone areas, exposure of populations and infrastructure to risks, and social dimensions of vulnerability. Chapter Seven outlines policy implications and opportunities, linking census findings to national and international climate change policies, highlighting mainstreaming opportunities, and identifying data gaps and research needs.

Finally, Chapter Eight synthesises the key findings, provides strategic policy recommendations, and proposes the way forward for integrating environment and climate change considerations into national development planning.

CHAPTER TWO

MIGRATION, LAND OWNERSHIP, HOUSING AND INFRASTRUCTURE

Box 2.1 Key Points

- Migration is accelerating urbanisation, increasing pressure on land and services.
- Work, education, family reunification and environmental stressors are the major drivers of migration
- Land tenure insecurity undermines climate adaptation investments.
- Housing quality and poor building materials expose many households to climate risks.
- Rural–urban service disparities threaten equitable resilience.
- Integrated policies can bridge gaps between land, housing, and service provision.

2.1 Introduction

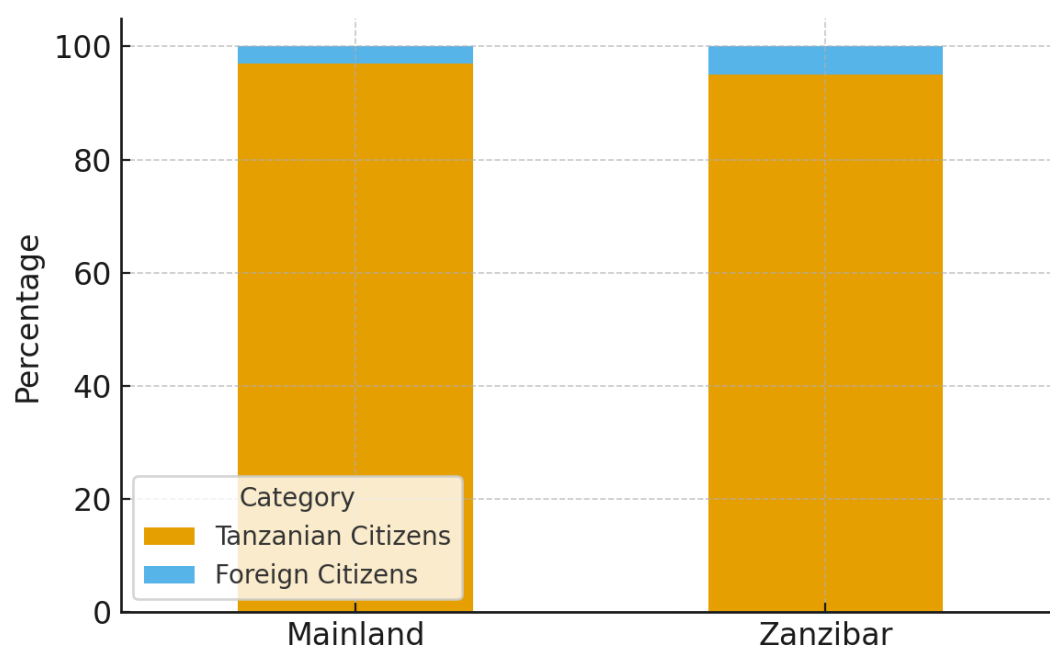
This chapter offers a comprehensive analysis of migration patterns, land ownership and tenure security, housing conditions, infrastructure and social services in Tanzania based on the 2022 PHC. It emphasises how demographic changes, housing quality, and access to essential services intersect with environmental sustainability and climate resilience. The evidence reveals significant urbanisation pressures, ongoing tenure insecurity, vulnerabilities in housing materials, and gaps in energy, water, and sanitation services. The findings show substantial migration from rural to urban areas across all age groups.

2.2 Migration Patterns and Environmental Implications

2.2.1 Citizenship

The 2022 PHC collected information on citizenship, which provides insight into international migration dynamics in Tanzania. Most residents are Tanzanian citizens, but there are also notable numbers of migrants from neighbouring countries such as Burundi, Rwanda, Kenya, and Malawi. Understanding citizenship status helps to link migration with resource use, land pressure, and urban growth, all of which have direct environmental and climate change implications (Figure 2.1). The majority of residents are Tanzanian citizens, with Tanzania Zanzibar showing a slightly higher proportion of foreign citizens compared to Mainland Tanzania.

Figure 2.3 Citizenship distribution by Mainland Tanzania and Tanzania Zanzibar, 2022 PHC.



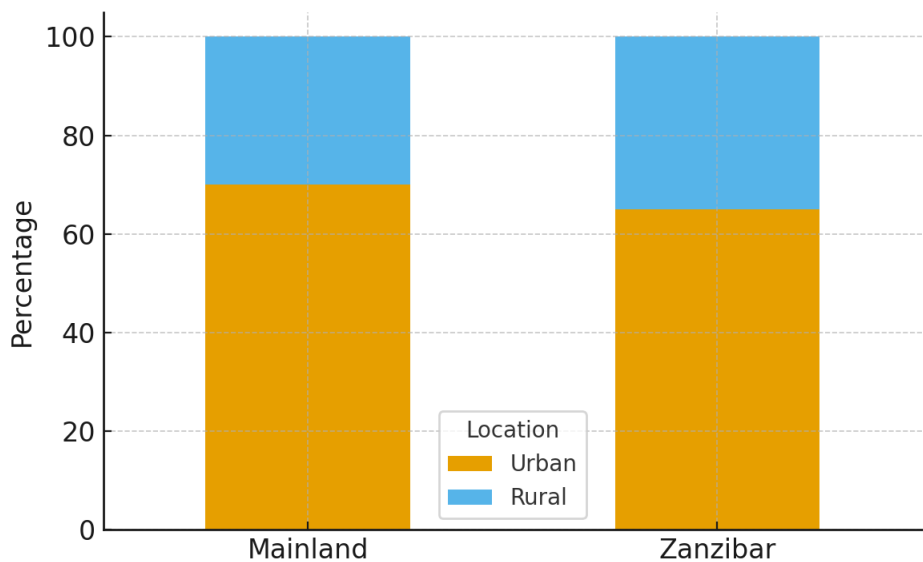
2.2.2 Place of Residence

Place of residence offers a snapshot of where international migrants are situated within Tanzania. The 2022 PHC indicates that most international migrants live in Mainland Tanzania, with Tanzania Zanzibar accommodating a smaller proportion (Table 2.1 and Figure 2.2). Urban centres attract a larger share of migrants compared to rural areas, reflecting employment opportunities and improved access to services. This concentration can strain urban infrastructure, energy supplies, and waste management.

Table 2.2: Working-age labour migration by place of residence, sex and place of birth, 2022 PHC

Place	Total	Tanzanians	Non-Tanzanians	Dual Citizens	No Citizenship
Tanzania					
Both Sexes	55,960	8,997	46,924	9	30
Male	36,485	6,040	30,411	7	27
Female	19,475	2,957	16,513	2	3
Tanzania Mainland					
Both Sexes	55,078	8,763	46,281	7	27
Male	35,830	5,865	29,936	5	24
Female	19,248	2,898	16,345	2	3
Tanzania Zanzibar					
Both Sexes	882	234	643	2	3
Male	655	175	475	2	3
Female	227	59	168	0	0

Figure 2.4 : International migrants by place of residence, Tanzania 2022 PHC.

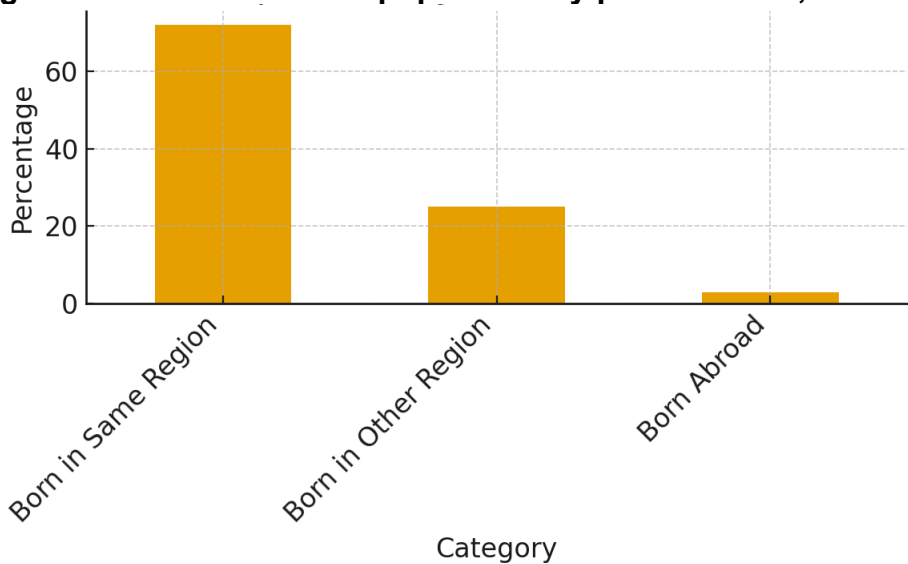


Urban areas dominate as destinations for migrants, indicating increasing urbanisation and environmental stress in cities.

2.2.3 Place of Birth

Analysis of birthplaces shows that a significant portion of Tanzania's population was born outside their current region of residence. Internal migration, particularly rural-to-urban movement, is a key factor driving demographic change (Figure 2.3). This trend affects land use conversion and settlement expansion, while also putting pressure on natural resources. Internal migration accounts for a quarter of the population, while a smaller share was born abroad.

Figure 2.5 : Distribution of population by place of birth, Tanzania 2022 PHC



2.2.4 Migration and Reasons for Movement

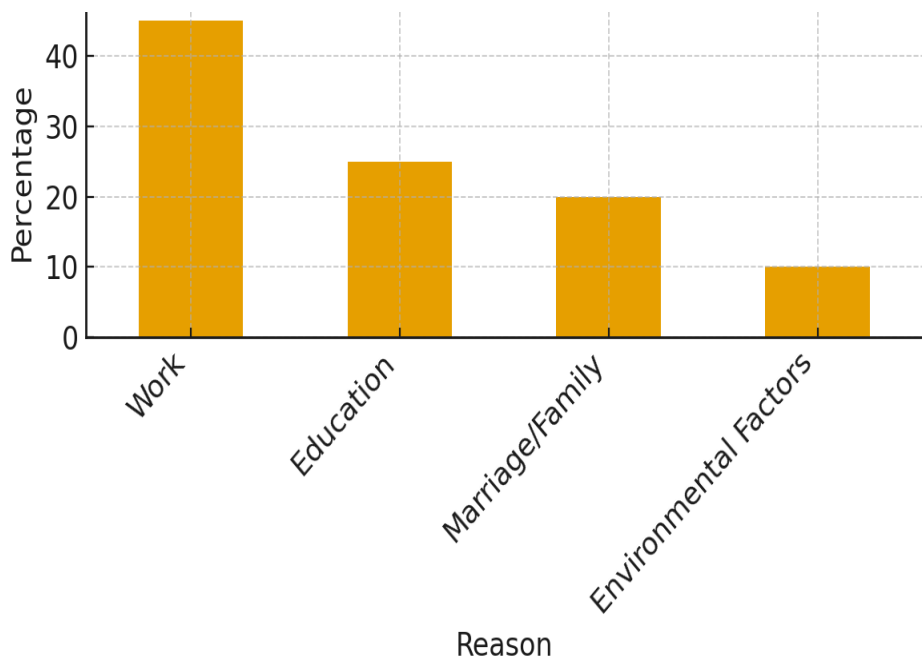
The Census highlighted the reasons for migration, with work, education, and family reunification being the primary drivers, particularly among the younger population. Additionally, migration due to environmental stressors such as drought, floods, and the search for agricultural land is evident, especially in rural areas. These factors underscore the connection between livelihoods and the impacts of climate change (Table 2.2 and Figure 2.4).

For the young population aged 10-19 years, marriage is another reason for migration. This situation is more pronounced in rural areas compared to urban areas, indicating a significant number of young marriages in rural regions, with girls being more affected than boys. Work opportunities serve as the primary motivator for individuals seeking new locations, yet environmental factors, including climate, resources, and overall quality of life, significantly influence those decisions as well.

Table 2.3: Number of recent in-migration by main reason, 2022 PHC

Reason	Number of recent in-migration of young population age 10-13 by main reason																			
	Total	Male	Female	To take up a paid job	Job transfer	To look for work/green pasture/clients	Study/training	Marriage	Family moved/joining family	Medical treatment/health care	Conflict/insecurity/natural disaster	Looking for suitable land for agriculture	Looking for suitable site for fishery	Looking for suitable grazing land	Cost of living	Moving into a new homestead	Visit friend/family	Conflict of Marriage/Family	Death of parent (s)	To be cared
Total	513587	246526	267061	0	0	0	50396	0	302077	3096	526	0	0	0	0	23927	93654	0	7395	32516
Rural	258770	129730	129040	0	0	0	17115	0	167771	1583	392	0	0	0	0	13365	37308	0	4149	17087
Urban	254817	116796	138021	0	0	0	33281	0	134306	1513	134	0	0	0	0	10562	56346	0	3246	15429
Number of recent in-migration of young population age 13-19 by main reason																				
Total	1139392	489907	649485	67894	1505	43335	160707	34662	480069	7295	805	7503	413	1509	704	43213	229932	1123	12498	46225
Rural	461619	223971	237648	18729	449	8846	39150	20935	241699	3203	604	7036	213	1400	301	21676	70216	596	6066	20500
Urban	677773	265936	411837	49165	1056	34489	121557	13727	238370	4092	201	467	200	109	403	21537	159716	527	6432	25725
Number of recent in-migration of young population age 15-35 by main reason																				
Total	4395176	1967817	2427359	595313	95157	897671	410427	601880	881650	25980	2447	142688	5761	16474	16421	180632	431277	8461	20379	62558
Rural	1477791	682341	795450	180931	28440	163940	54388	261584	380729	10547	1699	129933	3853	15150	5823	81434	124413	4180	8771	21976
Urban	2917385	1285476	1631909	414382	66717	733731	356039	340296	500921	15433	748	12755	1908	1324	10598	99198	306864	4281	11608	40582

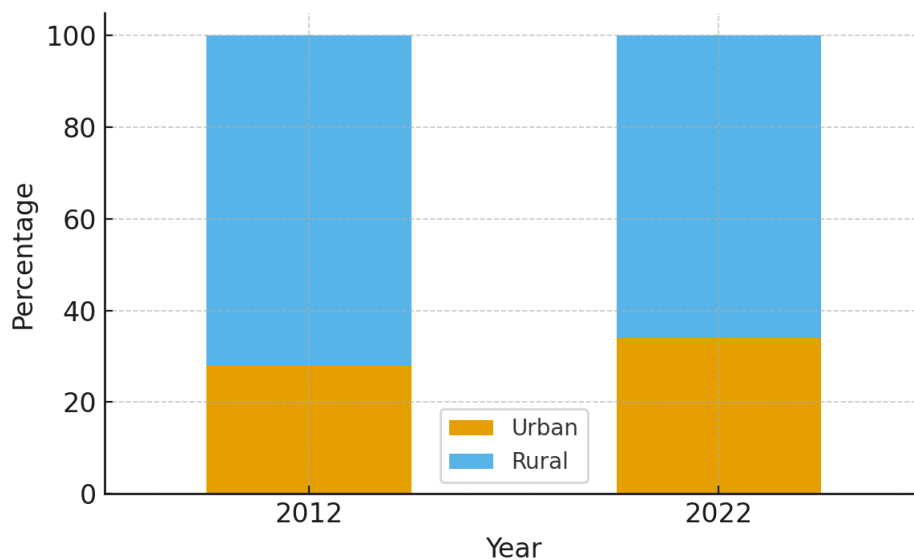
Figure 2.6: Reasons for migration in Tanzania, 2022 PHC



2.2.5 Migration trend by Place of Residence in 2012 and 2022

Comparisons of census data between 2012 and 2022 reveal significant shifts in migration trends. Urban areas have experienced rapid growth due to in-migration, while some rural regions show a population decline. These trends suggest that pressures from climate change on rural livelihoods are pushing populations towards urban centres. A considerable proportion of the population aged between 19 and 35 years migrates to seek work or take up paid employment. Urbanisation has accelerated over the last decade, intensifying environmental challenges in cities (Figure 2.5).

Figure 2.7: Migration Trends by place of residence by year; Tanzania, 2022 PHC



2.3 Infrastructure and Social Services

This section synthesises five core household service indicators from the 2022 PHC: information and communication technology (ICT), energy access, water supply, sanitation, and solid waste management, and interprets their implications for environmental quality and climate resilience. We prioritise Mainland–Zanzibar and rural–urban contrasts, providing concise policy insights for climate action.

2.3.1 Information and Communication Technology (ICT) access

The PHC 2022 covers equipment ownership and use (e.g., phones, internet-enabled devices). These are essential for early warnings (floods, storms), climate advisories to farmers/fishers, and coordination during disasters. The PHC states that in Tanzania, 38.7% (33.7% in rural areas and 46.3% in urban areas) of the population owns a radio, 27.3% (16.9% in rural and 43.2% in urban) have landline telephones, and 0.6% (0.2% in rural and 1.2% in urban) have internet access. While 82.5% own a mobile phone, of which 87.4% are men and 78.2% are women (Tables 2.3, 2.4 and 2.5). This indicates that the rural population, especially women, have limited access to climate change early warning information.

Table 2.4: Communication assets ownership, 2022 PHC

Place of residence	Total number of households	Percentage ownership			
		Owning Radio	Owning Television	Has landline telephone	Has internet facility
Tanzania	14,152,803	38.7	27.3	1.1	0.6
Rural	8,547,333	33.7	16.9	1.0	0.2
Urban	5,605,470	46.3	43.2	1.2	1.2
Mainland Tanzania	13,776,975	38.6	26.8	1.1	0.6
Rural	8,355,992	33.6	16.6	1.0	0.2
Urban	5,420,983	46.3	42.5	1.2	1.2
Tanzania Zanzibar	375,828	42.0	45.8	1.2	0.3
Rural	11,341	37.9	29.8	1.2	0.3
Urban	184,487	46.2	62.5	1.2	1.2

Table 2.5: Mobile phone ownership for population age 15 years and above, 2022 PHC

Place of residence	Total			Percentage mobile phone ownership		
	Both Sexes	Male	Female	Both Sexes	Male	Female
Tanzania	34,475,324	16,285,772	18,189,552	82.5	87.4	78.2
Rural	21,291,058	10,140,173	11,150,885	78.1	84.8	72.0
Urban	13,184,266	6,145,599	7,038,667	89.7	91.7	87.9
Tanzania Mainland	33,389,842	15,778,198	17,611,644	82.3	87.3	77.9
Rural	20,765,719	9,892,223	10,873,496	77.9	84.7	71.8
Urban	12,624,123	5,885,975	6,738,148	89.6	91.6	87.8
Tanzania Zanzibar	1,085,482	507,574	577,908	88.8	91.9	86.0
Rural	525,339	247,950	277,389	85.8	90.5	81.6
Urban	560,143	259,624	300,519	91.6	93.3	90.2

In the interim, policy emphasis should be on last-mile connectivity, inclusive digital literacy, and subsidised access to climate information services.

Table 2.6: Number of Buildings by Type of Basic Services, 2022 PHC

Place of residence	Electricity (National Grid)	Alternative source	Water	Toilet	Accessible by roads	Infrastructure for people with disability
Tanzania	3,354,146	4,048,026	3,572,597	11,120,843	10,415,962	562,056
Rural	1,113,541	3,288,968	1,520,753	7,467,382	6,830,498	318,527
Urban	2,240,605	759,059	2,051,844	3,653,462	3,585,465	243,529
Mainland	3,134,547	4,031,401	3,374,446	10,806,308	10,144,645	542,020
Zanzibar	219,599	16,625	198,151	314,535	271,317	20,036

2.4 Occupational Patterns and Environmental Stress

2.4.1 Occupational Patterns

Tanzania's population is engaged in a diverse range of occupations that form the backbone of the economy and people's livelihoods. According to the 2022 Population and Housing Census (PHC) (Table 2.6), the total employed population was about 24.7 million, with 24 million residing in Mainland Tanzania and 0.7 million in Tanzania Zanzibar. In Tanzania Zanzibar, the population consisted of approximately 0.4 million men and 0.3 million women. This distribution underscores the broad reliance on agriculture, services, and trade, while also reflecting gendered differences in employment across sectors.

Agriculture and Fisheries form the largest occupational group in Tanzania, engaging 43.2% of the workforce nationwide. Mainland Tanzania shows a slightly higher rate of 43.8%, compared to only 24.2% in Tanzania Zanzibar. Women are more represented in this sector nationally, with 44.8% compared to 41.6% of men. On the Tanzania Mainland, 45.5% of women and 42.1% of men are engaged in agriculture and fisheries, while in Zanzibar, 21.7% of women and 26.4% of men depend on this sector. This pattern reflects the stronger agrarian base of the Mainland economy, while Zanzibar is more service-oriented.

Elementary Occupations represent the second largest group, accounting for 21.7% of the national workforce. In Mainland Tanzania, 21.5% of people are engaged in such activities, with female participation (22.3%) slightly exceeding that of males. In Tanzania, Zanzibar, elementary occupations absorb an even larger share, 27.3% of the employed population, with both women (28.3%) and men (26.7%) showing high involvement.

Craft and Related Trades constitute the third most common occupation, engaging about 19.7% of the employed population in Mainland Tanzania and 19% in Tanzania Zanzibar. On the Mainland, male participation (20.4%) is slightly higher than female (19.1%). Conversely, in Tanzania Zanzibar, women are more engaged (21.6%) compared to men (16.8%).

Service and Sales Workers make up 6.5% of the national workforce, though the Mainland Tanzania (6.3%) and Tanzania Zanzibar (12.1%) display contrasting dynamics. In Mainland Tanzania, 7.5% of women and 5.1% of men work in this sector, while in Zanzibar, female participation (12.6%) also surpasses that of men (11.7%). This illustrates the stronger role of services in Tanzania Zanzibar's economy compared to the Mainland Tanzania.

Technicians and Associate Professionals represent 4.5% of the national workforce, with an apparent gender disparity: 6.4% of men compared to only 2.6% of women. In the Mainland, this group accounts for 4.4% of employment, while in Zanzibar the share is significantly higher at 7.5%. Within Zanzibar, men (8.9%) are more engaged than women (5.8%).

Professionals, including teachers, nurses, and lawyers, account for 2.2% of the employed population nationally. On the Mainland, this group represents 2.0% of the workforce, with nearly equal male (2.3%) and female (1.9%) participation. In Tanzania Zanzibar, however, professionals represent a much higher share at 5%, with a strong female presence (6.8%) compared to men (3.8%).

Minor occupations make up a small fraction of Tanzania's workforce. Nationally, only 0.6% are employed as managers and legislators, 1.2% as plant and machine operators, and 0.5% in clerical roles. In Tanzania Zanzibar, these proportions are slightly higher: 2.2% for managers and legislators, 1.5% for clerical workers, and 1.2% for plant and machine operators. Although small in scale, these roles reflect the emerging but limited presence of formal and administrative employment in both Mainland Tanzania and Zanzibar.

The occupational patterns outlined above are highly relevant to environmental and climate change dynamics in Tanzania. With agriculture and fisheries employing the largest share of the population, especially women, shifts in rainfall patterns, droughts, floods, and coastal changes directly affect the majority of livelihoods. Similarly, the high reliance on elementary occupations and craft-related trades reflects dependence on natural resources and informal sectors that are often more vulnerable to climate variability. On the other hand, the relatively smaller share of professionals, technicians, and administrative roles indicates limited capacity in climate-resilient sectors. Understanding these occupational structures is therefore critical for designing inclusive adaptation strategies that safeguard livelihoods while promoting sustainable economic transformation in both Mainland Tanzania and Zanzibar.

Table 2.7: Occupational Pattern distribution by Industries and Sex in Tanzania; Tanzania 2022 PHC

Occupation	Tanzania			Tanzania Mainland			Tanzania Zanzibar		
	Both Sexes (%)	Male (%)	Female (%)	Both Sexes (%)	Male (%)	Female (%)	Both Sexes (%)	Male (%)	Female(%)
Total Number	24,695,842	12,292,806	12,403,036	23,986,730	11,916,451	12,070,279	709,112	376,355	332,757
Legislators, administrators and managers	0.6	0.7	0.5	0.6	0.7	0.4	2.2	2.5	2.0
Professionals	2.2	2.3	2.0	2.1	2.3	1.9	5.0	3.8	6.3
Technicians and associate professionals	4.5	6.4	2.6	4.4	6.3	2.5	7.5	8.9	5.8
Clerks	0.5	0.5	0.6	0.5	0.5	0.5	1.5	1.2	1.7
Service workers and shop sales workers	6.5	5.3	7.6	6.3	5.1	7.5	12.1	11.7	12.6
Agricultural and fishery workers	43.2	41.6	44.8	43.8	42.1	45.5	24.2	26.4	21.7
Craft and related workers	19.7	20.3	19.2	19.7	20.4	19.1	19.0	16.8	21.6
Plant and machine operators and assemblers	1.2	2.0	0.3	1.2	2.0	0.3	1.1	1.9	0.2
Elementary occupations	21.7	20.9	22.4	21.5	20.7	22.3	27.3	26.7	28.0

2.4.2 Employment Status

According to the 2022 PHC (Table 2.7), Tanzania had a total employed population of 24.6 million, comprising 12.2 million men and 12.4 million women. In contrast, 2.09 million individuals were unemployed (0.8 million men and 1.2 million women), while 7.69 million were classified as inactive. This inactive group includes children, homemakers, and the elderly who depend on the working population for sustenance. In total, about 17.7 million Tanzanians were not engaged in employment, placing significant dependency on the employed population for economic support.

On the Mainland, the employed population reached about 23.9 million, with men accounting for 11.9 million and women for 12.0 million. The number of unemployed stood at 1.9 million, including 0.7 million men and 1.2 million women. In Tanzania Zanzibar, employment levels are smaller but still significant, with around 0.7 million employed (0.4 million men and 0.3 million women) and 0.18 million unemployed. Interestingly, formal employment figures are much lower in Zanzibar, with only 25,758 men and 59,415 women in formal jobs, suggesting that informal and household-based activities remain dominant.

Despite its small size, Tanzania Zanzibar records a relatively higher employment rate than the Mainland Tanzania. Notably, female employment is more prominent in Zanzibar, reflecting cultural, policy, or economic factors that encourage women's participation in the labour market. This stronger labour force engagement may provide opportunities for more inclusive and sustainable growth if coupled with green economic initiatives.

The demographic structure of employment has direct implications for the environment and climate change. A large inactive population relying on a relatively small workforce increases pressure on natural resources to meet rising demands for food, energy, and housing. Since many employed individuals, especially in rural areas, work in agriculture, fishing, and informal trades, unsustainable practices could accelerate deforestation, soil degradation, overfishing, and water scarcity. In urban areas, population pressures heighten risks of pollution, poor waste management, and declining air and water quality.

Table 2.8: Economic activity status by place of residence and region, Tanzania 2022 PHC

Place of Residence	Economic Activity Status			Total
	Employed	Unemployed	Inactive	
Tanzania	24,695,842	2,092,217	7,687,265	34,475,324
Rural	15,685,530	672,299	4,933,229	21,291,058
Urban	9,010,312	1,419,918	2,754,036	13,184,266
Tanzania Mainland	23,986,730	1,920,496	7,482,616	33,389,842
Rural	15,287,713	604,594	4,873,412	20,765,719
Urban	8,699,017	1,315,902	2,609,204	12,624,123
Tanzania Zanzibar	709,112	171,721	204,649	1,085,482
Rural	397,817	67,705	59,817	525,339
Urban	311,295	104,016	144,832	560,143

In Tanzania, key livelihood sectors such as agriculture, fisheries, forestry, and livestock play a central role in national development, yet they also contribute significantly to environmental stress when managed unsustainably. Agricultural expansion into forested areas, coupled with poor land management and excessive use of chemicals, leads to deforestation, soil erosion, water depletion, and biodiversity loss. Fisheries, vital to coastal and lakeside communities, are threatened by overfishing, destructive techniques, and pollution from vessels and settlements. Forests are under pressure from illegal logging, charcoal production, and land clearing for farming and grazing, resulting in habitat destruction and reduced carbon storage. Livestock farming adds to the strain through overgrazing, poor waste management, and methane emissions, while competition for grazing land intensifies deforestation and land disputes. Collectively, these activities exert heavy pressure on Tanzania's natural resources, posing risks to ecological stability, food security, and climate resilience. Sustainable land-use planning, environmentally friendly practices, and stronger governance are essential to mitigate these impacts. This chapter explores the extent to which these activities engage Tanzania's population.

CHAPTER THREE

ENERGY, WATER, SANITATION, AND WASTE MANAGEMENT

Box 3.1 Key Points

- Majority (70.1%) of households in Tanzania use improved sources of drinking water. Improved water access reduces reliance on vulnerable surface sources, lowering exposure to waterborne disease and pressure on fragile ecosystems.
- More than half of households in Tanzania (52%) and Mainland Tanzania (51%) use improved toilet facilities, while in Tanzania Zanzibar, it is 62%. Improved sanitation reduces contamination of water bodies and ecosystems, supporting public health and biodiversity.
- 79% of households in rural areas and 20.1% in urban areas use firewood for cooking. Heavy reliance on firewood drives deforestation, forest degradation and biodiversity loss, and increases greenhouse gas and black carbon emissions that exacerbate climate change and health impacts.
- Percentage of households using electricity from the national grid for lighting increased from 21.3 per cent in 2012 to 37.4% in 2022 in Tanzania. Expanded electrification can reduce reliance on biomass and kerosene, lowering emissions and indoor air pollution, if electricity is sourced from low-carbon grids or renewables.
- Four in ten (40.1%) households in Tanzania use burning of solid waste as the main method of solid disposal. Open burning releases toxic pollutants, particulate matter and greenhouse gases, harming health and contributing to local air pollution and climate forcing. It also indicates weak waste management systems that can contaminate soil and water.

3.1 Introduction

The 2022 PHC gathered data on sources of drinking water, sanitation, and primary energy sources used for cooking and lighting by households nationwide. It also collected information on environmental control methods, water sources and accessibility, household drinking water, sanitation, waste management, toilet facilities, solid waste disposal and

sorting, as well as electronic and electrical waste. These data were obtained explicitly for assessing and analysing household wealth status, but also have implications for the environment and climate change.

3.2 Energy Sources

Reliable energy is vital for economic growth, healthcare, education, and industrial progress. However, many regions still lack access to clean and affordable energy. There is a global shift towards renewable sources (solar, wind, hydro) to lower carbon emissions and reduce reliance on fossil fuels. Energy strategies are increasingly incorporating climate objectives, energy efficiency, and decentralised systems like mini-grids for rural electrification.

In 2022, Tanzania's Total Primary Energy Supply (TPES) reached 36,119.4 kilotonnes of oil equivalent (ktoe). Biofuels, primarily wood and charcoal, dominated the energy mix, accounting for 82% of the TPES. Oil products made up 10.7%, while natural gas, coal, and hydro contributed smaller shares. These figures underscore the country's reliance on traditional biomass and the growing need for energy diversification, particularly through renewable sources.

3.2.1 Energy Sources for Cooking

Tanzania's cooking energy landscape is primarily reliant on traditional biomass, with limited adoption of clean alternatives. The 2022 PHC gathered information on households' primary energy sources for lighting and cooking. These data enabled an assessment of access to clean energy sources such as electricity, solar power, and gas. Utilising clean energy as an alternative offers two main benefits: (a) reducing dependence on wood as the primary cooking fuel, thus protecting the environment, and (b) improving population health, particularly for women, by decreasing exposure to smoke from wood fuels. The key determinants of cooking energy choice include household income and education level, availability and cost of fuel, stove type and cooking habits, and awareness of health and environmental impacts.

Table 3.1 indicates that the majority of households in Tanzania rely on firewood (55.7%) as their primary cooking fuel, followed by charcoal (25.9%). Seventy-nine per cent of rural households and 20.1 per cent of urban households use firewood for cooking. The proportion of households using firewood in Tanzania Mainland is 56%, while in Tanzania Zanzibar it is 46.9%. Across regions, the percentage of households using firewood ranges from 4.5% in Dar es Salaam to 77.4% in Simiyu.

Regarding charcoal, 12.6 % of households in rural areas and 46.3% in urban areas rely on charcoal as the primary energy source for cooking. The proportion of households using charcoal for cooking is 25.8%t in Tanzania Mainland and 28.9% in Tanzania Zanzibar. Across regions, the percentage of households using charcoal ranges from 9.4% in Arusha to 44% in Mjini Magharibi.

3.2.2 The Use of Clean Energy for Cooking

Clean energy includes electricity, gas, biogas, solar power, generator or private sources, and wind-generated electricity. Figure 3.1 shows that the use of clean energy for cooking by households in Tanzania has increased from 2.7% in 2012 to 16% in 2022. In Tanzania Mainland, the increase is from 2.5% to 15.9%, and in Tanzania Zanzibar, it rose by 16% (from 4.7% to 20.7%). At the regional level, there is a significant increase in households using clean energy in Dar es Salaam (from 11.3% to 47.7%), Arusha (from 6.8% to 37.3%), Mjini Magharibi (from 8.6% to 33.8%), Kilimanjaro (from 3.4% to 22.8%), and Mwanza (from 1.3% to 18.1%).

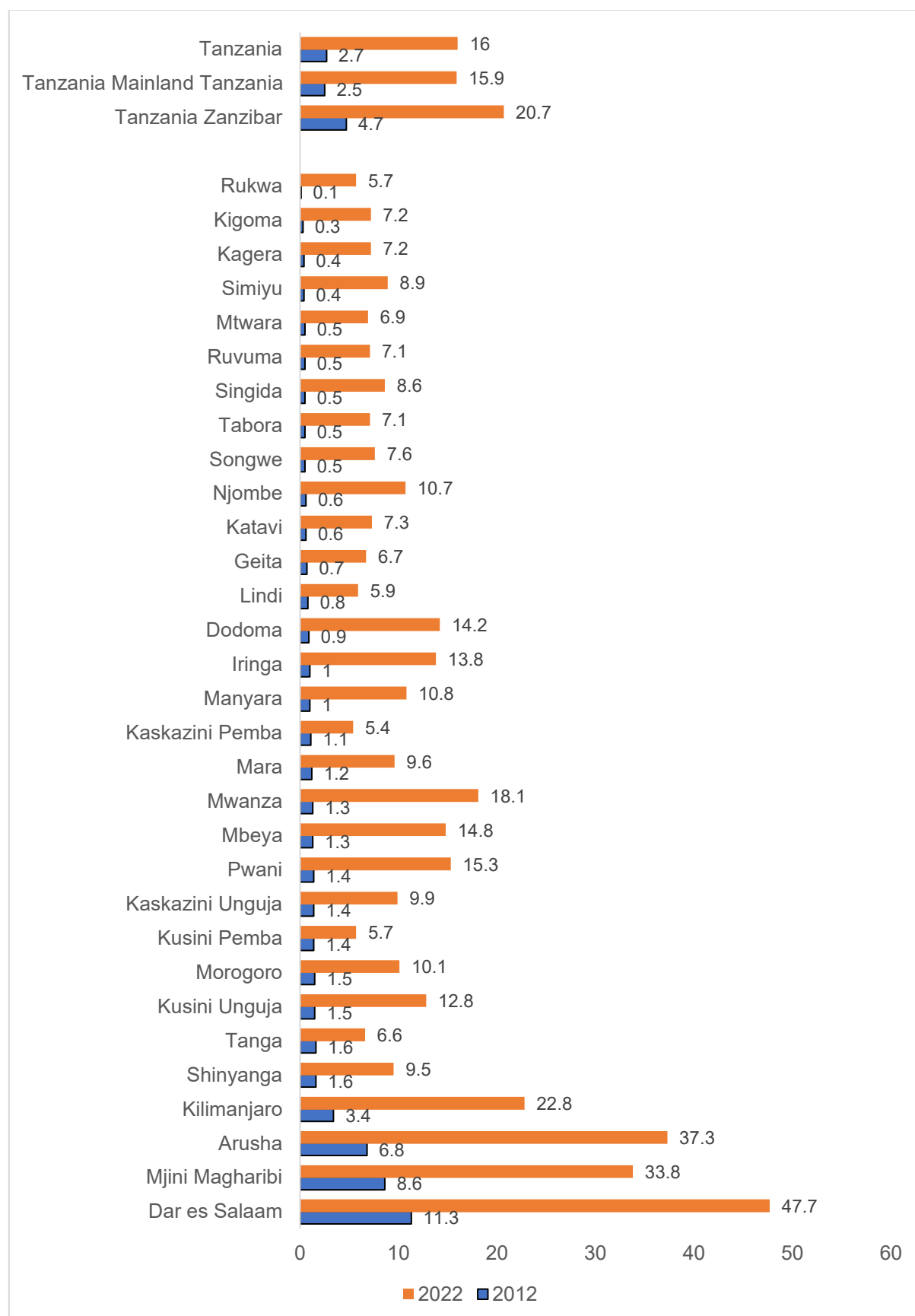
The National Clean Cooking Energy Strategy (2024–2034) promotes LPG, electricity, biogas, and improved biomass stoves. Tanzania is working to ensure universal access to affordable, reliable, and modern energy services as part of implementing the global development goals, specifically Goal 7 (Ensuring Access to Clean and Affordable Energy). Green financing projects like UWASA’s green bond in Tanga serve as models for infrastructure investment. The energy mix is shifting towards reducing biomass reliance, expanding renewables, and improving rural electrification. The primary challenges remain high upfront costs, limited awareness, and infrastructure gaps, which hinder the adoption of clean energy.

Table 3.9: Percentage Distribution of Households by Main Source of Energy for Cooking, Place of Residence and Region; Tanzania, 2022 PHC

Residence/ Region/Headship	Total Number of Households	Main Source of Energy for Cooking													
		Electricity (TANESCO/ZECO)	Solar	Generator/ Private Sources	Gas	Biogas	Wind Generated Electricity	Paraffin	Coal	Charcoal	Firewood	Wood/Residuals	Animal residuals	Charcoal Briquette	Not Applicable
Tanzania	14,152,803	4.3	2.4	0.2	9.2	0.1	0	0.5	0.1	25.9	55.7	0.1	0	0	1.4
Rural	8,547,333	1.4	3.1	0.2	2.2	0.1	0	0.4	0.1	12.6	79.1	0.1	0	0	0.9
Urban	5,605,470	8.7	1.4	0.2	19.9	0.2	0	0.7	0.2	46.3	20.1	0	0	0.1	2.3
Male Headed Households	9,088,599	4.2	2.4	0.2	9.4	0.1	0	0.5	0.1	25.3	55.5	0.1	0	0	2
Female Headed Households	5,064,204	4.3	2.3	0.2	8.8	0.1	0	0.5	0.1	27	56.1	0.1	0	0	0.4
Tanzania Mainland	13,776,975	4.2	2.5	0.2	9.1	0.1	0	0.5	0.1	25.8	56	0.1	0	0	1.4
Dodoma	754,631	2.6	2	0.3	9.5	0.1	0	0.1	0.1	18.3	65.4	0.2	0	0	1.5
Arusha	611,939	6.3	2.1	0.1	28.6	0.2	0	1.7	0.1	9.4	49.8	0.1	0.2	0	1.4
Kilimanjaro	494,428	4.5	1.4	0.3	16.8	0.1	0	1	0.1	9.8	64.5	0.1	0	0	1.3
Tanga	631,258	1.3	0.9	0	4.2	0	0	0.4	0.1	23.1	68	0	0	0	1.8
Morogoro	822,467	2.9	2.2	0.1	4.9	0.1	0	0.4	0.1	34.8	52.8	0.1	0	0	1.5
Pwani	537,040	5	2.2	0.3	7.9	0.1	0	0.8	0.2	40.1	41.6	0.1	0	0	1.6
Dar es Salaam	1,537,293	15.7	0.7	0.1	31.1	0.2	0	1	0.2	42.9	4.5	0	0	0.1	3.4
Lindi	344,447	1.2	2.3	0.2	2.3	0	0	0.2	0.1	22	69.7	0	0	0	1.8
Mtwara	491,811	1.2	2.9	0.1	2.8	0	0	0.2	0.1	16.9	74.5	0	0	0	1.2
Ruvuma	463,666	1.6	3.2	0.5	2.2	0.1	0	0.1	0.1	23.1	68.3	0	0	0	0.8
Iringa	319,117	4.2	2.3	0.2	7.3	0.1	0	0.3	0.1	22.5	62.3	0	0	0	0.8
Mbeya	624,320	3.8	2.3	0.3	8.5	0.1	0	0.4	0.1	31.4	51.6	0	0	0	1.3
Singida	392,111	2.1	3.1	0	3.4	0	0	0.2	0.1	16.2	72.6	1	0	0	1.3
Tabora	592,039	1.6	3.5	0.1	1.9	0	0	0.3	0.1	24.3	67.2	0	0	0	0.8
Rukwa	328,052	1.1	2.6	0.2	1.9	0	0	0.4	0.1	27.8	65.2	0	0	0	0.6
Kigoma	451,967	1.7	4.5	0.1	1.6	0	0	0.3	0.1	19.7	71.2	0	0	0	0.7
Shinyanga	418,771	2.7	2.9	0.2	3.8	0.1	0	0.2	0.1	30.8	57.8	0	0	0	1.3
Kagera	698,257	2	3.1	0.2	2.1	0.1	0	0.6	0.1	16.2	75	0	0	0	0.7
Mwanza	744,709	4.5	3.2	0.2	10.3	0.1	0	0.2	0.1	32.5	47.4	0	0	0.1	1.3
Mara	467,473	2	3.1	0.1	4.4	0.1	0	0.4	0.1	21.5	67.4	0.1	0	0	0.8
Manyara	398,735	2.1	3.8	0.3	4.8	0.1	0	0.4	0.1	13.4	73.3	0.2	0.1	0	1.5
Njombe	244,579	3.5	3.7	0.4	3.4	0.1	0	0.1	0.1	21.7	66.4	0	0	0	0.6

Residence/ Region/Headship	Total Number of Households	Main Source of Energy for Cooking													
		Electricity (TANESCO/ZECO)	Solar	Generator/ Private Sources	Gas	Biogas	Wind Generated Electricity	Paraffin	Coal	Charcoal	Firewood	Wood/Residuals	Animal residuals	Charcoal Briquette	Not Applicable
Katavi	213,825	1.6	3.8	0.2	1.8	0.1	0	0.2	0.1	33.4	57.9	0.1	0	0	0.8
Simiyu	311,247	2	3.4	0.9	3.2	0.2	0.1	0.1	0.1	11.9	77.4	0	0.1	0	0.7
Geita	555,345	1.6	2.8	0.2	2.2	0	0	0.1	0.2	37.4	54.3	0	0	0	1.1
Songwe	327,448	2.2	2.3	0.1	3.1	0	0	0.4	0.1	24	66.8	0	0	0	0.9
Tanzania Zanzibar	375,828	7.5	0.4	0.1	12.6	0.2	0	1.6	0.1	28.9	46.9	0.1	0	0	1.6
Kaskazini Unguja	53,770	4.4	0.7	0.1	4.6	0.2	0	3.4	0.1	11.5	73.9	0	0	0	1.1
Kusini Unguja	46,003	4.1	0.7	0	7.8	0.2	0	1	0.1	15.2	68.8	0.1	0	0	2
Mjini Magharibi	180,889	11.3	0.1	0	22.1	0.3	0	1.1	0.2	44	18.6	0.1	0	0	2.3
Kaskazini Pemba	48,178	3.4	0.6	0.2	1.2	0.1	0	1.8	0.1	15.2	76.7	0.1	0	0	0.5
Kusini Pemba	46,988	3.7	0.4	0	1.5	0	0	2.4	0.1	18.3	72.6	0.1	0	0	0.7

Figure 3.8: Percentage Distribution of Households Using Clean Energy for Cooking; Tanzania, 2022 PHC



3.2.3 Energy Sources for Lighting

Lighting energy has transitioned towards modern sources, particularly in electrified and peri-urban regions. For instance, the 2022 PHC results indicate that the primary energy source for lighting in Tanzania is electricity from the national grid (TANESCO/ZECO), utilised by 37.4% of households, followed by solar energy (32.4%). Electricity is mainly used in urban households (69.4%) compared to rural ones (16.4%). The proportion of national grid electricity used as the main lighting source in Tanzania, Zanzibar (66.9%), is nearly twice that of Tanzania Mainland (36.6%). The use of electricity from the national grid as the primary lighting energy source varies from 15.9% in Simiyu Region to 88.9% in Mjini Magharibi (Table 3.2).

Some regions with lower percentages of households relying on electricity from the national grid as the main source of lighting have relatively high proportions of households using solar energy. These include Mtwara (55.2%), Ruvuma (49.8%), and Lindi (48.4%). Table 3.2 shows an increase in the use of national grid electricity for lighting in Tanzania. The percentage of households using electricity from the national grid for lighting rose from 21.3% in 2012 to 37.4% in 2022 in Tanzania; from 20.7% to 36.6% in Tanzania Mainland, and from 42.9% to 66.9% in Tanzania Zanzibar. Similar increases are observed across all regions.

Table 3.10: Percentage Distribution of Households by Main Source of Energy for Lighting, Place of Residence and Region; Tanzania, 2022 PHC

Residence/Region/Headship	Total Number of Households	Main Source of Energy												
		Electricity (TANESCO/ZECO)	Solar	Generator / Private Source	Gas (Industrial)	Gas (Biogas)	Wind Generated Electricity	Acetylene Lamp	Kerosene (Lantern/Chimney)	Kerosene (Wick Lamps)	Candles	Firewood	Torch/Chinese Rechargeable Lamp	Electricity (Generated from Plant Residuals)
Tanzania	14,152,803	37.4	32.4	0.3	0.1	0	0.1	0.7	0.5	3.5	0.8	2.1	22	0
Rural	8,547,333	16.4	43.3	0.4	0.1	0.1	0.1	0.8	0.4	4.5	0.6	3.1	30.2	0
Urban	5,605,470	69.4	15.9	0.2	0.1	0	0.1	0.5	0.5	1.9	1.2	0.6	9.5	0
Male Headed Households	9,088,599	37.4	34.1	0.3	0.1	0	0.1	0.6	0.4	3.2	0.8	2	20.9	0
Female Headed Households	5,064,204	37.4	29.4	0.3	0.1	0.1	0.1	0.8	0.5	4	0.9	2.3	24.1	0
Tanzania Mainland	13,776,975	36.6	33.2	0.3	0.1	0	0.1	0.7	0.5	3	0.8	2.1	22.5	0
Dodoma	754,631	28.9	34	0.6	0.1	0	0.1	0.4	0.2	0.9	0.4	2.3	32	0
Arusha	611,939	52.3	23.5	0.1	0	0	0	0.6	1.2	2.1	0.9	4	15.2	0
Kilimanjaro	494,428	63.1	15.7	0.3	0.2	0	0.1	1.2	1.7	5.3	1.3	1.1	9.9	0
Tanga	631,258	33.5	26.9	0.2	0	0	0	1.5	0.6	16.9	0.5	1.4	18.4	0
Morogoro	822,467	33.4	30.6	0.2	0	0	0	0.6	0.5	3.1	0.8	1.9	28.7	0
Pwani	537,040	41.9	26.5	0.4	0.2	0.1	0.1	1.6	0.7	6.4	1	1.4	19.9	0
Dar es Salaam	1,537,293	86	5.1	0.1	0.1	0	0	0.5	0.5	0.9	1.5	0.2	5	0
Lindi	344,447	18.8	48.4	0.3	0.3	0	0	0.4	0.2	1.6	0.3	2.4	27.1	0
Mtwara	491,811	16.6	55.2	0.3	0	0	0	0.3	0.2	1	0.3	2.3	23.8	0
Ruvuma	463,666	24.8	49.8	0.5	0.2	0	0.2	0.3	0.2	0.5	0.4	2.3	20.7	0
Iringa	319,117	43.1	31.9	0.3	0.1	0	0.1	0.4	0.7	2	1.1	2.2	18.1	0
Mbeya	624,320	44.7	25.3	0.6	0.2	0	0.1	0.7	0.5	2.5	1.5	2	22	0
Singida	392,111	21.2	44.5	0.2	0	0	0	0.3	0.2	0.8	0.5	3	29.2	0
Tabora	592,039	20.2	47	0.2	0	0	0.1	0.6	0.2	1.5	0.4	2.8	26.9	0
Rukwa	328,052	19.5	38.5	0.3	0	0.1	0.1	1.5	0.4	9.7	0.6	2.4	26.8	0
Kigoma	451,967	17.7	42.2	0.3	0	0	0	0.5	0.2	2	0.4	3.6	32.9	0.1
Shinyanga	418,771	25.9	42.5	0.4	0.1	0	0	0.2	0.1	0.5	0.4	1.8	27.9	0
Kagera	698,257	21.3	43.4	0.2	0.1	0	0	1.2	0.5	9.3	0.6	2.5	20.7	0
Mwanza	744,709	37.7	37.6	0.3	0.1	0	0.1	0.4	0.3	0.8	1.4	1.6	19.7	0
Mara	467,473	26.1	41.9	0.2	0	0	0	0.8	0.6	3	1	2.3	24	0
Manyara	398,735	23.1	35.1	0.5	0.1	0	0.1	0.6	0.4	0.9	0.7	5.3	33.2	0.1
Njombe	244,579	35.9	41.8	2.2	0.1	0	0	0.3	0.2	0.6	0.8	2.4	15.8	0
Katavi	213,825	20.3	47.8	0.4	0	0	0.1	0.7	0.2	1.2	0.4	2.3	26.6	0

Residence/Region/Headship	Total Number of Households	Main Source of Energy												
		Electricity (TANESCO/ZECO)	Solar	Generator / Private Source	Gas (Industrial)	Gas (Biogas)	Wind Generated Electricity	Acetylene Lamp	Kerosene (Lantern/Chimney)	Kerosene (Wick Lamps)	Candles	Firewood	Torch/Chinese Rechargeable Lamp	Electricity (Generated from Plant Residuals)
Simiyu	311,247	15.9	32.2	1	0.1	0.9	0.3	0.6	0.1	0.4	0.3	2.8	45.3	0
Geita	555,345	19.9	44.1	0.4	0.1	0	0.3	0.2	0.1	0.4	0.6	1.7	32.3	0
Songwe	327,448	28.1	33.4	0.2	0	0	0	0.6	0.3	2.5	1.4	2.6	30.7	0
Tanzania Zanzibar	375,828	66.9	5	0.1	0	0	0	1.8	1	19.6	0.6	1	4	0
Kaskazini Unguja	53,770	44.2	7.4	0.3	0	0	0	4	1	35.5	0.6	2.4	4.5	0
Kusini Unguja	46,003	54	12.4	0.1	0	0	0	1.1	1	15.7	0.8	1	13.8	0
Mjini Magharibi	180,889	88.9	1.5	0	0	0	0	0.6	0.6	4.8	0.6	0.3	2.4	0
Kaskazini Pemba	48,178	39.8	7.1	0.2	0.1	0	0	2.9	1.8	44.4	0.3	1.7	1.6	0
Kusini Pemba	46,988	48.8	6.2	0	0	0	0	3.4	2.1	36.1	0.3	1	2	0

3.3 Water Sources and Accessibility

Household and public drinking water in Tanzania originates from two primary sources: improved and non-improved water sources. Improved water sources are considered safer and more reliable. These include piped water (water piped into homes, yards, or public taps), protected wells (wells that are covered and shielded from contamination), protected springs (natural springs with protective structures to prevent pollution), and rainwater harvesting (collecting and storing rainwater, often utilised in rural and peri-urban areas). Non-improved water sources carry higher health risks due to exposure and contamination. These include: unprotected wells (open wells without protective barriers), unprotected springs (springs exposed to runoff and animal waste), and surface water (rivers, lakes, ponds, often untreated and shared with livestock).

3.3.1 Water Accessibility by Household Heads and Residence

The 2022 Population and Housing Census results show that about 70.1% of private households in Tanzania use drinking water from improved sources, with regional disparities ranging from 41.9% in Tabora to 97.5% in Dar es Salaam. The majority (91.3%) of private households in urban Tanzania use drinking water from improved sources, and more than half (56.1%) of private households in rural Tanzania utilise drinking water from improved sources (Table 3.3).

The percentage of male-headed households (69.4%) that use improved sources of drinking water is nearly the same as that of female-headed households (71.4%) in Tanzania. The same pattern is also observed for unimproved sources of drinking water. Tanzania Zanzibar has a higher percentage of both male- and female-headed households using improved sources of drinking water compared to Mainland Tanzania. Conversely, Mainland Tanzania has a higher proportion of households using unimproved sources than Zanzibar (Table 3.3).

The results show that there is very minimal difference between male-headed households (91.4%) that use improved sources of drinking water compared to female-headed households (91.7%) in urban areas. The same situation is also observed in rural areas, where the proportion of male-headed households using improved sources of drinking water is 55.4% and 57.5% for female-headed households (Table 3.3).

Both male and female-headed households that use improved sources of drinking water are more common in urban areas than in rural areas. Households relying on unimproved sources of drinking water are slightly more prevalent among male-headed households

(44.7%) than female-headed households (42.5%) in rural areas. In urban areas, 8.6% of male-headed households and 8.3% of female-headed households fall into this category (Table 3.3).

Across regions, Dar es Salaam has the highest percentage of both male- and female-headed households with improved sources of drinking water (97.5% versus 97.7%). Other regions with relatively high percentages of male- and female-headed households using improved water sources for drinking are Mjini Magharibi (97.2% versus 97.6%), Kaskazini Unguja (92.8% versus 93.8%), and Kilimanjaro (92.4% versus 93.6%).

Conversely, regions with a high percentage of male-headed households using unimproved water sources are Tabora (59.4%), Singida (54.3%), and Kagera (53.1%). Female-headed households with a high proportion of households using unimproved water sources are also found in Tabora (55.7%), Singida (50.1%), and Kagera (49.7%) (Table 3.4).

Table 3.11: Percentage Distribution of Households Using Improved and Unimproved Sources of Drinking Water by Sex of Household Head, Place of Residence and Region; Tanzania, 2022 PHC

Region	Total Number of Households	Total		Total	Male Headed		Total	Female Headed	
		Improved source of drinking water	Unimproved source of drinking water		Improved source of drinking water	Unimproved source of drinking water		Improved source of drinking water	Unimproved source of drinking water
Tanzania	14,152,803	70.1	29.9	9,088,599	69.4	30.6	5,064,204	71.4	28.6
Rural	8,547,333	56.1	43.9	5,538,628	55.3	44.7	3,008,705	57.5	42.5
Urban	5,605,470	91.5	8.5	3,549,971	91.4	8.6	2,055,499	91.7	8.3
Mainland Tanzania	13,776,975	69.5	30.5	8,828,073	68.7	31.3	4,948,902	70.9	29.1
Dodoma	754,631	67.8	32.2	487,599	67.2	32.8	267,032	68.9	31.1
Arusha	611,939	87.3	12.7	362,664	89.2	10.8	249,275	84.5	15.5
Kilimanjaro	494,428	92.8	7.2	309,059	92.4	7.6	185,369	93.6	6.4
Tanga	631,258	62.4	37.6	406,575	61.3	38.7	224,683	64.2	35.8
Morogoro	822,467	72	28	554,464	70.5	29.5	268,003	75.1	24.9
Pwani	537,040	72.2	27.8	353,150	70.9	29.1	183,890	74.6	25.4
Dar es Salaam	1,537,293	97.5	2.5	1,016,319	97.5	2.5	520,974	97.7	2.3
Lindi	344,447	59.2	40.8	224,703	57.6	42.4	119,744	62.2	37.8
Mtwara	491,811	66.3	33.7	312,044	65	35	179,767	68.5	31.5
Ruvuma	463,666	75	25	321,405	73.8	26.2	142,261	77.7	22.3
Iringa	319,117	78.5	21.5	193,896	77.6	22.4	125,221	79.9	20.1
Mbeya	624,320	76.9	23.1	391,943	76.1	23.9	232,377	78.3	21.7
Singida	392,111	47.2	52.8	252,175	45.7	54.3	139,936	49.9	50.1
Tabora	592,039	41.9	58.1	385,034	40.6	59.4	207,005	44.3	55.7
Rukwa	328,052	55.8	44.2	212,413	54.6	45.4	115,639	57.9	42.1
Kigoma	451,967	64.5	35.5	290,263	63.8	36.2	161,704	65.7	34.3
Shinyanga	418,771	67.2	32.8	265,824	66.1	33.9	152,947	69	31
Kagera	698,257	48	52	461,726	46.9	53.1	236,531	50.3	49.7
Mwanza	744,709	71.7	28.3	456,855	70.6	29.4	287,854	73.3	26.7
Mara	467,473	49.9	50.1	269,565	49.5	50.5	197,908	50.5	49.5
Manyara	398,735	62.1	37.9	258,529	62.2	37.8	140,206	61.8	38.2
Njombe	244,579	80.4	19.6	147,867	79.8	20.2	96,712	81.3	18.7
Katavi	213,825	56.4	43.6	147,583	55.5	44.5	66,242	58.3	41.7
Simiyu	311,247	68.3	31.7	179,039	67.2	32.8	132,208	69.8	30.2
Geita	555,345	59.4	40.6	358,603	58.1	41.9	196,742	61.8	38.2
Songwe	327,448	57.1	42.9	208,776	56.5	43.5	118,672	58.1	41.9
Tanzania Zanzibar	375,828	92.6	7.4	260,526	92.3	7.7	115,302	93.2	6.8
Kaskazini Unguja	53,770	93.1	6.9	38,191	92.8	7.2	15,579	93.8	6.2
Kusini Unguja	46,003	85.3	14.7	32,562	84.1	15.9	13,441	88.2	11.8
Mjini	180,889	97.3	2.7	126,970	97.2	2.8	53,919	97.6	2.4
Kaskazini Pemba	48,178	81.5	18.5	31,889	81.1	18.9	16,289	82.2	17.8
Kusini Pemba	46,988	92.2	7.8	30,914	91.9	8.1	16,074	92.8	7.2

3.3.2 Government's Initiatives for Improving Water Access

Tanzania has launched a series of ambitious, multi-tiered initiatives to improve water access nationwide, especially in underserved rural and peri-urban areas. These initiatives include the Tanzania Water Investment Programme (TanWIP) 2023–2030, which is a transformative initiative aimed at securing water access, enhancing climate resilience, and promoting socio-economic development. The programme is aligned with Dira 2050. This aligns with the African Union's Continental Water Investment Programme (CWIP), which supports SDG 6 (Clean Water and Sanitation). The core objectives of the project are to ensure national water security, build climate resilience, promote inclusive access to safe water and sanitation, mobilise domestic and international financing, and strengthen governance and institutional capacity.

Another initiative is Tanzania's National Water Fund (NWF) Strategic Plan 2023–2026, which serves as a key instrument for financing water sector priorities under the Ministry of Water. The plan aligns with Tanzania's National and Global Frameworks, including the *Dira* 2050, FYDP III (2021/22–2025/26), SDG 6 – Clean Water and Sanitation, and the African Union's AIP – Continental Water Investment Programme. Priority investment areas of the plan are rural water supply schemes, urban sanitation infrastructure, water harvesting and storage systems, institutional sanitation (schools, health centres), and emergency water interventions in drought-prone areas.

3.4 Sanitation and Waste Management

3.4.1 Toilet Facilities

The 2022 PHC provides updated insights into sanitation conditions. The analysis of toilet facilities classifies household access into four categories: Improved Facilities (flush to sewer, septic, or covered pit; pit latrine with washable slab and lid); Unimproved Facilities (pit latrine with non-washable slab, open pit, or washable slab without lid); No Facility (bush, field, or beach); and Other (flush to elsewhere, bucket). These categories are presented at national, Mainland Tanzania, Tanzania Zanzibar, regional, urban, and rural levels, as well as by male- and female-headed households, and are analysed in the subsections below.

The national-level pie chart (Figure 3.2) for Tanzania's 14,152,803 households (52.0% Improved, 39.7% Unimproved, 5.6% No Facility, 2.7% Other) shows progress since NESR, 2017 (19% improved), possibly driven by urban sanitation initiatives. Mainland Tanzania (13,776,975 households, 97.3% of total) has slightly lower improved facilities (51.0%) compared to the national level and higher rates of unimproved (40.5%) and no-facility (5.8%),

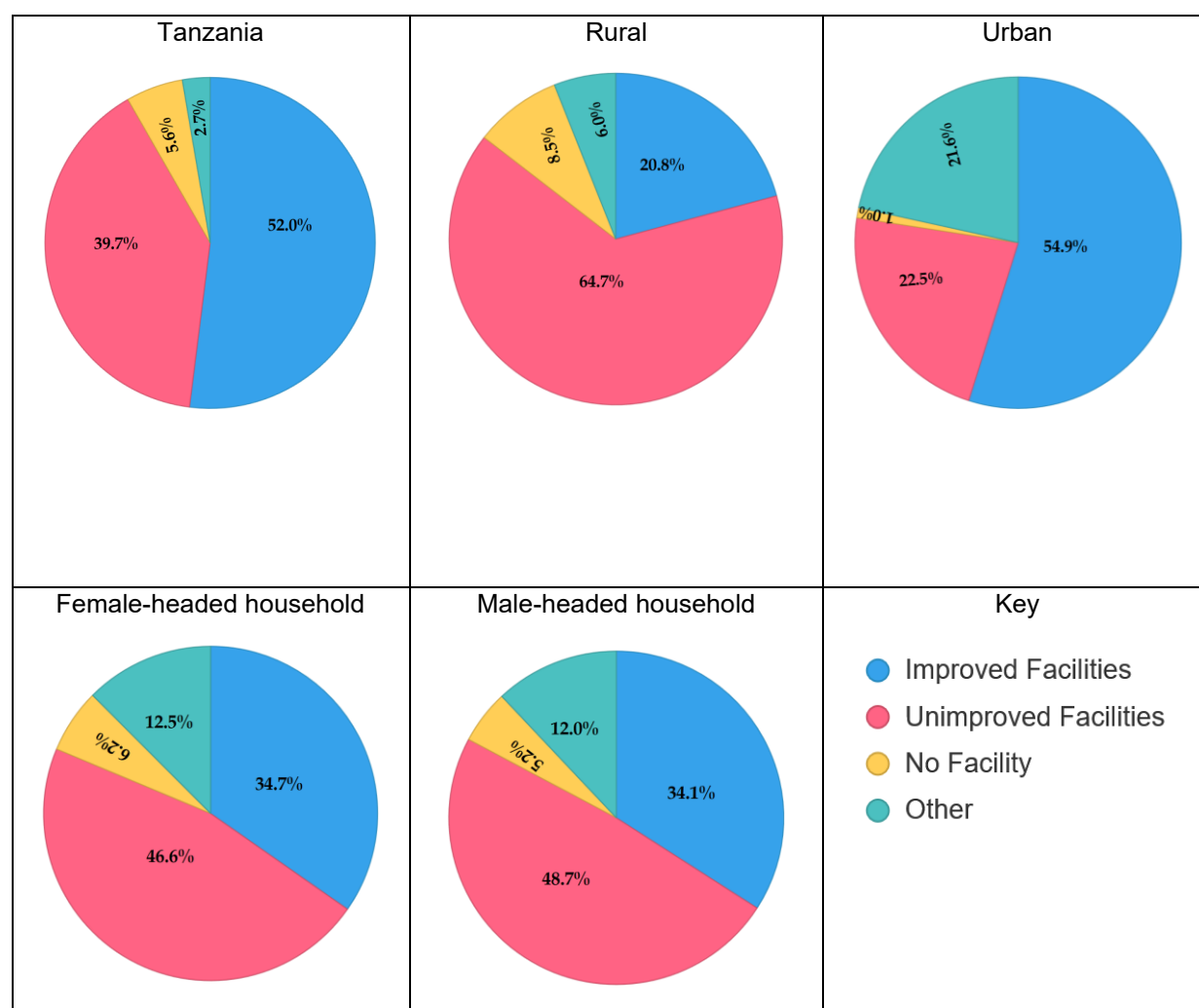
reflecting its diverse urban-rural makeup, with urban centres like Dar es Salaam (75% improved) contrasting with rural areas such as Kagera (17% improved).

Tanzania Zanzibar (375,828 households, representing 2.7% of the total) shows higher rates of improved facilities (62.0%) and lower rates of unimproved facilities (29.0%), primarily driven by urbanised Mjini Magharibi (65.9% improved). However, its no-facility rate (6.0%) is increased by rural Pemba regions (17-22% no facility). The "Other" category (2.7% Mainland, 3.0% Zanzibar) includes informal practices such as flushing to unknown locations and buckets, which are more common in Zanzibar's transitional settings. Despite improvements, significant proportions of unimproved and no-facility options highlight ongoing sanitation gaps, particularly in the Mainland's rural areas.

In Tanzania, the 2012 PHC reported that 76% of households relied on pit latrines, reflecting significant gaps in access to improved facilities and contributing to environmental pressures such as groundwater contamination. By 2017, the National Environmental Statistics Report (NESR, 2017) indicated that only 19% of the Mainland Tanzania population used improved sanitation. Pit latrines remained predominant but often inadequate, with related surveys showing that nearly two-thirds of households depended on poor facilities, thereby increasing risks amid climate variability.

The 2022 PHC data (Figure 3.2) reveal disparities in sanitation access by gender. Male-headed households (64.2%) report 34.1% with improved facilities, 48.7% with unimproved, 5.2% with no facilities, and 12.0% with other options, while female-headed households (35.8%) show 34.7% with improved, 46.6% unimproved, 6.2% with no facilities, and 12.5% with other types. This near-equality in access to improved facilities (34.7% vs. 34.1%) contrasts with a significant gap in no-facility rates (6.2% vs. 5.2%), highlighting gender-based inequalities. Female-headed households often experience greater poverty (32%) below the poverty line compared to 26% for male-headed households (World Bank, 2020) and have lower access to credit (13.2% versus 86.7% for men; World Bank, 2020), which creates obstacles to investing in sanitation infrastructure. Their reliance on unimproved facilities (46.6%), such as basic pit latrines, and informal systems in the "other" category (12.5%), like buckets or drains, complicates sanitation management, especially during climate shocks.

Figure 3.9. Distribution of Toilet Facilities by Place of Residence, and Household Headship in Tanzania; Tanzania, 2022 PHC



The 2022 PHC regional analysis (Table 3.4) shows significant disparities in access to toilet facilities across Tanzania's 31 regions. Urban areas like Dar es Salaam and Mjini Magharibi show significant improvement in access to facilities, with 75% and 65% of residents, respectively, having access to improved facilities. In contrast, rural regions such as Kagera, Kigoma, and Pemba report much lower improvement rates. Specifically, in Kagera, only 17% of residents have access to improved facilities, while 60% have unimproved access and 15% lack any facilities. Kigoma has 21% improved access, 58% unimproved, and 12% with no facilities. In the Pemba region, between 25% to 30% of residents have improved access, with 45% to 50% having unimproved access, and up to 22% lacking any facilities in Kusini Pemba. Overall, rural areas face challenges with low improvement rates and a high percentage of residents without adequate access to facilities (Table 3.4).

Sanitation and waste management deficiencies across Tanzania highlight serious environmental consequences affecting water, agriculture, ecosystems, and climate

resilience. The 2022 Population and Housing Census (PHC) indicates that 40.5% of households on the Tanzanian mainland and 29.0% in Zanzibar use unimproved facilities, while 5.8% and 6.0% respectively lack any sanitation facilities, risking faecal contamination of water sources. The dangers posed by climate hazards are exacerbated by events such as floods, which are perceived by 12.5% of households in Tanzania. These floods threaten agriculture, a key source of livelihood for 75% of households, as well as fragile ecosystems like Lake Victoria and the coastal waters of Tanzania Zanzibar. Additionally, informal waste disposal, which affects 2.7% to 3.0% of urban areas, leads to increased pollution during heatwaves. In drought-prone Singida, where 46.3% of residents report experiencing drought, the risks of contamination are further heightened (Table 3.4).

Regional disparities increase the challenge, with high no-facility and unimproved rates in Kagera, Singida, Manyara, Kigoma, and Pemba contributing to groundwater, farmland, and coastal pollution. Gender inequalities worsen outcomes: female-headed households have higher no-facility (6.2%) and unimproved rates (46.6%), leading to open defecation, water contamination, and child stunting. Even in Dar es Salaam, where 75% use improved sanitation, sewer overflows during floods remain a threat. Expanding improved, climate-resilient, and gender-responsive sanitation, such as eco-latrines in rural areas, flood-proof sewers in cities, and stronger coastal systems, is essential to reduce health and environmental risks, safeguard livelihoods, and prevent projected GDP losses of 1–2% annually by 2030 (Table 3.4).

Table 3.12: Regional Distribution of Toilet Facilities in Tanzania, 2022 PHC

Region Name	Improved (%)	Unimproved (%)	No Facility (%)	Other (%)	Total (%)
Arusha	60.5	33.2	4.0	2.3	100
Dar es Salaam	75.0	20.0	2.0	3.0	100
Dodoma	45.0	45.0	7.5	2.5	100
Geita	40.0	50.0	7.5	2.5	100
Iringa	55.0	38.0	5.0	2.0	100
Kagera	17.0	70.0	10.0	3.0	100
Kaskazini Pemba	30.0	50.0	17.0	3.0	100
Kaskazini Unguja	50.0	40.0	7.0	3.0	100
Katavi	35.0	55.0	8.0	2.0	100
Kigoma	21.0	65.0	11.0	3.0	100
Kilimanjaro	65.0	30.0	3.0	2.0	100
Kusini Pemba	25.0	50.0	22.0	3.0	100
Kusini Unguja	50.0	40.0	7.0	3.0	100
Lindi	30.0	60.0	8.0	2.0	100
Manyara	25.0	62.0	10.0	3.0	100
Mara	45.0	45.0	7.5	2.5	100
Mbeya	50.0	40.0	7.0	3.0	100
Mjini Magharibi	65.0	30.0	3.0	2.0	100
Morogoro	55.0	37.0	5.0	3.0	100
Mtwara	35.0	55.0	8.0	2.0	100
Mwanza	50.0	40.0	7.0	3.0	100
Njombe	55.0	38.0	5.0	2.0	100
Pwani	60.0	33.0	4.0	3.0	100
Rukwa	40.0	50.0	7.5	2.5	100
Ruvuma	50.0	40.0	7.0	3.0	100
Shinyanga	35.0	55.0	8.0	2.0	100
Simiyu	30.0	60.0	8.0	2.0	100
Singida	25.0	62.0	10.0	3.0	100
Songwe	45.0	45.0	7.5	2.5	100
Tabora	35.0	55.0	8.0	2.0	100
Tanga	55.0	37.0	5.0	3.0	100

3.4.2 Analysis of Solid Waste Disposal

This section examines solid waste disposal practices from the 2022 PHC to support environmental sustainability and climate change mitigation strategies. The data presented in Table 3.5, aligned with SDG 11.6.1 and WHO/UNEP guidelines, categorises disposal methods into four groups: collected (regular/irregular), burned, buried/composted, and dumped (roadside, open space, water bodies, bush/ravine). By analysing national, regional, urban-rural, and gender-based trends, this review highlights how improper waste practices, such as burning and dumping, worsen greenhouse gas (GHG) emissions, soil and water pollution, and climate vulnerabilities like floods and droughts, endangering ecosystems, agriculture (75% household reliance), and public health. These insights assist policymakers in developing resilient waste management systems to reduce environmental harm and improve climate adaptation.

Nationally, the 2022 PHC data (Table 3.5) shows solid waste disposal distributed as 24.8% collected, 40.1% burned, 26.4% buried or composted, and 8.8% dumped across 14,152,803 households, indicating an improvement from the 2017 NESR's that estimated only 10% collection. Burning remains the most common method, contributing to greenhouse gas emissions and air pollution. Dumping pollutes water bodies, and buried or composted waste risks methane release if not properly managed. This distribution highlights the urgent need for expanded formal collection and sustainable waste practices to reduce environmental and climate impacts.

Mainland Tanzania (13,776,975 households) closely follows the national trend, with 24.3% of waste collected, 40.5% burned, 26.9% buried or composted, and 8.3% dumped, reflecting limited infrastructure in many areas. Tanzania Zanzibar (375,828 households) shows higher collection rates (40.8%) but also higher dumping (23.4%), especially in coastal Pemba regions, where ocean and river dumping pose threats to marine ecosystems. Urban areas in Tanzania Zanzibar achieve 50.6% collection compared to only 7.8% in rural areas, highlighting disparities in infrastructure. These patterns suggest Mainland Tanzania requires expanded collection systems, while Tanzania Zanzibar needs targeted coastal waste management to mitigate environmental vulnerabilities (Table 3.5).

Urban areas nationally achieve 50.6% collection and 29.6% burning, contrasting with rural areas that have 7.8% collection and 46.9% burning. Buried or composted waste accounts for 33.2% in rural areas versus 10.0% in urban areas, while dumping is at 12.1% in rural areas versus 3.5% in urban areas. In the Mainland Tanzania, urban areas reach 74.7% collection, whereas rural regions lag behind at 11.6%. Tanzania Zanzibar's urban areas

(50.6% collection) outperform rural (7.8%), with high rural burning (46.9%). Reliance on burning and dumping in rural areas worsens flood-related contamination, while urban regions face overflow risks during heavy rains. This underscores the need for expanded collection services in urban centres and safe composting programmes in rural areas to reduce pollution.

Female-headed households slightly favour collection (25.5%) over male-headed households at 24.3%, with nearly identical rates for burning (40.3% vs. 39.9%), buried/composted (25.4% vs. 26.9%), and dumping (8.7% vs. 8.9%). Socio-economic barriers, including higher poverty rates among female-headed households, limit access to formal collection, particularly in rural areas (7.8% collection). High burning and dumping rates in both groups reflect cost constraints, increasing environmental risks like air and water pollution, especially in climate-vulnerable rural settings (Table 3.5).

High waste burning releases GHGs and pollutants, worsening air quality and heatwave impacts. Meanwhile, dumping contaminates water bodies, threatening fisheries and coastal ecosystems vital to 75% of households relying on agriculture. Buried or composted waste poses risks of methane emissions and groundwater pollution if not properly managed, especially in rural areas prone to flooding. Urban centres like Dar es Salaam (3.5% dumping) face overflow risks during heavy rains, increasing health hazards such as cholera. These practices worsen climate vulnerabilities and highlight the need for sustainable waste management to protect ecosystems and public health.

**Table 3.13: Percentage Distribution of Households by Main Means of Solid Waste Disposal by place of residence, Household Headship and Regions, 2022
PHC**

Region	Total Households	Collected (%)	Burned (%)	Buried/Composted (%)	Dumped (%)	Total (%)
Tanzania	14,152,803	24.8	40.1	26.4	8.8	100
Female Headed Households	5,064,204	25.5	40.3	25.4	8.7	100
Male Headed Households	9,088,599	24.3	39.9	26.9	8.9	100
Rural	8,547,333	7.8	46.9	33.2	12.1	100
Urban	5,605,470	50.6	29.6	16.0	3.9	100
Mainland Tanzania	13,776,975	24.3	40.5	26.9	8.3	100
Dodoma	754,631	17.5	39.7	32.9	9.9	100
Arusha	611,939	42.1	43.2	7.2	7.5	100
Kilimanjaro	494,428	19.1	59.9	17.7	3.3	100
Tanga	631,258	13.7	36.3	35.6	14.4	100
Morogoro	822,467	18.3	44.1	28.2	9.4	100
Pwani	537,040	21.7	41.7	28.7	7.8	100
Dar es Salaam	1,537,293	74.7	14.6	7.2	3.5	100
Lindi	344,447	12.3	42.2	34.9	10.6	100
Mtwara	491,811	9.8	47.7	35.0	7.5	100
Ruvuma	463,666	10.5	38.4	43.3	7.7	100
Iringa	319,117	17.8	37.5	41.1	3.4	100
Mbeya	624,320	27.6	37.3	29.6	5.5	100
Singida	392,111	11.9	47.1	31.4	9.6	100
Tabora	592,039	14.5	38.9	32.1	14.5	100
Rukwa	328,052	13.1	34.5	41.9	10.4	100
Kigoma	451,967	12.8	32.9	40.7	13.7	100
Shinyanga	418,771	21.5	45.6	22.1	10.8	100
Kagera	698,257	12.7	49.2	31.2	6.9	100
Mwanza	744,709	28.5	45.1	19.4	6.9	100
Mara	467,473	14.2	54.2	23.0	8.6	100
Manyara	398,735	11.5	54.5	19.4	14.6	100
Njombe	244,579	17.1	38.7	42.3	1.7	100
Katavi	213,825	13.4	41.9	31.3	13.4	100
Simiyu	311,247	11.6	63.7	13.5	11.1	100
Geita	555,345	14.6	46.2	30.2	8.9	100
Songwe	327,448	20.2	32.9	40.4	6.5	100
Zanzibar	375,828	40.8	25.8	10.0	23.4	100
Kaskazini Unguja	53,770	18.0	34.4	11.6	36.0	100
Kusini Unguja	46,003	10.7	42.5	23.6	23.2	100
Mjini Magharibi	180,889	69.6	18.5	6.8	5.1	100
Kaskazini Pemba	48,178	13.8	33.6	9.3	43.3	100
Kusini Pemba	46,988	13.1	20.2	8.4	58.4	100

3.4.3 Analysis of Electronic Waste Disposal

This section examines electronic waste (e-waste) disposal practices from the 2022 PHC to inform strategies for environmental sustainability and climate change mitigation. Aligned with Basel Convention goals and SDG 11.6.1, the data categorises e-waste disposal into five types: collected (by government, private entities, or individuals), burned, buried, dumped (mixed with refuse, on compounds or streets, or in latrines), and recycled or reused (sold or given as gifts). Improper e-waste disposal, such as dumping and burning, releases toxins like lead and mercury, pollutes soil, water, and air, and exacerbates climate vulnerabilities like floods, droughts, and sea-level rise (up to 41 cm by 2080; IPCC, 2022). These hazards threaten agriculture, which is a vital source of income for 75% of households, and public health, potentially causing annual economic losses of 1-2% of GDP by 2030 (World Bank, 2020). This analysis assesses national, regional, urban-rural, and gender-based trends to guide resilient e-waste management strategies.

Nationally, the 2022 PHC data show e-waste disposal distributed as 3.7% collected, 13.3% burned, 13.9% buried, 64.8% dumped, and 4.3% recycled or reused across 14,152,803 households. The high dumping rate (64.8%) and burning (13.3%) reflect limited formal systems, contributing to soil and groundwater contamination and greenhouse gas emissions, while low recycling (4.3%) misses resource recovery opportunities. These patterns emphasise the urgent need for improved collection and recycling infrastructure to reduce environmental and climate impacts (Table 3.6).

Mainland Tanzania (13,776,975 households) reflects the national trend with 3.7% collected, 13.4% burned, 14.2% buried, 64.4% dumped, and 4.4% recycled or reused, demonstrating widespread reliance on unsafe methods. Tanzania Zanzibar (375,828 households) exhibits higher dumping (80.0%) and lower burning (8.4%), influenced by coastal disposal practices in Pemba, with collection at 4.0%. Targeted coastal management in Tanzania Zanzibar and improved collection systems on the mainland are essential for reducing toxicity and climate risks (Table 3.6).

Rural areas (8,547,333 households) show low waste collection rates (2.3%) and high rates of burning (16.6%), burial (17.8%), and dumping (61.1%). In contrast, urban areas (5,605,470 households) have a collection rate of 5.6%, a dumping rate of 74.4%, and lower burning at 8.4%. Urban centres like Dar es Salaam (7.7% collection) risk overflow during floods, while rural regions such as Kagera (25.0% burning) contribute to increased air and soil pollution. These differences highlight the urgent need to expand urban recycling

programmes and establish safe waste disposal methods in rural areas to combat flood-related contamination and climate vulnerabilities.

Female-headed households (35.8%) display similar e-waste disposal patterns to male-headed households (64.2%). Both groups show comparable rates of collection at 3.7% versus 3.6%, dumping at 65.1% versus 64.7%, burning at 13.3% versus 13.3%, burying at 13.8% versus 14.0%, and recycling or reuse at 4.2% versus 4.4%. Socio-economic barriers, notably higher poverty levels among female-headed households, restrict access to formal collection (2.3% in rural areas), leading to increased reliance on dumping and burning, which exacerbates environmental risks in climate-sensitive regions.

Generally, high e-waste dumping releases toxic metals into soil and groundwater, which is worsened by floods and threatens agriculture and fisheries. It also degrades air quality, increasing respiratory risks during heatwaves, while buried e-waste risks leachate and methane emissions. Low recycling rates miss resource recovery opportunities; rural areas face heightened food insecurity due to contamination, and urban flood overflows increase cholera risks. Sustainable e-waste management is crucial for reducing toxicity and enhancing climate resilience (Table 3.6).

Table 3.14: Percentage Distribution of Households by Methods of Electronic Waste Disposal: National, Mainland Tanzania, Tanzania Zanzibar, Rural, Urban, Headship and Regional, 2022 PHC

Region	Total Households	Collected (%)	Burned (%)	Buried/Composted (%)	Dumped (%)	Total (%)
Tanzania	14,152,803	3.7	13.3	13.9	64.8	4.3
Female-Headed Households	5,064,204	3.7	13.3	13.8	65.1	4.2
Male-Headed Households	9,088,599	3.6	13.3	14.0	64.7	4.4
Rural	8,547,333	2.3	16.6	17.8	58.5	4.8
Urban	5,605,470	5.6	8.3	8.1	74.4	3.7
Mainland Tanzania	13,776,975	3.7	13.4	14.2	64.4	4.4
Dodoma	754,631	2.3	13.8	11.0	69.8	100
Arusha	611,939	4.8	13.3	8.5	71.0	100
Kilimanjaro	494,428	5.0	20.0	25.1	45.2	100
Tanga	631,258	2.1	12.0	12.1	71.5	100
Morogoro	822,467	2.7	12.7	13.4	68.8	100
Pwani	537,040	3.4	11.5	15.9	66.6	100
Dar es Salaam	1,537,293	7.7	3.6	5.2	78.6	100
Lindi	344,447	1.5	9.3	9.5	76.8	100
Mtwara	491,811	1.6	10.9	18.7	65.0	100
Ruvuma	463,666	2.1	11.5	24.4	56.3	100
Iringa	319,117	2.8	14.2	14.8	64.4	100
Mbeya	624,320	3.3	12.8	15.2	65.6	100
Singida	392,111	3.2	18.8	16.9	57.7	100
Tabora	592,039	3.1	14.4	11.8	64.8	100
Rukwa	328,052	2.1	12.3	16.3	65.5	100
Kigoma	451,967	3.8	13.6	14.9	62.8	100
Shinyanga	418,771	3.7	15.0	10.7	64.3	100
Kagera	698,257	3.7	25.0	22.6	43.7	100
Mwanza	744,709	4.1	13.9	13.6	62.7	100
Mara	467,473	2.8	16.9	13.3	61.5	100
Manyara	398,735	3.8	20.9	23.1	49.8	100
Njombe	244,579	3.5	14.5	19.3	58.4	100
Katavi	213,825	3.0	12.9	18.4	59.1	100
Simiyu	311,247	2.1	17.4	10.3	65.6	100
Geita	555,345	3.8	12.0	11.6	63.5	100
Songwe	327,448	2.8	16.3	19.3	55.7	100
Zanzibar	375,828	3.5	8.4	5.8	80.0	2.3
Kaskazini Unguja	53,770	2.2	15.0	8.1	72.4	100
Kusini Unguja	46,003	3.4	13.8	8.6	70.7	100
Mjini Magharibi	180,889	4.0	2.9	2.8	88.3	100
Kaskazini Pemba	48,178	4.4	11.5	10.1	71.8	100
Kusini Pemba	46,988	2.5	13.6	7.7	74.2	100

CHAPTER FOUR

AWARENESS, AND CLIMATE CHANGE KNOWLEDGE

Box 4.1 Key Points

- Climate change awareness is high nationally, with Tanzania Zanzibar and urban areas slightly ahead; lowest in Kigoma and Geita, highest in Iringa and Songwe.
- Major perceptions included decreased rainfall (76.5%), shifting seasons (74.5%), and rising temperatures (60.5%).
- Regional impacts include severe drought in Arusha, Simiyu, Mara, Dodoma; floods and sea-level rise in Zanzibar; cyclones in Songwe and Rukwa; landslides in Mbeya; earthquakes in Dar es Salaam.
- Urban–rural differences are minimal, but hazard exposure varies significantly by region.
- Policy priorities include climate education in low-awareness areas, drought-resilient farming, flood/coastal protection, early warning systems, and pilot adaptation programmes in high-awareness regions.

4.1 Introduction

This chapter uses data from the 2022 PHC, based on 69,932 community interviews, to analyse community knowledge and perceptions of climate change at the national, rural-urban, Mainland Tanzania, Tanzania Zanzibar, as well as regional levels. It examines key indicators, including perceived changes in rainfall patterns, temperature fluctuations, sea-level rise, lake or dam level variations, and the proportion of respondents reporting no climatic differences. Additionally, the chapter investigates specific climate-related events over the past 12 months, such as land degradation caused by sand/gravel mining, charcoal burning, industrial sewage, and deforestation for agricultural purposes. It also addresses major climatic incidents, including drought, floods, cyclones, landslides, and earthquakes. By highlighting differences in awareness and environmental pressures, this analysis reveals how human activities and natural hazards contribute to Tanzania's climate vulnerabilities, providing policymakers with vital insights to tailor education, mitigation, and adaptation strategies to improve resilience across diverse geographic and demographic contexts.

4.2 Percentage Distribution of Persons Aged 4 years and Above by Level of Education

This section analyses the percentage distribution of persons aged 4 years and above by level of education from the 2022 PHC (Table 4.1), categorised by place of residence, including national, rural-urban, Mainland Tanzania, Tanzania Zanzibar, and regional levels. The educational levels include pre-primary, primary school, O-level, A-level, and university, as well as related qualifications. By examining disparities in education access, this section provides policymakers with actionable data to design targeted interventions that enhance climate resilience through improved environmental literacy and adaptive skills.

Nationally, primary education dominates with 69.8% (average of male 69.4% and female 70.2%), followed by secondary O-level at 19.5% (male 19.0%, female 19.9%), pre-primary at 4.3% (consistent across genders), university and related at 4.4% (male 4.9%, female 3.8%), and secondary A-level at 1.3% (male 1.6%, female 1.1%) (Table 4.1).

Tanzania Mainland demonstrates a distribution with 70.8% in primary education, 18.7% in secondary O-level, 4.3% in university, 4.2% in pre-primary, and 1.3% in A-level, reflecting a focus on basic schooling. Tanzania Zanzibar, however, exhibits a more balanced spread with 42.5% in primary, 42.4% in secondary O-level, 6.5% in pre-primary, 6.3% in university, and 1.7% in A-level, indicating higher secondary access but less primary dominance (Table 4.1).

Gender patterns in Mainland Tanzania favour males in higher education (university 4.9% vs. female 3.7%), whereas Tanzania Zanzibar shows slight female advantages in secondary O-level (44.7% vs. male 40.0%) and university (6.5% vs. 6.1%). Rural areas across the country show 77.6% primary education, 15.0% secondary O-level, 4.0% pre-primary, 2.1% university, and 0.8% A-level, indicating limited access to higher education. Urban areas have lower primary rates at 58.0% but higher secondary O-level at 26.2%, university at 7.8%, and A-level at 2.1%, with pre-primary at 4.8%, reflecting better infrastructure and opportunities (Table 4.1).

In Mainland Tanzania, rural primary stands at 78.5% compared to 59.0% in urban areas, with urban university attendance at 7.8% versus 2.0% in rural regions. Tanzania Zanzibar's rural primary education is at 48.3%, while urban primary education is 37.1%, but urban secondary O-level and university participation are higher at 45.6% and 8.6%, respectively.

Regional variations are distinct across Tanzania Mainland, with primary education levels highest in Simiyu (80.2%), Tabora (80.0%), and Katavi (79.9%), reflecting basic access but low progression to higher education (university 2.0-2.3%). Dar es Salaam leads in university enrolment (11.1%) and secondary O-level (28.6%), followed by Arusha (university 7.0%, O-level 23.8%) and Kilimanjaro (6.3%, 22.4%), highlighting urban and economic centres. Lower university participation is observed in Lindi (2.1%), Rukwa (2.2%), and Geita (2.2%). In Zanzibar, Mjini Magharibi registers the highest university rate (8.7%) and secondary O-level (45.9%), whereas Kaskazini Pemba trails with primary enrolment at 52.6% and university at 3.8% (Table 4.1).

These disparities underscore uneven educational infrastructure, with northern and urban regions outperforming southern and rural areas. While education levels do not directly cause environmental issues, higher attainment is linked to greater environmental awareness and sustainable practices. Regions with low university attendance, such as Lindi (2.1%) and Simiyu (2.0%), may face difficulties in adopting climate-resilient agriculture, increasing their vulnerability to environmental degradation. Conversely, areas like Dar es Salaam (11.1% university) could utilise educated populations to support green initiatives, but urban-rural disparities risk uneven environmental management, potentially worsening resource depletion in low-education rural zones.

Table 4.15: Number Percentage Distribution of Persons Aged 4 Years and Above by level of education, Place of Residence and Region; Tanzania, 2022 PHC

Region	Total	Pre Primary	Primary School (1 - 8)	Secondary School O - level (1 - 4)	Secondary School A - level (5 - 6)	University and Other Related
Tanzania	42,445,178	4.3	69.8	19.5	1.3	4.4
Rural	25,468,657	4.0	77.6	15.0	0.8	2.1
Urban	16,976,521	4.8	58.0	26.2	2.1	7.8
Male	20,955,730	4.3	69.4	19.0	1.6	4.9
Female	21,489,448	4.3	70.2	19.9	1.1	3.8
Mainland Tanzania	40,997,065	4.2	70.8	18.7	1.3	4.3
Rural	24,769,638	3.9	78.5	14.3	0.8	2.0
Urban	16,227,427	4.7	59.0	25.3	2.1	7.8
Male	20,248,784	4.2	70.2	18.3	1.6	4.9
Female	20,748,281	4.2	71.3	19.0	1.1	3.7
Tanzania Zanzibar	1,448,113	6.5	42.5	42.4	1.7	6.3
Rural	699,019	7.0	48.3	39.1	1.2	3.8
Urban	749,094	6.1	37.1	45.6	2.2	8.6
Male	706,946	6.6	44.9	40.0	1.8	6.1
Female	741,167	6.4	40.2	44.7	1.5	6.5
Regional						
Dodoma	1,982,627	4.1	73.2	16.2	1.0	4.7
Arusha	1,646,089	5.3	60.2	23.8	2.1	7.0
Kilimanjaro	1,535,217	4.7	63.6	22.4	1.7	6.3
Tanga	1,868,523	4.6	72.7	17.6	0.8	2.9
Morogoro	2,183,967	4.1	72.3	18.0	1.2	3.8
Pwani	1,460,139	4.4	68.5	21.2	1.1	4.0
Dar Es Salaam	4,574,849	5.1	51.7	28.6	2.4	11.1
Lindi	819,474	3.2	77.4	16.1	0.7	2.1
Mtwara	1,197,626	3.6	76.8	16.1	0.7	2.5
Ruvuma	1,381,125	3.8	76.0	15.9	0.9	2.7
Iringa	914,545	4.9	66.0	21.5	1.6	5.1
Mbeya	1,711,059	4.8	65.3	22.3	1.8	5.2

Region	Total	Pre Primary	Primary School (1 - 8)	Secondary School O - level (1 - 4)	Secondary School A - level (5 - 6)	University and Other Related
Singida	1,281,932	3.9	77.9	14.3	0.8	2.5
Tabora	1,788,782	3.0	80.0	13.3	0.9	2.3
Rukwa	934,287	4.3	77.4	14.7	1.0	2.2
Kigoma	1,444,625	3.9	78.9	13.3	1.1	2.5
Shinyanga	1,406,967	2.8	77.1	15.8	1.1	2.7
Kagera	2,001,070	4.4	75.5	15.8	1.2	2.4
Mwanza	2,653,073	4.3	69.4	20.0	1.6	4.1
Mara	1,714,949	5.0	73.8	17.2	1.0	2.4
Manyara	1,156,684	3.9	75.1	15.9	1.2	3.3
Njombe	692,649	4.8	69.6	19.4	1.4	3.9
Katavi	619,217	3.2	79.9	13.6	0.9	2.0
Simiyu	1,262,570	3.5	80.2	13.1	0.8	2.0
Geita	1,856,658	3.4	77.4	15.7	1.0	2.2
Songwe	908,362	4.5	74.4	16.9	1.1	2.8
Kaskazini Unguja	183,863	6.4	47.8	40.6	0.9	3.5
Kusini Unguja	152,340	6.3	42.6	45.4	1.1	4.0
Mjini Magharibi	732,007	6.1	36.6	45.9	2.1	8.7
Kaskazini Pemba	183,222	7.7	52.6	33.8	1.3	3.8
Kusini Pemba	196,681	7.1	49.7	36.9	1.5	4.2

4.3 Community Knowledge of Climate Change

This section analyses the percentage of respondents assessing community knowledge about climate change from the 2022 Tanzania PHC, based on 69,932 community interviews. The data show responses for Tanzania total, Mainland Tanzania, Tanzania Zanzibar, as well as rural and urban, and regional residence. . This analysis highlights variations in climate change awareness, offering policymakers insights to tailor education and adaptation strategies to address environmental vulnerabilities.

In Tanzania, 88.0% of respondents reported having knowledge about climate change, while 12.0% did not. This high level of awareness indicates widespread recognition of climate change, likely driven by observable environmental changes such as extreme weather or resource depletion. The 12% lacking knowledge highlights the need for broader climate education to ensure all communities are equipped for adaptation efforts (Figure 4.1).

Mainland Tanzania reports 87.9% awareness and 12.1% lack thereof, closely aligning with the national average. Tanzania Zanzibar shows higher awareness at 90.3% and lower unawareness at 9.7%. Tanzania Zanzibar's heightened awareness may result from its coastal exposure to visible climate impacts, while Mainland's slightly lower rate could reflect diverse socio-economic contexts. These differences highlight the need for region-specific climate literacy programmes.

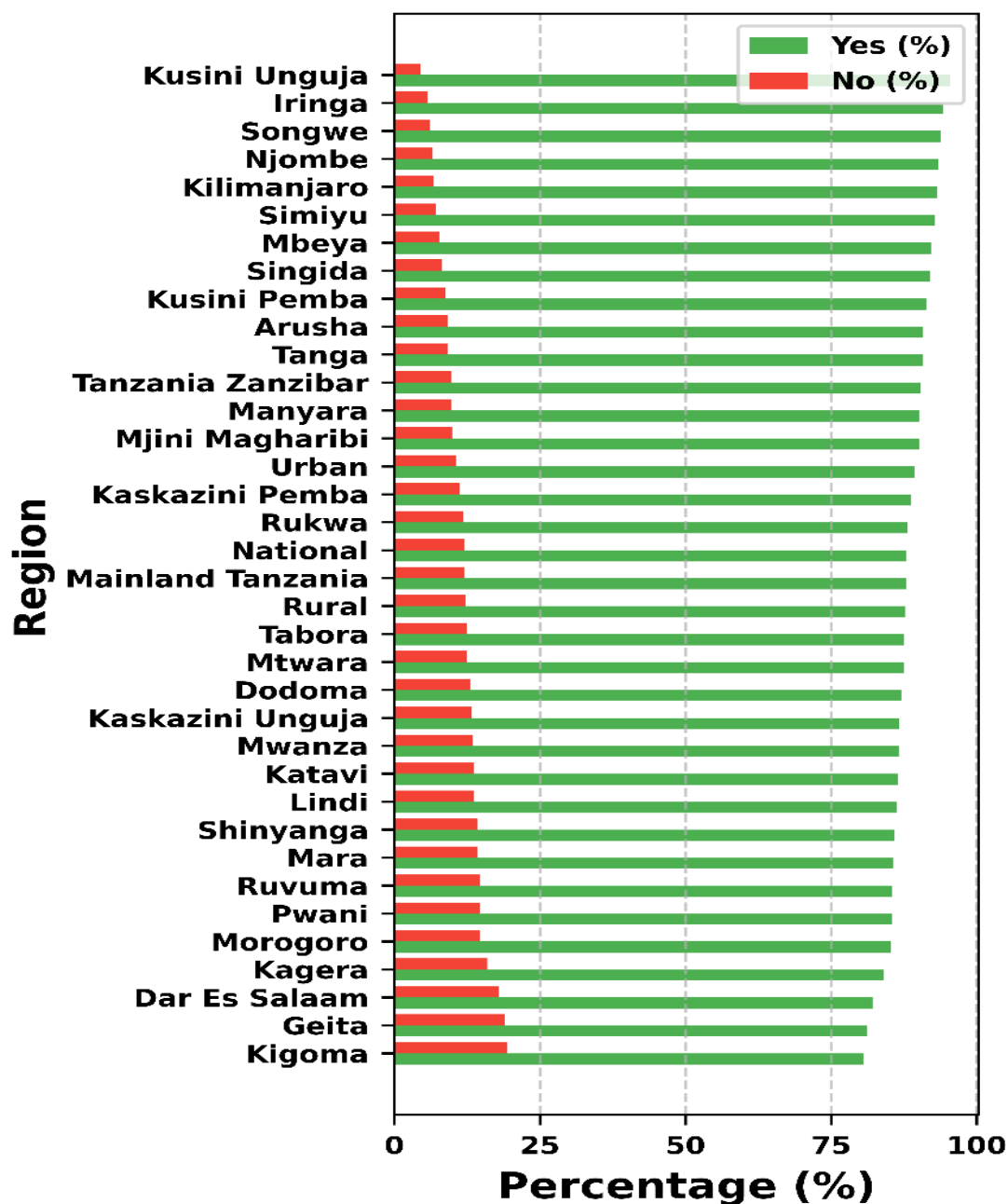
Urban areas show higher knowledge levels (89.3%) compared to rural areas (87.8%), with unawareness at 10.7% and 12.2%, respectively.. Urban populations, with greater access to media and education, exhibit slightly better awareness. Rural areas, despite direct exposure to climate impacts, display marginally lower knowledge, probably due to limited access to information. This urban-rural difference emphasises the need for targeted rural education programmes (Figure 4.1).

Regional variations are significant, with Songwe (93.9%), Iringa (94.2%), Njombe (93.4%), and Kilimanjaro (93.3%) reporting the highest levels of knowledge, possibly due to agricultural or educational exposure. In contrast, Kigoma (80.6%), Geita (81.1%), and Dar es Salaam (82.1%) exhibit lower awareness, potentially because of information gaps or urban distractions. In Tanzania Zanzibar, Kusini Unguja (95.5%) leads, followed by Kaskazini Unguja (86.7%). These disparities highlight the need for targeted climate education in regions with lower awareness.

High knowledge levels (88.0%) demonstrate community awareness of environmental challenges like drought or deforestation, which harm ecosystems and increase climate

vulnerabilities. The 12.0% lack of awareness, especially in regions like Kigoma and Geita, risks delayed adaptation, potentially worsening environmental damage. Improving climate literacy can empower communities to adopt sustainable practices, reducing issues such as soil erosion and biodiversity loss.

Figure 4.10: Respondents with Knowledge of Climate Change by Regio, Tanzania 2022 PHC



4.4 Perceptions of Climate Change Trends

The key indicators examined in this section include perceived rainfall declines, variations in rainfall seasons, temperature increases and decreases, sea-level rise, changes in lake or dam levels, and the proportion of respondents reporting “no difference” in climate conditions. These indicators offer a foundation for understanding community perceptions of climate change across national, regional, Mainland Tanzania, and Tanzania Zanzibar contexts.

In Tanzania, 76.5% of respondents perceive declining rainfall (Figure 4.2a), and 74.5% observed shifting rain seasons (Table 4.2), indicating widespread concern over reduced and erratic precipitation. Temperature rises are reported by 60.5%, compared to 21.5% noting decreases. Figure 4.2b displays dominant yellow bars (rain decreases) and red bars (temperature increases). Other perceptions (Table 4.2), such as sea-level rise (0.8%) and changes in lakes or dams (approximately 3%), are less common. Only 3.1% report “no difference.”

Mainland Tanzania reflects national patterns: 76.5% perceive less rainfall, 74.5% note variations in seasonal rainfall, and 60.5% report higher temperatures. Coastal Pwani reports 5.5% for sea-level rise, while Mwanza shows 12.0% for increased lake levels. Tanzania Zanzibar exhibits heightened coastal vulnerability, with 37.5% reporting sea-level rise compared to just 0.6% on the mainland. Rainfall reduction (80.2%) and seasonal shifts (79.7%) are consistent with Mainland trends, but temperature increases (82.6%) are more pronounced. The data display consistent dominance of yellow (rain decrease) and red (temperature increase) bars, with near-universal warming perceptions in Pemba. “No difference” accounts for only 1.7%.

The regional analysis in Mainland Tanzania shows rainfall declines peaking in Arusha (90.0%), Simiyu (88.9%), and Tanga (86.9%), highlighting drought concerns in the north and centre. Temperature rises are most noted in Mara (75.5%) and Shinyanga (71.8%), while some areas report localized cooling, such as Dar es Salaam (44.3%) and Manyara (37.2%). In Zanzibar, perceptions of sea-level rise are highest in Pemba at over 55%, with rainfall decreases (80.2%) and seasonal changes (79.7%) reinforcing the pattern seen on the mainland, but temperature increases remain higher at 82.6%.

These patterns have significant environmental implications, highlighting the urgency of adaptation. Declining rainfall and changing seasons necessitate drought-resistant agriculture, improved climate services, and better water management in the drought-prone

northern and central Mainland Tanzania. Widespread warming requires heat-tolerant crops and resilient infrastructure. In southern areas, enhanced flood preparedness might be necessary, and Tanzania Zanzibar’s increased concern about sea-level rise underscores the need for coastal protection measures such as mangrove restoration and seawalls. The very low proportion of “no difference” responses show strong public awareness, which can be leveraged through education campaigns; however, these perceptions still need validation against long-term meteorological data.

Figure 4.11. Percentage of Respondents Perceiving (a) Rainfall and (b)Temperature Increases and Decreases Over the Past 10 Years by Region, Tanzania, 2022 PHC

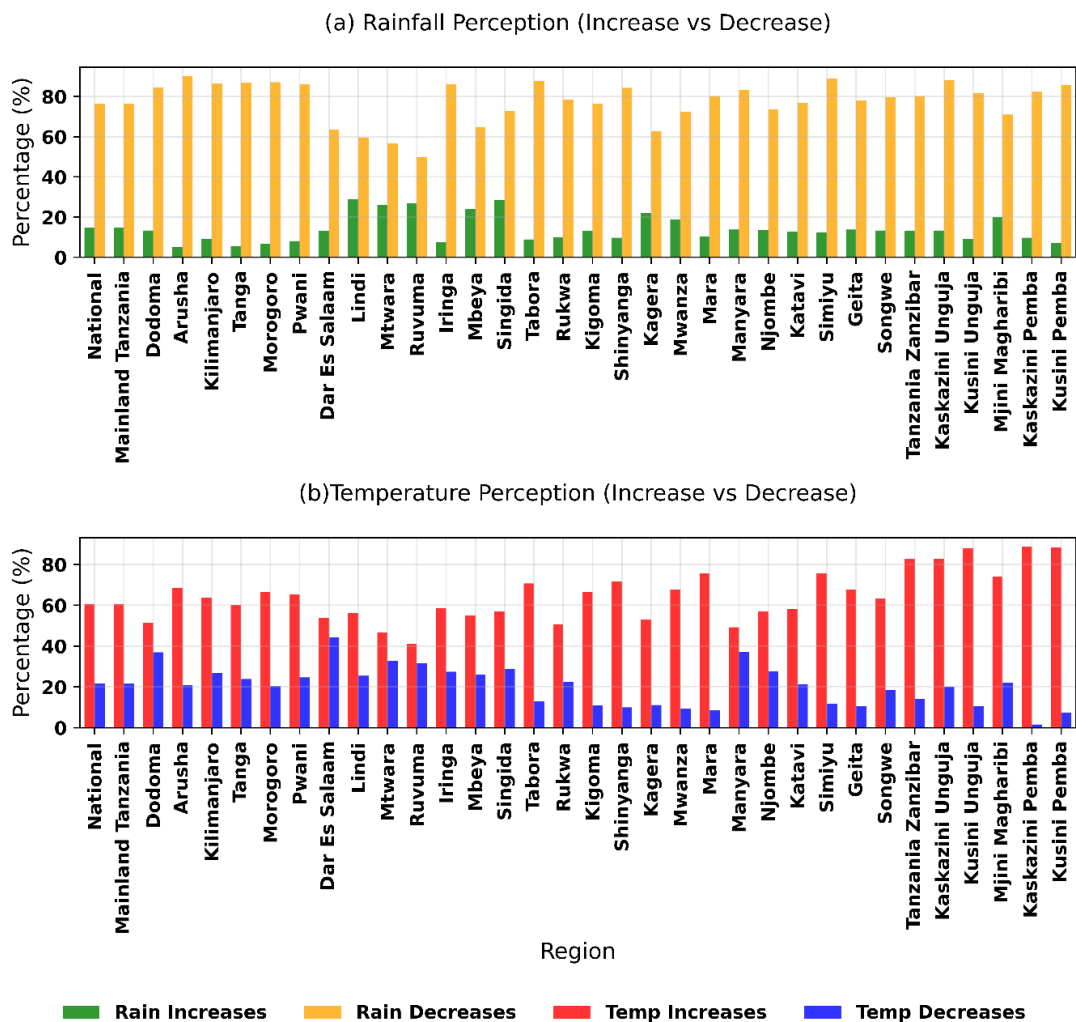


Table 4.16.: Percentage Distribution of Perceived Climate Change Differences Between 2012 - 2022 by Type and Place of Residence, Tanzania, 2022 PHC

Place of Residence	Total Community Interviewed	Change in rain seasons	Increased sea level	Increased lake/Dam level	Decreased lake/Dam level	No difference
National	69,932	74.5	0.8	2.8	3.5	3.1
Mainland Tanzania	69,529	74.5	0.6	2.8	3.5	3.1
Dodoma	3,500	78.9	0.1	1.0	4.2	1.9
Arusha	1,696	76.5	0.1	1.1	2.6	1.7
Kilimanjaro	2,317	83.7	0.1	0.4	2.0	0.6
Tanga	4,804	85.7	0.9	0.3	2.7	0.9
Morogoro	3,802	80.3	0.1	0.3	2.6	2.5
Pwani	2,164	77.9	5.5	1.5	8.4	2.0
Dar Es Salaam	680	64.0	5.0	0.4	1.2	5.7
Lindi	2,518	72.8	2.8	0.6	1.9	3.2
Mtwara	3,630	67.7	1.2	0.5	1.4	5.2
Ruvuma	3,785	70.0	0.1	2.2	1.9	6.7
Iringa	2,096	78.7	0.1	0.3	2.3	1.9
Mbeya	3,143	70.2	0.1	1.1	0.9	2.7
Singida	2,365	73.2	0.2	2.7	3.5	1.3
Tabora	3,943	71.2	0.2	0.4	3.6	2.1
Rukwa	1,970	67.8	0.4	12.7	2.8	2.9
Kigoma	2,077	66.6	0.1	7.0	3.4	4.8
Shinyanga	2,886	70.9	0.1	0.5	4.1	2.6
Kagera	3,784	69.3	0.2	3.7	3.0	7.7

Place of Residence	Total Community Interviewed	Change in rain seasons	Increased sea level	Increased lake/Dam level	Decreased lake/Dam level	No difference
Mwanza	3,841	75.6	0.2	12.0	8.6	3.3
Mara	2,808	76.2	0.4	8.7	7.9	2.5
Manyara	2,073	71.9	0.3	2.0	6.1	3.3
Njombe	1,957	70.5	0.2	2.1	1.3	2.9
Katavi	971	68.7	0.9	3.1	1.8	4.4
Simiyu	2,759	81.8	0.1	1.9	2.8	1.2
Geita	2,392	70.4	0.2	5.4	4.1	4.5
Songwe	1,568	79.8	0.1	3.4	1.2	2.0
Tanzania Zanzibar	403	79.7	37.5	0.7	5.5	1.7
Kaskazini Unguja	75	72.0	25.3	0.0	5.3	0.0
Kusini Unguja	66	87.9	40.9	0.0	3.0	0.0
Mjini Magharibi	131	77.1	24.4	0.8	5.3	3.8
Kaskazini Pemba	62	83.9	56.5	3.2	1.6	3.2
Kusini Pemba	69	81.2	55.1	0.0	11.6	0.0

4.5 Major Climatic Events and Incidents

4.5.1 Analysis of Major Climatic Events

This section examines data from Table 4.3, which shows the percentage of respondents reporting specific climate change-related events in the past 12 months, grouped by place of residence. These events include land degradation caused by sand and gravel mining, charcoal burning, industrial water sewage, and deforestation for agricultural purposes. The table includes national totals, distinctions between Tanzania Mainland and Zanzibar, urban-rural differences, and regional variations, based on responses from a total of 69,932 community interviews. This analysis highlights patterns in environmental pressures, demonstrating how human activities related to resource extraction and land use contribute to climate vulnerabilities across different regions and demographic groups in Tanzania.

At the national level, deforestation for agricultural land is the most commonly reported issue, accounting for about 31.5% of respondents, followed by charcoal burning at 23.7%, land degradation from sand and gravel mining at 11.3%, and industrial water sewage at a very low 0.6%. These figures highlight the heavy reliance on land-based resources for livelihoods, with agriculture and energy demands causing significant environmental changes. The low reports of industrial sewage suggest that pollution from established industries is not a major concern across the country (Table 4.3).

Tanzania Mainland closely aligns with national trends, with deforestation at 31.5%, charcoal burning at 23.6%, land degradation at 11.1%, and sewage at 0.6%, based on 69,529 interviews, reflecting its large share of the population and land area. In contrast, Zanzibar displays markedly different patterns, with higher land degradation (43.2%) and charcoal burning (37.7%), but lower deforestation (22.1%) and slightly higher sewage (1.5%) from just 403 interviews. These differences indicate that Mainland's extensive rural areas enable more deforestation for agriculture, while Tanzania Zanzibar's coastal and urban growth intensifies resource extraction pressures (Table 4.3).

Rural areas report higher rates of deforestation (34.1%) and charcoal burning (25.3%), but lower levels of land degradation (10.3%) and sewage (0.4%), based on responses from 61,270 individuals. This pattern aligns with agrarian lifestyles and dependence on biomass energy in less developed regions. Conversely, urban areas exhibit higher rates of land degradation (18.4%) and sewage (2.1%), but lower levels of charcoal burning (12.5%) and deforestation (13.0%), according to 8,662 interviews, reflecting shifts towards construction-driven mining and industrial pollution amid rapid urbanisation. This urban-rural divide

demonstrates how population density and economic transitions influence environmental stressors (Table 4.3).

Regional differences are evident, with Pwani exhibiting the highest levels of charcoal burning (43.3%) and deforestation (41.8%), while Dar es Salaam leads in land degradation (22.8%) and sewage (6.5%), reflecting urbanisation and port-related activities along the coast. In Tanzania Zanzibar regions, Kaskazini Unguja reports severe land degradation (57.3%), whereas Kusini Unguja has a high rate of charcoal burning (59.1%), indicating localised resource pressures on the islands. Mainland areas such as Lindi (51.7% deforestation) and Katavi (49.2%) highlight agricultural frontiers, whereas Arusha and Kilimanjaro show lower rates across most categories, perhaps due to tourism-driven conservation efforts. These differences emphasise uneven development, with southern and western regions experiencing greater impacts from extractive practices compared to the northern highlands.

The reported events have severe environmental impacts, including soil erosion and loss of biodiversity, which exacerbate climate change by reducing carbon sinks. This heightened climate instability increases vulnerability to extreme weather events, such as droughts and floods, creating ideal conditions for the spread of communicable diseases like malaria, chikungunya, dengue, and cholera. Vulnerable subpopulations, including those in degraded areas, face the greatest health risks as worsening environmental conditions impact both ecosystems and human health, leading to persistent and emerging health challenges.

In Zanzibar's delicate island environment, high rates of mining and charcoal production threaten coral reefs and mangroves, intensifying risks associated with sea-level rise. Nationally, these trends indicate accelerating habitat fragmentation, which could lead to irreversible ecological tipping points if unchecked, with rural deforestation notably damaging watersheds and urban sewage polluting coastal areas.

Table 4.17. Climate Change-Related Events in the Past 12 Months by Place of Residence and Region, Tanzania, 2022 PHC

Place of Residence	Land Degradation due to sand/gravel mining	Charcoal burning	Industrial water sewage	Deforestation for Agricultural land	Total Community Interviewed
Tanzania	11.3	23.7	0.6	31.5	69,932
Rural	10.3	25.3	0.4	34.1	61,270
Urban	18.4	12.5	2.1	13.0	8,662
Mainland Tanzania	11.1	23.6	0.6	31.5	69,529
Dodoma	13.2	32.9	0.3	30.4	3,500
Arusha	7.8	10.1	1.1	11.9	1,696
Kilimanjaro	9.1	10.3	0.5	17.5	2,317
Tanga	9.0	17.6	0.3	26.5	4,804
Morogoro	11.4	23.1	0.8	29.6	3,802
Pwani	13.0	43.3	1.3	41.8	2,164
Dar Es Salaam	22.8	6.5	6.5	1.9	680
Lindi	9.4	25.7	0.2	51.7	2,518
Mtwara	5.8	16.5	0.0	28.8	3,630
Ruvuma	8.4	19.1	0.3	37.6	3,785
Iringa	12.4	28.6	0.3	35.6	2,096
Mbeya	10.1	19.3	1.3	24.4	3,143
Singida	13.2	28.6	0.5	40.9	2,365
Tabora	11.2	28.5	0.2	42.7	3,943
Rukwa	14.8	25.9	0.3	36.5	1,970
Kigoma	12.8	21.2	1.1	32.6	2,077
Shinyanga	12.0	24.8	0.8	31.3	2,886
Kagera	8.0	18.4	0.3	24.1	3,784
Mwanza	14.4	29.3	1.0	26.4	3,841
Mara	17.2	36.0	1.5	36.4	2808
Manyara	11.3	26.1	0.2	27.5	2,073
Njombe	8.5	23.7	0.3	35.2	1,957
Katavi	15.9	29.9	0.4	49.2	971
Simiyu	9.0	23.3	0.2	30.8	2,759
Geita	13.3	20.7	1.1	29.8	2,392
Songwe	9.9	17.1	0.6	28.8	1,568

Place of Residence	Land Degradation due to sand/gravel mining	Charcoal burning	Industrial water sewage	Deforestation for Agricultural land	Total Community Interviewed
Tanzania Zanzibar	43.2	37.7	1.5	22.1	403
Kaskazini Unguja	57.3	38.7	2.7	29.3	75
Kusini Unguja	39.4	59.1	1.5	33.3	66
Mjini Magharibi	36.6	14.5	2.3	1.5	131
Kaskazini Pemba	40.3	45.2	0.0	30.7	62
Kusini Pemba	46.4	53.6	0.0	34.8	69

4.5.2 Analysis of Major Climatic Incidences

This section examines key climatic events, concentrating on floods (Map 4.1aa), droughts (Map 4.1b), cyclones, landslides, and earthquakes (Table 4.4). The data, collected from 69,932 community interviews, highlights differences across national, regional, rural-urban, and Mainland-Zanzibar contexts. These insights expose Tanzania's climate and geological risks, providing policymakers with essential information to prioritise adaptation strategies and effectively manage localised hazards.

Nationwide, drought is the most frequently reported climate-related event at 46.3%, followed by floods (12.5%), cyclones (12.3%), earthquakes (9.4%), and landslides (4.0%). These statistics highlight Tanzania's vulnerability to water and geological hazards, with drought impacting nearly half of the population. Though less common, floods and cyclones pose notable risks in specific regions, while landslides and earthquakes reveal localised geological weaknesses. This national overview emphasises the importance of comprehensive climate resilience measures to reduce economic and human losses.

Mainland Tanzania reports a slightly higher drought rate (46.6%) than the national average, with floods (12.5%), cyclones (12.3%), landslides (4.0%), and earthquakes (9.4%) closely aligned, based on 69,529 interviews. Tanzania Zanzibar, with only 403 interviews, shows a lower drought rate (8.4%) but higher prevalence of floods (13.7%), and fewer cyclones (5.7%), landslides (3.2%), and earthquakes (7.2%). The higher drought prevalence in Mainland Tanzania reflects its extensive agricultural areas. At the same time, Tanzania Zanzibar's flood risk corresponds to its coastal geography, requiring different adaptation

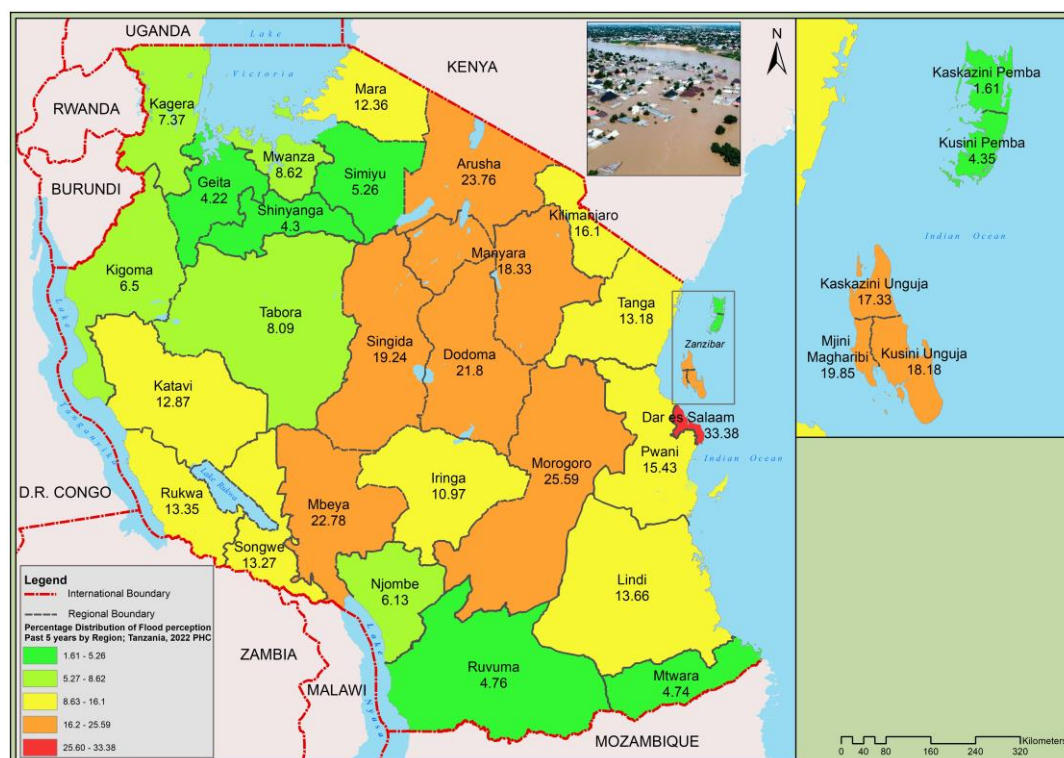
strategies, such as irrigation for the Mainland Tanzania and flood barriers for Tanzania Zanzibar.

Rural areas report higher drought (47.8%) compared to urban areas (35.9%), reflecting agricultural reliance, but lower instances of floods (11.8% vs. 17.4%) and earthquakes (9.0% vs. 12.6%), based on 61,270 rural and 8,662 urban interviews. Urban areas face increased flood risks due to dense infrastructure and poor drainage, as seen in Dar Es Salaam (33.4% floods). Cyclones (12.5% rural vs. 10.7% urban) and landslides (4.2% rural vs. 3.0% urban) show less variation. These patterns emphasise the need for drought-resistant crops in rural regions and better urban flood management.

Regional differences are pronounced, with Simiyu (78.1% drought), Dodoma (71.1%), and Mara (68.6%) experiencing severe drought, while Dar es Salaam (33.4% floods) and Morogoro (25.6%) face high flood risks. Cyclones are prominent in Songwe (27.2%) and Rukwa (22.6%), landslides occur in Mbeya (10.8%), and earthquakes are reported in Dar es Salaam (23.4%). Zanzibar's Kaskazini Unguja (17.3% floods) and Kusini Pemba (14.5% earthquakes, 7.3% landslides) underline coastal and seismic hazards. These differences, aligned with events like the 2023 Manyara landslides and 2016 Kagera earthquake, call for region-specific measures.

Drought exacerbates water scarcity and food insecurity, particularly in rural Mainland, while floods threaten urban infrastructure and coastal ecosystems in Zanzibar. Cyclones and landslides disrupt livelihoods and biodiversity, particularly in Songwe and Mbeya, while earthquakes pose threats to urban centres such as Dar Es Salaam. These hazards lead to soil erosion, habitat loss, and increased greenhouse gas emissions from disturbed ecosystems, heightening Tanzania's vulnerability to climate change and calling for urgent environmental protection measures.

Map 4.1 (a): Flood Perception in the past 5 years by Region, Tanzania 2022 PHC



Map 4.2 (b): Drought perception in the past 5 years by Region, Tanzania 2022 PHC

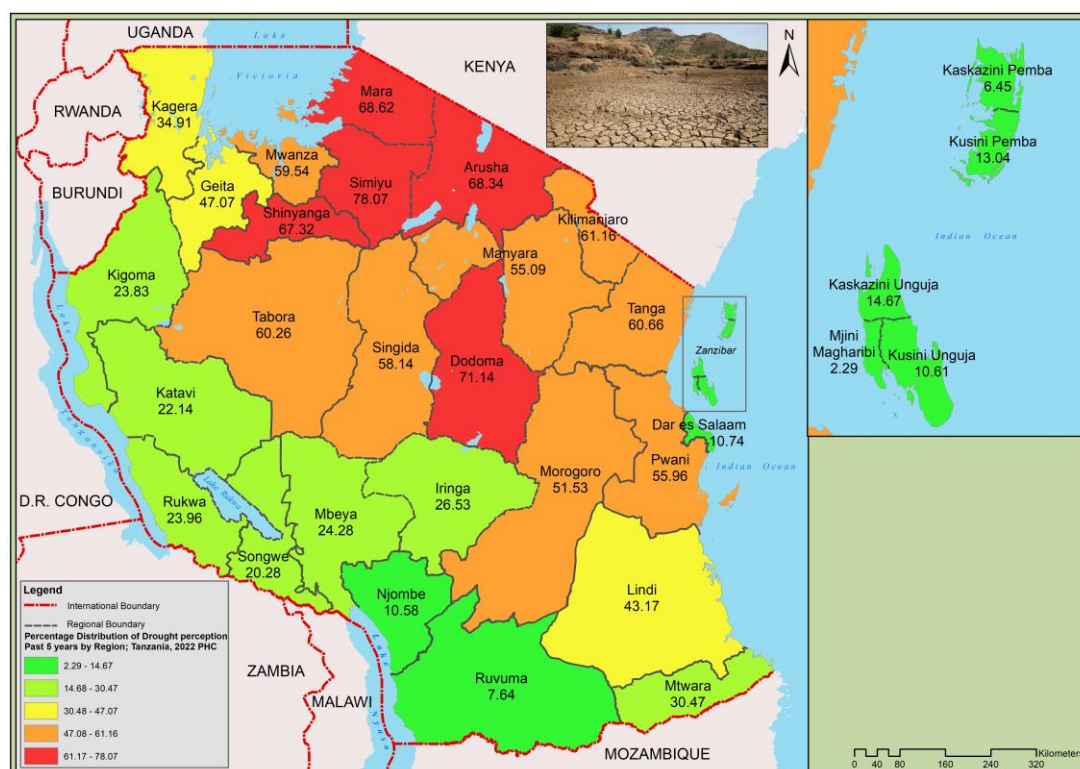


Table 4.18: Climate Change-Related Incidences in the Past 5 Years by Place of Residence and Region, Tanzania, 2022 PHC

Place of Residence	Cyclones	Landslides	Earthquakes	Total Community Interviewed
Tanzania	12.3	4.0	9.4	69,932
Rural	12.5	4.2	9.0	61,270
Urban	10.7	3.0	12.6	8,662
Mainland Tanzania	12.3	4.0	9.4	69,529
Dodoma	15.7	6.0	10.9	3,500
Arusha	11.7	5.0	6.0	1,696
Kilimanjaro	11.1	6.5	9.7	2,317
Tanga	8.1	5.7	12.2	4,804
Morogoro	15.2	5.6	8.1	3,802
Pwani	16.7	2.6	15.6	2,164
Dar Es Salaam	5.2	5.0	23.4	680
Lindi	14.5	2.1	12.0	2,518
Mtwara	12.1	0.9	4.4	3,630
Ruvuma	20.2	2.9	5.1	3,785
Iringa	15.5	5.3	4.9	2,096
Mbeya	17.5	10.8	17.0	3,143
Singida	8.3	3.3	9.3	2,365
Tabora	11.1	1.3	3.6	3,943
Rukwa	22.6	6.7	11.3	1,970
Kigoma	15.1	2.6	7.9	2,077
Shinyanga	6.5	1.6	6.0	2,886
Kagera	5.6	1.7	13.5	3,784
Mwanza	8.3	2.6	9.7	3,841
Mara	8.4	3.7	15.1	2,808
Manyara	11.3	6.2	5.2	2,073
Njombe	15.1	4.9	7.0	1,957
Katavi	16.5	2.2	6.5	971
Simiyu	5.1	1.7	4.3	2,759
Geita	6.9	2.8	14.8	2,392
Songwe	27.2	9.6	9.7	1,568
Tanzania Zanzibar	5.7	3.2	7.2	403
Kaskazini Unguja	6.7	0.0	1.3	75
Kusini Unguja	3.0	0.0	0.0	66
Mjini Magharibi	6.1	2.3	10.7	131
Kaskazini Pemba	4.8	8.1	6.5	62
Kusini Pemba	7.3	7.3	14.5	69

CHAPTER FIVE

SETTLEMENT QUALITY: DISASTER RISKS AND VULNERABILITY

Box 5.1 Key Points

- Approximately 67.1% of buildings, especially in rural areas, remain unsurveyed, hindering sustainable land management and climate-resilient infrastructure investment.
- Urban areas mainly use cement bricks (56.5%), whereas rural areas favour less durable materials like baked/sundried bricks and poles/mud. Tanzania Zanzibar predominantly uses cement bricks for walls (76.9%).
- Iron sheets are the most common roofing material in Tanzania (84.8%), but a significant proportion of rural households still use grass/leaves (11.6% nationally, 18% in rural regions), making them more vulnerable to weather events.
- Almost 60.0% of households in rural areas use Earth/Sand as flooring compared to just over 13.0% in urban areas.
- A consistent urban-rural divide shows that urban areas have better housing materials and more secure land tenure than rural regions, highlighting socioeconomic inequalities.

5.1 Introduction

The 2022 PHC data highlights notable disparities in housing construction materials and land surveying status between the Mainland Tanzania and Tanzania Zanzibar, emphasising issues of uneven development and regional inequality in Tanzania. Variations in materials used for roofing, flooring, and walls reflect living standards and resilience to climate change, impacting indoor air quality and vulnerability to extreme weather and diseases. Moreover, secure land tenure is vital for sustainable land management, fostering investment and reducing conflicts, whereas its absence can lead to resource exploitation and obstruct long-term adaptation strategies. Tackling these challenges is crucial for promoting sustainable development and enhancing living conditions in the region.

5.2 Settlements Condition and Implications to Environment and Climate Change

5.2.1 Land Survey Status

The key indicators in this section include Land Survey Status (Surveyed, Unsurveyed, Regularised), Place of Residence (Rural, Urban), and Region. These indicators offer valuable insights into land tenure security and its spatial distribution across Tanzania, which are essential for informed policy-making and sustainable development. In Tanzania, there are a total of 14,347,320 buildings. Of these, 3,247,942 (22.6%) are formally surveyed, 9,628,425 (67.1%) remain unsurveyed, and 980,348 (6.8%) are regularised (Table 5.1). This data highlights a significant gap in formal land surveying efforts, with a large majority of buildings lacking formal documentation. This situation presents challenges for land management, property rights, and investment in sustainable development initiatives.

Mainland Tanzania and Tanzania Zanzibar show notable differences in building surveys. Mainland Tanzania has 13,906,992 buildings, with only 22.4% surveyed, while Tanzania Zanzibar has 440,328 buildings, with a higher surveyed percentage of 31.1%. Despite this, nearly half of Zanzibar's buildings (48.9%) remain unsurveyed, highlighting ongoing challenges in land tenure security (Table 5.1).

The disparity between rural and urban areas highlights the need for targeted interventions in land regularisation. In rural households, of the 10,037,270 buildings, only 12.8% are surveyed, while 80.0% remain unsurveyed. In contrast, urban areas have 4,310,050 buildings, with 45.6% surveyed and 37.1% unsurveyed. This contrast indicates that rural areas face greater challenges, necessitating focused efforts to address their unique barriers.

Analysis at the regional level reveals considerable differences in land survey status. For instance, Dar es Salaam, a highly urbanised region, has a relatively high proportion of surveyed buildings (45.3%), reflecting formal planning and land administration processes. In contrast, Kagera has a significantly greater number of unsurveyed buildings, with a large majority being unsurveyed (85.9%), which underscores the need for intensified land regularisation efforts in the area. These regional differences highlight the importance of tailoring policy interventions to address each area's specific challenges and opportunities (Table 5.1).

The variation in land survey status directly affects environmental management and climate change resilience. Unsurveyed land hampers sustainable land-use planning, raises the risk of land disputes, and deters long-term investments in climate-resilient agriculture and infrastructure. Without secure land tenure, communities might be hesitant to adopt sustainable practices like agroforestry and soil conservation, fearing displacement or loss

of their investments. Conversely, secure land tenure encourages responsible land management, supports climate-smart agriculture, and reduces environmental degradation, enabling communities to implement effective adaptation strategies to address climate change impacts.

Table 5.19: Number of Buildings by Land Survey Status, Place of Residence and Region; Tanzania, 2022 PHC

Place of Residence/Region		Land Survey Status			
		Surveyed	Un-surveyed	Regularised	Don't Know
Tanzania		22.6	67.1	6.8	3.4
	Rural	12.8	80.0	4.8	2.5
	Urban	45.6	37.2	11.6	5.6
Tanzania Mainland		22.4	67.7	6.8	3.1
	Rural	12.5	80.5	4.7	2.3
	Urban	45.8	37.4	11.8	5.1
Dodoma		19.9	71.0	7.7	1.4
	Rural	5.5	89.9	3.7	0.9
	Urban	48.1	33.9	15.6	2.4
Arusha		24.2	64.1	8.2	3.5
	Rural	13.2	79.6	4.8	2.3
	Urban	46.4	32.9	15.0	5.7
Kilimanjaro		17.0	74.0	6.4	2.6
	Rural	9.8	82.5	5.5	2.1
	Urban	55.9	27.9	11.2	5.1
Tanga		18.9	72.8	5.9	2.5
	Rural	10.5	83.6	3.7	2.2
	Urban	49.2	33.4	13.7	3.7
Morogoro		27.9	61.8	6.7	3.7
	Rural	21.3	70.1	5.9	2.8
	Urban	40.2	46.2	8.2	5.3
Pwani		17.4	71.0	6.4	5.2
	Rural	12.6	79.2	3.9	4.3
	Urban	25.7	57.2	10.5	6.6
Dar es Salaam		45.4	32.1	14.9	7.6
	Rural	-	-	-	-
	Urban	45.4	32.1	14.9	7.6
Lindi		23.1	69.2	5.1	2.7
	Rural	17.1	75.6	5.1	2.2
	Urban	50.4	40.0	4.8	4.8
Mtwara		26.2	64.6	7.0	2.2
	Rural	20.2	72.3	5.5	2.0
	Urban	49.1	35.3	13.0	2.7
Ruvuma		25.1	66.8	5.9	2.1
	Rural	18.5	73.8	5.9	1.8
	Urban	51.9	38.8	5.9	3.3
Iringa		30.1	60.4	7.0	2.5
	Rural	26.5	65.0	6.2	2.3
	Urban	42.3	44.8	9.4	3.5

Place of Residence/Region		Land Survey Status			
		Surveyed	Un-surveyed	Regularised	Don't Know
Mbeya		27.6	59.7	8.6	4.0
	Rural	18.6	71.4	6.9	3.1
	Urban	47.0	34.5	12.4	6.1
Singida		16.9	77.0	4.2	1.9
	Rural	9.3	85.9	3.4	1.5
	Urban	56.0	31.7	8.1	4.2
Tabora		16.9	74.3	5.8	3.0
	Rural	10.5	82.0	5.0	2.6
	Urban	51.3	33.4	10.1	5.2
Rukwa		21.0	69.8	6.5	2.7
	Rural	16.7	75.4	5.7	2.2
	Urban	39.0	46.7	9.5	4.8
Kigoma		32.1	58.9	5.6	3.4
	Rural	24.1	67.1	5.7	3.2
	Urban	57.3	33.1	5.2	4.3
Shinyanga		21.0	71.7	4.2	3.1
	Rural	7.7	87.0	3.1	2.3
	Urban	47.6	41.2	6.5	4.7
Kagera		9.4	85.9	2.7	2.0
	Rural	5.6	90.5	2.2	1.7
	Urban	44.9	42.8	7.2	5.1
Mwanza		25.5	61.8	9.4	3.3
	Rural	9.3	83.0	4.9	2.9
	Urban	59.7	17.2	18.9	4.1
Mara		20.0	71.5	6.6	1.9
	Rural	10.5	82.4	5.4	1.7
	Urban	44.7	43.3	9.6	2.4
Manyara		18.0	72.2	7.0	2.9
	Rural	12.8	77.6	6.9	2.7
	Urban	46.3	42.5	7.2	3.9
Njombe		20.6	71.9	5.4	2.1
	Rural	11.2	82.3	5.1	1.4
	Urban	50.4	38.7	6.4	4.5
Katavi		19.1	72.7	6.0	2.3
	Rural	10.6	84.2	3.5	1.8
	Urban	44.5	38.3	13.5	3.7
Simiyu		12.1	82.4	3.4	2.2
	Rural	6.9	88.2	3.0	1.9
	Urban	39.1	51.7	5.3	3.8
Geita		14.0	77.5	5.2	3.3
	Rural	6.2	87.0	4.2	2.6
	Urban	32.3	55.3	7.3	5.1
Songwe		15.4	75.7	5.7	3.2
	Rural	10.8	81.9	4.7	2.6
	Urban	31.4	54.0	9.1	5.6
Tanzania Zanzibar		31.1	48.9	7.1	12.9
	Rural	23.1	59.9	5.9	11.1

Place of Residence/Region		Land Survey Status			
		Surveyed	Un-surveyed	Regularised	Don't Know
	Urban	43.0	32.6	8.8	15.6
Kaskazini Unguja		29.7	55.9	5.8	8.5
	Rural	28.7	57.6	6.0	7.7
	Urban	35.8	45.8	4.8	13.6
Kusini Unguja		23.0	53.2	8.0	15.9
	Rural	19.5	59.7	7.4	13.5
	Urban	35.7	29.6	10.2	24.5
Mjini Magharibi		39.6	33.5	9.3	17.7
	Rural	26.2	43.1	8.2	22.5
	Urban	45.3	29.3	9.8	15.6
Kaskazini Pemba		24.1	66.1	4.2	5.5
	Rural	20.7	70.3	4.0	4.9
	Urban	37.7	49.6	4.9	7.9
Kusini Pemba		24.2	63.0	4.0	8.9
	Rural	18.1	72.1	3.4	6.4
	Urban	40.8	38.0	5.6	15.6

5.2.2 Land Ownership and Tenure Security

The 2022 PHC provides a detailed overview of land ownership and tenure security across Mainland Tanzania and Tanzania Zanzibar. The findings show that many households claim land ownership, but formal tenure security, indicated by possession of title deeds, remains relatively low (Figures 5.1 and 5.2). Differences are observed between rural and urban areas, as well as between the Mainland and Zanzibar. These patterns have important implications for environmental sustainability and climate change adaptation. Households with secure tenure are more likely to invest in climate-resilient practices such as tree planting, soil conservation, and better housing (Figure 5.1). Conversely, insecure tenure can lead to land degradation, unsustainable farming, and resource conflicts.

Figure 5.12: Land Ownership distribution across Mainland Tanzania, Tanzania Zanzibar, Urban and Rural households, 2022 PHC

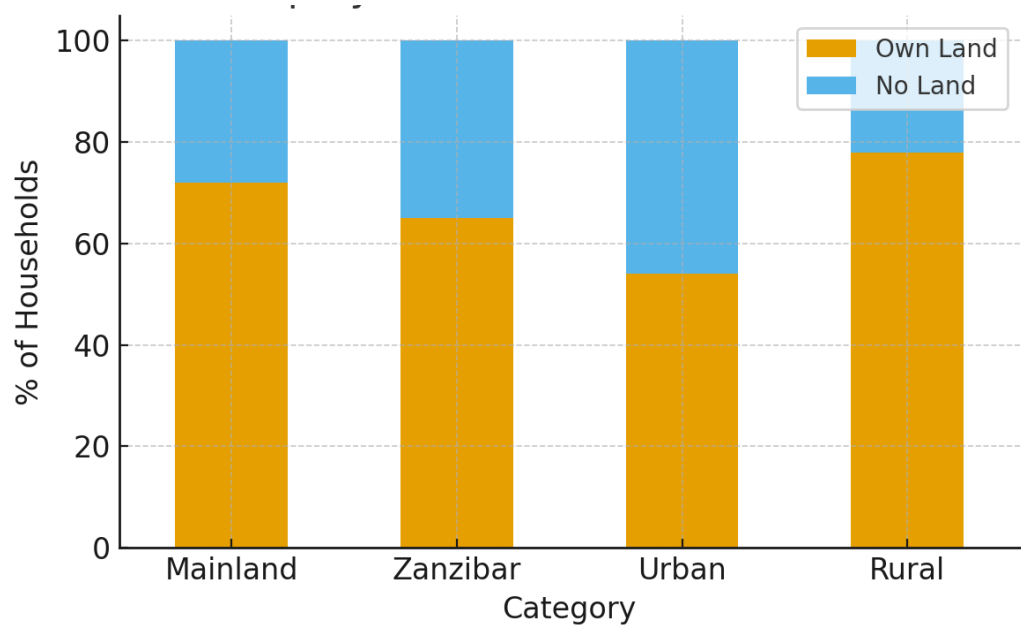


Figure 5.13: Proportion of households with and without title deeds, 2022 PHC



5.2.2.1 Land Ownership

According to the 2022 PHC, most households across Tanzania report owning land, although patterns vary between Mainland Tanzania, Tanzania Zanzibar, and rural and urban areas. Land ownership is highest in rural households (78%), where agriculture is the main livelihood. In contrast, urban ownership stands at 54%, reflecting limited access to agricultural land and the growth of rental housing (Figure 5.2). Mainland Tanzania displays slightly higher land ownership rates than Tanzania Zanzibar. These patterns are important

when examining environmental management, as households with land are more likely to engage in tree planting, soil conservation, and climate-smart agriculture.

5.2.2.2 Tenure Security (Title Deeds)

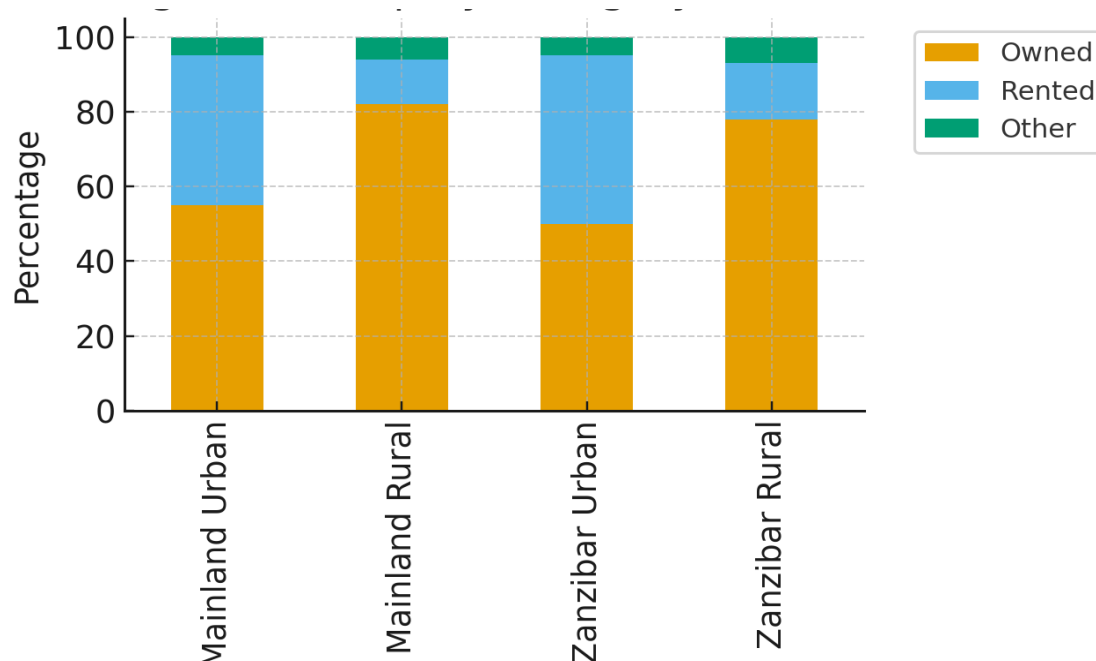
Despite widespread land ownership, only a minority of households possess title deeds that legally secure their tenure. The Census data show that around 22% of Mainland Tanzania households and 18% of Tanzania Zanzibar households hold title deeds. Urban households report higher title deed coverage (31%) compared to rural areas (14%), reflecting stronger formalisation of land markets in cities (Figure 5.2). The lack of title deeds in rural areas leaves households vulnerable to land disputes, undermines long-term investments, and can increase vulnerability to environmental degradation. Insecure tenure also discourages households from adopting climate-resilient practices such as terracing, agroforestry, and permanent housing improvements.

5.3 Housing Ownership and Environmental Sustainability

5.3.1 Housing ownership

This subsection outlines the distribution of housing ownership, roofing, flooring, and walling materials across the Tanzania Mainland and Tanzania Zanzibar. Housing conditions reflect not only household welfare but also have direct environmental implications, such as the demand for timber, cement, and energy-intensive materials, as well as resilience to climate-related hazards. Ownership dominates in rural areas, while rental housing is more common in urban settings (Figure 5.3).

Figure 5.14: Housing ownership by category and location, 2022 PHC



Results show that one third (33.3%) of all buildings in Tanzania lack legal land ownership documents, 24.8 % have CCRO, 17.5% possess Local Government documents, and 10.4% hold title deeds. In Tanzania Zanzibar, approximately half (45.7%) of all buildings are constructed on land without legal ownership documents, while about a quarter (23.5%) have title deeds (Table 5.2).

In rural areas of Tanzania, 40.6% of all buildings lack legal land ownership documents, 32.9% are built on land with CCRO, and 4.3% are built on land with title deeds. In urban areas, 24.9 per cent of all buildings have title deeds, 21.9 per cent have Local/Village Government documents, and 17.3 per cent do not possess legal land ownership documents (Table 5.2).

Simiyu Region in Mainland Tanzania has the highest proportion of buildings occupied by owners (90.5%), while Dar es Salaam Region has the lowest proportion (57.6%). Furthermore, Dar es Salaam Region has the highest proportion of rented buildings (26.7%), whereas Lindi Region has the lowest proportion (4.5%). In Tanzania Zanzibar, both Kaskazini Unguja and Kaskazini Pemba Regions have the highest proportion of buildings occupied by owners (88.6% each), while Mjini Magharibi Region has the lowest proportion (13.1%) (Table 5.2).

**Table 5.20: Percentage Distributions of Buildings by Place of Residence and Type of Ownership, 2022
PHC**

Type of Ownership	Tanzania	Mainland Tanzania	Tanzania Zanzibar
Total (Number of Buildings)	14,348,372	13,907,951	440421
Total (percent)	100.0	100.0	100.0
Individual	87.0	86.8	91.9
Housing Cooperatives	9.8	9.9	5.4
Parastatal/Institutions (TBA/ZBA, NHC/ZHC, WHC, NSSF/ZSSF)	0.5	0.5	0.3
Local Government	0.9	0.9	0.1
Central Government	0.4	0.4	0.7
Non-Government Organisation (NGO's/CBO's)/ Private Company	0.4	0.4	0.2
Religious Institutions (Mosque, Church, Temple, etc	0.8	0.8	0.8
Political Parties/Sports Clubs	0.1	0.1	0.2
Mixed Ownership	0.1	0.1	0.4

5.4 Building Materials

5.4.1 Floor Materials

The distribution of flooring types among Tanzania's 14,152,803 households is essential for evaluating housing quality and socioeconomic inequalities. Cement remains the most prevalent flooring material, utilised by 49.1% of households, while 41.4% still rely on earth or sand, highlighting a need for improvement. Ceramic tiles are adopted by only 7.4% of households, with other materials making up a small portion of the total (Table 5.3).

A comparison of flooring materials in Tanzania reveals apparent differences between Mainland Tanzania and Tanzania Zanzibar. In Mainland Tanzania, with 13,776,975 households, the most common materials are cement (48.4%), earth/sand (42.2%), and ceramic tiles (7.3%). In Tanzania Zanzibar, home to 375,828 households, cement dominates at 76%, used in about 285,630 homes, while earth/sand and ceramic tiles are present in 11.7% and 11.5%, respectively (Table 5.3). The higher use of cement in Zanzibar suggests better housing standards, whereas Mainland Tanzania's reliance on earth/sand highlights a need for improvements in housing quality.

The contrast between rural and urban housing highlights a significant disparity. In rural areas, with 8,547,333 households, 59.8% have earth or sand flooring, while 35.6% use cement, and only 1.9% have ceramic tiles. In urban areas, home to 5,605,470 households,

69.8% have cement flooring, 15.8% use ceramic tiles, and just 13.2% rely on earth or sand flooring. This stark difference emphasises the socioeconomic gap, with rural areas lagging in access to quality housing and sanitation.

Regional disaggregation reveals notable differences across Tanzania. Dar es Salaam has the highest percentage of households using improved flooring, with 71.3% employing cement and 25.5% using ceramic tiles, while only 2.2% depend on earth or sand. In stark contrast, Kigoma reports the highest share of earth or sand flooring, with 71.7% of households using this material. Other regions heavily reliant on earth or sand flooring include Manyara and Simiyu. In Zanzibar, Mjini Magharibi, the most urbanised region, shows high cement usage at 77.3%.

The choice of flooring materials directly affects environmental sustainability and climate change. Earth or sand flooring, although affordable, can release indoor air pollutants and harbour pathogens, raising the risk of respiratory infections and other health issues. Manufacturing cement is energy-intensive and contributes to carbon emissions, exacerbating climate change. Using wood that is unsustainably harvested for flooring causes deforestation and habitat destruction. Palm or bamboo, when sustainably harvested, can be a more environmentally friendly flooring option.

Table 5.21: Percentage Distribution of Households by Type of Floor Covering Materials of Main Dwelling, Place of Residence and Region; Tanzania, 2022
PHC

Residence/Region	Total Number of Households	Type of Flooring Materials									
		Cement	Ceramic Tiles	Parquet or Polished Wood	Terrazzo	Vinyl or Asphalt Strips	Wood Planks	Palm/Bamboo	Earth/Sand	Dung	Others
Tanzania	14,152,803	49.1	7.4	0.2	0.4	0.1	0.4	0.3	41.4	0.6	0.3
Rural	8,547,333	35.6	1.9	0.2	0.3	0.1	0.5	0.5	59.8	0.9	0.3
Urban	5,605,470	69.8	15.8	0.2	0.5	0.1	0.1	0.1	13.2	0.1	0.2
Tanzania Mainland	13,776,975	48.4	7.3	0.2	0.4	0.1	0.4	0.3	42.2	0.6	0.3
Dodoma	754,631	39.2	6.2	0.2	0.3	0	0.2	0.3	53.1	0.2	0.3
Arusha	611,939	50.3	11	0.2	0.6	0.1	0.8	0.5	28.7	7.4	0.4
Kilimanjaro	494,428	64.5	10	0.5	0.7	0.1	0.7	0.2	22.2	0.3	0.9
Tanga	631,258	38.5	5.2	0.1	0.2	0	0.9	0.5	54.1	0.2	0.2
Morogoro	822,467	46.2	5.5	0.1	0.3	0	0.4	0.6	46.3	0.2	0.3
Pwani	537,040	57.3	8.4	0.2	0.4	0.1	0.7	0.8	31.8	0.1	0.3
Dar es Salaam	1,537,293	71.3	25.5	0.2	0.6	0	0.1	0	2.2	0	0.2
Lindi	344,447	33.5	1.8	0.2	0.1	0	0.4	0.8	63	0.1	0.2
Mtwara	491,811	41.4	2.2	0.1	0.2	0	0.3	0.3	55.3	0	0.1
Ruvuma	463,666	46.6	2.2	0.3	0.2	0	0.1	0.2	50.1	0.1	0.2
Iringa	319,117	58.2	4.8	0.1	0.2	0	0.2	0.2	35.8	0.1	0.3
Mbeya	624,320	60.6	5	0.4	0.3	0.1	0.2	0.3	31.9	1	0.3
Singida	392,111	36	3.4	0.1	0.3	0	0.3	0.2	59.4	0.1	0.2
Tabora	592,039	37.1	2.9	0.1	0.2	0	0.2	0.3	58.7	0.2	0.2
Rukwa	328,052	44.6	1.4	0.1	0.1	0	0.1	0.2	52.9	0.4	0.2
Kigoma	451,967	24.2	2.4	0.2	0.3	0	0.3	0.5	71.7	0.1	0.3
Shinyanga	418,771	47.9	5.7	0.2	0.3	0	0.2	0.1	45.4	0.1	0.2
Kagera	698,257	33	3.1	0.2	0.4	0.1	0.6	0.6	61.6	0.2	0.2

Residence/Region	Total Number of Households	Type of Flooring Materials									
		Cement	Ceramic Tiles	Parquet or Polished Wood	Terrazzo	Vinyl or Asphalt Strips	Wood Planks	Palm/Bamboo	Earth/Sand	Dung	Others
Mwanza	744,709	57.1	9.4	0.3	0.7	0.1	0.3	0.1	31.7	0.1	0.2
Mara	467,473	45.4	5.1	0.1	0.4	0.1	0.4	0.3	47.6	0.4	0.2
Manyara	398,735	33	2.7	0.2	0.5	0.1	1.2	1	58.8	2	0.7
Njombe	244,579	62.9	4	0.1	0.2	0	0.2	0.1	32	0.2	0.1
Katavi	213,825	40.5	2	0.1	0.1	0	0.4	0.5	56	0.1	0.3
Simiyu	311,247	28	2	0.4	0.4	0.1	0.2	0.1	68.5	0.1	0.2
Geita	555,345	54.4	4.1	0.2	0.3	0	0.1	0.1	40.2	0.1	0.4
Songwe	327,448	53.5	3.2	0	0.1	0	0.1	0.2	41.8	0.9	0.2
Tanzania Zanzibar	375,828	76	11.5	0	0.6	0	0.1	0.1	11.7	0	0
Kaskazini Unguja	53,770	82.8	2.7	0	0.2	0	0.2	0.1	14	0	0.1
Kusini Unguja	46,003	80	6.7	0.1	0.6	0	0.2	0.1	12.1	0	0.2
Mjini Magharibi	180,889	77.3	19.4	0	1	0	0	0	2.2	0	0
Kaskazini Pemba	48,178	65.7	3	0.1	0.1	0	0.1	0.1	30.8	0	0
Kusini Pemba	46,988	69.7	4.3	0	0.3	0	0.1	0.2	25.4	0	0

5.4.2 Wall Materials

This section highlights the percentage distribution of household wall materials in Tanzania, which is essential for assessing housing quality and environmental impact. Out of 14,152,803 households, baked bricks are the most common, used by 34.5%, followed by cement/rock bricks at 28.1% and sundried bricks at 18.5%. Poles and mud account for 15.7%, while stones (1.2%), timber (0.5%), timber and sheets (0.5%), and grass (0.9%) are less commonly used. These figures highlight significant regional and urban-rural disparities (Table 5.4).

A comparison of Mainland Tanzania and Tanzania Zanzibar reveals notable differences in building materials. Mainland Tanzania, with 13,776,975 households, primarily uses baked bricks (35.4%), cement or rock bricks (26.8%), sundried bricks (19%), and poles and mud (15.8%). In Tanzania Zanzibar, which has 375,828 households, cement or rock bricks dominate at 76.9%, followed by poles and mud (11.4%) and stones (9.1%). Baked bricks are used minimally. The greater reliance on cement bricks in Tanzania Zanzibar, indicates differences in economic factors, resource availability, and building traditions compared to the mainland.

The urban-rural divide further amplifies these differences. In rural areas, home to 8,547,333 households, baked bricks are the most common wall material (38.8%), followed by sun-dried bricks (24.5%), poles and mud (23.2%), and cement or rock bricks (9.5%). In contrast, urban areas, with 5,605,470 households, predominantly use cement or rock bricks (56.5%), followed by baked bricks (27.9%), sun-dried bricks (9.3%), and poles and mud (4.2%). This stark contrast highlights the greater affordability and availability of traditional materials like baked and sun-dried bricks and poles, and mud in rural areas. In contrast, urban regions prefer more durable, though often more costly, cement-based materials (Table 5.4).

Regional disaggregation further reveals diverse patterns. Dar es Salaam, the most urbanised region, overwhelmingly uses cement bricks/rock bricks (95.6%). In contrast, regions like Ruvuma and Songwe exhibit high dependence on baked bricks (80.4% and 81.7%, respectively), likely due to local availability of clay and suitable firing conditions. Tanga has a very high percentage of households using poles and mud (49.4%), while Manyara also relies heavily on this material (40.5%). In Tanzania Zanzibar, Kusini Unguja shows a notably higher usage of stones (25.8%) compared to other regions, reflecting local geological resources.

The types of wall materials used in housing have significant linkages with the environment and climate change. The production of cement bricks/rock bricks is often energy-intensive, contributing to greenhouse gas emissions. Sundried brick production can contribute to land degradation through topsoil extraction. The baking of bricks usually relies on deforestation for fuel, impacting biodiversity and increasing carbon emissions. Unsustainable timber harvesting for housing leads to deforestation and habitat loss. Houses constructed with poles and mud or grass are often less durable and more vulnerable to climate-related disasters like floods and strong winds, and can also lead to indoor air pollution.

Table 5.22: Percentage Distribution of Households by Type of Wall Materials of Main Dwelling, Place of Residence and Region; Tanzania, 2022 PHC

Residence/Region	Total Number of Households	Type of Wall Materials									
		Stones	Cement Bricks/Rock Bricks	Sundried Bricks	Baked Bricks	Timber	Timber and Sheets	Poles and Mud	Grass	Glass/Aluminium	Tent/Containers
Tanzania	14,152,803	1.2	28.1	18.5	34.5	0.5	0.5	15.7	0.9	0	0.2
Rural	8,547,333	1	9.5	24.5	38.8	0.7	0.6	23.2	1.4	0	0.2
Urban	5,605,470	1.5	56.5	9.3	27.9	0.1	0.3	4.2	0.2	0	0.1
Tanzania Mainland	13,776,975	1	26.8	19	35.4	0.5	0.5	15.8	0.9	0	0.2
Dodoma	754,631	0.8	25.3	33.2	20.1	0	0.3	19.5	0.6	0	0.2
Arusha	611,939	0.7	46.9	4	13.7	2	1	29.4	1.9	0	0.3
Kilimanjaro	494,428	2.7	41.4	6	31	6.1	1.1	11.1	0.3	0	0.3
Tanga	631,258	0.8	19.5	6.8	22	0.1	0.4	49.4	0.8	0	0.2
Morogoro	822,467	0.5	12.5	7.5	57.6	0.2	0.3	19.7	1.5	0	0.2
Pwani	537,040	1.2	55.7	2.7	3.3	0.1	0.6	34.1	2	0	0.2
Dar es Salaam	1,537,293	1.5	95.6	0.9	0.8	0	0.4	0.6	0	0	0.1
Lindi	344,447	2.2	11.7	11.8	27.4	0.1	0.3	44.4	2	0	0.2
Mtwara	491,811	0.7	19.1	30.6	25.8	0.1	0.2	23	0.7	0	0.1
Ruvuma	463,666	0.7	3	9.2	80.4	0.1	0.1	5.6	0.9	0	0.1
Iringa	319,117	0.8	6.1	15.5	57	0.2	0.2	19.5	0.5	0	0.2
Mbeya	624,320	1.2	7.8	35.9	49.4	0.2	0.2	4.6	0.5	0	0.2
Singida	392,111	0.3	15.9	50.5	25	0	0.2	7.4	0.6	0	0.1
Tabora	592,039	0.3	10.9	47.8	28.4	0.1	0.2	10.9	1.2	0	0.1
Rukwa	328,052	0.4	2	12.2	81.7	0.1	0.1	2	1.5	0	0.1
Kigoma	451,967	0.3	2.7	15.9	67.9	0.1	0.2	11.2	1.5	0	0.2
Shinyanga	418,771	0.5	21.7	50.5	23.9	0	0.3	2.4	0.5	0	0.1
Kagera	698,257	0.7	4.6	13.6	37	0.5	2	40.1	1.3	0	0.2

Residence/Region	Total Number of Households	Type of Wall Materials									
		Stones	Cement Bricks/Rock Bricks	Sundried Bricks	Baked Bricks	Timber	Timber and Sheets	Poles and Mud	Grass	Glass/Aluminium	Tent/Containers
Mwanza	744,709	1.5	42.7	27.6	23.8	0.8	1	2	0.6	0	0.1
Mara	467,473	1.7	14.1	18	48.1	0.2	0.4	16.2	1.1	0	0.2
Manyara	398,735	0.9	6.7	9.8	37.6	0.3	1	40.5	2.6	0	0.6
Njombe	244,579	0.9	5	13.4	78.3	0.4	0.2	1.7	0.2	0	0
Katavi	213,825	0.4	2.4	14.3	71.5	0.1	0.2	8.7	2.2	0	0.2
Simiyu	311,247	1.3	19.2	63.9	13.6	0.1	0.1	1.4	0.3	0	0.1
Geita	555,345	0.8	6.1	24.3	64	0.1	0.3	3.4	0.7	0	0.3
Songwe	327,448	0.3	1.9	12.8	81.7	0.1	0.1	2.3	0.8	0	0.1
Tanzania Zanzibar	375,828	9.1	76.9	1.5	0.4	0	0.2	11.4	0.4	0	0.1
Kaskazini Unguja	53,770	9.9	81.6	1.6	0.5	0.1	0.2	5.4	0.7	0	0
Kusini Unguja	46,003	25.8	63.5	1.2	0.6	0	0.7	6.5	1.4	0	0.2
Mjini Magharibi	180,889	3.7	94.7	0.5	0.1	0	0.1	0.8	0.1	0	0
Kaskazini Pemba	48,178	15.5	49.2	2.7	0.9	0	0.2	31.1	0.4	0	0
Kusini Pemba	46,988	5.9	44.3	4.5	0.9	0	0.2	43.7	0.3	0	0

5.4.3 Roofing Materials

The distribution of roofing materials among households is vital for evaluating housing quality and resilience to climate change in Tanzania. With 14,152,803 households, iron sheets are the most common roofing material, used by 84.8%. However, 11.6% of households still use grass or leaves, highlighting a need for interventions to enhance housing quality. Other materials, such as tiles (0.4%), concrete (0.2%), and asbestos (0.1%) are used by only a small percentage of households (Table 5.5).

Analysing Mainland Tanzania and Tanzania Zanzibar shows similar patterns in roofing materials, with some key differences. In Mainland Tanzania, with 13,776,975 households, iron sheets are the most common roofing material, used by 84.6% of households. Grass/leaves are the second most common, covering 11.7% of homes. In Tanzania Zanzibar, with 375,828 households, iron sheets are even more widespread, used by 92.5%, or about 347,641 households. Grass/leaves are used by just 5.7% (Table 5.5). Although iron sheets dominate in both areas, the higher usage rate in Tanzania Zanzibar may indicate better overall housing conditions there.

The urban-rural divide in roofing materials highlights socioeconomic disparities. In rural areas, with 8,547,333 households, 77.3% use iron sheets, demonstrating their widespread availability and affordability even in less developed regions. However, about 18% of rural households depend on grass or leaves for roofing, meaning about 1,538,520 households lack adequate weather protection. In stark contrast, urban areas with 5,605,470 households have 96.2% of homes using iron sheets. Only 1.9% of urban households rely on grass or leaves. The stark difference in roofing materials between rural and urban areas underscores ongoing socioeconomic inequalities and the need for targeted measures to improve housing quality in rural regions.

Regional differences in Tanzania show notable variations in housing materials. Dar es Salaam leads with 96.5% of households using iron sheets, reflecting its urbanisation and economic progress. In contrast, Lindi has the lowest iron sheet usage at 65.1% and the highest reliance on grass/leaves at 33.5%, highlighting a need for housing improvement initiatives. Kilimanjaro and Njombe also display high iron sheet usage (96.3% and 96.1%, respectively), while Kaskazini Pemba depends more on grass/leaves (22.7%).

The choice of roofing materials is directly linked to environmental sustainability, climate change, and human health. The manufacturing of iron sheets is an energy-intensive process that contributes to greenhouse gas emissions. Homes with iron sheet roofing can also

experience increased heat stress, resulting in higher energy use for cooling. Unsustainable harvesting of grass and leaves for roofing can lead to deforestation and habitat loss. Furthermore, the use of asbestos roofing presents significant health risks and should be phased out entirely.

Table 5.23: Percentage Distribution of Households by Type of Roofing Materials of Main Dwelling, Place of Residence and Region; Tanzania, 2022 PHC

Residence/Region	Total Number of Household	Type of Roofing Materials							
		Iron sheets	Tiles	Concrete	Asbestos	Grass/Leaves	Mud and Leaves	Plastics/Box	Tent
Tanzania	14,152,803	84.8	0.4	0.2	0.1	11.6	2.4	0.2	0.2
Rural	8,547,333	77.3	0.2	0	0.1	18	3.8	0.2	0.3
Urban	5,605,470	96.2	0.8	0.5	0.1	1.9	0.3	0	0.1
Tanzania Mainland	13,776,975	84.6	0.4	0.2	0.1	11.7	2.5	0.2	0.2
Dodoma	754,631	86.2	0.2	0.1	0.1	3.1	10	0.1	0.2
Arusha	611,939	82.3	0.7	0.2	0.1	11.5	4.6	0.2	0.4
Kilimanjaro	494,428	96.3	0.5	0.1	0.1	2.3	0.4	0.1	0.2
Tanga	631,258	79.6	0.7	0.1	0.2	16.2	1.3	1.6	0.2
Morogoro	822,467	81.1	0.3	0.1	0.3	16.3	1.6	0.1	0.2
Pwani	537,040	84.1	0.3	0.1	0.1	14.2	0.8	0.2	0.3
Dar es Salaam	1,537,293	96.5	1.6	1.4	0.1	0.3	0.1	0	0.1
Lindi	344,447	65.1	0.1	0	0.1	33.5	0.9	0.1	0.2
Mtwara	491,811	73.1	0.2	0	0.1	26.1	0.4	0	0.1
Ruvuma	463,666	77.5	0.2	0	0.1	21.3	0.7	0	0.1
Iringa	319,117	91	0.4	0	0.1	6.8	1.3	0.1	0.3
Mbeya	624,320	90.6	0.3	0.1	0.1	7.8	0.9	0.1	0.3
Singida	392,111	81.8	0.2	0	0	4	13.7	0.1	0.2
Tabora	592,039	65.3	0.2	0.1	0.1	30.2	3.9	0.1	0.2
Rukwa	328,052	73.3	0.2	0	0.1	24.7	1.4	0	0.2
Kigoma	451,967	75.6	0.3	0	0.1	21.3	2.2	0.1	0.3
Shinyanga	418,771	81.9	0.4	0.1	0.1	12.1	5.2	0.1	0.2
Kagera	698,257	90.4	0.2	0	0.1	8.1	0.8	0.2	0.2
Mwanza	744,709	92.6	0.3	0.1	0.1	5.8	0.7	0.2	0.2
Mara	467,473	85.4	0.2	0	0.1	12.5	1.5	0.1	0.2
Manyara	398,735	75.4	0.3	0	0.1	14.7	8.5	0.2	0.8

Residence/Region	Total Number of Household	Type of Roofing Materials							
		Iron sheets	Tiles	Concrete	Asbestos	Grass/Leaves	Mud and Leaves	Plastics/Box	Tent
Njombe	244,579	96.1	0.2	0	0	3.3	0.2	0.1	0.1
Katavi	213,825	74.8	0.2	0	0.1	22.4	2.1	0.1	0.3
Simiyu	311,247	89.3	0.1	0	0.1	5	5.3	0	0.1
Geita	555,345	91.6	0.2	0	0	6.8	0.8	0.1	0.4
Songwe	327,448	88	0.2	0	0.1	10.9	0.6	0	0.1
Tanzania Zanzibar	375,828	92.5	0.4	0.9	0.2	5.7	0.2	0	0
Kaskazini Unguja	53,770	93.6	0.3	0.2	0.5	5	0.4	0	0.1
Kusini Unguja	46,003	89.6	1.4	0.5	0.7	7.3	0.2	0.1	0.2
Mjini Magharibi	180,889	97.5	0.4	1.4	0.1	0.6	0	0	0
Kaskazini Pemba	48,178	76.1	0.1	0.5	0.2	22.7	0.3	0	0
Kusini Pemba	46,988	91.5	0.1	0.5	0.2	7.5	0.2	0	0

CHAPTER SIX

CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

The 2022 PHC is a landmark achievement in Tanzania's national statistical development. Beyond its primary function of demographic enumeration, it serves as the most comprehensive evidence base available for transitioning the nation's environmental and climate change policies from aspiration to implementation.

6.2 Conclusion

In conclusion, the data and insights highlight a complex relationship between climate change, socio-economic vulnerabilities, and environmental challenges in Tanzania. Since the country's economy relies heavily on natural resources, the effects of climate variability pose serious threats not only to livelihoods but also to environmental health. The findings from the 2022 PHC emphasise the urgent need for adaptive strategies to address these interconnected issues effectively.

The reliance on biomass fuels, especially firewood and charcoal, poses significant risks to both public health and the environment. This dependence accelerates deforestation and contributes to increased greenhouse gas emissions. Additionally, regional differences in energy use highlight the need for strong policy measures to promote the adoption of clean energy solutions, particularly in rural areas where access is limited. Transitioning to renewable energy sources should be a priority, not only to reduce health risks associated with indoor air pollution but also to lessen the environmental pressures caused by traditional energy use.

Furthermore, an analysis of housing quality underscores the essential need for sustainable construction methods. Improving access to durable, affordable, and eco-friendly building materials is vital for building resilience against climate change. Learning from models in Solomon Islands, which focus on low-carbon options and sustainable housing projects, can help reduce resource strain while enhancing living standards. Tackling inequalities in housing quality will greatly benefit public health and overall community wellbeing.

The gender dimensions shown in the data highlight the unequal burdens women face in resource-dependent areas. Women often deal with the severe impacts of water shortages and reliance on biomass for energy. Therefore, it is crucial to implement gender-sensitive

policies that empower women and improve their participation in sustainable land management and economic activities. Giving women access to clean water, alternative energy sources, and economic opportunities is essential for breaking the cycle of poverty and environmental harm.

Recognising youth as a vital demographic in resource-related initiatives requires the creation of targeted programmes that provide education and employment opportunities. Empowering the younger generation through skill development in sustainable practices can promote innovation in natural resource management and ensure that economic growth does not harm environmental health.

Finally, the data's depiction of public awareness regarding climate change highlights a significant opportunity for policy engagement. The widespread recognition of changing climate patterns indicates that communities are increasingly open to actionable strategies. Nonetheless, this awareness should be reinforced through solid, evidence-based planning that corresponds with identified climate risks, including drought, flooding, and sea-level rise. Implementing resilient agricultural practices, investing in water management infrastructure, and improving climate services are essential steps to protect vulnerable communities from the harmful effects of climate change.

Addressing the interconnected challenges of environmental degradation, socio-economic inequalities, and climate vulnerability is vital for Tanzania's sustainable development. By promoting equitable access to resources, fostering gender inclusivity, and investing in clean energy and sustainable housing, Tanzania can enhance resilience against climate change while protecting its natural resources and supporting community livelihoods. A holistic approach, such as One Health, which harmonizes the health of humans, animals, and ecosystems, further strengthens this effort. It recognizes the critical links between human and animal health, plant vitality, and environmental sustainability. By enhancing collaboration across sectors, One Health addresses urgent issues such as infectious diseases, antimicrobial resistance, and food safety, thereby promoting ecosystem integrity. Institutionalized in Tanzania through the One Health strategic plan for 2022-2027, this integrated strategy is essential for ensuring that economic growth and environmental stewardship can coexist, benefiting both present and future generations.

6.3 Policy Implications and Recommendations

6.3.1 Linking Census Data to National Environmental and Climate Change Policies

Tanzania possesses a suite of robust national policy frameworks designed to guide environmental management and climate response. These include the National Environmental Policy (2021), the National Climate Change Response Strategy (NCCRS, 2021–2026), and the National Environmental Master Plan for Strategic Interventions (2022–2032). The 2022 PHC operationalises these policies by mapping the precise locations, scale, and characteristics of the populations most affected by environmental and climate-related challenges.

6.3.2 Energy and Nationally Determined Contributions (NDCs)

Under the Paris Agreement, Tanzania has committed to a set of Nationally Determined Contributions (NDCs) that outline its goals for reducing greenhouse gas emissions and adapting to the impacts of climate change. The 2022 PHC provides a crucial reality check on the scale and nature of the challenges that must be overcome to meet these commitments. The single most consequential statistic from the census for Tanzania's NDC is the finding that an overwhelming 82% of households still rely on biomass fuels (firewood and charcoal) for cooking. This figure directly quantifies the immense and sustained pressure on Tanzania's forests, which are a critical carbon sink, and reveals the deep-rooted nature of energy poverty across the nation. This widespread dependency on biomass directly undermines the NDC-II goals, which aim to mitigate greenhouse gas emissions from the land-use sector and promote a transition to sustainable energy sources. This reality dictates that Tanzania's NDC strategy must be fundamentally reframed as a development strategy centred on achieving a just energy transition, shifting the policy focus from prohibition to substitution through targeted subsidies for cleaner fuels and scaled-up investment in renewable energy.

6.3.3 Water and Sanitation

The census data reveals a significant degree of "implementation inertia," where foundational vulnerabilities identified in earlier policy documents persist on a massive scale. The National Adaptation Programme of Action (NAPA), formulated in 2007, correctly identified water resources as a priority sector highly vulnerable to climate change. The 2022 PHC validates this initial assessment with alarming clarity, showing that nearly two decades later, a mere 16.3% of rural households have access to piped water. This long-term persistence of a critical vulnerability suggests that the primary barrier to progress is not a lack of policy direction, but rather a deficit in targeted resource allocation and sub-national implementation capacity. The principal value of the 2022 PHC lies in providing the granular, sub-national

data necessary to break this cycle of inertia through evidence-based budgeting and localised planning.

6.3.4 Housing and Settlements

The NCCRS's emphasis on resilient housing is given concrete urgency by the 2022 PHC data that reveals significant regional disparities in the use of vulnerable building materials. The prevalence of grass or leaves for roofing and earth or sand for flooring in certain regions exposes these communities to heightened risks from extreme weather events, fire, and waterborne diseases. This data enables the creation of a national housing vulnerability index, allowing for the strategic targeting of resources towards upgrading housing stock in the most at-risk areas.

6.3.5 Waste Management

The census data provides a stark, quantitative picture of the implementation gaps in key policy areas. For example, the National Environmental Policy's objective of pollution control is directly confronted by the census finding that approximately 40% of households nationwide burn their solid waste. This statistic transforms a general policy goal into a quantifiable public health and emissions crisis that can be mapped at the district and even ward level, identifying hotspots where interventions are most urgently needed.

6.3.5 Sustainable utilization of Biomass Energy

Tanzania's current biomass policy, which fails to differentiate between sustainable woodlots and unsustainably harvested forests, accelerates deforestation and undermines the country's climate goals. This approach treats a key environmental degradation driver as a neutral energy source, leading to carbon debt and ecosystem loss. Tanzania should adopt a sustainable charcoal strategy requiring all commercial biomass to come from certified woodlots or managed village forests. This would formalize the supply chain, reduce pressure on natural forests, and align biomass use with climate and conservation objectives.

6.4 Linking Census Data with the SDGs Implementation

The 2022 PHC is a vital tool for tracking Tanzania's progress towards the 2030 Agenda for Sustainable Development. Its full analytical potential is realised when the SDGs are viewed not as separate entities but as an interconnected system, with climate change playing a central role. The census data provides empirical evidence that demonstrates how advancements, or deficiencies, in one goal area can directly affect outcomes in others, especially through the lens of climate vulnerability and action. The connections between specific SDGs and census data are both clear and impactful.

- a) **SDG 6 (Clean Water and Sanitation) and SDG 13 (Climate Action):** The census finding that 34% of rural households use unimproved pit latrines is a critical metric for SDG 6. However, it is simultaneously a potent indicator of climate vulnerability. These sanitation systems are highly susceptible to failure during flood events, which are projected to increase in frequency and intensity, leading to the contamination of water sources and the outbreak of waterborne diseases. Thus, investing in climate-resilient sanitation is a direct contribution to both SDG 6 and SDG 13.
- b) **SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action):** The data on household energy sources, particularly the 82% reliance on biomass, is the primary metric for tracking access to clean cooking fuels under SDG 7. At the same time, this figure serves as a direct proxy for greenhouse gas emissions (including black carbon, a potent short-lived climate pollutant) from the residential sector, making it a core indicator for SDG 13.
- c) **SDG 11 (Sustainable Cities and Communities) and SDG 13 (Climate Action):** Census data on housing materials, settlement patterns, and waste management practices (such as the 40% of households that burn waste) help to quantify the proportion of the urban population living in conditions that are vulnerable to climate impacts like floods and heat stress. These practices also contribute directly to urban air pollution and GHG emissions, forging an inextricable link between the sustainability of cities (SDG 11) and climate action (SDG 13).

The strategic integration of these data can break down the institutional silos that often hinder effective policymaking. The proposal to create a national SDG monitoring platform that merges census data with other relevant datasets is a critical step in this direction. Such a platform would create the technical foundation for a "nexus approach" to governance. It would allow different government ministries to see, in quantitative and geographic terms, how their sectoral policies generate co-benefits or trade-offs for other sectors.

6.5 Opportunities for Mainstreaming Environment and Climate Change in Development Planning

The insights from the 2022 PHC are not just theoretical; they are highly practical. Their real worth lies in how they are implemented, by being incorporated into the main processes of development planning at every level of governance. From long-term national visions to the annual budgets of local authorities and strategic plans of key economic sectors, the census data provides the empirical foundation to ensure that all development in Tanzania is resilient to climate change.

6.5.1 National Development Planning

Tanzania's long-term development blueprint, *Dira* 2050, outlines a bold plan to transform the nation into an upper-middle-income country by mid-century. The diverse effects of climate change fundamentally challenge this ambitious aim. The 2022 PHC provides essential demographic and socio-economic data necessary for climate-proofing this long-term vision. To be effective, the macroeconomic and sectoral models supporting the vision must be integrated with the realities revealed by the census. Data on population growth projections, urbanisation rates, and the spatial distribution of the population, especially the density in climate-vulnerable areas such as low-lying coastal zones or arid inland regions, must be key inputs. This integration enables planners to go beyond basic economic forecasts and start modelling future demand for critical infrastructure (water, energy, transport), food, and social services under various plausible climate scenarios. Such an approach allows for a national-level "climate stress test" of the *Dira* 2050 goals, facilitating a proactive, strategic reallocation of public and private investments towards resilience-building measures.

6.5.2 Local Government Planning

Apparently, the most profound and immediate opportunity offered by the 2022 PHC is the empowerment of local government to lead climate action. The availability of disaggregated census data down to the ward and enumeration area level enables a paradigm shift towards a bottom-up, context-specific approach that is developed, owned, and implemented by LGAs. This granular data allows local authorities to diagnose their specific vulnerability profiles with unprecedented precision and to design tailored interventions accordingly. This localised approach is explicitly supported by national frameworks designed to empower local planning, such as the Opportunities and Obstacles to Development (O&OD) framework and the Scaling Up Locally Led Climate Action in Tanzania (SCALE) Programme, which can now be supercharged with data. Providing LGAs with both the data and the mandate to act creates a robust new political economy for climate resilience, fostering local accountability and a "race to the top" in local service delivery and climate adaptation.

6.5.3 Sectoral Integration

To effectively integrate climate considerations into mainstream practices, they need to be communicated in the language, metrics, and operational logic of essential economic and social sectors. The 2022 PHC data serves as a universal translator, offering a shared

evidence base that helps incorporate climate resilience into the fundamental planning and budgeting processes of various sectoral ministries.

- a) **Energy Sector:** The national goals for energy transition can be operationalised with surgical precision. Census data showing that only 9.2% of households use gas for cooking highlights the immense market for cleaner alternatives. By overlaying this data with maps of solar irradiance or data on agricultural residues, planners can pinpoint hotspots for investment in solar home systems or biogas digesters, creating circular economy solutions that address energy poverty, waste management, and sanitation simultaneously.
- b) **Urban Planning and Housing:** With rapid urbanisation, ensuring the resilience of Tanzania's cities is a paramount concern. Census data on the location of informal settlements, population density, and the prevalence of substandard building materials provides a clear roadmap for investment. Municipal authorities can use this information to prioritise the allocation of funds for critical infrastructure upgrades, such as stormwater drainage systems, and to inform the urgent reform of national building codes.
- c) **Public Health:** The census provides the essential denominator for calculating the prevalence rates of climate-sensitive diseases. The links between poor sanitation and waterborne diseases, and between indoor air pollution from cooking with biomass and respiratory illnesses, are well-established. By establishing formal data-sharing protocols that allow for the anonymised linking of census data with health management information systems, a robust public health surveillance system can be created to map and predict potential outbreaks.

6.5.4 Climate Finance Readiness

In the increasingly competitive landscape of international climate finance, a compelling, data-driven "climate rationale" is the cornerstone of any successful funding proposal. The 2022 PHC is arguably Tanzania's single most powerful asset in constructing these evidence-based investment cases for submission to multilateral bodies such as the Green Climate Fund (GCF), the Adaptation Fund, and the new Loss and Damage Fund. The specificity enabled by the census data transforms a generic request into a verifiable, high-impact investment proposal, providing funders with a high degree of confidence in the project's targeting, its potential for impact, and the rigorous, evidence-based approach of the proposing entity.

6.6 Data Gaps and Research Needs

While the 2022 PHC provides an unprecedented foundation for evidence-based climate action, it also illuminates the boundaries of our current knowledge. Its primary strength lies in establishing a comprehensive baseline of population characteristics and socio-economic vulnerabilities. However, for a complete and dynamic understanding of climate risk, which is a function of hazard, exposure, and vulnerability, the census data must be complemented and enhanced. The 2022 PHC was not designed as a specialised environment and climate change survey. As a result, several critical domains of information essential for nuanced environmental and climate analysis were not captured.

The most significant gaps include:

- i. **Hazard exposure:** The census provides detailed information on *who* lives *where*, but it does not contain direct data on the specific climate hazards those households or communities are exposed to, such as the frequency or intensity of floods, droughts, landslides, or coastal erosion.
- ii. **Loss and Damage:** The census does not measure the direct impacts of extreme weather events. There is no systematic data collection on the number of lives lost, houses destroyed, hectares of crops lost, or livelihoods disrupted due to specific climate-related disasters.
- iii. **Adaptation practices:** While the census describes conditions of vulnerability, it provides minimal data on the proactive adaptation measures that households and communities are already taking, such as tree planting, rainwater harvesting, or the adoption of improved cookstoves.
- iv. **Gender-Environment-Climate Change Nexus:** The census identifies female-headed households, but it does not capture the deeper, gendered dimensions of climate vulnerability, such as the time burden on women and girls for collecting increasingly scarce water and firewood.
- v. **Community infrastructure:** The census focuses on household characteristics but does not include data on the availability, condition, or capacity of the community-level infrastructure that is essential for climate resilience, like flood defences, irrigation schemes, or early warning systems.

- vi. **Health-Environment-Climate Change Nexus:** The census does not collect direct health data, making it impossible to directly link environmental conditions (e.g., cooking smoke, poor sanitation) to health outcomes within the census dataset itself.

Addressing these data gaps requires a multi-pronged, long-term strategy that looks beyond the decadal census. The following framework (Table 6.1) outlines a strategic approach, linking each identified data gap to its policy implication and providing concrete, actionable recommendations.

Table 6.24: Strategic Framework for Data Enhancement

Data Gap / Sector Focus	Policy Implication of the Gap (The "So What?" Problem)	Strategic Recommendation & Research Need
Hazard Exposure (Floods, Droughts, etc.)	Ineffective Adaptation: Without knowing <i>who</i> is exposed to <i>what</i> specific hazard, adaptation investments are based on guesswork. Resources may be spent on flood defences in areas more prone to drought, leading to maladaptation and wasted funds. Policies remain reactive rather than proactive.	Short-Term Strategy: Overlay existing 2022 census data (at enumeration area level) with geospatial hazard maps (from satellite imagery and meteorological data) to create a national, first-generation climate risk atlas. Long-Term Strategy (2032 PHC): Integrate a dedicated module with questions like: "In the last 5 years, has your household been affected by a major flood/drought?" and "What was the primary impact?".
Loss and Damage (L&D) (Lives, Property, Livelihoods)	Weakened International Position: Tanzania cannot effectively quantify the economic and non-economic costs of climate impacts. This undermines its ability to make evidence-based claims to the international Loss and Damage Fund and hampers domestic disaster recovery planning and budgeting.	Short-Term Strategy: Establish a national protocol for Post-Disaster Needs Assessments (PDNAs) that is standardized and links directly to census baseline data to measure impact against a known demographic and asset base. Research Need: Commission retrospective L&D studies in known climate hotspots to build a historical database of climate-related damages.
Adaptation Practices (Adoption of new techniques)	Inefficient Policy Learning: The government is "flying blind" on which adaptation strategies actually work. It cannot assess the adoption rates or effectiveness of interventions like rainwater harvesting or improved cookstoves, preventing the scaling of successful practices and the phasing out of ineffective ones.	Short-Term Strategy: Integrate standardized adaptation modules into regular surveys like the Household Budget Survey (HBS) and Demographic and Health Survey (DHS) to track adoption of key practices. Research Need: Conduct impact evaluations of major adaptation projects to understand the drivers and barriers to adoption.
Gender-Climate Nexus (Time use, decision-making)	Gender-Blind Policies: Policies fail to address the disproportionate burden climate change places on women (e.g., increased time collecting scarce water/firewood). This not only leads to inequitable outcomes but also misses the opportunity to leverage women's crucial role as agents of adaptation in their communities.	Short-Term Strategy: Conduct targeted, gender-sensitive Climate Vulnerability and Capacity Assessments (G-CVCAs) in priority regions. Long-Term Strategy (2032 PHC & HBS): Incorporate questions on time use for resource collection and intra-household decision-making on agriculture and natural resource use.

Data Gap / Sector Focus	Policy Implication of the Gap (The "So What?" Problem)	Strategic Recommendation & Research Need
Community Infrastructure (Flood defences, irrigation)	Systemic Risk Miscalculation: Planners lack a national inventory of the condition and capacity of critical resilience infrastructure. This makes it impossible to systematically identify infrastructure deficits or assess the cascading failure risks where, for example, the failure of a single flood levee could impact multiple communities.	Short-Term Strategy: Mandate LGAs to conduct and maintain an inventory of critical community infrastructure within their jurisdictions, linked geospatially to census enumeration areas. Research Need: Develop a national infrastructure vulnerability assessment, modelling the potential impacts of various climate hazards on this inventoried infrastructure.
Health-Climate Nexus (Climate-sensitive diseases)	Fragmented Public Health Response: The health system cannot proactively plan for climate-related health impacts. The inability to directly link environmental drivers (e.g., heat stress, poor sanitation) to health outcomes at a granular level prevents the development of targeted public health advisories, early warning systems, and integrated health-environment interventions.	Short-Term Strategy: Establish formal data-sharing agreements between the National Bureau of Statistics and the Ministry of Health to enable the linking of anonymized census data with health information system records at a local level. Research Need: Commission epidemiological studies to quantify the burden of disease attributable to specific environmental factors revealed in the census (e.g., indoor air pollution from cooking fuels).

6.7 Future Directions

The vision for 2032 PHC and beyond is the creation of a dynamic national data ecosystem for environment and climate resilience. This future ecosystem would integrate real-time data from satellites, big data from mobile networks, high-frequency survey data, and citizen-generated data to enable a proactive and adaptive state of continuous monitoring, prediction, and pre-emptive action. This will not only safeguard the development gains made on the path to 2050 but will also position Tanzania as a leader in evidence-based, environment and climate-resilient development. The census provides the baseline; the next step is embedding its insights into national, local, and sectoral planning systems to ensure development remains sustainable, climate-resilient and inclusive.

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Appendices

Appendix 1: Contributors to the Environment and Climate Change in Tanzania

Appendix 2: 2022 Census Questionnaire

QUESTIONNAIRE FOR THE 2022 POPULATION AND HOUSING CENSUS									
This census is conducted in accordance with Section 6(2)(a) of the Statistics Act Cap. 351 All responses collected in this census are protected under this Act									
SECTION A: IDENTIFICATION									
Region	District	Council	Constituency	Division/Wadi	Ward/Shehia	Village/Mtaa	Hamlet/Enumeration Area (EA)	Household Number	CONFIDENTIAL
A01 Please State the number all persons who Spent here at the Census Night									
SECTION B: DEMOGRAPHICS INFORMATION									
B01 No.	B02 HOUSEHOLD MEMBERS Please state the names of all persons who spent the census night, that is Monday night before Tuesday 23rd August, 2022 in your household, starting with the name of the head of household. DO NOT FORGET TO INCLUDE ALL INFANTS, HOUSEHOLD MEMBERS WHO SLEPT IN A NEARBY FUNERAL AND THOSE WORKING NIGHT SHIFTS SUCH AS NURSES, DOCTORS, POLICE, GUARDS, ETC. WRITE DOWN FULL NAME OF EACH HOUSEHOLD MEMBER	B03 RELATIONSHIP TO THE HEAD What is the relationship of [NAME] to the head of the household?	B04 SEX Is [NAME] a male or a female?	B05 AGE How old is [NAME]? WRITE AGE IN COMPLETE YEARS. IF UNDER ONE YEAR WRITE "00" FOR 97 YEARS AND ABOVE WRITE "97"	B06 MARITAL STATUS (APPLICABLE TO AGE 10+) What is current marital status of [NAME]? never married, married, living together, divorced, separated, widowed?	B07 MOBILE PHONE (AGE 15+) Please give the mobile number of [NAME]? WRITE THE MOBILE NUMBER OF ALL HOUSEHOLD MEMBERS AGED 15+.			
		1 Head 2 Spouse 3 Son/Daughter 4 Biological Parent 5 Grand Child 6 Other Relative 7 Not Related	1 Male 2 Female		1 Never Married 2 Married 3 Living Together 4 Divorced 5 Separated 6 Widowed 7 Not Stated				
0 1									
0 2									
0 3									
0 4									
0 5									
0 6									
0 7									
0 8									

SECTION A: IDENTIFICATION									
Region	District	Council	Constituency	Division/Wadi	Ward/Shehia	Village/Mtaa	Hamlet/Enumeration Area (EA)	Household Number	CONFIDENTIAL
SECTION C: INFORMATION ON DISABILITIES/DIFFICULTIES									
B01 No.	C01 ALBINISM Is [NAME] an albino?	C02 SEEING Does (NAME) have difficulty seeing, even if wearing glasses?	C03 HEARING Does (NAME) have difficulty hearing, even if using a hearing aid?	C04 WALKING Does [NAME] have difficulty walking or climbing steps?	C05 REMEMBERING Does (NAME) have difficulty remembering or concentrating?	C06 SELF CARE Does (NAME) have difficulty with self-care, such as washing all over or dressing?			
	1 Yes 2 No	1 No Difficulty 2 Some Difficulty 3 A Lot of Difficulty 4 Unable to See 5 Not Applicable	1 No Difficulty 2 Some Difficulty 3 A Lot of Difficulty 4 Unable to Hear 5 Not Applicable	1 No Difficulty 2 Some Difficulty 3 A Lot of Difficulty 4 Unable to Walk 5 Not Applicable	1 No Difficulty 2 Some Difficulty 3 A Lot of Difficulty 4 Unable to Remember 5 Not Applicable	1 No Difficulty 2 Some Difficulty 3 A Lot of Difficulty 4 Unable to Care 5 Not Applicable			
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SECTION A: IDENTIFICATION									
Region	District	Council	Constituency	Division/Wadi	Ward/Shehia	Village/Mtaa	Hamlet/Enumeration Area (EA)	Household Number	CONFIDENTIAL

SECTION C: INFORMATION ON DISABILITIES/DIFFICULTIES																																																												
B01 No.	C07 COMMUNICATION	C08 OTHER DISABILITIES	C09 CAUSE OF DISABILITY	C10 ASSISTIVE DEVICES AND MATERIALS																																																								
	USING THE COMMON LANGUAGE: Does [NAME] have difficulty communicating; for example understanding or being understood?	Does, [NAME] have other type of disabilities/difficulties among the following? READ ALL TYPES OF DISABILITIES/ DIFFICULTIES TO RESPONDENT Yes = 1 No = 2 Don't know = 9	ASK FOR EVERY TYPE OF DISABILITY FROM C02 TO C07 IF CODE 3 OR 4 OR CODE 1 IN QUESTION C08 What is the cause of disability for [NAME]? MULTIPLE RESPONSE IS ALLOWED	ASK IF QC01 = 1 OR ANY QUESTION FROM QC02 TO QC07 = 3 OR 4 OR QC08 IS CODE 1 FOR B,C,D Does [NAME] has disability assistive devices or materials? Yes = 1 No = 2																																																								
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Region	District	Council	Constituency	Division/Wadi	Ward/Shehia	Village/Mtaa	Hamlet/Enumeration Area (EA)	Household Number	CONFIDENTIAL

SECTION D: MIGRATION INFORMATION					
B01 No.	D01 CITIZENSHIP	D02 DUAL CITIZENSHIP	D03 PLACE OF RESIDENCE	D04 WHERE RESPONDENT SPENDS MOST OF THE DAY TIME	D05 PLACE OF BIRTH
	What is (NAME) country of citizenship? IF TANZANIAN, WRITE CODE 001 IF NON-TANZANIAN WRITE APPROPRIATE CODE, FOR DUAL CITIZENSHIP WRITE "888" ► IF THE ANSWER IS CODE OF RESPECTIVE COUNTRY GO TO D03	What is (NAME) countries of citizenship? WRITE CODES FOR THE COUNTRIES MULTIPLE RESPONSE IS ALLOWED FIRST COUNTRY SECOND COUNTRY	Which region/country does [NAME] usually live? WRITE CODE FOR THE COUNTRY, REGION AND DISTRICT IF LIVING IN TANZANIA, OR COUNTRY CODE IF LIVING OUTSIDE TANZANIA THEN GO TO THE NEXT QUESTION	Where do you spend most of your time during the day? WRITE COUNTRY, REGION AND DISTRICT CODES IF SPENDS MOST OF THE DAY TIME IN TANZANIA OR COUNTRY CODE IF OUTSIDE TANZANIA THEN GO TO THE NEXT QUESTION CODES FOR THE 8th BOX Rural =1 Regional /District Headquarters =2 Other Urban= 3	In which region/country was [NAME] born? WRITE CODE FOR COUNTRY, REGION AND DISTRICT IF BORN IN TANZANIA OR COUNTRY CODE IF BORN OUTSIDE TANZANIA. IF COUNTRY OF BIRTH IS UNKNOWN WRITE "9999999" ► IF THE RESPONDENT WAS BORN IN THE REGION WHERE THE INTERVIEW IS TAKING PLACE GO TO D10
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SECTION A: IDENTIFICATION																																								
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B01	D00	D07	D08	D09	D10	D11																																		
No.	TIME OF ARRIVE When did [NAME] arrive to live in this region/country? WRITE MONTH AND YEAR OF ARRIVAL OF A CURRENT PLACE MM YYYY	LIVING PERIOD How long has [NAME] been living in this region/Country? WRITE COMPLETE YEARS. IF LESS THAN ONE YEAR WRITE "00"	PREVIOUS RESIDENCE Where was [NAME] living before coming here? IF IN TANZANIA WRITE CODE 01 FOR RURAL, 02 FOR URBAN AREA AND COUNTRY CODE FOR OUTSIDE TANZANIA AND IF COUNTRY IS UNKNOWN WRITE CODE 999	MAIN REASON FOR MIGRATION What was [NAME's] main reason for moving to this region/to Tanzania? <table border="1" style="width:100%; font-size: 8px;"> <tr><td>01</td><td>To take up a paid job</td></tr> <tr><td>02</td><td>To look for work/green pastures/cilents</td></tr> <tr><td>03</td><td>Study/training</td></tr> <tr><td>04</td><td>Marriage</td></tr> <tr><td>05</td><td>Family moved/joining family</td></tr> <tr><td>06</td><td>Medical treatment/health care</td></tr> <tr><td>07</td><td>Conflict/Insecurity/natural disaster</td></tr> <tr><td>08</td><td>Looking for suitable land for agriculture</td></tr> <tr><td>09</td><td>Looking for suitable site for fishery activities</td></tr> <tr><td>10</td><td>Looking for suitable grazing land</td></tr> <tr><td>11</td><td>Cost of living</td></tr> <tr><td>12</td><td>Moving into a new household</td></tr> <tr><td>13</td><td>Violence/family</td></tr> <tr><td>14</td><td>Conflict of Marriage/family</td></tr> <tr><td>15</td><td>Death of parent (s)</td></tr> <tr><td>16</td><td>To be cared</td></tr> <tr><td>17</td><td></td></tr> </table>	01	To take up a paid job	02	To look for work/green pastures/cilents	03	Study/training	04	Marriage	05	Family moved/joining family	06	Medical treatment/health care	07	Conflict/Insecurity/natural disaster	08	Looking for suitable land for agriculture	09	Looking for suitable site for fishery activities	10	Looking for suitable grazing land	11	Cost of living	12	Moving into a new household	13	Violence/family	14	Conflict of Marriage/family	15	Death of parent (s)	16	To be cared	17		PLACE OF RESIDENCE IN YEAR 2012 In which Region /Country was [NAME] living during 2012 census? WRITE CODE FOR THE COUNTRY, REGION AND DISTRICT IF LIVING IN TANZANIA, OR COUNTRY CODE IF LIVING OUTSIDE TANZANIA THEN GO TO THE NEXT QUESTION IF COUNTRY IS UNKNOWN WRITE CODE 999 ► TO BE ASKED FOR PERSONS AGED 11 YEARS OR ABOVE	PLACE OF RESIDENCE IN YEAR 2021 In which Region /Country was [NAME] living in 2021? WRITE CODE FOR THE COUNTRY, REGION AND DISTRICT IF LIVING IN TANZANIA, OR COUNTRY CODE IF LIVING OUTSIDE TANZANIA THEN GO TO THE NEXT QUESTION ► FOR CHILDREN AGED '00' DON'T ASK THIS QUESTION SKIP TO E01
01	To take up a paid job																																							
02	To look for work/green pastures/cilents																																							
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Ward/Shehia		Village/Mtaa		Hamlet/Enumeration Area (EA)		Household Number		CONFIDENTIAL																		
SECTION E: INFORMATION ON POSSESSION OF NATIONAL DOCUMENTS AND ORPHANHOOD																										
B01	E01	E02	E02F	E03																						
No.	BIRTH CERTIFICATE, PASSPORT, AND HEALTH INSURANCE Does [NAME] have the following Identification? Yes = 1 No = 2 Don't know = 9 QUESTION E01F SHOULD BE ASKED FOR A PERSON AGED 60 YEARS OR ABOVE	OTHER DOCUMENTS - FOR PERSON AGED 18+ Does [NAME] have the following National Documents? Yes = 1 No = 2 Don't know = 9 ► IF D01 NOT TANZANIAN DON'T ASK CODE C, E AND F E02A1: IF A or B IS CODE 1, ASK, Please, mention National ID number of [NAME] E02C1: IF CODE C IS 1, ASK, Please, mention Zanzibar ID number of [NAME]	ENTREPRENEUR ID - FOR PERSON AGED 5+ ► IF D01 NOT TANZANIAN DON'T ASK THIS QUESTION Does [NAME] have small entrepreneur ID? Yes = 1 No = 2 Don't know = 9 IF CODE 2 OR 9 SKIP TO E03 E02F1: IF CODE 1, ASK, Please, mention Entrepreneur ID number of [NAME] IF ID IS NOT FOUND OR DOES NOT REMEMBER THE ID NUMBER WRITE CODE "999999999"	SURVIVAL OF PARENTS (APPLICABLE TO PERSONS BELOW AGE 18) Is [NAME]'s Father alive? Is [NAME]'s Mother alive? Yes = 1 No = 2 Don't Know = 9																						
	<table border="1" style="width:100%; font-size: 8px;"> <tr><td>A</td><td>Birth Certificate</td></tr> <tr><td>B</td><td>Birth Notification</td></tr> <tr><td>C</td><td>Travel Passport</td></tr> <tr><td>D</td><td>National Health Insurance/Community Health Insurance</td></tr> <tr><td>E</td><td>Other Health Insurance</td></tr> <tr><td>F</td><td>Card for elderly treatment</td></tr> </table>	A	Birth Certificate	B	Birth Notification	C	Travel Passport	D	National Health Insurance/Community Health Insurance	E	Other Health Insurance	F	Card for elderly treatment	<table border="1" style="width:100%; font-size: 8px;"> <tr><td>A</td><td>National ID (NIDA)</td></tr> <tr><td>B</td><td>National ID Number (NIDA)</td></tr> <tr><td>C</td><td>Zanzibar ID</td></tr> <tr><td>D</td><td>Driving Licence</td></tr> <tr><td>E</td><td>Voter's ID</td></tr> </table>	A	National ID (NIDA)	B	National ID Number (NIDA)	C	Zanzibar ID	D	Driving Licence	E	Voter's ID	FILL ID NUMBER	FILL ID NUMBER
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SECTION F: EDUCATION INFORMATION - ALL PERSONS AGED 4 YEARS OR ABOVE																	
B01 No.	F01 READING AND WRITING	F01A NUMERACY	F02 SCHOOL ATTENDANCE	F03 REASON FOR SCHOOL DROPOUT - 4 TO 24 YEARS								F04 LEVEL OF EDUCATION					
	Can [NAME] read and write a short sentence in Kiswahili, English, Kiswahili and English or any other language? Kiswahili = 1 English = 2 Kiswahili and English = 3 Other Languages = 4 Illiterate = 5	Can [NAME] do a simple arithmetics addition, subtraction, division or multiplication? Yes = 1 No = 2	Is [NAME] currently attending, partially attended, completed or never attended school? Now attending =1 Partially attended =2 Completed =3 Never attended =4 ► IF CODE 1 OR 3 SKIP TO F04	What was the main reason for [NAME] school dropout/never attended?								► ASK IF F02 CODED 1, 2 OR 3 What level of education has [NAME] completed or is currently attending? WRITE THE APPROPRIATE CODE					
				Financial Constraints	School too far away	Ill/Sick	Disability	Pregnancy	Tuancy/Refusal	Indispline behaviour /Expulsion	To work/looking for work		Caring for the sick/children	Marriage	Difficulty/dangerous environment	Unfriendly infrastructure	Not started school
				01	02	03	04	05	06	07	08	09	10	11	12	13	
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CODES FOR F03

Education level	Code
Pre Primary	00
Std 1	01
Std 2	02
Std 3	03
Std 4	04
Std 5	05
Std 6	06
Std 7	07
Std 8	08

Secondary Education

Education level	Code
Pre form one	18
Form 1	09
Form 2	10
Form 3	11
Form 4	12
Form 5	13
Form 6	14

Education after Primary/Secondary School

Education level	Code
University and other related	15
Training after Primary Education	16
Training after secondary education	17
Unit (People with mental disabilities/mental health disabilities)	19

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SECTION G: INFORMATION ON ECONOMIC ACTIVITY - ALL PERSONS AGED 5 YEARS OR ABOVE									
B01 No.	G01 WORK DURING LAST WEEK			G02 TEMPORARY ABSENCE			G03 SEEKING WORK		G04 AVAILABLE TO WORK
	During the period of Last week, which of the following work/activity did [NAME] do for many hours? ENUMERATOR: READ CATEGORIES			Even though [NAME] did not work last week, did [NAME] have a paid job, or any kind of business, or farming or other activity to generate income that you were absent from and definitely you will return to? EXAMPLES OF TEMPORARY ABSENCE • WAGE JOBS: LEAVE, STOOD DOWN, ILLNESS, STUDY LEAVE BUT STILL ATTACHED TO A JOB • BUSINESS/AGRIC: TEMPORARY ABSENCES WHILE ACTIVITY CONTINUES DURING THAT ABSENCE; • UNPAID WORKERS AND CASUAL WORKERS SHOULD NOT BE INCLUDED UNDER TEMPORARY ABSENT. Yes.....1 No.....2			Did [YOU/NAME] taken any steps during the past four weeks to look for a paid job or start a business or an activity to generate income? Yes 1 No 2		At present are [YOU/NAME] available to take up a paid job, or do any kind of business, farming or any activity to generate income if such opportunity arises? Yes 1 No 2
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B01	G05	OCCUPATION	G06	OWNER OF THE ENTERPRISE					G07	MAIN ECONOMIC ACTIVITY	G08	MINING AND QUARRYING ACTIVITY	G09	EMPLOYMENT STATUS																															
No.	ENUMERATOR: THE FOLLOWING QUESTIONS ARE ABOUT [NAME'S] MAIN JOB OR BUSINESS. YOUR MAIN JOB IS THE ONE ON WHICH YOU USUALLY SPEND MOST OF YOUR WORKING TIME INCLUDING THOSE WHO WERE TEMPORARY ABSENT In main job, what kind of work does [NAME] usually do? WRITE OCCUPATION FULLY OR AT LEAST IN TWO WORDS		In your main work, who is the owner of the enterprise? <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Central Government</td> <td style="width: 10%;">Local Government</td> <td style="width: 10%;">Parastatal Organization</td> <td style="width: 10%;">NGO/religious organization, political party, Non-profit institution</td> <td style="width: 10%;">International organization or foreign embassy</td> <td style="width: 10%;">Private business (non-firm)</td> <td style="width: 10%;">Registered partnership or cooperative</td> <td style="width: 10%;">Own or family farm</td> <td style="width: 10%;">Household(s) domestic worker</td> <td style="width: 10%;">Household - Other economic activities</td> <td style="width: 10%;">Other Private</td> </tr> <tr> <td>01</td><td>02</td><td>03</td><td>04</td><td>05</td><td>06</td><td>07</td><td>08</td><td>09</td><td>10</td><td>11</td> </tr> </table>					Central Government	Local Government	Parastatal Organization	NGO/religious organization, political party, Non-profit institution	International organization or foreign embassy	Private business (non-firm)	Registered partnership or cooperative	Own or family farm	Household(s) domestic worker	Household - Other economic activities	Other Private	01	02	03	04	05	06	07	08	09	10	11	What is the main activity of the business or place where [NAME] work[s]? WRITE ACTIVITY FULLY OR AT LEAST IN TWO WORDS		During the period of 12 Months that is from August 2021 to the day before the census Night, Did [YOU/NAME] work on the following mining or quarrying activities? ▶ IF CODE "Z" SKIP TO QN. G10 READ RESPONSES		In [YOUR/NAME'S] job, do/does [YOU/NAME] work as...? <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Paid Employee</td> <td style="width: 10%;">Self Employed without employees</td> <td style="width: 10%;">Self employed with employees</td> <td style="width: 10%;">casual worker</td> <td style="width: 10%;">Workers not classifiable by status</td> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> </table>		Paid Employee	Self Employed without employees	Self employed with employees	casual worker	Workers not classifiable by status	1	2	3	4	5
Central Government	Local Government	Parastatal Organization	NGO/religious organization, political party, Non-profit institution	International organization or foreign embassy	Private business (non-firm)	Registered partnership or cooperative	Own or family farm	Household(s) domestic worker	Household - Other economic activities	Other Private																																			
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SECTION G: INFORMATION ON ECONOMIC ACTIVITY - ALL PERSONS AGED 5 YEARS OR ABOVE																																															
B01	G10	AGRICULTURAL ACTIVITIES	G11	TYPES OF CROPS					G11A	LEGAL RIGHT OVER THE OWNERSHIP	G12	TYPES OF LIVESTOCK		G13	TYPES OF FISHERY AND AQUACULTURE		G14	TYPES OF FOREST TREES																													
No.	Does [NAME] involved in agricultural activities during 2021/22 agricultural year? MULTIPLE RESPONSE IS ALLOWED ▶ IF CODE Z SKIP TO QN. G15		Fill Crop Type Codes (At most two) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Crop Farming</td> <td style="width: 10%;">Livestock Keeping</td> <td style="width: 10%;">Capture Fishery and Aquaculture</td> <td style="width: 10%;">Forestry/Tree Activity</td> <td style="width: 10%;">Not Applicable</td> </tr> <tr> <td>A</td><td>B</td><td>C</td><td>D</td><td>Z</td> </tr> </table>					Crop Farming	Livestock Keeping	Capture Fishery and Aquaculture	Forestry/Tree Activity	Not Applicable	A	B	C	D	Z	What legal right do you have over the ownership of the land used for crop production in the agricultural year 2021/22? <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Title deed</td> <td style="width: 10%;">Customary law</td> <td style="width: 10%;">Contract</td> <td style="width: 10%;">Rented</td> <td style="width: 10%;">Share cropped</td> <td style="width: 10%;">Land under other forms of tenure</td> <td style="width: 10%;">Donated own</td> <td style="width: 10%;">Don't know</td> </tr> <tr> <td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>Z</td> </tr> </table>		Title deed	Customary law	Contract	Rented	Share cropped	Land under other forms of tenure	Donated own	Don't know	A	B	C	D	E	F	G	Z	Fill Livestock Type Codes (At most two) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">1st LIVESTOCK</td> <td style="width: 10%;">2nd LIVESTOCK</td> </tr> </table>		1st LIVESTOCK	2nd LIVESTOCK	Fill Capture Fishery, Aquaculture Activity and Sea Weeds production Codes (At most two) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">1st ACTIVITY</td> <td style="width: 10%;">2nd ACTIVITY</td> </tr> </table>		1st ACTIVITY	2nd ACTIVITY	Fill Forestry/Tree Activity Type Codes (At most two) <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">1st ACTIVITY</td> <td style="width: 10%;">2nd ACTIVITY</td> </tr> </table>		1st ACTIVITY	2nd ACTIVITY
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Codes for COL. G11					
Maize	11	Field peas	37	Banana	71
Paddy	12	Flw	101	Avocado	72
Sorghum	13	Sunflower	41	Mango	73
Bulrush Millet	14	Sesame	42	Papaw	74
Finger Millet	15	Groundnut	43	Pineapple	75
Wheat	16	Palm Oil	44	Orange	76
Barley	17	Coconut	45	Grapes	78
Cassava	21	Soybeans	47	Mandarin	79
Sweet Potatoes	22	Caster seed	48	Guava	80
Irish potatoes	23	Cotton	50	Plums	81
Yams	24	Malay apple	38	Apples	82
Cocoyams	25	Bread fruit	67	Pears	83
Onions	26	Jack fruit	69	Peaches	84
Ginger	27	Passion Fruit	70	Durian	97
Garlic	28	Solanum Nigrum	903	Rambutan	99
Beans	31	collard greens	904	Custard Apple	200
Cowpeas	32	Grapefruit	77	God Fruit	201
Green gram	33	Pomeio	68	Plum	203
Pigeon pea	34	Bilmbi	98	Date	210
Lentils	35	Star fruit	39	Vanilla	212
Bambara nuts	36	Nutmeg	65	Strawberry	213

sourp	215	Seaweed	19
Rassberry	216	Cashew nut	46
flower	217	Tobacco	51
Lime	851	Pyrethrum	52
Lemon	852	Sisal	53
Cabbage	86	Coffee	54
Spinach	88	Tea	55
Carrot	89	Cocoa	56
Chilies	90	Rubber	57
Amaranths	91	Sugar cane	60
Pumpkins	92	Cardamom	61
Cucumber	93	Jute	62
Egg Plant	94	Cinnamon	64
Water Mellon	95	Clove	66
Cauliflower	96	Olive	110
Okra	100	Green Tomato	300
Coriander seed	102	Lemon grass	307
Tomatoes	871	Other	998
White eggplant	872	Pumpkin leaves	906
Green pepper	901	Black Pepper	18
brocol	905	Not applicable	999

Codes for COL. G12	
Cattle	1
Goat	2
Sheep	3
Pig	4
Horse	5
Donkey	6
Chicken	7
Duck	8
Turkey	9
Rabbit	10
Other livestock	98
Not Applicable	99

Codes for COL. G13	
Capture Fishery	1
Aquaculture (fish farming, crab, etc exclude sea weed)	2
Sea Weed Production	3
Not Applicable	9

Codes for COL. G14	
Bee Keeping	1
Production of Seedling	2
Tree Plantation	3
Forest Product	4
Gathering and Hunting	5
Other forestry activities	8
Not Applicable	9

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SECTION I: INFORMATION ON FERTILITY - FEMALES AGED 10 YEARS OR ABOVE

B01 No.	CHILDREN EVER BORN - CHILDREN SURVIVING				FERTILITY IN LAST 12 MONTHS FOR WOMEN AGED 10 TO 49 YEARS	
	I01 BIRTH	I02 BORN ALIVE IN HOUSEHOLD	I03 BORN ALIVE LIVING ELSEWHERE	I04 CHILDREN DIED	I05 CHILDREN BORN ALIVE	
	Have you ever given live birth? Yes = 1 No = 2 ► IF CODE "2" SKIP TO I04	How many male/female children were born alive to [NAME] and are now living with you/her in this household? IF SHE IS NOT LIVING WITH ANY OF HER CHILDREN WRITE "00" MALE FEMALE	How many male/female children were born alive to [NAME] and are now living elsewhere? IF SHE HAS NO CHILDREN LIVING ELSEWHERE WRITE "00" MALE FEMALE	How many male/female children were born alive to [NAME] and are now unfortunately dead? IF NONE OF HER CHILDREN HAS DIED WRITE "00" ► IF QN I01 = 2 AND I04 = 0 SKIP TO J01	How many of the male/female children who were born alive to [NAME] in the last 12 months? (22 AGOST, 2022 BACK TO 23 AGOST, 2021) IF THERE IS NO CHILD SURVIVING WRITE "0" ► IF THERE IS NO CHILD BORN ALIVE IN THE LAST 12 MONTHS WRITE "0" THEN GO SECTION J. DON'T ASK FEMALES AGED 50 YEARS OR ABOVE	
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0 4						
0 5						
0 6						
0 7						
0 8						

SECTION A: IDENTIFICATION							
Region	District	Council	Constituency	Division/Wadi	Ward/Shehia	Hamlet/Enumeration Area (EA)	Kitongoji/Eneo la Kuhesabia Watu (EA)

SECTION J: INFORMATION ON GENERAL AND MATERNAL DEATHS IN THE HOUSEHOLD

PLEASE RECORD INFORMATION ON DEATHS THAT OCCURRED IN THE HOUSEHOLD DURING THE LAST 12 MONTHS. DO NOT FORGET CHILDHOOD MORTALITY																								
J01 Was there any death which occurred in this household during the last 12 months? (i.e. 22 AUGUST 2022 - 23 AUGUST 2021) Yes = 1 No = 2 ☐ ► IF THE ANSWER IS NO, SKIP TO SECTION K				J02 How many number of death occurred in this household during the last 12 months RECORD THE NUMBER OF DEATHS																				
Death Serial Number	SEX AND AGE OF DECEASED; AND CAUSE OF DEATH			IF DEATH IS OF A WOMAN AGED 10 TO 49 YEARS																				
	J04 SEX OF DECEASED	J05 AGE OF DECEASED	J06 CAUSE OF DEATH	J07 DURING PREGNANCY	J08 DURING CHILDBIRTH	J09 DURING SIX WEEKS	J10 PLACE OF DEATH																	
	Was the deceased a male or a female? Male =1 Female =2	How old was the deceased at the time of death? WRITE AGE IN COMPLETE YEARS. IF UNDER ONE YEAR WRITE "00" IF 97 YEARS OR ABOVE WRITE "97"	What was the main cause of death? <table border="1" style="width:100%; text-align: center; font-size: 8px;"> <tr> <td>Road Accident</td> <td>Other Accidents</td> <td>Suicide</td> <td>Domestic Violence/Homicide</td> <td>Sickness/Disease</td> <td>Maternal Death</td> <td>Killed</td> <td>Unspecified reasons</td> </tr> <tr> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> </table>	Road Accident	Other Accidents	Suicide	Domestic Violence/Homicide	Sickness/Disease	Maternal Death	Killed	Unspecified reasons	1	2	3	4	5	6	7	8	Did the death occur during pregnancy? Yes = 1 No = 2 ► IF CODE 1 SKIP TO QUESTION J10	Did the death occur during childbirth? Yes = 1 No = 2 ► IF CODE 1 SKIP TO QUESTION J10	Did the death occur during the 6 weeks period following the end of pregnancy, irrespective of the way the pregnancy ended? Yes = 1 No = 2	ASK IF QJ07 OR J08 OR J09 = 1 Did this death occurred at home or in health facility? Home = 1 Health facility = 2 On the way = 3	
Road Accident	Other Accidents	Suicide	Domestic Violence/Homicide	Sickness/Disease	Maternal Death	Killed	Unspecified reasons																	
1	2	3	4	5	6	7	8																	
0 1																								
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