County Government of Homa Bay

AMT. AKIBA MASHINANI TRUST

GLOBAL CENTER ON ADAPTATION

RINGITI ISLAND SETTLEMENT

REPORT - 2

Settlement Profiling - Homa Bay County

AUTHORS & ACKNOWLEDGEMENTS

Developed By:

Akiba Mashinani Trust (AMT)

This *Situational Analysis Report for Ringiti Island Informal Settlement* was prepared by Akiba Mashinani Trust (AMT) in collaboration with the County Government of Homa Bay through its Department of Lands, Housing, Physical Planning and Urban Development. The report provides a comprehensive baseline assessment of socio-economic, spatial, and environmental conditions on Ringiti Island to inform inclusive, climate-resilient, and sustainable settlement upgrading under the Local Physical and Land Use Development Plan (LPLUDP) framework.

The study integrates quantitative household surveys, spatial mapping, and participatory community profiling, and forms part of AMT's broader work on locally led adaptation and settlement resilience within informal settlements across the Lake Victoria basin.

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EXECUTIVE SUMMARY

This situational analysis presents the first comprehensive profile of Ringiti Island, an informal settlement in Lake Victoria, Homa Bay County, Kenya. Originally established as a fishing camp, Ringiti has rapidly grown into a dense settlement of about 640 households. Its emergence has created interlocking challenges: people are concentrated in cramped eastern shoreline zones with little open space, most households rent single-room "row houses" on plots they do not own, and infrastructure and services have not kept pace with growth. Migration rather than natural increase drives population growth, resulting in a predominantly working-age, male-headed population with few children. Women are central to fisheries and commerce but face barriers to land, finance and services. These dynamics leave households vulnerable to environmental shocks and economic fluctuations.

The study's objective was to establish a baseline of conditions across physical, social and economic dimensions so that county officials, community leaders and development partners can design targeted interventions. Using household surveys, spatial mapping and participatory workshops, the assessment examined the island's physical environment, population and migration trends, land tenure and land use, housing patterns, infrastructure and services, social facilities, and socio-economic conditions. Findings show that Ringiti's rocky topography and exposure to storms and fluctuating lake levels compound settlement vulnerability. Most of the island is public land administered by the national government, and access is governed through the Beach Management Unit rather than formal title. Residential land use dominates (about three-quarters of compounds), with row houses accounting for more than 96 per cent of dwellings. Tenure insecurity is high; less than one-sixth of households own their structures, and documentation is rare. Physical infrastructure is rudimentary: residents rely on lake water and rainwater harvesting, there is no sewer system, energy comes from small solar systems and charcoal, and transport depends on walking and waterbus services. Social infrastructure is similarly scarce—only two educational facilities (Ringiti Primary School and Rock Academy ECDE), one dispensary and a police post serve the population. Livelihoods hinge almost entirely on fishing and related trade, leaving households exposed to market volatility and climate risks.

Overall, the analysis highlights a settlement that is both resilient and precarious. Community networks, gendered economic roles and adaptive coping strategies enable residents to navigate daily challenges, yet overcrowding, insecure tenure, limited services, environmental degradation and gender disparities combine to make even small shocks cascade into crises. The report concludes that sustainable improvement will require coordinated, multi-sectoral interventions: enhancing tenure security through formalized land-allocation frameworks, investing in safe and durable housing, expanding water, sanitation, energy and transport services, improving education and health facilities, diversifying livelihoods beyond fishing, and integrating Ringiti into climate-resilient planning. By providing a shared evidence base, this situational analysis aims to guide inclusive and climate-responsive development strategies for one of Homa Bay County's most unique and vulnerable settlements.

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LIST OF ACRONYMS & ABBREVIATIONS

Abbreviation	Full Form	Abbreviation	Full Form
BMU	Beach Management Unit	NEMA	National Environment Management Authority
CBO	Community-Based Organization	NGO	Non-Governmental Organization
CIDP	County Integrated Development Plan	SDG	Sustainable Development Goal
ECDE	Early Childhood Development Education	SWOT	Strengths, Weaknesses, Opportunities, and Threats
GIS	Geographic Information System	UN-Habitat	United Nations Human Settlements Programme
Gok	Government of Kenya	WASH	Water, Sanitation and Hygiene
ICT	Information and Communication Technology	WHO	World Health Organization
ITCZ	Inter-Tropical Convergence Zone		

1 INTRODUCTION

1.1 Introduction

This Situational Analysis Report provides a **baseline understanding of conditions in Ringiti**, an informal settlement that has emerged as a key fishing hub within Lake Victoria. Ringiti's significance extends beyond its small size; it represents the realities of many lake-based informal settlements where livelihoods, housing, and services are shaped almost entirely by the dynamics of the fishing economy and the ecological systems of the lake. The settlement comprises approximately 640 households, forming the basis for the household survey and subsequent analysis presented in this report.

The report brings together **multiple strands of evidence**—a full-coverage household survey, spatial enumeration and mapping, and participatory profiling with community members and county officials. These approaches were further validated through **community-level workshops and stakeholder consultations**, ensuring that the findings reflect both technical accuracy and lived experience. In doing so, the analysis moves beyond a purely descriptive exercise to offer a **holistic account of the settlement's demographic, social, and economic organization, its infrastructure and service gaps, and its exposure to environmental and climate-related risks**.

The primary purpose of the report is to provide **a coherent evidence base** that can guide decision-making on upgrading and resilience-building in Ringiti. Informal settlements like Ringiti are often absent from official planning frameworks, leaving them under-served and highly vulnerable. This analysis fills that gap by establishing a situational baseline that makes the settlement visible to **county government departments, development partners, and civil society actors**. By consolidating both quantitative and qualitative data, the report equips these actors with a shared understanding of current conditions, laying the groundwork for coordinated and inclusive interventions.

Beyond its diagnostic role, the report positions Ringiti within the **broader development context of Homa Bay County**. Like many informal settlements in the region, Ringiti faces challenges of insecure tenure, overcrowded and temporary housing, limited access to water, sanitation, and energy, and growing vulnerability to climate variability. At the same time, the settlement demonstrates forms of resilience and adaptability through community networks, gendered economic roles, and locally embedded coping mechanisms. By capturing these dynamics, the report situates Ringiti within county, national, and even global conversations about **sustainable urbanization, informal settlement upgrading, and climate-responsive development**.

Ultimately, this introduction underscores the report's dual role: to document and diagnose the conditions in Ringiti with accuracy and depth, and to provide a shared evidence base that makes visible the realities of life in the settlement, enabling a clearer understanding of its social, economic, and environmental context. Through this lens, the report serves not only as a record of current realities but also as a reference point for researchers, county officials, and stakeholders, ensuring that the characteristics and challenges of Ringiti are fully captured and appreciated in their complexity.

1.2 Historical Background

Unlike mainland settlements that trace their origins through generations of continuous occupation and kinship-based landholding, Ringiti is a recent and highly mobile community. Its identity is defined less by deep-rooted ancestry and more by the flows of migration, labor, and opportunity connected to the fishing economy of Lake Victoria.

The island's history is inextricably tied to **waves of in-migration over the past three decades**. Residents overwhelmingly describe themselves as newcomers, with very few identifying as native-born. This pattern reflects the way Ringiti has grown: not through gradual, family-based expansion, but through the steady arrival of fishers, traders, and small-scale entrepreneurs responding to the ebb and flow of the lake's resources.

Migration into Ringiti accelerated significantly in the early 2000s and has continued at an even faster pace in recent years. What was once a sparsely occupied island becoming, within a short period, a dense and bustling settlement, its population drawn from both the immediate lakeshore communities of Homa Bay and from neighboring counties such as Kisumu, Siaya, and

Migori. The settlement also carries a modest cross-border dimension, with a smaller number of households tracing their origins to Uganda and Tanzania. This diversity of origins gives Ringiti a distinctly **cosmopolitan character**, shaped by multiple cultures and economic networks within the Lake Victoria basin.

Over time, the island has informally organized itself into several identifiable zones or neighborhood clusters, each with its own local identity and landmarks. These include **Centre**, **Wuothogik**, **Soweto**, **Kanyada**, **Kasarani**, **Kisumu Ndogo**, and **Koyuwai**. While the boundaries between these zones are fluid, they reflect the organic growth of the settlement—often influenced by access to landing beaches, trading spaces, or social networks among early settlers. Together, these neighborhoods form the social and spatial framework through which daily life on Ringiti is structured.

The motivations for settlement are overwhelmingly economic. Fishing stands at the heart of the island's appeal, not only for those directly involved in catching fish but also for those engaged in processing, vending, boat repair, food services, and small-scale trade. The absence of ancestral landholdings reinforces this dynamic: without generational ties to land, access to space is negotiated through local leadership structures such as the Beach Management Unit (BMU). The BMU is a formal co-management institution created under national fisheries regulations to organise fishing activities and manage beach resources; in Ringiti it also functions as a de facto local authority by allocating plots for temporary housing and mediating disputes among residents.

As a result, the historical trajectory of Ringiti differs sharply from that of more established mainland settlements. It has been shaped not by long-term family continuity but by **short-term cycles of opportunity and mobility**. Its growth mirrors the rhythms of the lake itself — expanding during productive fishing seasons, contracting when catches decline — and its identity has been continually redefined by the movement of people seeking livelihoods along Lake Victoria.

1.3 Problem Statement

Ringiti's emergence as a fishing settlement has created a unique set of interlocking challenges that shape everyday life and strain the island's capacity to sustain itself. While large parts of the settlement are relatively underdeveloped, **population and housing are intensely concentrated in specific zones**, particularly along the eastern shoreline. Here, houses are clustered in cramped conditions with little open space, producing pockets of extreme congestion that contrast with more sparsely built areas in the west. This uneven settlement pattern creates pressures on land use, infrastructure, and social life that are highly localized yet deeply felt.

The transitory character of the community compounds these pressures. Tenancy is the dominant housing arrangement, and few residents hold any form of secure or permanent claim to land. With government ownership of the island and local allocation systems managed informally through the BMU, residents occupy their spaces without formal protection. This produces a sense of impermanence and vulnerability, even where eviction threats are not immediately present.

Infrastructure and services have not kept pace with the rapid growth of these densely inhabited zones. **Water, sanitation, and waste systems** are inadequate, while healthcare and education facilities are modest and overstretched. Seasonal migration further destabilizes service demand: during peak fishing periods, sudden inflows of newcomers amplify the congestion and strain resources, while off-season departures reduce demand in unpredictable ways.

The demographic profile adds further complexity. Households are typically small and nuclear, often composed of single adults or couples without children. Few extended family structures exist on the island itself, limiting the support networks that are common in mainland communities. The overwhelming concentration of working-age adults reflects Ringiti's role as a labor hub, but it also signals structural risk: without diversification, employment remains precariously tied to fishing.

Gendered inequalities cut across these realities. Women are central to the fisheries value chain, especially in processing and trade, yet they face barriers to land access, finance, and services. Female-headed households, while numerous, remain among the most vulnerable, navigating economic marginalization alongside broader structural insecurity.

Taken together, these conditions underscore the **precariousness of life in Ringiti's congested core areas**. Overcrowding, insecure tenure, inadequate services, youth underemployment, and gender disparities intersect with environmental exposure to create a settlement where even small shocks — whether health, income, or climatic — can escalate quickly into crises for households with few buffers and limited institutional support.

1.4 Scope

1.4.1 Contextual Scope

The contextual scope of this situational analysis is **deliberately multi-sectoral**, reflecting the reality that settlement life in Ringiti cannot be understood through a single dimension. Instead, the report adopts an integrated perspective that brings together physical,

social, economic, and environmental aspects of the island.

Physical environment: The report considers the natural setting of Ringiti, including its rocky topography, hydrological and drainage patterns, geological and soil characteristics, and prevailing climatic conditions. These environmental features form the backdrop against which settlement growth, housing patterns, and vulnerability to hazards must be understood.

Demographic and spatial profile: Attention is given to the size and structure of households, the balance of age and gender groups, and the distinct migration dynamics that have shaped Ringiti's identity as a predominantly migrant settlement. The spatial distribution of residents — concentrated in certain pockets of the island while other areas remain relatively open — is also central to understanding density, congestion, and service pressures.

Land tenure and land use: The study examines how land is accessed, allocated, and occupied in the absence of formal title deeds. The reliance on informal systems mediated by local leadership bodies such as the BMU is a defining feature of the settlement's organization and shapes perceptions of security and vulnerability.

Housing and infrastructure: The analysis documents the types of housing found on the island, the ways in which they are occupied, and the degree of access residents have to essential services. These include water supply, sanitation facilities, sources of energy, systems for waste disposal, and means of transport to and from the island.

Socio-economic conditions and livelihoods: Particular focus is placed on the centrality of fishing to the island economy and the range of related activities, from processing and vending to transport and trade. The study also considers household income sources, expenditure patterns, and the vulnerabilities associated with dependence on a narrow set of livelihoods.

Environmental pressures and climate risks: Finally, the report assesses the environmental stresses that affect settlement life, including storms, fluctuating lake levels, flooding, and waste accumulation. It also considers how households and community structures respond to these hazards, highlighting both vulnerabilities and coping mechanisms.

By interweaving these thematic areas, the report establishes a comprehensive baseline overview of Ringiti. This scope ensures that the settlement is understood not only in terms of its immediate living conditions but also within the broader dynamics of environment, economy, and society that sustain and challenge it.

1.4.2 Geographical Scope

The geographical scope of this situational analysis is confined to Ringiti Island, a small rocky outcrop within Lake Victoria, situated in Mfangano Ward of Suba North Constituency, Homa Bay County, Kenya.

Ringiti lies close to the Kenya–Uganda border, giving it a strategic but also sensitive location within the international waters of Lake Victoria. The island sits immediately adjacent to Mfangano Island, one of the largest and most prominent islands in the lake, while also forming part of a cluster of smaller fishing islands that includes Remba and Rusinga.

The island itself covers an area of about 0.2364 square kilometers, making it compact in size but heavily utilized for settlement and fishing-related activities. Its physical boundaries are clearly marked by the waters of Lake Victoria, with all access dependent on boat transport.

Photo 1.1: Aerial view of Ringiti Island showing its settlement pattern within Lake Victoria (Source: GCA field visit 2025)

Settlement is unevenly distributed within the island. The eastern shoreline, where the main landing beach and market facilities are located, is highly congested with housing, trade, and fish processing structures, while the rocky western side and interior remain more sparsely developed.

1.5 Objectives

1.5.1 General objective

The situational analysis aims to establish a comprehensive baseline of conditions in Ringiti that can inform inclusive, sustainable and climate-resilient upgrading of the island settlement by guiding context-specific interventions.

1.5.2 Specific objectives

1. Assess demographic and spatial characteristics – measure population size, household composition, age and gender structure, and settlement density, so that interventions can be tailored to the settlement's population structure and spatial constraints.
2. Analyze housing and tenure dynamics – document housing typologies, tenancy rates and the implications of insecure tenure and eviction threats, to understand the structure and stability of housing in the settlement and address insecurity.
3. Evaluate access to services and infrastructure – examine water, sanitation, energy, waste management, health, education, transport and communications as determinants of living standards, to identify service gaps and areas requiring improvement.
4. Investigate socio-economic conditions and livelihoods – understand income sources, expenditure patterns and financial vulnerabilities that shape household resilience, to design appropriate economic development and support programmes.
5. Identify environmental pressures and hazards – assess exposure to climate-related risks such as storms, flooding and fluctuating lake levels and their interaction with settlement vulnerabilities, to integrate climate risk into planning and protect residents.
6. Document community priorities and coping strategies – capture residents' perspectives on needs, aspirations and adaptive behaviours to ensure interventions are participatory and responsive, so that planning reflects local knowledge and priorities.
7. Generate evidence-based recommendations – integrate climate adaptation, equity and sustainability into planning pathways for Ringiti, to provide actionable guidance for stakeholders and ensure interventions are context-sensitive.

1.6 Methodology

1.6.1 Approach and Rationale

The analysis adopts a mixed methods design to capture the multidimensional realities of a fishing settlement. Quantitative data were obtained through a structured household survey of all 640 households, supported by a spatial enumeration and mapping exercise that recorded housing units and established a framework for the survey. Qualitative insights were supplemented with a review of secondary data, including county documents and scholarly studies relevant to informal settlements around Lake Victoria.

This combination of methods balanced statistical coverage with contextual understanding, enabling the study to generate reliable evidence grounded in both settlement-level data and wider regional perspectives.

1.6.2 Data Collection Methods

Field team and logistics: A total of 26 community members were recruited and trained as co-researchers (also referred to as field assistants or enumerators) to support the entire data collection process. The process began on March 17 2025 with a community sensitization meeting held in the morning to introduce the objectives of the exercise, outline roles, and secure community participation. This was followed by a training session later that morning on mapping and numbering procedures, data collection ethics, and use of digital tools. The activities were conducted over a six-day period, beginning with training on March 17, followed by the mapping and numbering exercise from the afternoon of March 17 through to March 19, and concluding with the household enumeration survey from March 20 to March 22.

Enumerators were provided with name tags for identification, as well as stationery for filing and for drawing on mapping sheets. This structured approach ensured organization, accuracy, and community ownership of the process.

Numbering and mapping: The exercise began with a training session for the co-researchers on how to conduct systematic mapping and numbering. Using mapping sheets and the Kobo Collect digital platform, enumerators divided the settlement into sections.

Working in pairs, each team focused on one or two mapping sheets at a time. One member physically marked the unique number on each structure and recorded it on the mapping sheet, while the other simultaneously entered details into Kobo Collect. Each structure was assigned a unique identification (ID) code, which linked the mapping data to the corresponding household during the later survey stage. This ensured consistency between spatial and survey information. Information collected included house number, building materials, number of rooms, primary use, and occupancy status. This process created a digital spatial reference system that served as the foundation for the subsequent household survey and for future referencing.

Photo 1.2: Co-researchers conducting mapping and numbering (Source: GCA field visit 2025)

Household survey: After the mapping exercise, a separate training was conducted to prepare enumerators for administering the household questionnaire. Using the unique identification codes assigned during enumeration, the survey was conducted digitally on Kobo Collect. It covered demographic characteristics, housing conditions, tenure status, access to services, energy use, waste management, income sources, expenditure, and hazard exposure. Unlike the mapping, which was done in pairs, the household survey was carried out individually, with each enumerator responsible for a defined set of households. Prior to administering the questionnaire, enumerators sought informed consent from respondents to ensure voluntary participation.

Secondary data review: To complement the primary data, county development plans, environmental assessments, and scholarly literature on informal fishing settlements were reviewed. Key documents reviewed included the Homa Bay County Integrated Development Plan (CIDP) 2023 – 2027, the County Climate Change Action Plan (CCAP) 2023, the County Integrated Action Plan (CIAP) 2023 – 2027, and the Homa Bay County Participatory Climate Risk Assessment 2023. These county documents provided a framework for understanding policy priorities, development targets, and resilience strategies relevant to island and lakeshore settlements.

Environmental and sectoral reference materials such as the Fisheries (Beach Management Unit) Regulations 2007, the National Fisheries Policy 2020, the Kenya Climate Change Act 2016, and the Lake Victoria Basin Commission (LVBC) Strategic Plan 2021 – 2026 were also reviewed to situate Ringiti within national and regional environmental governance contexts.

Complementary literature and studies, including the IUCN publication on Beach Management Units in Kenya (2018), the KISIP II Environmental and Social Impact Assessments (2023), and regional academic works on informal fishing communities and co-management systems around Lake Victoria, provided comparative insights that enriched interpretation of local conditions.

Together, these sources helped to contextualize the primary findings, linking Ringiti's realities to broader county, national, and regional planning frameworks and highlighting policy implications for sustainable and climate-resilient development.

1.6.3 Data Analysis and Synthesis

Survey data were cleaned, coded, and analyzed using Microsoft Excel, with the Power Query functionality applied to organize and process large datasets efficiently. This happened from 8th September to 22nd

September 2025. Descriptive statistics were generated to produce frequencies, cross-tabulations, and summary measures. Qualitative observations from fieldwork were used to interpret these statistical patterns, highlighting dynamics such as tenure insecurity, seasonal migration, and gender roles. The findings were then synthesized thematically, following the structure of this situational analysis to ensure clarity and comparability across sections.

1.6.4 Data Validation and Stakeholder Engagement

Preliminary results were validated through a **community feedback meeting held on 29 September 2025**, which brought together community residents, county government representatives, and local leadership through the Beach Management Unit. The session provided an opportunity for residents to review the data, identify gaps, and contribute additional information. It also enabled participants to develop a clearer understanding of their current situation, strengthening both the accuracy and legitimacy of the analysis.

Photo 1.3: Community validation meetings. (Source: AMT, 2025)

1.6.5 Limitations and Mitigation Strategies

Several limitations informed the scope of this work. Primarily, **data gaps** meant that detailed soil or drainage studies could not be carried out; regional environmental data were used to approximate these conditions. Due to **resource and time constraints**, only the most essential indicators were prioritized, balancing the depth of inquiry with the breadth of coverage. Furthermore, while the survey aimed to target all households, **coverage gaps** arose because seasonal mobility meant some residents were temporarily absent; as such, population figures represent a snapshot that may fluctuate with fishing seasons. **Tenure sensitivities** were carefully managed by treating information on land occupancy, ownership disputes, and eviction threats with strict confidentiality and anonymizing all identifiers. Lastly, **climate data limitations** necessitated the use of county and national datasets to approximate climate risks, as localized meteorological data specific to Ringiti were unavailable. Despite these limitations, the combination of mapping, household enumeration, and secondary data review provides a robust baseline record of conditions in Ringiti. The resulting analysis is not exhaustive, but it captures the most critical dimensions of settlement life, offering a reliable foundation for understanding the island's present realities.

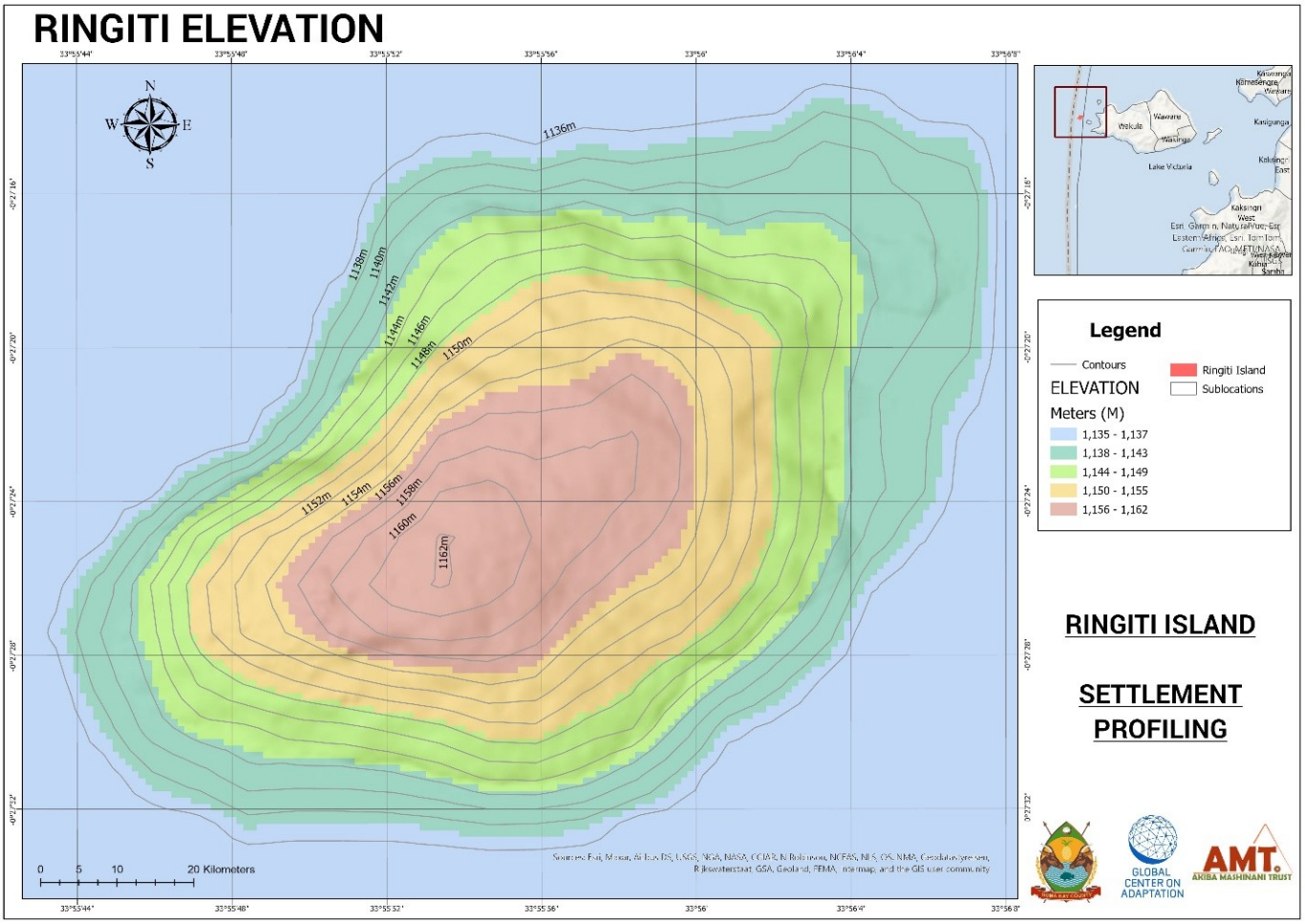
2 PHYSICAL ENVIRONMENT

2.1 Topography

2.1.1 Elevation

Ringiti Island is characterized by a rugged topographic profile, with its landform rising steeply from the shores of Lake Victoria towards a central elevated ridge. The elevation ranges between **1,135 meters and 1,162 meters above sea level**, showing a relatively narrow altitudinal variation across the island.

The contours illustrate a conical shape, with the highest point concentrated at the central core (1,162 m), gradually sloping outward in all directions. The steepest gradients occur along the western and southern flanks, while the northern and eastern slopes are relatively gentler. This relief structure influences drainage, settlement patterns, and land use, as households tend to cluster on the moderately sloping mid-sections where access is easier and erosion risks are lower.

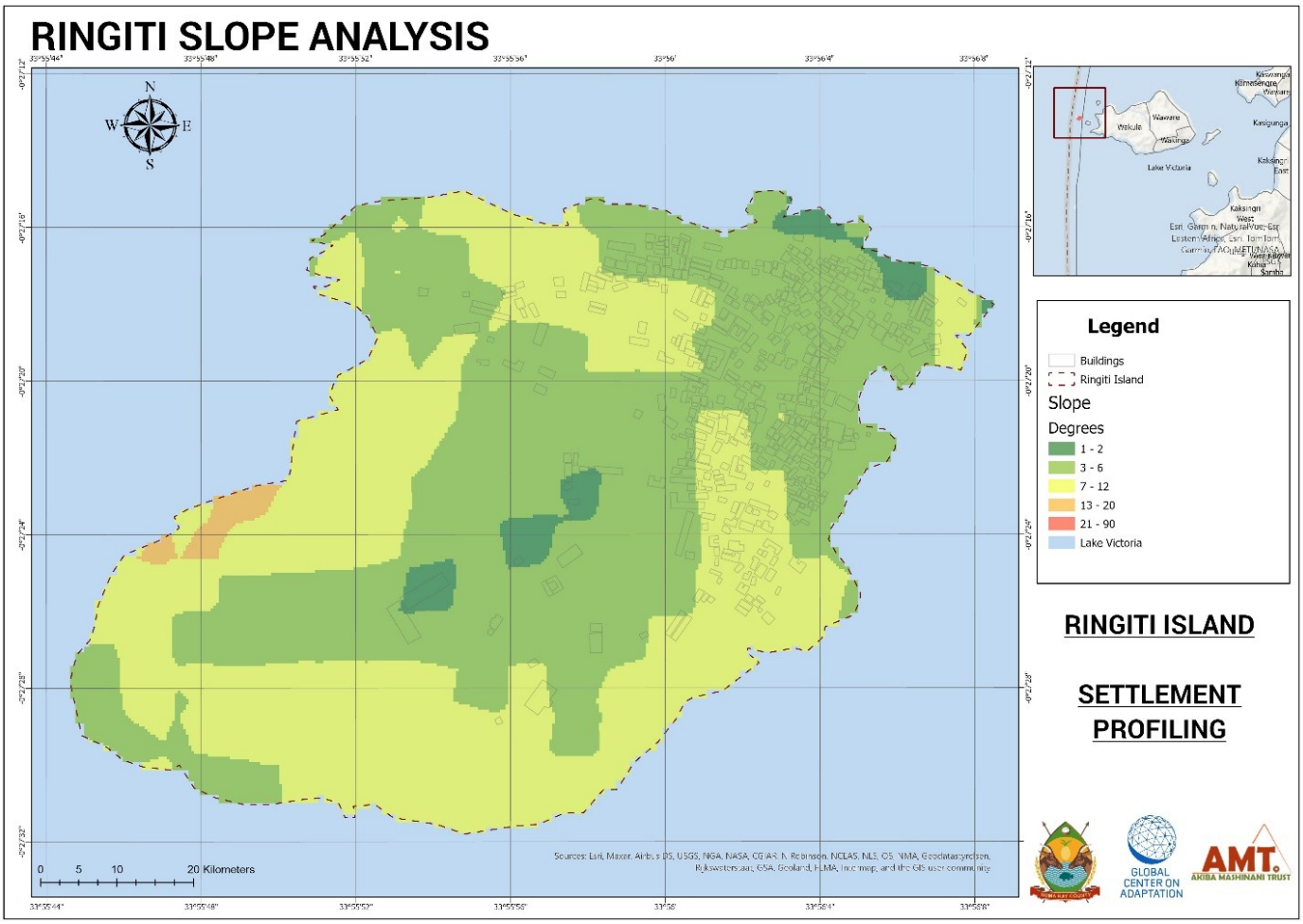


Map 1: Digital Elevation Model

The elevated central area not only provides vantage points but also plays a role in directing surface runoff towards the lake. This makes the lower slopes susceptible to erosion, particularly where vegetation cover has been cleared. The compact nature of the island means that no extensive flat plains exist, and usable land is primarily confined to terraces created along the slopes.

2.1.2 Slope

The slope analysis of Ringiti Island reveals a predominantly gentle to moderate terrain, with slope gradients ranging from **1° to over 20°**. These variations have important implications for settlement distribution, infrastructure planning, and environmental management.



Map 2: Slope

Flat to nearly flat slopes (1–2°) occur mainly along the shoreline, particularly on the eastern and northeastern parts of the island. Such areas are attractive for settlement because of easy accessibility and construction feasibility. However, they are also the most vulnerable to **flooding, lake level fluctuations, and waterlogging**, especially where drainage is poor.

The majority of the built-up areas fall within the **gentle slope (3–6°)** category. Gentle gradients provide favorable conditions for housing, paths, and small-scale cultivation, while still allowing for natural surface drainage. These areas offer the best balance between **livability and safety**, explaining why most households are clustered here.

Moderate slopes (7–12°) are found largely in the central and southern parts of the island, these slopes pose moderate risks of **erosion** if vegetation cover is removed. Settlements and farming are possible but require **soil conservation measures** such as contouring and controlled drainage to prevent land degradation.

Concentrated in pockets within the island interior, **strong slopes (13–20°)** are less suitable for settlement due to construction challenges and high susceptibility to erosion. Their best use is in **tree planting, natural vegetation cover, or controlled grazing**. **Very steep slopes (>20°)**, on the other hand, are limited but occur in small patches, particularly on the southwestern tip of the island. Such steep terrain is unsuitable for either housing or farming and should be reserved for **conservation purposes**, as disturbance could trigger severe soil erosion and slope instability.

Overall, the slope analysis indicates that while much of Ringiti Island is suitable for settlement and livelihood activities, **slope-sensitive planning** is essential. Maintaining vegetation on steeper slopes, restricting settlement expansion into high-risk zones, and promoting drainage management in flatter areas will be critical for ensuring environmental sustainability and reducing climate-related risks.

2.2 Hydrology and drainage

Ringiti Island's hydrological system is shaped almost entirely by its position within **Lake Victoria**, the largest freshwater lake in Africa. The island lacks permanent rivers or streams, and its surface water dynamics are largely influenced by **rainfall, surface runoff, and direct interaction with the lake**.

The steep central ridge and sloping terrain direct most surface runoff rapidly downslope towards the shoreline. During heavy rains, this generates temporary streams and rills, which often lead to **localized erosion** and sediment transport into the lake. The absence of well-defined drainage channels means that runoff is

dispersed, but in flat or gently sloping areas near the shore, **water stagnation and pooling** are common. This creates conditions favorable for mosquito breeding and localized flooding during peak rainy seasons.

The surrounding waters of Lake Victoria provide the island's primary hydrological and ecological function. They serve as the **main source of domestic water supply, fishing grounds, and transportation routes**, underpinning the island's socio-economic life. However, reliance on direct lake abstraction exposes households to water quality risks, particularly from pollution, shoreline waste disposal, and limited treatment facilities.

Groundwater resources are minimal due to the island's small size and rocky substratum. Shallow wells are absent, leaving the population entirely dependent on **lake water and minimal rainwater harvesting**. Rainwater harvesting has potential as a supplementary water source, but uptake is limited, to only institutions, by resource constraints, storage capacity, and variability in rainfall patterns.

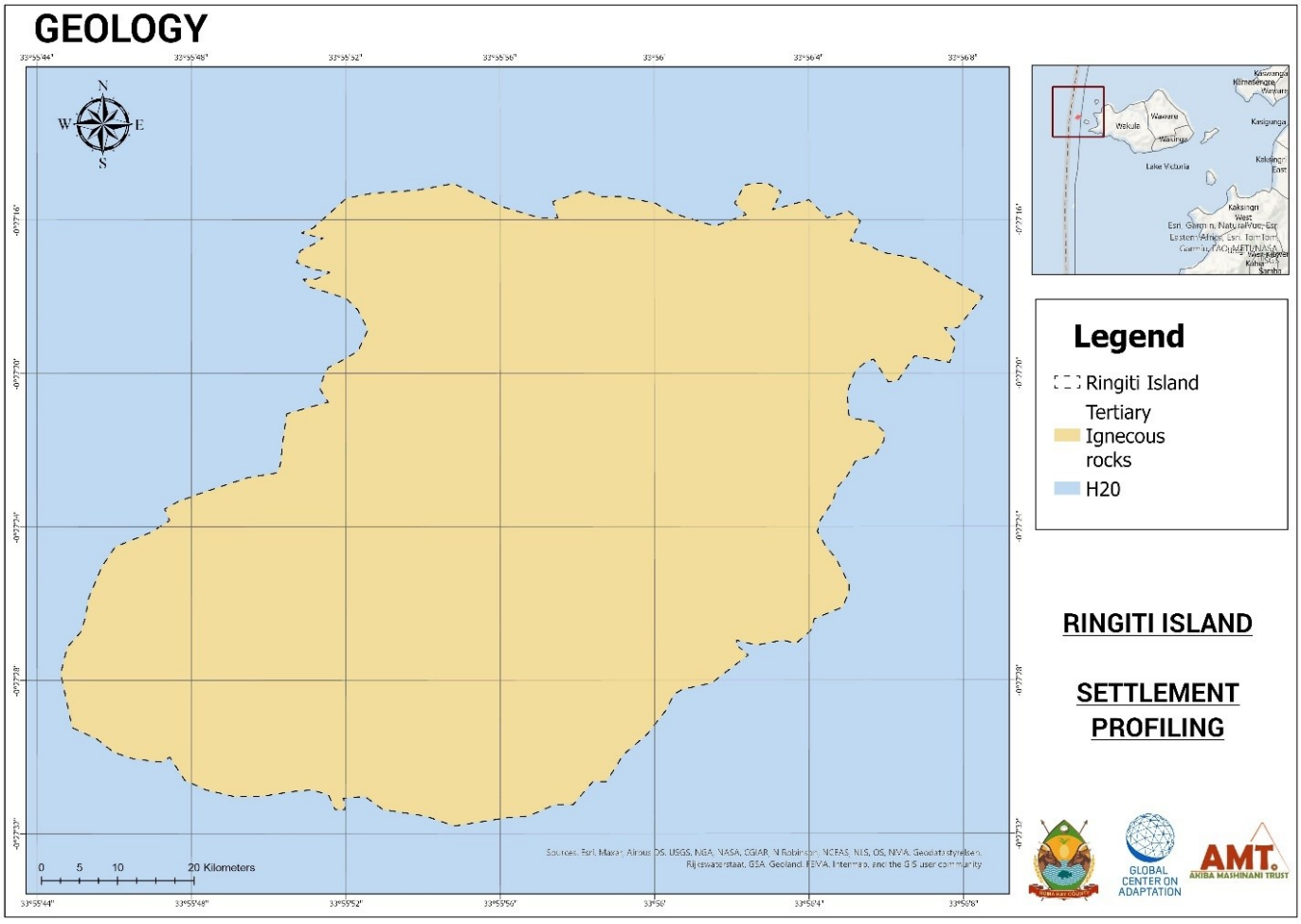
Hydrological challenges are compounded by climate variability, with **seasonal fluctuations in lake levels** affecting settlement stability, access routes, and fish landing sites. High water levels may inundate low-lying shore areas, while declining levels reduce access to safe docking points and increase exposure of fragile shoreline soils.

2.3 Geology and soil characteristics

2.3.1 Geology

Ringiti Island is founded on tertiary igneous rocks, typical of the Lake Victoria basin. These rocks are predominantly volcanic in origin, hard, and resistant to weathering. Their dominance explains the island's steep slopes, rocky outcrops, and limited depth of soils. The igneous foundation provides a stable base for settlement but restricts groundwater storage and aquifer development, reinforcing the community's reliance on surface water from Lake Victoria and rainwater harvesting.

The geological structure has further implications as it constrains agricultural potential by limiting the depth and fertility of soils; it offers potential building stone resources, but extraction risks environmental degradation; and it provides a relatively stable surface against landslides, though steep terrain and thin soils remain erosion-prone when vegetation cover is disturbed.



Map 3: Geology

2.3.2 Soils

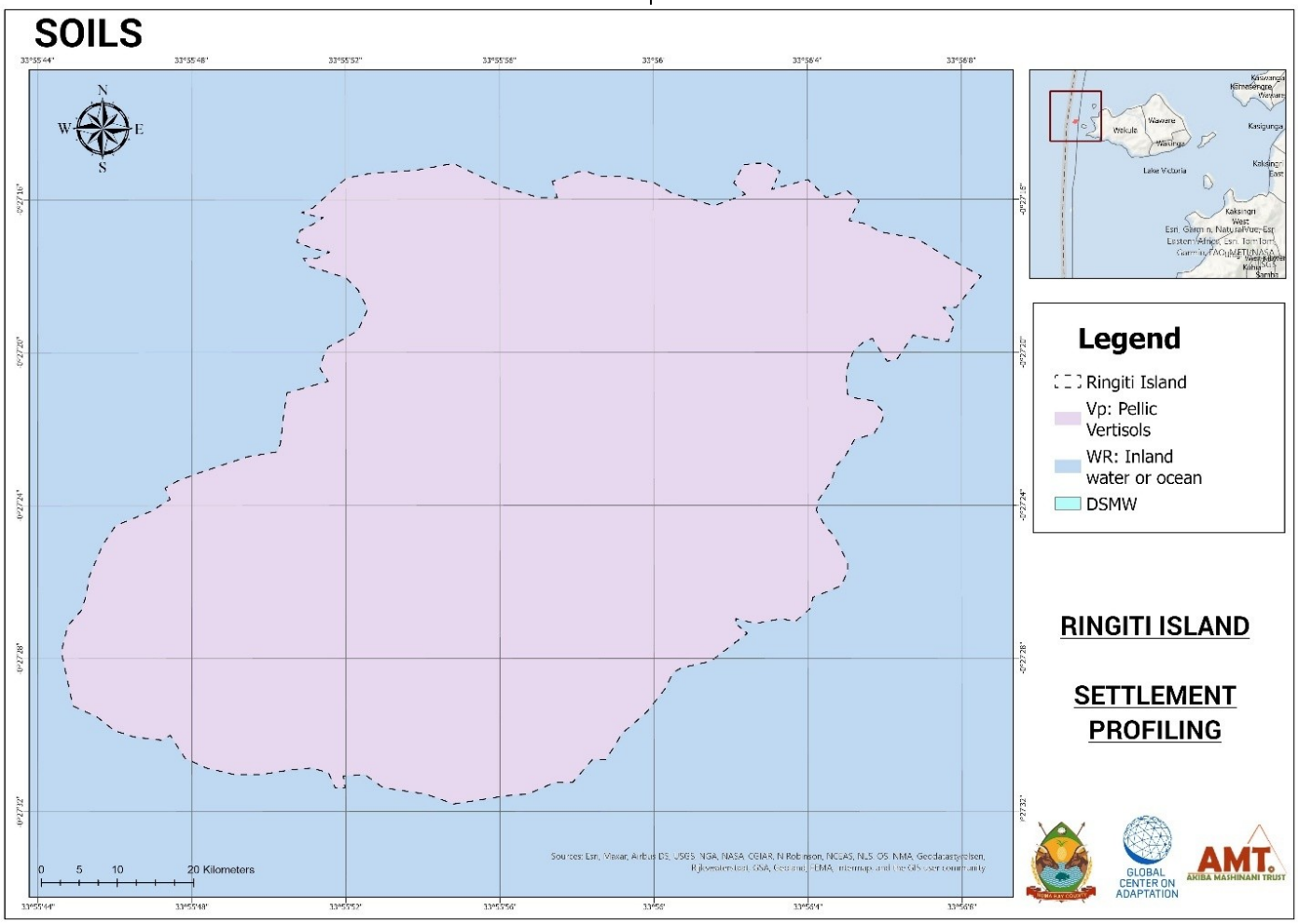
The island's soils are dominated by **pellic vertisols**, heavy clay soils, dark in color, with distinctive shrink–swell properties that cause them to crack deeply during dry periods and become sticky when wet. Key characteristics and implications include:

Fertility: Vertisols are generally fertile due to a high clay content and mineral reserves. However, their agricultural potential on Ringiti is constrained by the shallow soil depth overlying hard igneous rock, limited land availability, and the dominance of fishing as the primary livelihood.

Workability: These soils are difficult to manage. In wet conditions, they become sticky and poorly drained, hampering cultivation and construction. In dry periods, they harden and crack, posing challenges for infrastructure stability.

Drainage: Poor internal drainage increases susceptibility to **waterlogging** in flat coastal zones, particularly after heavy rains. This contributes to localized flooding and standing water, which can exacerbate health risks.

Erosion and degradation: On slopes, the combination of clay soils and deforested land cover accelerates erosion, especially where paths and informal housing disturb the surface.



Map 4: Soils

2.4 Climate

Ringiti Island experiences a **tropical climate** influenced strongly by its location within Lake Victoria. The lake's vast water body moderates temperature variations, creating a relatively humid environment with frequent breezes and high evapotranspiration rates.

2.4.1 Temperature

Temperatures remain warm throughout the year, with average daytime temperatures ranging between **23°C and 30°C**. The moderating effect of Lake Victoria prevents extremes, although nights can be cooler on the elevated ridge areas of the island. This stable thermal regime supports continuous fishing activity and human habitation but also enhances the persistence of vector-borne diseases such as malaria.

2.4.2 Rainfall

Rainfall is bimodal, with two main rainy seasons: the long rains (March–June), which are heavier and more sustained, and the short rains (September–December), which are less intense but still important for water harvesting and soil moisture recharge.

Annual rainfall averages **1,000–1,400 mm**, slightly higher than inland areas due to the **lake effect**, which generates convective rainfall. However, rainfall distribution is uneven, with intense storms often leading to rapid runoff and localized flooding on lower slopes.

2.4.3 Humidity and Wind

Humidity remains high year-round, averaging over 70%, a condition linked to the lake's constant evaporation. Prevailing winds are driven by seasonal shifts of the Inter-Tropical Convergence Zone and localized lake breezes. These winds influence fishing safety and settlement exposure along the shoreline.

2.4.4 Climate Variability and Risks

The island is highly sensitive to climate variability and change. Rising lake levels in recent years have led to shoreline inundation, threatening housing and fish landing sites. Conversely, declining rainfall during dry years reduces rainwater harvesting potential, intensifies reliance on lake water, and exacerbates water scarcity. Increasing frequency of extreme events—heavy storms, floods, and prolonged dry spells—pose risks to both livelihoods and settlement sustainability.

2.5 Environmental Conservation and Sustainability Measures

Ringiti Island faces significant environmental pressures due to its small land area, growing population, and dependence on natural resources. The settlement's rapid expansion, coupled with limited infrastructure, places strain on the fragile ecosystem and heightens vulnerability to environmental degradation. Key sustainability challenges include:

Soil erosion and degradation: The combination of clay vertisols, steep slopes, and informal footpaths intensifies surface runoff during rains, leading to gully formation and loss of topsoil.

Water quality concerns: Direct abstraction of lake water exposes households to contamination from human activity, fish landing operations, and improper waste disposal along the shoreline.

Biodiversity pressures: Overfishing and disturbance of shoreline habitats threaten fish breeding grounds and aquatic ecosystems, reducing long-term fish stock viability.

Waste management gaps: Lack of structured waste collection and disposal systems results in accumulation of solid waste in the settlement and on the shoreline, with adverse effects on both human health and the lake environment.

In summary, Ringiti's environmental condition reflects **intensifying stress on land, water, and aquatic resources**, with sustainability risks driven largely by population pressure and lack of coordinated management systems. These challenges highlight the urgency of integrating **environmental safeguards** into future planning and development of the island.

2.6 Climate Impacts, Adaptation and Resilience Initiatives

Ringiti's exposure to the changing dynamics of Lake Victoria has made climate resilience a daily priority for its residents. The settlement faces a combination of environmental pressures—rising lake levels, heavy storms, strong winds, and prolonged dry spells—that interact to create a cycle of risk and recovery.

The 2020 flooding event marked the most severe episode in recent memory. Lake waters rose sharply, inundating homes, displacing families, and destroying shoreline structures such as fish bandas —temporary wooden or iron-sheet shelters used for fish processing, drying, and storage—and latrines. Many residents still recall that year as a turning point, when the lake reclaimed portions of the settlement and forced temporary relocation inland. Yet even as the waters receded, a different, equally destructive hazard persisted: strong, unpredictable winds.

Residents repeatedly emphasized during validation that wind hazards now rival flooding in their impact. The island's open exposure and lack of tall vegetation make it especially vulnerable. Sudden gusts from the lake can tear off roofs, topple light structures, and scatter fishing gear. Unlike flooding, which builds gradually, the winds strike without warning—often at night—leaving households to rebuild repeatedly. The problem is compounded by the dominance of temporary housing, typically made from lightweight materials such as iron sheets and timber frames, which lacks the strength to withstand frequent windstorms. Over time, this constant cycle of minor destruction has eroded household savings and contributed to a sense of fragility and impermanence across the settlement.

Given this context, adaptation on Ringiti requires both immediate coping mechanisms and longer-term planning to reduce exposure and strengthen community resilience.

Current and potential adaptation measures include:

Adaptation efforts in Ringiti reflect both community-driven initiatives and opportunities for institutional support. Current measures draw on local knowledge and practical coping strategies developed through experience with recurring floods and strong winds. Residents already employ localized solutions such as anchoring roofs with sandbags, rearranging building layouts to reduce wind exposure, restoring vegetation where space allows, and using locally available materials for quick repairs. These actions demonstrate significant community innovation, even though they are often limited by resource constraints.

Potential measures, which build on these existing practices and require external investment or coordination, are outlined below according to key thematic areas:

Water security: Expansion of rainwater harvesting systems—including household tanks, community reservoirs, and guttered roofs—to reduce dependence on untreated lake water during dry seasons. Exploration of small-scale water treatment and filtration technologies could further improve safety and reduce disease risks such as typhoid.

Erosion, wind, and flood control: Establishment of shoreline vegetation buffers (such as vetiver grass and indigenous shrubs) to stabilize soils and reduce wave action; promotion of wind-resistant building designs with low-profile roofs and stronger anchoring; community windbreak initiatives using tree planting or recycled materials; and improved drainage management to limit erosion during storms.

Livelihood resilience: Diversification of income sources beyond fishing—such as small-scale trade, aquaculture, and eco-tourism—to reduce dependence on a single climate-sensitive sector. Strengthened Beach Management Units can further promote sustainable fishing practices, regulate gear use, and rehabilitate nearshore breeding grounds that serve as natural protective buffers.

Health adaptation: Expanded vector control through mosquito net distribution, larval source management, and community awareness campaigns during periods of standing water. Improved health outreach during climate-sensitive outbreaks such as malaria, cholera, and typhoid—particularly after flooding—and inclusion of mental health and disaster recovery support in local health services to address the stress of repeated shocks.

Policy and institutional frameworks: Alignment with the Homa Bay County Climate Change Act (2022) to ensure adaptation planning is embedded in county budgets and sectoral programs. Strengthened collaboration among NGOs, county departments, and community-based organizations will be key to mobilizing climate finance, technical expertise, and inclusive participation.

By linking community innovation with institutional support, Ringiti can transition from reactive rebuilding to a proactive and sustainable approach to living with the rhythms of Lake Victoria. County and partner agencies can amplify existing local efforts through investment in durable infrastructure, training, and inclusion of small islands like Ringiti in broader climate resilience programs.

3 POPULATION AND DEMOGRAPHIC CHARACTERISTICS

3.1 Population Size, Distribution & Density

3.1.1 Current Population Distribution

Table 1: Ringiti general information

Total Population	Area (km^2)	Population Density	Household	Average Household Size
1,453	0.2364 km^2	6,145 persons/ km^2	640	2

Ringiti covers an estimated 23.64 hectares (0.2364 km^2) with a total population of 1,453 residents distributed across 640 households. This results in a remarkably high population density of about 6,145 persons per square kilometer, or roughly 61 persons per hectare. Such dense settlement patterns are typical of small islands where land scarcity, fishing-based livelihoods, and limited expansion space concentrate populations into compact areas.

The relationship between total population and household numbers indicates an average household size of 2.27 persons per household, suggesting a predominance of small family units. This below-average household size, compared to typical rural contexts where extended family systems often result in larger household configurations, points to potential demographic transitions such as urbanization pull factors, economic constraints limiting family size, or changing social structures that favor nuclear households. While the island as a whole is characterized by exceptionally high population density, the relatively small household units may help reduce immediate intra-household pressure on limited living space. However, the broader demographic reality still places considerable strain on available resources and services, necessitating innovative planning approaches to ensure equitable access to water, healthcare, sanitation, and education within the island's constrained environment.

3.2 Household Characteristics

3.2.1 Household Size and Structure

Average Household Size

Ringiti settlement maintains an average household size of about two persons, confirming the broader pattern of small household units observed in the overall population data. This consistently low household size across the settlement reflects genuine household composition trends rather than a statistical anomaly. Many residents migrate to the island primarily for fishing and related activities, often leaving their spouses and children on the mainland. As a result, households are commonly composed of single adults, young couples without children, or temporary living arrangements shared among peers. This dynamic is further influenced by the seasonal nature of fishing, which causes the island's population to fluctuate, with peaks during productive fishing months and declines during off-seasons.

The prevalence of small and temporary household units has profound implications for social support systems. Reduced household sizes limit the capacity for resource pooling and mutual assistance, especially during economic shocks or health crises. From a planning perspective, the dominance of small, transient households necessitates recalibration of housing policies and social programs that may otherwise assume larger, more stable family structures. Infrastructure planning must also account for the relatively high number of households compared to the permanent population, where each unit's economic capacity and labor availability are limited. This demographic reality increases vulnerability in terms of care provision for children, elderly, and other dependents, as most working-age residents live away from their families, leaving dependents reliant on mainland support systems rather than island-based care networks.

Family Structure

Analysis of household composition on Ringiti reveals a strong predominance of nuclear family arrangements, accounting for 569 households (89%). This pattern reflects the settlement's character as a fishing hub,

where most residents are adult men and women who migrate temporarily for work, leaving their spouses, children, and extended kin on the mainland. Nuclear households here are often smaller than in mainland contexts, with many comprising only two adults or an adult and one child, rather than the typical two parents with multiple children.

Extended family households are relatively rare, comprising only **51 households (8%)**. This small share represents a departure from traditional rural African family systems, where extended households provide important roles in economic security, childcare, and eldercare. On Ringiti, the scarcity of extended households suggests that kin-based support structures remain anchored on the mainland, while island households operate more as work-based, independent units. This creates a gap in localized informal safety nets, which may leave households more vulnerable to shocks such as illness, loss of income, or accidents at sea.

Non-kin households represent **20 households (3%)**. These typically consist of unrelated adults—often fishermen or traders—sharing housing for convenience and affordability. Such arrangements are particularly common in highly congested settlements where land and housing are scarce, and they demonstrate the community's adaptive strategies to maximize limited space. However, non-kin households may lack the stability and mutual support systems of family-based units, which can contribute to social insecurity during crises.

The dominance of nuclear families and the marginal presence of extended and non-kin households highlight the transitional and work-oriented nature of settlement on Ringiti. Household structures are heavily shaped by seasonal and economic drivers, with population numbers rising during peak fishing periods and declining in off-seasons. This demographic reality has several implications:

Social support systems: With limited extended-family presence, households cannot rely heavily on kin-based safety nets, increasing the need for community-level or institutional support.

Service demand: Most households are composed of working-age adults, which skews demand toward services such as healthcare, water, sanitation, and financial services, while reducing—but not eliminating—direct demand for schooling and child-related services.

Housing and planning: The prevalence of small households and shared accommodation calls for compact housing solutions, dormitory-style options, and flexible service delivery models that can adapt to seasonal fluctuations.

Vulnerability: Single-parent or couple-only households may face particular strain during health crises or economic downturns, as they have fewer household members to share responsibilities.

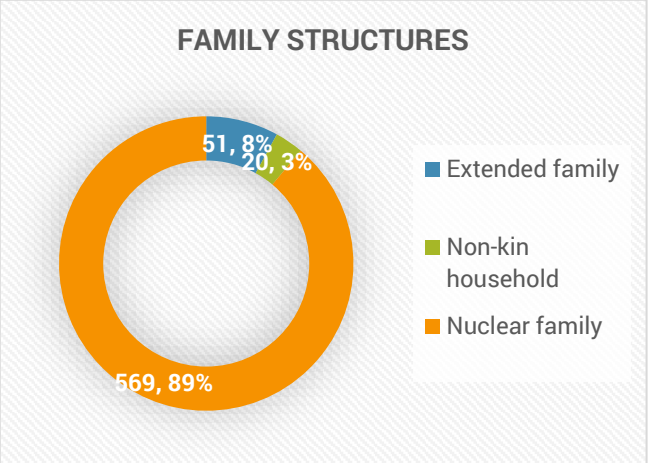


Chart 1: Family Structures

Gender of Household Heads

The gender distribution of household leadership on Ringiti shows that **two-thirds of households (66%) are male-headed**, while **female-headed households account for 34%**. A very small minority, **one household (0.1%)**, is headed by an intersex person. This distribution aligns more closely with traditional gender norms compared to mainland rural areas where male household leadership often exceeds 75–80%. The comparatively high proportion of female-headed households on Ringiti reflects the island's unique socio-economic dynamics shaped by migration, fishing livelihoods, and seasonal population movement.

Several factors contribute to this pattern. First, many women relocate temporarily to the island to engage in trade, food vending, or fish processing, often establishing independent households separate from their mainland families. Second, the high mobility of fishermen and the prevalence of informal marital arrangements result in situations where women effectively manage households in the absence of permanent male partners. Third, the fishing economy's volatility and associated social stresses may contribute to household restructuring, with women taking leadership roles when relationships dissolve or men migrate seasonally.

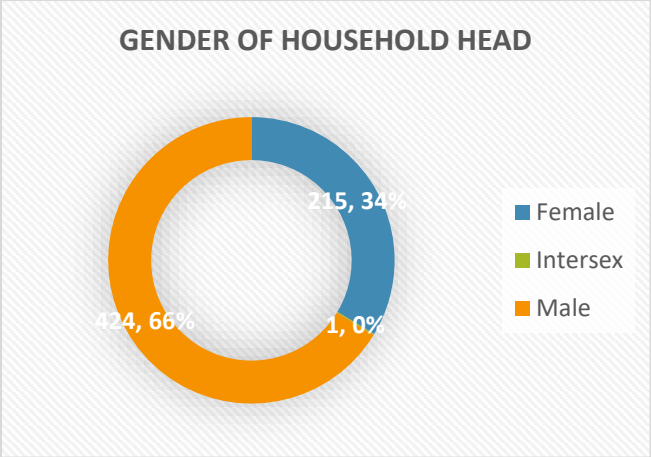


Chart 1: Gender of Household head

From a development perspective, this gendered household structure carries both opportunities and challenges. Female-headed households often demonstrate strong resilience and adaptability, but they may also face structural disadvantages such as reduced access to land tenure security, limited financial capital, and gendered wage gaps in local markets. At the same time, male-headed households dominate numerically, underscoring the continued centrality of men in the fishing economy, especially in activities directly tied to fish capture.

The presence of even a single intersex-headed household, while statistically marginal, highlights the importance of inclusivity in planning and service delivery. Recognizing gender diversity ensures that social protection, healthcare, and livelihood programs are responsive to all community members, regardless of identity.

3.3 Gender and age composition in the Settlement

3.3.1 Gender

The population of Ringiti is slightly male-dominated, with **781 individuals (54%)** compared to **670 females (46%)**, and **2 individuals (0.1%)** identifying as intersex. This results in a sex ratio of approximately 116 males for every 100 females.

This pattern contrasts with many rural mainland areas in Kenya, where women often outnumber men due to male labor migration to urban centers. On Ringiti, the reverse occurs: the fishing economy attracts large numbers of men who migrate seasonally or semi-permanently to the island for work, often without their spouses or children. Consequently, men form the numerical majority within the settlement, while many women remain in mainland households managing family responsibilities and farms.

The presence of a significant proportion of women (46%) reflects their critical role in the fishing value chain, particularly in post-harvest activities such as fish processing, vending, and small-scale trade. Women on Ringiti often establish independent or temporary households, contributing substantially to the island's economy while also navigating vulnerabilities linked to insecure tenure, gender-based exploitation, and limited access to services.

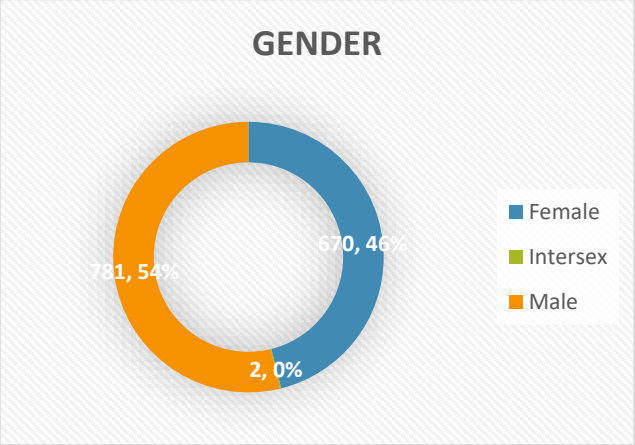


Chart 2: Gender distribution

The enumeration of two intersex individuals, though statistically marginal, is socially significant. It reflects a recognition of gender diversity within demographic data collection and highlights the need for inclusive approaches to service delivery and community engagement.

The gender balance has direct implications for social and economic dynamics. The male majority intensifies competition for resources, housing, and livelihood opportunities, while also influencing household structures, many of which are male-dominated or gender-skewed. At the same time, the nearly equal presence of women ensures that interventions targeting both men and women are critical for sustainable development on the island.

3.3.2 Age

The age structure of Ringiti's population demonstrates a youthful and economically active community with distinct implications for planning and service provision. The age profile underscores the island's role as a **youth- and labor-driven economy**, with few children and elderly residents. The dominance of working-age adults points to a transient, migration-based settlement tied to the fishing economy. While this creates opportunities for harnessing a demographic dividend, it also raises concerns about long-term population sustainability, dependency ratios, and intergenerational balance. A detailed breakdown of the population by age is presented in the section below:

Infants (0–4 years): Consisting of **81 individuals (5.6%)**, the infant population is small relative to national

averages, raising questions about fertility patterns, child survival rates, and family structures shaped by temporary migration. This has direct implications for pediatric healthcare and early childhood services, which may face limited but critical demand.

Primary school children (5–14 years): 218 individuals (15%) fall into the primary school-going age group. This modest share suggests lower child residency on the island, as many children remain with families on the mainland. Consequently, demand for primary education facilities is limited compared to the size of the adult workforce, though seasonal fluctuations may temporarily increase school enrolment.

High school age group (15–19 years): 104 individuals (7.2%) are in this bracket. Their presence highlights the importance of access to secondary education and vocational training, particularly for those who remain on the island. Limited facilities and opportunities, however, may push many in this group to migrate to the mainland, contributing to population turnover.

Youth (18–35 years): This demographic segment, **689 individuals (47.3%)**, represents a pronounced youth population. This group forms the backbone of the island's labor force, especially in fishing, processing, and trade. While this offers significant potential for economic productivity, it also poses risks if employment opportunities remain narrowly confined to fishing and informal trade. Without investment in skill development and economic diversification, this demographic could experience underemployment and social marginalization.

Working-age population (18–60 years): Encompassing about **70% of the total population**, (1,017 people), this group reflects Ringiti's function as a labor-oriented settlement. The concentration of working-age adults explains the island's limited number of dependents and the prevalence of small, temporary households oriented around livelihoods rather than family life. This pattern is typical of migrant-worker settlements.

Elderly (60+ years): The elderly population is small, with only **71 individuals (≈5%)** recorded. This suggests either out-migration of older adults to mainland areas where family support is available, or a settlement pattern characterized historically by younger migrants. Limited elderly presence reduces immediate demand for geriatric services but highlights vulnerabilities for those few who remain without extended family networks.

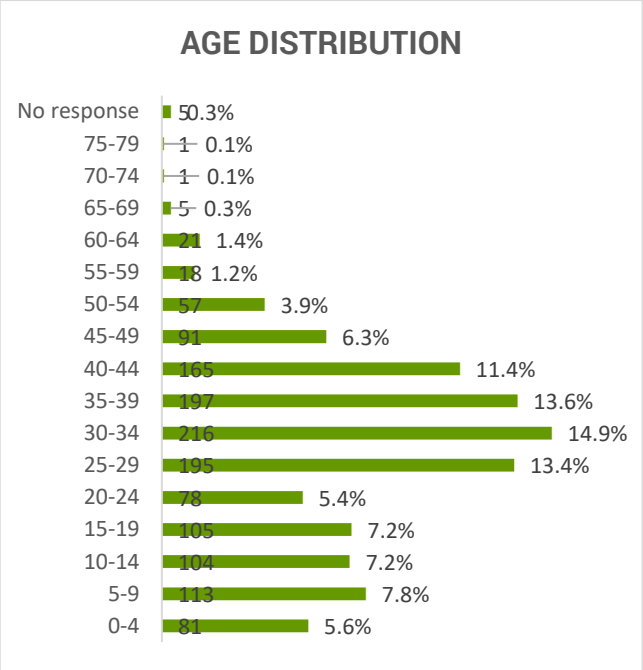


Chart 3: Age distribution

Unclassified/No response: About **50 individuals (≈3%)** did not disclose their age, which may reflect data collection challenges or reluctance in enumeration.

3.4 Migration and Vulnerability

3.4.1 Migrant versus Native Population

Ringiti's population is overwhelmingly composed of migrants. 552 individuals (86%) reported having moved to the island from elsewhere, compared to only 84 individuals (13%) who were born on the island. A small proportion, 4 individuals (1%), did not provide information. This demonstrates that Ringiti is primarily a settlement shaped by in-migration rather than natural population growth.

The dominance of migrants is closely tied to the island's role as a fishing hub. The majority of residents relocate temporarily or semi-permanently to participate in fishing and related economic activities such as processing, vending, and trade. Migration is strongly seasonal, with population inflows peaking during productive fishing months and declining when catches are low.

The limited native-born population suggests that Ringiti functions less as a multigenerational community and more as a labor-driven settlement. This has several implications. The limited native-born population suggests that Ringiti functions less as a multigenerational community and more as a labor-driven settlement. This has several implications: **Social cohesion and identity**, for example, are affected because, with most residents being newcomers, traditional kinship-based ties are weaker, and community bonds are shaped more by economic interdependence than by ancestry. **Service demand volatility** is also a concern, as

seasonal migration creates fluctuations in population numbers, placing variable pressure on services such as housing, water, sanitation, and healthcare. Furthermore, the vulnerability of migrants is often high, as many live apart from their families, which reduces access to kin-based support systems and can exacerbate vulnerability to economic shocks, illness, or exploitation. Finally, there are sustainability concerns, as the long-term viability of the settlement depends heavily on the fishing economy and its capacity to continue attracting labor due to the low number of native-born residents.

3.4.2 Annual Trends in Migration

Migration into Ringiti has accelerated dramatically over the past three decades. The 1990s (1990–1999) recorded only 20 migrants (4.1%), indicating that the island was relatively isolated and had limited attraction for settlement during this period. Between 2000–2010, migration surged to 110 individuals (22.2%), representing a more than five-fold increase. This marked the beginning of a structural demographic shift, positioning the island as a significant destination within the regional fishing economy.

The trend continued upward between 2011–2020, with 152 migrants (31%), reflecting a 38% increase over the previous decade. However, the most dramatic growth has occurred in the current decade (2021–today), where 211 migrants (42.7%) have already arrived in less than five years, surpassing the entire previous decade's total.

This trajectory underscores that migration is the central driver of demographic change on Ringiti. The fact that nearly half of all recorded migrants have arrived since 2021 suggests a combination of powerful pull factors (booming fishing opportunities, established networks, proximity to trade routes, and better connectivity) and push factors (economic hardship, environmental stress, or limited opportunities in origin areas). The implications of this rapid influx are profound and touch on several core areas of the settlement's function: Population pressure strains limited infrastructure, increasing demand for housing, water, sanitation, and healthcare. Social integration becomes critical, as recent migrants constitute a significant portion of the population, necessitating mechanisms to foster cohesion between long-term residents and newcomers. While economic dynamism benefits the settlement through an expanded labor force, diversified skills, and contributions to local markets, it also intensifies competition for jobs and resources. Finally, accelerated population turnover presents governance challenges, requiring adaptive institutions and inclusive community leadership to maintain stability.

The steady acceleration of migration highlights Ringiti's emergence as a structural migration destination, not a temporary or episodic one. The turning point in the 2000s aligns with broader regional and national changes, including liberalization of the fishing economy, increased cross border trade, and improvements in transport links that made the island more accessible.

Sources of Migration

Chart 5: Sources of Migration into Ringiti Island illustrates the diverse origins of residents, showing both intra-county, inter-county, and international migration flows. The composition of migrants suggests varied motivations, including livelihood opportunities, displacement from stressed environments, and pursuit of better income prospects. Importantly, the persistence of upward migration trends indicates the role of migration networks—early settlers pave the way for relatives, friends, and community members, creating established corridors that reduce risks and costs of relocation. These networks now act as self-sustaining systems of population movement, reinforcing Ringiti's position as a regional labour and trading hub within Lake Victoria.

Intra-county migration: The largest single group—250 individuals (45.3%)—originated from within Homa Bay County. This highlights the island's close integration with its immediate hinterland. Many of these migrants likely moved from lakeshore villages or inland rural communities, drawn by the fishing economy and associated trade.

Inter-county migration: A nearly equal share—271 individuals (49.2%)—came from other counties across Kenya. Notable contributors include Siaya (16.3%), Kisumu (13.8%), and Migori (11.6%), all bordering Lake Victoria. These flows demonstrate strong regional linkages, as households from nearby counties relocate to tap into fishing and cross-border commerce. Smaller numbers also come from counties such as Nairobi, Kilifi, Garissa, and Bungoma, reflecting the wider pull of Ringiti's fishing economy and social networks.

International migration: Though smaller in scale, 29 individuals (5.3%) originated from outside Kenya—mainly Uganda (4.35%) and Tanzania (0.9%). Their presence underscores the cross-border dimension of Lake Victoria's fisheries, where shared waters and trading relationships foster regional labour mobility. This cross-border exchange contributes to skill transfer, technology sharing, and market linkages across the lake's fishing network.

Collectively, these trends show that Ringiti is not just a local settlement but part of a broader regional migration corridor. The chart above highlights how the island attracts people across multiple spatial scales—local, national, and international—driven largely by fishing and trade-related livelihoods.

From a vulnerability perspective, this diversity presents both strengths and challenges. On one hand, it enriches the community through varied skills and adaptive practices; on the other, it can complicate social cohesion as new arrivals integrate with established groups. This dynamic underscores the need for inclusive planning and governance systems capable of serving a mobile and heterogeneous population.

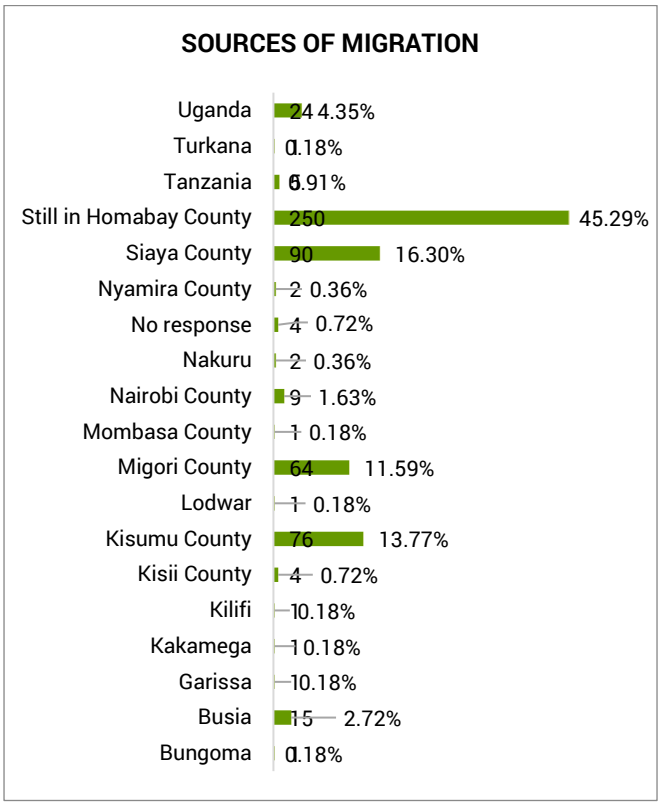


Chart 4: Sources of Migration

Drivers of Migration

Migration into Ringiti is overwhelmingly shaped by economic opportunities, particularly those tied to the fishing economy. Migration into Ringiti is overwhelmingly shaped by economic opportunities, particularly those tied to the fishing economy. The single largest driver, reported by 284 migrants (45.3%), underscores Ringiti's identity as a fishing hub, with migrants primarily drawn by opportunities in fish capture, processing, and trade. Beyond fishing itself, 175 migrants (27.9%) moved to the island seeking broader employment and income-generating activities that support the core economy, such as boat repair, transport, food vending, and casual labor. Furthermore, 115 migrants (18.3%) cited business prospects, including small-scale trading and entrepreneurial ventures that thrive in Ringiti's dense and transient marketplace. Social and household drivers account for only a small number, including those who migrated for education (13 migrants, 2.1%), marriage (8 migrants, 1.3%), or to be closer to family (7 migrants, 1.1%), highlighting the role of kinship and life-cycle events within an otherwise work-centered migration landscape. Access to services was cited by only 3 migrants (0.5%). Finally, while statistically negligible, isolated cases were reported for forced and environmental drivers, specifically weather events (1 migrant, 0.2%) and political/social persecution (1 migrant, 0.2%), showing that broader external shocks occasionally influence migration.

Interpretation

The data confirms that over 91% of migrants moved to Ringiti for economic reasons (fishing, employment, or business). Social, service-related, and forced migration drivers together account for less than 9%. This highlights the island's character as a labor destination settlement, where migration is primarily motivated by livelihood opportunities rather than traditional family-based or crisis-driven relocation.

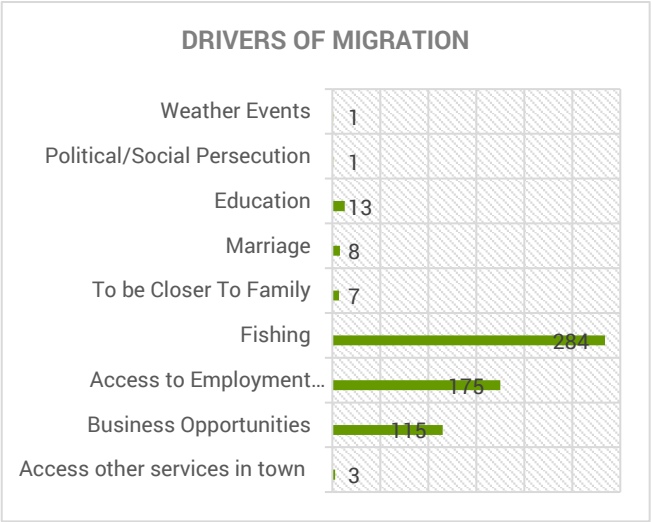


Chart 5: Drivers of Migration

3.5 Growth trends

The demographic analysis reveals a community experiencing profound transformation driven by migration-fueled growth against a backdrop of concerning internal demographic dynamics. The compound annual growth rate, driven primarily by migration rather than natural increase (given the extremely low child population), suggests a community in transition from a sparse, potentially declining rural area to an emerging settlement frontier attracting increasing population influx. Population records and household enumeration conducted during this study indicate a continued upward trend, with net annual population growth estimated at approximately 3.5–4%—a rate largely sustained by in-migration.

The growth trends indicate several critical trajectories requiring policy attention. First, the migration-dependent growth model, while currently driving population increase, may not be sustainable without addressing the underlying fertility crisis suggested by the minimal child

population. Second, the acceleration of migration combined with small household sizes and female-dominated household headship creates a unique demographic profile requiring tailored development approaches. Third, the youth bulge combined with working-age dominance provides a limited window of opportunity for demographic dividend capture before population aging becomes a concern.

At the current rate of migration-driven growth, projections suggest that the population could double within the next 15–20 years (based on extrapolations from the 2024 household enumeration data and validated through community profiling exercises). However, this projection must be tempered by recognition of potential constraints including environmental carrying capacity, infrastructure limitations, and social absorption capacity. The very low baseline population density suggests significant room for growth, but the acceleration of migration may soon test the limits of existing systems and structures. Strategic planning is essential to manage this growth sustainably while addressing the internal demographic imbalances that threaten long-term population viability.

4 LAND TENURE AND LAND USE ANALYSIS

4.1 Land Use analysis

The land use analysis reveals a predominantly residential character in the study area, with significant implications for urban planning, service delivery, and economic development strategies. The data demonstrates that residential uses account for **276 compounds (74.6% of all identified land uses)**, where "compound" refers to an individual household plot or cluster of structures—typically including one or more dwelling units and any associated outbuildings, such as kitchens or storage sheds, within a defined enclosure or shared yard. This indicates a primarily residential settlement pattern that shapes the area's demographic profile, infrastructure needs, and service delivery requirements. This overwhelming residential dominance suggests the area functions primarily as a living space for families and households, with other land uses serving supporting roles for the resident population.

4.1.1 Residential

The substantial residential footprint has important implications for housing policy, urban density management, and infrastructure planning. With nearly three-quarters of all compounds dedicated to residential use, the area faces typical challenges associated with residential-heavy development patterns, including the need for adequate water and sanitation services, reliable electricity supply, waste management systems, and transportation networks that can efficiently connect residents to employment and service centers. The high residential density also suggests potential opportunities for developing local economic activities that serve the resident population while creating employment opportunities within the community.

4.1.2 Commercial

Commercial land use represents the second-largest category with **48 compounds (13.0%)**, indicating a reasonably developed local economy that serves both resident and non-resident populations. This commercial presence suggests the area has evolved beyond a purely residential enclave to include economic activities that can provide local employment opportunities, reduce transportation costs for residents accessing goods and services, and contribute to the local tax base. The ratio of commercial to residential compounds (approximately 1:6) indicates a moderate level of commercial development that may be sufficient to meet basic daily needs but could benefit from strategic expansion to enhance economic opportunities and reduce dependency on external commercial centers. Main commercial uses in Ringiti include shops and small restaurants.

Table 2: Compound uses

Land Use	Number of Compounds
Commercial	48
Educational	2
Mixed Use	11
Public Purpose	21
Public Utility	7
Recreational	5
Residential	276

4.1.3 Public Purpose

The presence of **21 public purpose compounds (5.7%)** reflects institutional and community investment in serving the local population through civic and social facilities. The most prominent among these is the **Ringiti Dispensary**, which provides essential primary healthcare services in an otherwise underserved environment. Religious facilities, particularly **churches**, form another significant share, acting not only as centers of worship but also as focal points for social cohesion, moral guidance, and community support. The **Beach Management Unit Hall and office** play a critical governance role, coordinating fisheries management, facilitating conflict resolution, and supporting community decision-making within the fishing economy. Additionally, the **Ringiti Police Post** provides law enforcement and security oversight, reinforcing stability and safeguarding livelihoods in a high-density settlement with a highly mobile population.

Photo 4.1: Ringiti dispensary. (Source: AMT field visit, 2025)

While modest in proportion, these public purpose facilities serve as critical anchors for community well-being, governance, and order. However, their concentration in health, religion, fisheries governance, and security also points to gaps in other areas such as formal education, youth engagement, recreation, and administrative services. Addressing these gaps would broaden the institutional base of the island, enhance resilience, and strengthen the social fabric in the face of rapid demographic change and migration pressures.

4.1.4 Mixed use

Mixed-use developments account for 11 compounds (3.0%), representing an important but underutilized approach to land use optimization. These compounds, which combine residential, commercial, or office functions within single structures, demonstrate efficient land utilization strategies that can reduce transportation needs, enhance economic viability, and create more vibrant community environments. The limited prevalence of mixed-use development suggests opportunities for policy interventions that encourage this more intensive and integrated approach to land development, particularly in areas where land availability is constrained or where there are desires to create more walkable, self-contained communities.

Photo 4.2: Solar mini station in Ringiti. Source: AMT field visit, 2025)

4.1.5 Public Utilities

The presence of only 7 public utility compounds (1.9%) indicates either efficient centralized service provision or potential infrastructure gaps that could constrain future development. The most notable facility is the solar mini station, which provides a crucial source of renewable energy to households and businesses on the island. In a high-density settlement with no access to the national grid, this mini grid is a vital asset for lighting, refrigeration, small enterprises, and the operation of community services such as the dispensary and the BMU office. Other identified public utilities include public toilet blocks, which provide basic sanitation services for residents and traders, particularly in high-traffic areas near the landing beaches

Beyond energy, public utilities typically include infrastructure for water supply, waste disposal, and telecommunications, all of which are absent in the settlement, yet essential to sustaining the large residential population and supporting commercial activity. The limited number of such facilities may reflect the compact design of utility systems that serve multiple users from centralized points. However, it may also signal constraints in infrastructure capacity, particularly in solid waste management and water services, where demand rises sharply during peak fishing seasons.

Strengthening and diversifying utility infrastructure—by expanding renewable energy, upgrading waste management systems, and improving water and communication networks—will be critical to ensuring that service provision keeps pace with population growth and the economic dynamism of the island.

4.1.6 Educational

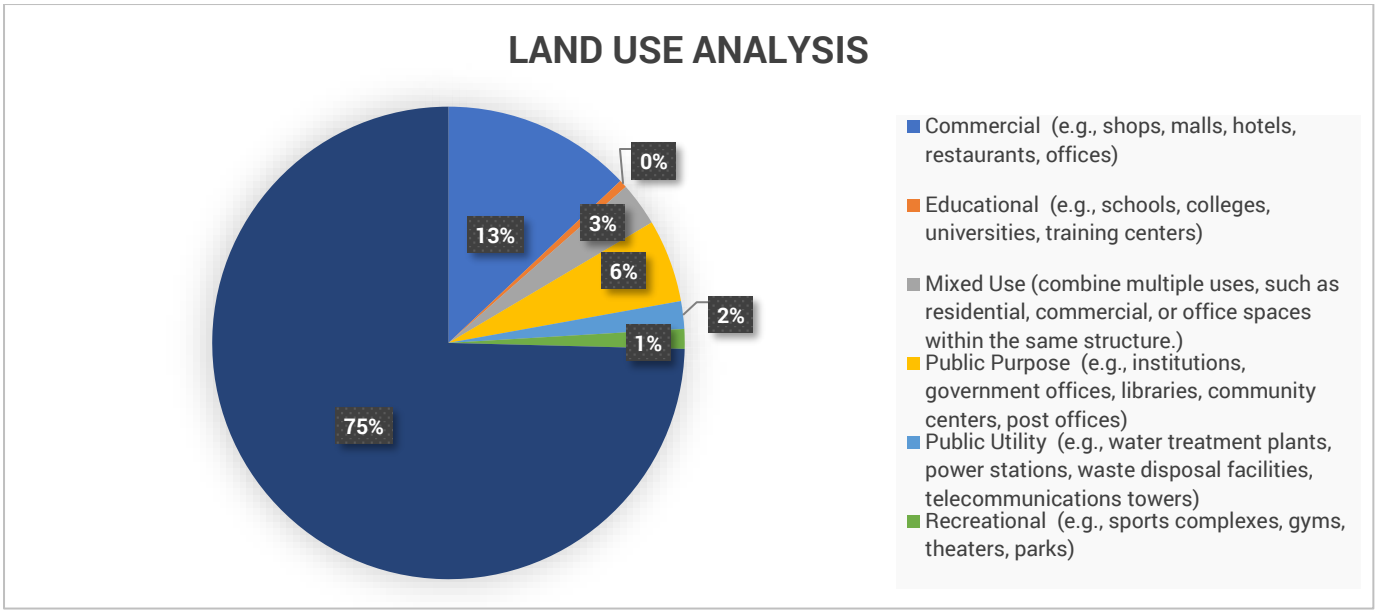


Chart 6: Land Use Analysis

Educational facilities represent the smallest land use category, with only two compounds (0.5%), which is notable given the size of the resident population and the proportion of school-age children. The settlement is currently served by Ringiti Primary School and the Rock Academy Early Childhood Development and Education (ECDE) centre, which together provide the only formal learning spaces within the island.

While these institutions meet part of the community's basic education needs, their capacity remains limited relative to demand, and there is no secondary school on the island. As a result, many older learners must travel to the mainland for schooling—a challenge that imposes financial and logistical burdens on families, particularly those with lower incomes.

This reliance on off-island facilities underscores the urgent need for investment in additional classrooms, teacher housing, and learning resources to expand access within existing schools. In the longer term, planning for a satellite secondary school or vocational training centre could significantly strengthen educational continuity and reduce dropout rates among adolescents.

4.1.7 Recreational

Recreational facilities account for five compounds (1.4%), indicating limited formal recreational infrastructure relative to the residential population. While this proportion may be supplemented by informal community spaces such as small local cinema halls and a rough open field used for football, these facilities are limited in size, accessibility, and quality. The football ground, though widely used, is uneven and rocky, making it unsuitable for organized sports or community events that require safe and well-maintained spaces.

Given the settlement's current population, at least one properly leveled and equipped community sports field and one multi-use recreational centre would be required to meet basic local demand. These facilities could host youth sports, community meetings, and cultural events, helping to strengthen social cohesion and support youth development.

The limited recreational infrastructure suggests potential gaps in quality-of-life amenities that are important for community health, social interaction, and psychological well-being. The low facility ratio may reflect both resource constraints and planning priorities that emphasize basic infrastructure such as housing and utilities over social amenities

4.2 Land Tenure System

Although survey responses suggest a diversity of land tenure arrangements, the reality is that the entire island of Ringiti is government land under the ownership of the national government, administered through the National Land Commission (NLC) in accordance with the Constitution of Kenya (2010) and the Land Act (2012). Islands within Lake Victoria, being part of Kenya's territorial waters, are classified as public land held in trust by the national government, while the county government plays a limited role in local planning and development oversight.

Residents' views of land ownership therefore reflect perceptions and lived experiences rather than legally recognized tenure systems. In practice, access to land is managed informally through community-based arrangements facilitated by Beach Management Unit (BMU) leadership, which allocates plots for temporary settlement and mediates disputes. This informal system ensures some level of order and accessibility but lacks the legal protection associated with formal tenure

4.2.1 Land Ownership

Community members reported different categories of landholding, with **public/government land perceived by 417 respondents (65.2%) as the dominant arrangement. This aligns with the official status of Ringiti as state land, though residents interpret their occupation as government-allocated or state-controlled access.**

Community land was cited by 188 respondents (29.4%), reflecting how many residents view land access as being mediated by traditional or collective arrangements. In practice, this means that when newcomers arrive, they negotiate with local leadership, particularly BMU officials, who then allocate small parcels where temporary houses can be erected. While this system is informal, residents often perceive it as a form of community-sanctioned tenure.

Private land was identified by 31 respondents (4.8%), likely reflecting individual perceptions of security or investment in plots they occupy, even though no legal private ownership exists on the island. Similarly, the very minimal mentions of ancestral land (2 respondents, 0.3%) indicate how some individuals may frame their settlement in traditional terms, despite the absence of officially recognized ancestral holdings on Ringiti.

A few respondents either **did not know (1)** or gave **no response (1)** regarding their tenure status, which may point to uncertainty or reluctance to disclose sensitive information, especially where disputes or overlapping claims exist.

In practice, **land access is governed through a locally managed allocation system** rather than formal title or ownership. The BMU leadership plays a central role, acting as de facto custodians of land, organizing settlement space, and mediating disputes. This arrangement provides flexibility for new migrants but also creates potential vulnerabilities, as residents lack formal tenure security and remain dependent on local institutions for continued access.

The gap between official government ownership and residents' perceptions underscores the **informal and negotiated nature of tenure on Ringiti**. For planning purposes, this highlights both the adaptability of local governance structures and the need for clearer frameworks that balance government ownership with community needs for security, predictability, and sustainable land management.

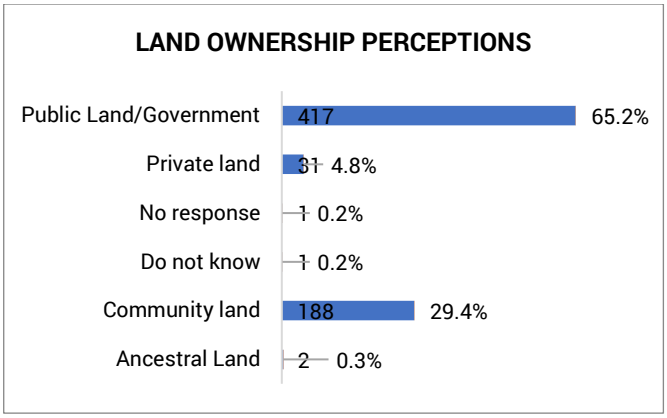


Chart 7: Land Ownership Perceptions

4.2.2 Tenure Security

Eviction threats provide a critical lens into the tenure insecurity facing Ringiti residents. While the majority of households reported no direct experience of eviction pressure, a significant minority expressed vulnerability. A total of 552 households, representing 86%, indicated that they had not received any eviction threats, while 84 households, equivalent to 13%, acknowledged having faced such threats. An additional 1% did not provide a response.

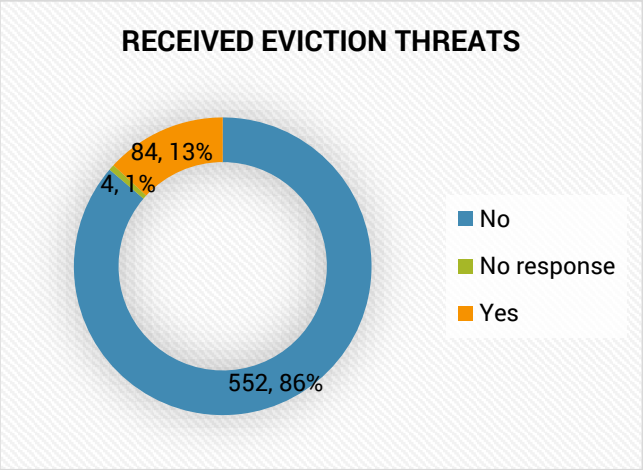


Chart 8: Received Eviction Threats

Validation findings revealed that **government authorities have never threatened or carried out evictions** on Ringiti Island. Residents were clear that **displacement occurs mainly as a result of natural causes**—particularly **strong winds, rising lake water levels, and flooding**—rather than administrative enforcement. These natural events periodically force households to relocate to safer ground, creating a cycle of temporary displacement that residents interpret as "eviction," though it arises from environmental, not institutional, pressures.

Among those who nonetheless reported experiencing threats of eviction, the sources varied considerably, reflecting the **complex and contested nature of land**

governance on the island. Nearly half of the affected households (47.6%) attributed eviction threats to private land claimants, a pattern suggesting that some individuals or groups informally assert control over land parcels despite the island's status as public land. Landlord–tenant disputes accounted for 14.3% of reported threats, underscoring the vulnerability of renters who lack written agreements or stable tenure. Family-based disputes contributed 6%, reflecting the way competition over scarce space can also generate intra-household tension. A very small proportion (2.4%) of respondents were uncertain about the source of threats.

These patterns expose the fragility of tenure security in Ringiti. Tenants—who constitute more than four-fifths of the settlement—remain disproportionately exposed to eviction pressures due to the absence of formal documentation and the informal nature of rental arrangements. The diversity of actors involved in issuing threats—from private claimants and landlords to family members—illustrates the ambiguity of authority and overlapping claims that define land relations on the island.

However, the validation exercise also underscored a positive aspect of local governance: the BMU and its land committee have so far maintained community stability, ensuring that no resident has been forcibly removed by government authorities. This informal governance arrangement, though lacking legal recognition, has effectively mediated disputes and sustained a sense of tenure continuity amid environmental volatility.

4.3 House Occupancy Status

House occupancy on Ringiti demonstrates a settlement pattern dominated by tenancy. Out of 640 households, the majority, 521 (81.4%), live as tenants, reflecting the temporary and highly mobile nature of residence on the island. Tenancy is common among migrant workers in the fishing economy, many of whom stay on the island seasonally or semi-permanently while maintaining families and permanent homes on the mainland.

A smaller proportion, 106 households (16.6%), are owners of their houses. While the land is publicly owned, these residents have invested in constructing their own dwellings, usually simple, temporary, or semi-permanent structures suited to the island's congested environment. Ownership in this context provides greater stability and a stronger sense of control compared to tenancy, even if long-term permanence is still constrained by settlement dynamics.

Other categories are minimal: caretakers (5 households, 0.8%), who manage houses for absent residents; family houses (3 households, 0.5%), used by multiple related occupants; and squatters (2 households, 0.3%), who occupy without clear arrangement. An additional 3 households (0.5%) gave no response.

These patterns highlight several key dynamics:

A high reliance on rental housing demonstrates the settlement's transient, work-driven character. House ownership, though limited, signals a degree of permanence among residents committed to staying longer-term. Caretaker and family-house arrangements reflect flexible use of housing space within a congested environment. The rarity of squatting indicates that most occupancy is mediated through some form of recognized agreement, whether rental, ownership, or allocation by local leadership.

Overall, house occupancy on Ringiti illustrates a fluid and adaptive housing system, balancing the needs of a highly mobile population with the settlement's limited land space and dense housing environment.

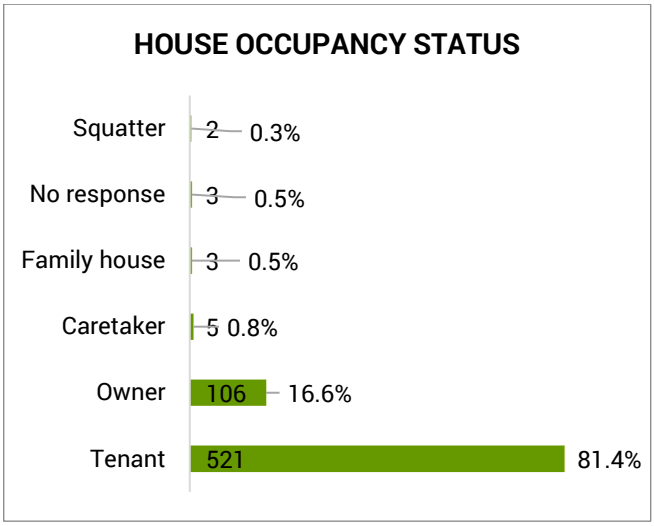


Chart 9: House Occupancy Status

4.4 Gender Dimensions of House Occupancy

The gender-disaggregated data on house occupancy reveals clear inequalities that shape access to secure housing and land on Ringiti. Out of all households, 66.4% are male-headed and 33.6% are female-headed, a distribution that influences how different groups engage with tenancy, ownership, and local housing markets.

Table 3: House occupancy status

House occupancy status	Female-head	Male-head	Grand Total
Caretaker	0.2%	0.6%	0.8%
Family house	0.2%	0.3%	0.5%
No response	0.2%	0.3%	0.5%
Owner	5.6%	11.0%	16.6%
Squatter	0.2%	0.2%	0.3%
Tenant	27.4%	54.0%	81.4%

Grand Total	33.6%	66.4%	100.0%

Tenancy dominates across both genders, but female-headed households are overrepresented among tenants (27.4%) compared to male-headed ones (54.0%), while ownership is more common among male-headed households (11.0%) than female-headed households (5.6%). Although "ownership" here refers to house structures rather than land, this disparity mirrors broader gendered inequalities in control over assets and housing stability. As a result, women are more exposed to eviction risks, rent fluctuations, and limited capacity for home improvement or expansion.

The gender imbalance extends to land access, where male-headed households control 72 plots (66.1%) compared to 37 plots (33.9%) for female-headed households. This near 2:1 ratio underscores structural barriers that restrict women's participation in landholding, even in a settlement built on public land. These disparities reflect national patterns where women's land rights are constrained by limited access to formal credit, weak inheritance protections, and male-dominated informal governance systems such as BMUs.

From a policy perspective, gender-sensitive planning and tenure interventions are essential to reduce vulnerability and strengthen women's economic security. Key measures should include:

Supporting women's transition from rental to ownership through flexible financing and community-led housing programs.

Promoting women's participation in BMU-led land allocation processes to enhance tenure security.

Expanding access to livelihood and credit programs that enable women to invest in housing and land improvements.

Integrating gender equality targets into future settlement upgrading plans and local governance structures.

Addressing these gender disparities is vital not only for social equity but also for sustainable settlement development—ensuring that both men and women benefit equitably from Ringiti's growth and future planning initiatives.

4.5 Land Cadaster and Documentation Coverage

An assessment of land documentation on Ringiti reveals a critical weakness in formal land administration, with significant implications for tenure security and settlement planning. Among the **106 respondents who self-identified as landholders**, only **31 (29.2%)** reported having some form of documentation, while **74 (69.8%)** indicated they lacked any formal or written proof of their rights to the land they occupy. One respondent did not provide information.

During the validation exercise, residents clarified that **land allocation on the island is managed by the BMU** through its designated **land committee member**, who is responsible for overseeing plot distribution. Access to land is granted upon registration and payment of a modest fee, after which the BMU issues a **registration form or receipt** serving as proof of allocation. However, because Ringiti Island is classified as national government land administered through the National Land Commission (NLC), formal private ownership or issuance of title deeds is not legally permissible. The BMU's locally issued documents therefore serve as community-level evidence of occupancy and legitimacy but do not constitute formal tenure under Kenyan land law.

In practice, residents' concept of "ownership" refers primarily to the **space occupied by their house or compound**, rather than legally recognized land rights. The BMU-led allocation system has evolved as a pragmatic solution to the island's lack of surveyed plots and official administration. It enables flexible access to land for migrants and fishers but offers no long-term legal protection.

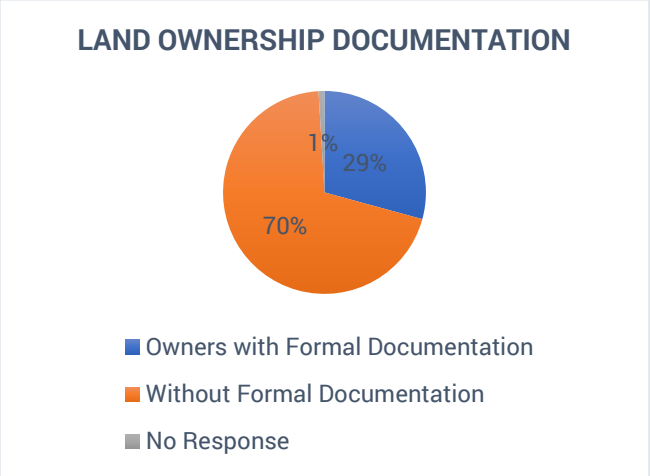


Chart 10: Land Ownership Documentation

The lack of formal land documentation has several implications. Without legally recognized records, households remain vulnerable to **disputes, eviction, or reallocation** of their space by local authorities. This uncertainty consequently **discourages long-term investment** in permanent improvements. Furthermore, formal land documents are often required as collateral for loans; without them, nearly **70% of self-identified landholders are excluded from formal financial systems**, relying instead on informal credit with higher risks and costs. The absence of a cadaster also complicates county and national efforts to manage settlement growth, regulate land use, and allocate public space for services and infrastructure, resulting in **weak planning**

oversight. Finally, land without documentation is difficult to transfer legally, creating the risk of disputes during succession and undermining intergenerational security. The minority of households who reported possessing documentation—31 cases—likely hold allocation letters, receipts, or locally issued agreements. While these are not formal titles, they provide stronger recognition of occupancy and could serve as a foundation for a future community-level cadaster system. This situation underscores the urgent need for affordable, accessible land documentation mechanisms adapted to Ringiti's context. Such a system would not override the island's status as public land, but it could formally record residents' rights to the plots of land they occupy, improving tenure security, reducing disputes, and supporting long-term planning for the settlement.

5 HUMAN SETTLEMENTS AND HOUSING

5.1 Human Settlement Patterns

Settlement on Ringiti is shaped by a unique building-compound structure, where the majority of compounds contain only one physical building, but each building is often internally subdivided into multiple houses. In this context, a "compound" refers to an individual plot or cluster of structures—typically enclosed or demarcated—that serves as a single household or rental unit, often accommodating several sub-households within one main building.

This produces an outward appearance of low-density development (dominated by single-building compounds), while in reality it creates one of the most densely populated and congested settlement forms in the region.

5.1.1 Compound Structure

Survey data shows that 272 compounds (81.0%) contain a single building, while only 19% of compounds host two or more buildings. At first glance, this suggests a landscape of standalone plots. However, the real picture emerges when house counts are analyzed.

Table 4: Number of Buildings in a Compound

Number of Buildings in a Compound	Count of Compounds	Percentage
1	272	80.7%
2	32	9.5%
3	10	3.0%
4	9	2.7%
5	5	1.5%
6	1	0.3%
7	1	0.3%
8	2	0.6%
10	3	0.9%
11	1	0.3%
13	1	0.3%
Grand Total	337	100.0%

5.1.2 House Distribution within Compounds

Detailed data on houses per compound reveals a striking pattern of internal densification: Only about one-third of compounds (100 cases, 29.7%) are occupied by a single house, resembling typical detached dwellings. Conversely, the majority of compounds (176 cases, 52.0%) are subdivided into two to five units, usually through partitioned rental rooms or extended sections under one roof. A significant minority of compounds (72 cases, 21.4%) fall into the range of six to fifteen houses, showing mid-level densification with multiple households sharing walls and amenities. Furthermore, outliers include very high-density buildings (6 cases) containing 23, 26, 30, and even 57 houses within a single compound. These extreme cases represent improvised tenement-style housing, reflecting intense pressure for accommodation on limited land.

5.1.3 Spatial Distribution

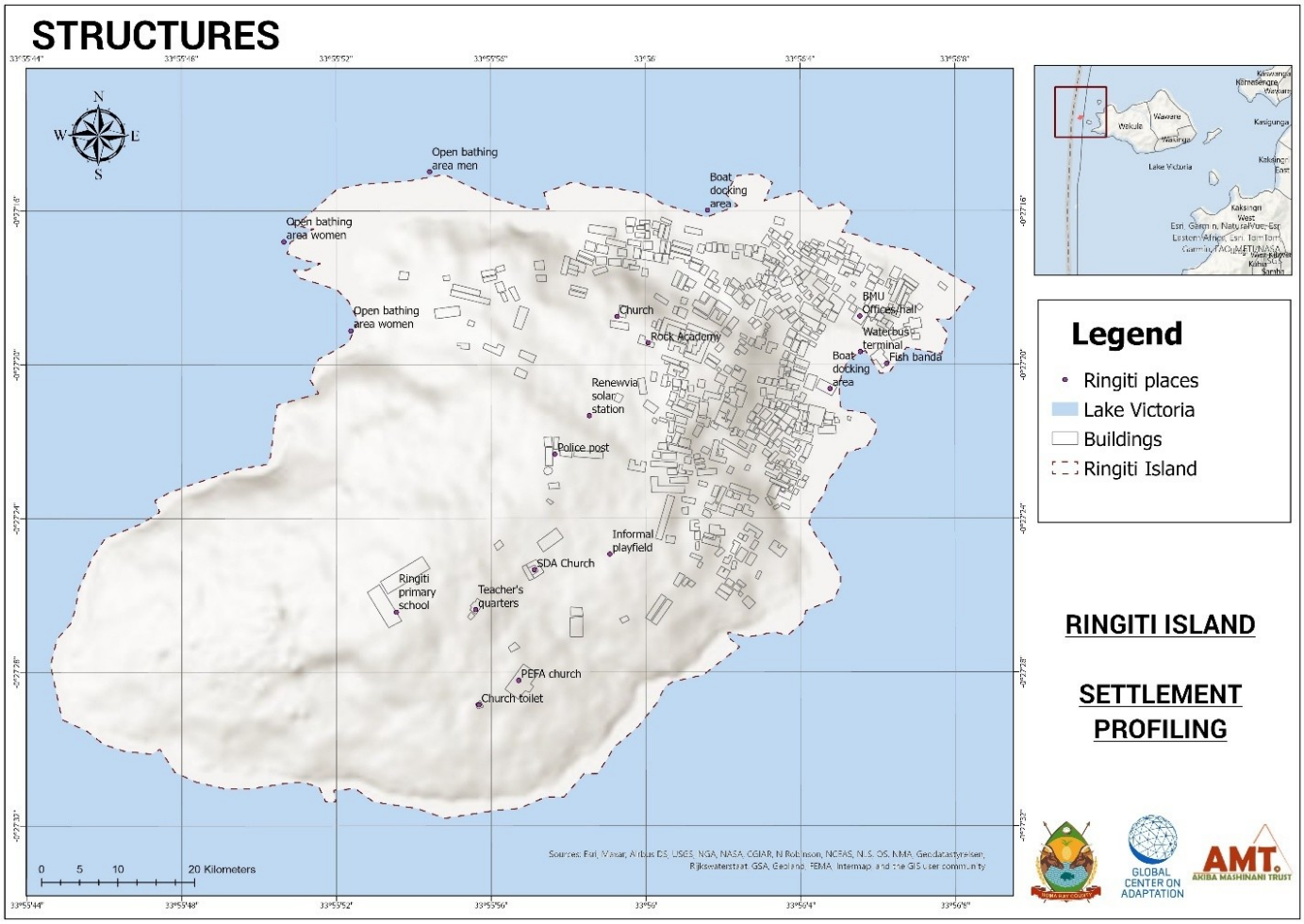
The satellite imagery makes this contrast vivid. On the eastern shore near the Waterbus Terminal—a key docking and passenger transport point that connects Ringiti Island to Mbita and other Lake Victoria landing sites—buildings are tightly clustered with minimal spacing, and most function as multi-unit compounds, producing extremely congested living conditions. Narrow footpaths act as circulation routes, and open spaces are virtually absent. In contrast, the western half of the island remains sparsely developed, hosting institutional facilities such as the Police Post and Dispensary, with large tracts of open land between structures. This uneven distribution has created a spatial imbalance: overcrowding and environmental stress in the east versus underutilization in the west.

Table 5: Number of Houses in a Compound

Number of Houses in a Compound	Count of Compounds	Percentage
1	100	29.7%
2	81	24.0%
3	34	10.1%
4	31	9.2%

5	30	8.9%
6	20	5.9%
7	6	1.8%
8	6	1.8%
9	5	1.5%
10	11	3.3%
11	2	0.6%
12	1	0.3%
13	3	0.9%
14	2	0.6%
15	1	0.3%
23	1	0.3%
26	1	0.3%
30	1	0.3%
57	1	0.3%
Grand Total	337	100.0%

The dominance of single-building compounds conceals the true scale of population pressure, leading to hidden density, as each building often houses multiple families. This mismatch between compound counts and actual household numbers severely complicates planning for services such as sanitation, drainage, and solid waste management. Furthermore, subdivided rental units dominate, reflecting the island's tenant-heavy profile. These houses are typically constructed with temporary materials and offer limited privacy, raising concerns about fire risk, disease transmission, and structural safety, contributing to housing vulnerability. Consequently, infrastructure stress is severe: systems such as water supply and waste disposal often face severe strain since they are designed by compound or building, not by the much larger number of households packed into each. Addressing these issues requires intervention, as the underdeveloped western areas present opportunities for planned expansion, decongestion, and redistribution, provided planning frameworks are put in place to avoid simply reproducing the same congested layouts. Ultimately, because space allocation is mediated by BMU officials rather than formal planning, the settlement pattern is highly organic and uncoordinated, which explains the irregular clustering seen in the east and the persistence of unoccupied land in the west, highlighting the immediate need for a formalized governance role in spatial planning.



Map 5: Structures in the settlement

5.2 Development Trend Analysis

Between 2017 and 2025, Ringiti Island underwent rapid transformation in its settlement patterns, marked by expansion of the built-up footprint, intensification of housing density, and increasing pressure on the shoreline.

In 2017, settlement was heavily clustered along the eastern shoreline, especially around the Waterbus Terminal, while large tracts of land in the central and western zones remained relatively open. By 2025, the built environment had spread further inland, with most of the transitional open spaces between the shoreline and the central island converted into residential compounds. The period saw significant compaction of structures in the eastern settlement zone. Single-building compounds increasingly functioned as multi-household units, with partitions and rental rooms multiplying within the same structures. What previously appeared as scattered clusters evolved into a tightly packed and continuous built-up fabric, reflecting rising demand for accommodation among migrants.

Despite the rapid growth in the east, the western side of the island remains largely underdeveloped. This area continues to host key institutional facilities such as the Ringiti Police Post and Dispensary, surrounded by open land. The contrast highlights a spatial imbalance: while the eastern side bears the full weight of housing and economic activity, the west retains a low level of development. In addition, housing has pressed closer to the lake edge over time. Coastal buffers that existed in 2017 have been reduced or eliminated by 2025, with structures now standing directly on the waterline. This expansion increases the risks of flooding, shoreline erosion, and direct disposal of waste into Lake Victoria, undermining both environmental and public health conditions.

The drivers of growth are multi-faceted. **Migration** is a central factor, as more than **40% of migrants arrived after 2021**, which has intensified the housing demand and accelerated infill. The **fishing economy** and its related trade remain the dominant attraction, concentrating settlement around landing beaches and markets. Lastly, **informal land allocation** continues to be coordinated by local leadership, particularly the BMU, resulting in organic growth without formal planning or zoning.

The settlement trajectory indicates that if current trends continue, the eastern side of Ringiti will reach **full saturation within the next decade**. Without spatial redistribution, this will exacerbate overcrowding, public health challenges, and environmental degradation. The western areas, currently underutilized, represent a critical opportunity for planned expansion that could relieve pressure in the east, provided supporting infrastructure is extended.

Table 6: Comparative Development Trends (2017 vs 2025)

Aspect	2017	2025	Change/Implication
Settlement footprint	Concentrated along eastern shoreline	Expanded further inland, especially SE areas	Significant infill and loss of transitional open land
Housing density	Moderately clustered, visible gaps between compounds	Highly compact, continuous built-up fabric	Intensification of single buildings into multi-household units
Spatial balance	Eastern dominance; western side sparsely developed	Same pattern persists, with west hosting mainly institutional facilities	Spatial imbalance sustained
Shoreline use	Some buffer zones along coast	Houses directly on waterline	Increased vulnerability to flooding, erosion, and pollution
Drivers of growth	Moderate migration, fishing economy	Accelerated migration (42% after 2021), intensified fishing and trade	Migration surge and economic pull driving congestion
Development outlook	Manageable congestion	Approaching full saturation in east	Need for planned redistribution to western areas

Photo 5.1: Ringiti Aerial Imagery 2017 vs 2025 (Source, Google Earth Pro)

5.3 Housing Typologies

The residential housing landscape of Ringiti is overwhelmingly dominated by row houses, which account for 266 units (96.4%) of all identified residential housing types. Row houses in this context refer to long, continuous structures subdivided into multiple single-room units arranged side by side under a shared roof and wall system, typically constructed from corrugated iron sheets or timber. Each unit functions as an independent household space, often opening directly onto narrow footpaths or shared courtyards. This striking uniformity points to a highly homogeneous development pattern, shaped by the island's spatial constraints, informal land tenure, and the economic realities of a transient, rental-based population. Compact single-story row units have become the prevailing form of housing, allowing the settlement to accommodate a dense population within its limited land area.

During the validation exercise, residents emphasized that there are no bungalows or apartments on the island—an observation that proved correct. The earlier survey data indicating the presence of a few such units was found to be inaccurate, likely resulting from respondent misunderstanding or data entry errors during enumeration rather than the actual existence of those housing types. Ground verification confirmed that all residential structures conform to the row-house typology, with no detached bungalows or multi-story apartment buildings found on-site.

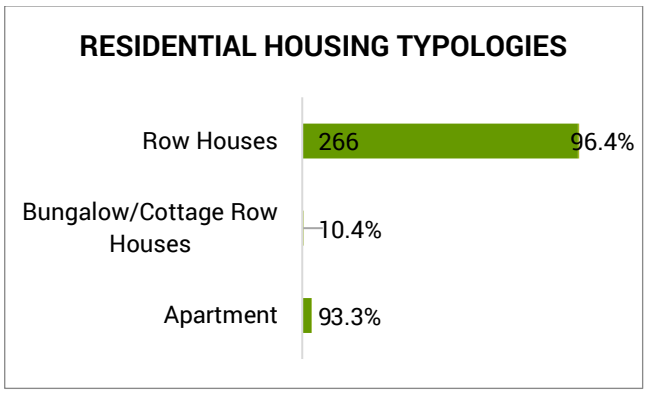


Chart 11: Residential Housing Typologies

Number of rooms

When all houses (residential and non-residential combined) are analyzed, the data shows that Ringiti's housing stock is overwhelmingly made up of **single-room units** (see Table 7). This pattern is consistent with the dominance of **row housing**, where each household typically occupies a single room within a partitioned structure, often shared by multiple tenants. Multi-room units are rare, highlighting the **transient and space-constrained character of housing on the island**.

Table 7: Number of rooms per house

Number of rooms per house	Count	Percentage
1	497	78.4%
2	102	16.1%
3	28	4.4%
4	5	0.8%
6	2	0.3%
Grand Total	634	100.0%

The combination of row housing dominance and one-room prevalence suggests that Ringiti's housing is designed to maximize occupancy per building, reflecting high demand from migrant fishers and traders who prioritize affordability and location over space. Consequently, households live in compact, single-room dwellings, often with little privacy, contributing to overcrowding and heightened vulnerability to fire, disease, and environmental stress. Furthermore, the absence of larger, multi-room houses illustrates the lack of accommodation for extended families or long-term settlement, which reinforces the perception of Ringiti as a temporary or transitional living space. Finally, the near absence of apartments or diverse housing types limits flexibility to respond to varying household needs, income levels, or demographic groups. Future housing planning

should consider diversifying typologies to include small-scale apartments, which could improve space efficiency, and a limited introduction of larger, multi-room housing for families intending to settle longer-term. Crucially, infrastructure design must account for the fact that service demand (water, sanitation, waste) is tied not to the number of buildings but to the much higher number of households and rooms packed into each structure. Overall, the continued dominance of single-room row houses highlights the urgency of addressing overcrowding, housing quality, and safety standards.

5.4 Cost of Housing

The cost of housing in Ringiti is overwhelmingly shaped by a **rental market concentrated within a narrow price band**, reflecting both affordability pressures and limited variation in housing quality. Validation findings indicate that **most rental units on the island fall within the 500–1,500 Ksh range per month**, confirming residents' observations during the community feedback sessions. This aligns closely with the dominant rent categories recorded in the survey but clarifies that the actual lower limit is slightly below earlier estimates.

A striking **72.6% of households (378 units)** pay rent in the **600–1,099 Ksh range**, making this the dominant rental category. This narrow clustering suggests that most residential units are relatively similar in terms of structure and amenities, with landlords setting rents within a standardized range that reflects prevailing market norms and the modest quality of housing stock on the island.

A smaller but significant share of households, **9.4% (49 units)**, pay rents between **100–599 Ksh**, representing the lower end of the market, while another **9.4% (49 units)** fall into the **1,100–1,599 Ksh range**. These groups highlight some degree of differentiation within the settlement, where a limited supply of cheaper units provides access for the most vulnerable, and slightly higher rents capture those with relatively better incomes or preferences for less congested housing. **5% (26 units)** pay between **1,600–2,099 Ksh**, while very few households, less than **3% combined**, occupy high-rent units above **2,500 Ksh**, indicating minimal presence of premium housing options.

A small fraction of households (**0.8%, 4 units**) reported not paying rent, which may reflect caretaking arrangements, family housing, or informal agreements where financial payment is substituted with other forms of contribution.

The overwhelming dominance of mid-range rents (600–1,599 Ksh) demonstrates a rental market that is highly compressed, offering little variation in cost despite differences in household needs and economic capacities. While this consistency can reduce uncertainty for tenants searching for housing, it also restricts choice and leaves limited options for both low-income households who struggle to meet even the lowest rents and for higher-income households who might otherwise stimulate investment in better-quality housing.

From a social equity perspective, the limited supply of affordable units under 600 Ksh raises concerns for the most vulnerable residents, particularly women-headed households and young migrants with irregular incomes. At the same time, the absence of higher-end housing options underscores the settlement's homogeneity, where nearly all residents experience similar housing conditions regardless of income. This uniformity may limit opportunities for upward mobility within the local housing market and concentrate economic pressures on households already allocating a large share of their income toward rent.

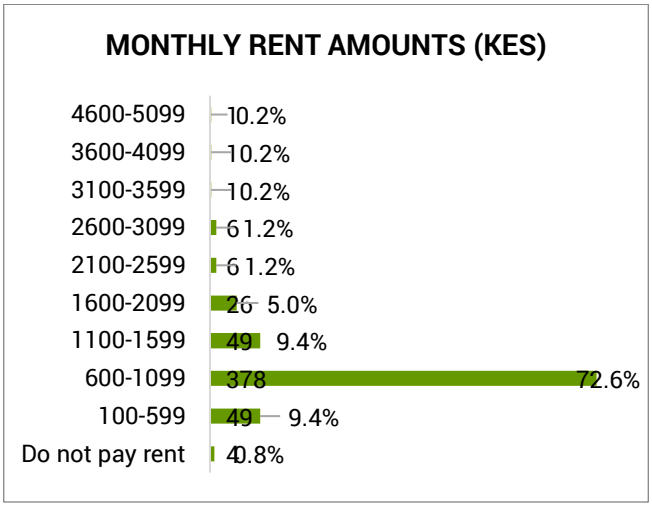


Chart 12: Monthly Rent Amounts in KES

5.5 Housing Conditions

5.5.1 Building Materials

The roofing and walling materials analysis reveals a housing stock dominated by iron sheet construction, with profound implications for housing quality, durability, maintenance costs, and resident comfort. Iron sheets account for 503 roofing installations (98.6%) and 504 walling installations (98.8%), indicating an almost universal reliance on this construction material. This overwhelming dominance of iron sheet construction suggests either strong cost advantages for this material, limited availability of alternative construction materials, or building practices that have evolved around iron sheet technology.

The prevalence of iron sheet construction creates both advantages and challenges for residents and the broader community. Iron sheets offer several benefits including relatively low initial cost, wide availability, ease of installation and repair, and reasonable durability when

properly maintained. The material's flexibility makes it suitable for various building configurations and allows for relatively quick construction or modification of structures. Additionally, iron sheets can be recycled and reused, providing some sustainability benefits and enabling residents to modify or relocate structures as needed.

However, iron sheet construction also presents significant limitations that affect resident comfort and housing quality. Iron sheet buildings typically experience substantial temperature fluctuations, becoming very hot during sunny periods and cooling rapidly at night, which can create uncomfortable living conditions and potentially affect resident health and productivity. The material's acoustic properties also mean that iron sheet buildings provide limited sound insulation, potentially creating noise problems in dense residential areas and affecting residents' privacy and rest quality.

Photo 5.2: Informal Corrugated Iron Housing Secured with Stones on the Roof (Source: GCA field visit 2025)

The minimal presence of alternative roofing materials highlights the limited diversification in construction practices. Only 6 buildings utilize concrete/slab roofing (1.2%), and 1 building uses asbestos sheets (0.2%), indicating very limited adoption of potentially more durable or comfortable roofing solutions. The absence of traditional roofing materials such as tiles or thatch suggests either their unavailability, cost disadvantages, or cultural shifts away from traditional construction methods.

Table 8: Roofing Materials

Roofing Material	Number of Buildings	Percentage of buildings
Asbestos Sheets	1	0.2%
Concrete/Slab	6	1.2%
Iron Sheets	503	98.6%
Grand Total	510	100.0%

For walling materials, the situation is similarly homogeneous, with iron sheets dominating and only 6 buildings (1.2%) utilizing cemented/plastered walls. This pattern suggests that even when residents invest in improved construction, they typically maintain iron sheet technology rather than transitioning to masonry or other permanent construction methods. This could indicate cost constraints, technical limitations, or satisfaction with iron sheet performance when properly implemented.

Table 9: Walling Materials

Walling Material	Number of Buildings	Percentage of buildings
Cemented/plastered	6	1.2%
Iron Sheets	504	98.8%
Grand Total	510	100.0%

The uniformity of construction materials has important implications for community resilience and disaster preparedness. Areas dominated by iron sheet construction may face heightened risks during severe weather events, particularly high winds that can damage or destroy iron sheet structures. The prevalence of this construction type also means that fire risks can spread rapidly through communities, as iron sheet buildings often lack fire-resistant characteristics and may be closely spaced.

The flooring materials analysis presents a markedly different pattern from the roofing and walling materials, with concrete/cement flooring dominating at 442 installations (86.7%). This prevalence of concrete flooring indicates significant investment in this aspect of housing

quality, suggesting that residents prioritize durable, easy-to-clean flooring even when utilizing iron sheet construction for walls and roofing. The dominance of concrete flooring reflects both practical advantages and affordability considerations that make this material the preferred choice for most residents.

Concrete flooring provides substantial benefits including durability, ease of cleaning and maintenance, resistance to moisture and pests, and improved hygiene compared to earth or mud alternatives. The high adoption of concrete flooring suggests that residents understand and value these benefits sufficiently to invest in this more expensive flooring option despite potentially limited household budgets. This pattern indicates successful prioritization of housing improvements that provide long-term value and health benefits.

The presence of earth flooring in 65 buildings (12.7%) indicates that approximately a good number of residents still rely on traditional flooring materials that present greater challenges for cleanliness and maintenance. These traditional flooring materials may reflect either financial constraints that prevent investment in concrete flooring or cultural preferences for traditional construction methods. However, the relatively small proportion of traditional flooring suggests a successful transition toward more durable flooring solutions across most of the housing stock.

Table 10: Flooring Materials

Flooring Material	Number of Buildings	Percentage of buildings
Concrete/Cement	442	86.7%
Earth	65	12.7%
Tiles	2	0.4%
Wood	1	0.2%
Grand Total	510	100.0%

The minimal presence of premium flooring materials, with only 1 use of tiles (0.2%) and wood flooring (0.2%), indicates limited adoption of high-end flooring solutions. This pattern suggests either cost constraints that make premium flooring inaccessible, limited availability of these materials, or resident satisfaction with concrete flooring performance that reduces demand for more expensive alternatives.

The flooring patterns have important health and quality of life implications. Concrete flooring can significantly improve indoor air quality and reduce dust-related health problems compared to earth or mud flooring. The ease of cleaning concrete floors also supports better hygiene practices and can reduce disease transmission risks, particularly important for households with young children or elderly residents.

5.5.2 Occupancy Status

The occupancy status analysis reveals a housing market with very high utilization rates, underscoring strong demand for housing and limited slack in supply. Out of the total housing stock, 1,173 units (94%) are currently occupied, while only 71 units (6%) remain vacant. This exceptionally high occupancy rate points to an environment where available housing is quickly absorbed, leaving very little surplus capacity.

The low vacancy rate of 6% falls within the lower bounds of typical urban vacancy benchmarks (5–10%), but in this context it suggests constrained availability rather than healthy market turnover. Such limited vacancy indicates that households have few alternatives when seeking to relocate, which can reduce housing choice and limit mobility. It also reflects the intense pressure on the existing housing stock, where demand is consistently high and supply are relatively static.

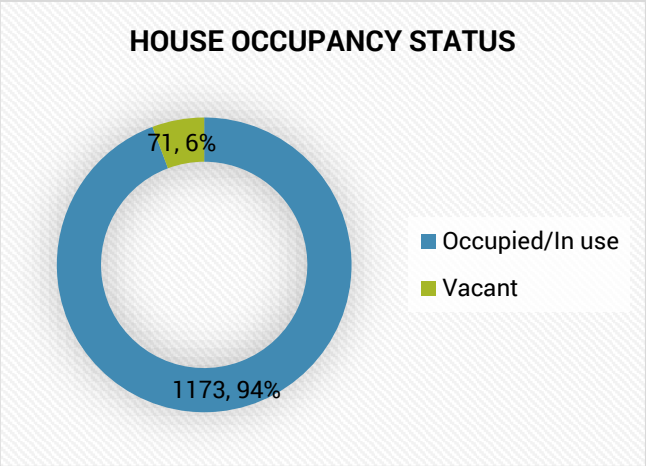


Chart 13: House Occupancy Status

For new residents arriving in Ringiti, the small pool of vacant units presents a significant barrier. With only a handful of houses available at any given time, newcomers may struggle to secure accommodation, often being forced to accept substandard housing or overcrowded arrangements. This situation is especially critical given the island's dependence on migration-driven population growth, where the continuous influx of fishers and traders requires flexible housing supply.

On the positive side, high occupancy levels demonstrate efficient utilization of the settlement's housing stock and suggest that the housing being provided generally meets residents' immediate needs. Community networks and informal allocation systems likely facilitate rapid matching of available units to incoming residents, ensuring minimal housing waste.

From a planning perspective, however, the persistently high utilization of the settlement's housing stock underscores the urgent need to expand housing supply to accommodate future growth. Without new housing

development, continued demand pressures risk exacerbating overcrowding, inflating rents, and undermining housing quality. Ensuring that additional units are constructed—and that they diversify housing options across different price ranges and household sizes—will be critical for sustaining livability and preventing displacement pressures within the settlement.

5.6 Informal Settlements and Challenges

The settlement structure of Ringiti is defined by the overwhelming dominance of **temporary housing**, with **337 temporary buildings (66.1%)** compared to **173 permanent buildings (33.9%)**. This nearly 2:1 ratio illustrates the precarious nature of housing on the island, where the majority of residents rely on semi-permanent or makeshift structures rather than durable, weather-resistant buildings.

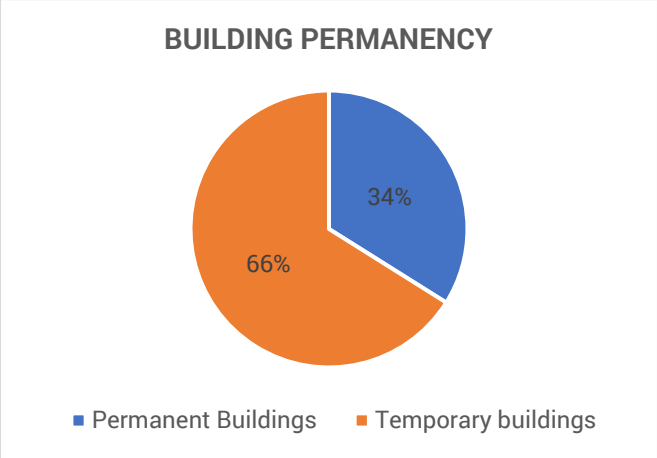


Chart 14: Building Permanency

The prevalence of temporary housing is closely tied to the island's unique tenure context. Since all land is officially public and residents occupy it based on informal allocations by the BMU, most households lack the security necessary to justify long-term investment in permanent construction. This insecurity, combined with limited household incomes, lack of access to affordable credit, and high construction costs, has reinforced a reliance on temporary materials such as iron sheets and timber. As a result, much of the settlement remains highly vulnerable to weather damage, fires, and rapid deterioration.

Beyond tenure insecurity, the heavy reliance on temporary buildings has implications for **community resilience and infrastructure planning**. Settlements dominated by non-permanent structures are particularly exposed to environmental hazards and disasters, requiring frequent repairs and raising household maintenance costs. Service providers may also hesitate to extend permanent infrastructure—such as piped water, drainage, or durable road networks—into areas where housing itself is unstable, perpetuating cycles of underdevelopment.

From a **development perspective**, this scenario highlights both risks and opportunities. On one hand, the dominance of temporary housing reflects vulnerability, constrained livelihoods, and weak institutional support for housing improvements. On the other hand, it reveals significant scope for targeted interventions that can help households upgrade their homes. Priority areas include improved access to affordable building materials, microfinance or savings schemes dedicated to housing improvement, technical support for safer construction practices, and tenure regularization initiatives that give residents the confidence to invest in permanent structures.

The **social and equity dimensions** of temporary housing are equally important. Vulnerable groups, particularly women-headed households, are often disproportionately affected as they face additional barriers to accessing resources for permanent construction. Children growing up in temporary homes are especially exposed to poor health outcomes due to inadequate protection against rain, cold, and overcrowding, while also lacking safe and conducive spaces for learning and development.

In conclusion, the housing profile of Ringiti reflects the wider settlement's informality, where insecurity of tenure, economic limitations, and lack of supportive policy frameworks have entrenched dependence on temporary housing. Addressing these challenges will require **integrated approaches** that combine tenure security, livelihood strengthening, access to housing finance, and improved building standards. Such measures are essential not only for improving individual household welfare but also for enhancing the island's overall resilience and sustainability in the face of demographic growth and environmental risks.

6 PHYSICAL INFRASTRUCTURE

6.1 Modes of Transportation

The transportation network on Ringiti Island is defined by its complete reliance on walking within the settlement and motorized boats for off-island travel. These systems provide both opportunities and limitations for mobility, access to services, and economic development.

6.1.1 Walking

On Ringiti Island, walking is the exclusive mode of land-based movement. This is directly shaped by the nature of settlement, where housing is densely packed along narrow footpaths and alleys, and the terrain is rugged and uneven. In addition, high levels of congestion in certain zones and the island's small geographic size make the introduction of bicycles or motorized road transport unnecessary and impractical.

The existing footpaths are mostly earthen and unplanned, making them vulnerable to erosion, flooding, and congestion. During the rainy season, sections of these paths become impassable due to mud and pooling water, while rising lake levels threaten shoreline routes. In localized areas with steeper gradients, small-scale landslides further compromise safety. These disruptions limit daily mobility, affect access to services such as schools and healthcare, and constrain the fishing economy by complicating the movement of gear, supplies, and fish.

Safety and accessibility are further undermined by poor or absent drainage, which creates hazardous walking conditions and stagnant pools that encourage disease vectors. At night, the lack of street lighting discourages movement, particularly for women, children, and the elderly, and raises concerns of insecurity. Overcrowding on shared footpaths—where residents must navigate while carrying loads or handling fishing equipment—adds to the risks.

Photo 6.1: Typical Unpaved Footpath Linking Household Clusters in the Settlement (Source: GCA field visit 2025)

Improving walking infrastructure should therefore be a priority for Ringiti. Recommended interventions include upgrading and designating main pedestrian routes, constructing raised walkways in flood-prone zones, and installing drainage systems to reduce seasonal disruption. The addition of solar-powered lighting on key paths would further improve safety and accessibility after dark. Importantly, these improvements should be pursued through participatory approaches that integrate community knowledge, enhance local ownership, and remain affordable and sustainable. Investing in walking infrastructure would not only improve mobility and safety but also strengthen resilience to climate shocks, support livelihoods, and improve overall quality of life for residents.

6.1.2 Water Transportation

Water transport remains the lifeline of Ringiti Island, linking residents to the mainland and other islands across Lake Victoria. With no road connections, all movement of people, goods, and services beyond the island relies on boats.

The Waterbus Service

Within Homa Bay County, Ringiti is served by the Waterbus, which provides relatively affordable, regular, and reliable ferry connections. Operating along major routes—including the Homa Bay–Northwest line and the Homa Bay–Asembo Bay corridor—the Waterbus links Ringiti to key mainland and island destinations. It functions on a fixed schedule, usually daily, and caters not only to passengers but also to goods, making it an essential service for trade, schooling, and medical travel.

Based on community consultations and validation findings, an estimated 80% of households rely on the Waterbus as their primary means of transportation to the mainland, particularly for accessing markets, health facilities, and education. For many residents, it provides the only reliable and safe alternative to small private boats, which are often weather-dependent and lack safety equipment.

At a standardized fare (for example, Ksh 350 from Mbita West to Ringiti), the Waterbus remains one of the most affordable and predictable formal transport option for most households. Its consistency and safety make it a lifeline for economic and social connectivity, reinforcing Ringiti's dependence on waterborne transport for nearly all external interactions.

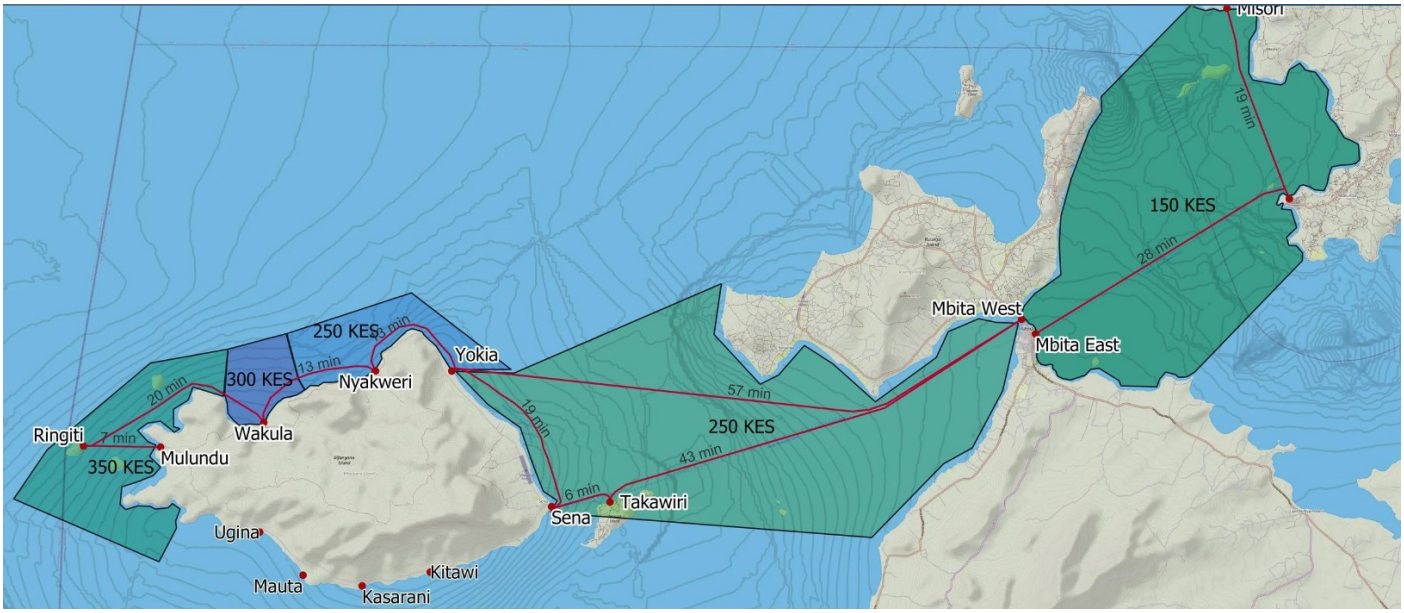


Photo 6.2: Waterbus routes and prices (Source, waterbus website 2025)

Canoes and Motorboats

Beyond the Waterbus, canoes and privately operated motorboats form the backbone of daily water transport for Ringiti residents. Canoes are primarily used for short-distance travel—linking nearby landing sites, facilitating fishing trips, and supporting local trade. Their accessibility and low operating cost make them indispensable for daily movement, though they remain limited in speed, passenger capacity, and safety during rough weather.

Privately operated motorboats provide connection between Ringiti and the mainland, particularly to Mbita. Validation findings clarified that a category of scheduled private boats operates daily at fixed times, offering fares of approximately Ksh 300 per trip—cheaper than the Waterbus fare of about Ksh 400. These boats provide an alternative transport option for routine travel, balancing affordability with flexibility.

However, outside these scheduled hours, most motorboats are used primarily for fishing rather than passenger transport, meaning that travelers needing to leave at unscheduled times must hire private boats, often at prohibitive rates. Such charters can cost several thousand shillings per trip, depending on distance and timing, placing them well beyond the reach of most residents.

While motorboats and canoes together ensure mobility in the absence of road infrastructure, the **system remains fragile and costly**. Transport affordability is constrained by fluctuating fuel prices, maintenance costs, and the lack of competition, leaving residents with few alternatives.

Photo 6.3: Docked Boats in the Settlement. (Source: GCA field visit 2025)

6.1.3 Strategic interventions

Strategic interventions to improve water transport on Ringiti should focus on several key areas, including developing modern landing sites and jetties that are resilient to flooding and wave action. It is also necessary to introduce and enforce safety regulations, such as mandatory life jackets and capacity limits. Furthermore, supporting community-managed transport cooperatives would help to reduce fares, increase predictability, and promote local ownership. Finally, strengthening collaboration between county and regional stakeholders is vital for expanding reliable and subsidized ferry services. By addressing these gaps, water transport on Ringiti can become safer, more affordable, and more resilient—bolstering the fishing economy, improving access to essential services, and reducing the island's isolation. Public Transportation Accessibility

Despite the centrality of water transport, public transport accessibility on Ringiti Island remains constrained by both affordability and reliability. The Waterbus, which is the most affordable and predictable service, operates daily with two trips—one in the morning (5:30 a.m.) and another in the evening (8:00 p.m.). This schedule provides a vital link for residents, supporting trade, schooling, health access, and social connections. However, the fixed timing of the Waterbus requires residents to carefully plan their movements. Missed departures often force reliance on private boats, which are considerably more expensive. For low-income households, who already spend a large share of their earnings on basic needs, the cumulative costs of private transport are prohibitive. This deepens economic strain and limits access to essential services.

Photo 6.4: Passengers Boarding the Waterbus in Ringiti. (Source: AMT field visit 2025)

The implications of limited accessibility are significant particularly concerning healthcare, where emergencies remain a major challenge. With only one under-equipped health facility on the island, many patients requiring advanced treatment must travel to the mainland. When emergencies occur outside the Waterbus schedule, households are forced to hire costly private motorboats, delaying or preventing timely medical care. Similarly, for education, while Ringiti hosts a primary school and an Early Childhood Development and Education (ECDE) center, secondary and tertiary learners must travel off the island for further studies. Daily commuting is impractical due to cost and distance, and reliance on twice-daily Waterbus trips or expensive motorboats discourages continuation of education beyond primary level. Furthermore, the reliance on limited transport options reduces access to regional markets, government services, and off-island employment opportunities,

impacting economic mobility. For traders and fishers, this can mean lower profits, delayed sales, and missed business opportunities. Strengthening public transport accessibility would not only enhance mobility but also reinforce equity, ensuring that health, education, and economic opportunities are not limited by transport constraints.

6.2 Energy

Energy access remains a fundamental challenge in this settlement, with the data revealing a complex landscape of energy sources that reflects both resource constraints and adaptive strategies employed by residents. The energy profile demonstrates significant reliance on traditional and alternative energy sources, with notable variations between lighting and cooking applications.

6.2.1 Lighting Energy Sources

For lighting purposes, **solar power** emerges as the **dominant energy source**, utilized by 452 households, representing approximately 70% of respondents. This substantial adoption of solar technology indicates both the availability of solar solutions and their perceived effectiveness in meeting basic lighting needs. The prevalence of solar power suggests either successful market penetration of affordable solar lighting systems or community-level initiatives promoting renewable energy adoption. However, the continued reliance on traditional lighting methods remains significant, with 68 (10.6%) households using candles and 65 (10.2%) using torches or flashlights, indicating that energy poverty persists for a substantial portion of the population.

The reported use of electricity by 33 households (5.2%) suggests a very limited penetration of electrical power in Ringiti. However, validation findings revealed that this figure reflects perception rather than reality, as there is no connection to the national electricity grid, and the island is instead served entirely by solar-based energy systems. Many residents rely on small solar panels for lighting, phone charging, and limited appliance use, but do not identify this as "electricity" in the conventional sense. As a result, the survey underreported actual household access to power.

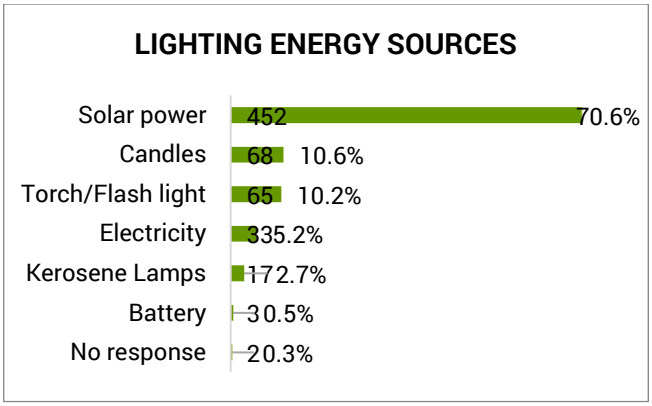


Chart 15: Lighting Energy Sources

The absence of grid electricity constrains opportunities for productive use—such as fish preservation, refrigeration, or small-scale enterprises—but the spread of off-grid solar systems demonstrates adaptive innovation within the community. Expanding and formalizing these decentralized solar networks could significantly improve energy reliability and support both household welfare and local economic activity.

Photo 6.5: Solar Panels at a Solar Mini Station in Ringiti. (Source: GCA field visit 2025)

6.2.2 Cooking Energy Sources

The cooking energy landscape presents a starkly different picture, dominated by charcoal use among 562 households, representing approximately 88% of respondents. This overwhelming dependence on charcoal has significant environmental, health, and economic implications. Charcoal production contributes to deforestation and environmental degradation, while indoor air pollution from charcoal burning poses serious health risks, particularly for women and children who spend more time in cooking areas. The economic burden of purchasing charcoal regularly also strains household budgets.

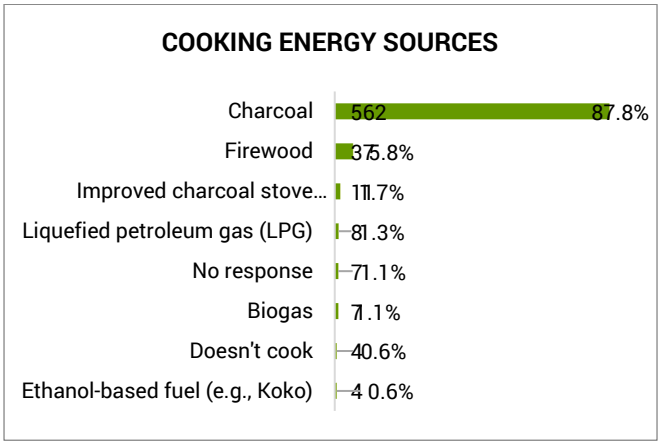


Chart 16: Cooking Energy Sources

The limited adoption of cleaner cooking technologies is evident in the data, with only 8 households using liquefied petroleum gas and 11(1.7%) households using improved charcoal stoves. This low uptake of cleaner cooking solutions suggests barriers related to affordability, availability, or awareness. The use of firewood by 37 (5.8%) households indicates continued reliance on biomass, often collected from surrounding areas, which has implications for local forest resources and women's time allocation. The minimal adoption of biogas (7 households) and ethanol-based fuels (4 households) indicates that these alternative technologies have not yet achieved significant market penetration, possibly due to high initial costs, technical challenges, or lack of awareness.

6.3 Water

6.3.1 Water Sources

The analysis of household water sources presents a concerning picture of both drinking and domestic water access on Ringiti Island. For drinking water, an overwhelming majority—588 households (91.9%)—rely directly on Lake Victoria. This near-total dependence on untreated lake water poses serious public health risks, exposing residents to waterborne diseases and contamination, particularly during periods of high turbidity and waste inflow.

Validation findings confirmed that there are no communal taps or boreholes on the island, despite a small number of survey responses suggesting their presence. Those records likely reflect misreporting or temporary private installations rather than functional, shared infrastructure. As residents emphasized, the lake remains the sole consistent source of water for most households, both for drinking and domestic purposes.

Alternative sources of safer water remain extremely limited: 34 households (5.3%) access water from small kiosks, 8 households (1.3%) purchase from vendors, 2 households (0.3%) rely on rainwater harvesting, 2 households (0.3%) use private boreholes, and 1 household (0.2%) reports using a shallow well. These figures collectively illustrate the marginal role of improved or treated sources within the settlement.

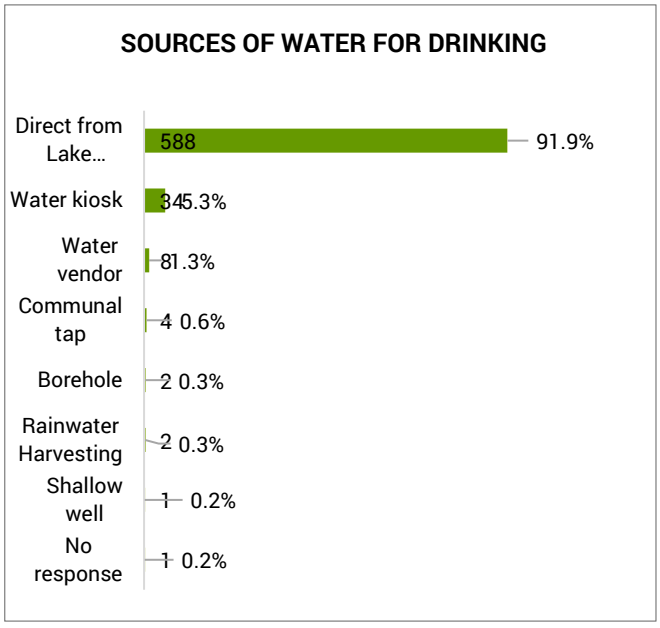


Chart 17: Sources of Water for Drinking

For domestic use, reliance on the lake is even more pronounced, with 636 households (99.4%) drawing directly from Lake Victoria. Other sources—including communal taps (2), water tankers (1), and other minor alternatives—play a negligible role. This heavy reliance on untreated surface water underscores the absence of adequate water infrastructure and safe alternatives. While the lake provides physical availability, the lack of treatment and reliable distribution systems means that availability does not translate into safety or reliability.

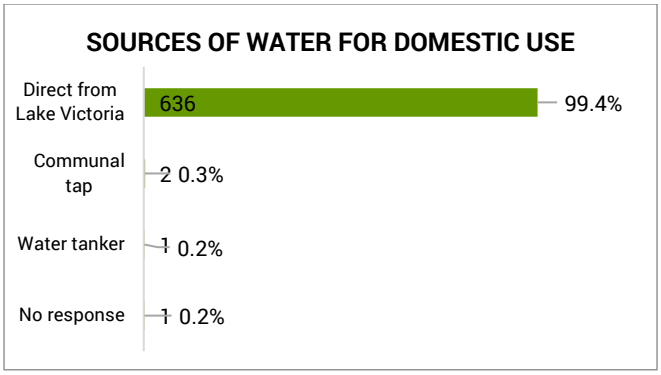


Chart 18: Sources of Water for Domestic Use

6.3.2 Water Quality Perceptions

Despite widespread reliance on **Lake Victoria** for both drinking and domestic use, the majority of households express doubts about the safety of their water. **Nearly seven in ten households (69.4%)** reported that they do not consider their water safe for drinking, compared to only **30.5%** who believe it is safe. A very small fraction (0.2%) gave no response.

This perception aligns with the **health risks posed by untreated surface water**, which is often exposed to contamination from human activity, waste disposal, and fishing operations. The high proportion of households expressing concerns about water safety underscores both **low confidence in water quality** and the **absence of adequate water treatment mechanisms** within the settlement.

The disconnect between **physical availability** (with nearly universal reliance on the lake) and **perceived safety** reveals the central challenge: households are dependent on a resource they do not fully trust. This situation elevates vulnerability to **waterborne diseases** and highlights the urgent need for **affordable treatment options, awareness campaigns, and investment in safer water supply systems**.

6.3.3 Water Treatment Practices

Although most households express concern about the safety of their drinking water, not all take steps to treat it. Out of the surveyed households, **395 (89%)** reported treating their water, while **48 households (11%)** do not, and a negligible share (0.2%) gave no response.

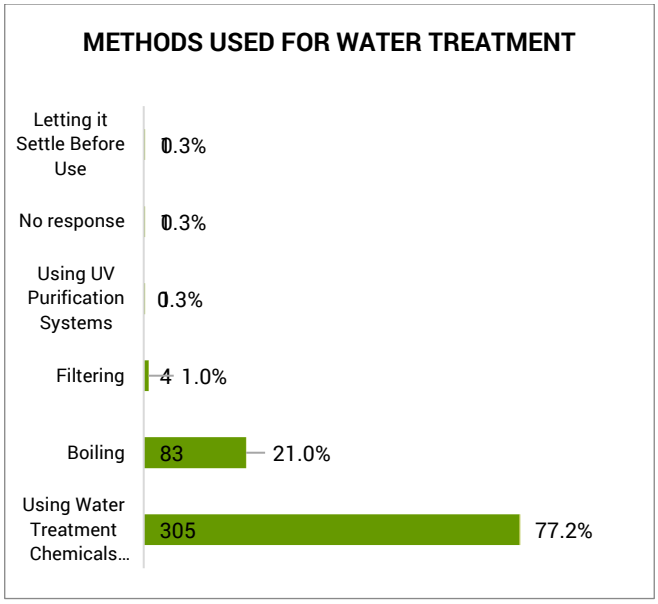


Chart 19: Methods Used for Water Treatment

Among those who treat their water, the most common method is the use of **water treatment chemicals** (305 households, 77.2%). This is followed by **boiling** (83 households, 21%), while a very small number reported using filtering (4 households, 1%), letting water settle (1 household, 0.3%), or UV purification (1 household, 0.3%).

These results highlight two critical issues: While a strong majority treat their water, the **heavy reliance on chemical treatment** raises concerns about cost, consistent availability, and correct usage. In addition, the relatively low use of boiling and filtration methods that can be more reliable if consistently applied—suggests possible barriers such as **fuel costs, awareness gaps, or access to equipment**. In contrast, the **11% of households who do not treat their water** remain at heightened risk of waterborne diseases, especially given the near-universal reliance on untreated **Lake Victoria** water.

High treatment rates reflect strong household awareness of water safety risks, but practices are skewed toward short-term, potentially unsustainable methods. Therefore, promoting **low-cost, sustainable treatment options**—such as improved filtration or safer boiling practices—could strengthen household resilience. Interventions should also target the small but vulnerable group who consume untreated water.

6.3.4 Water Consumption

Household water consumption patterns reveal significant constraints on daily use, with the majority of households (512, or 81.3%) consuming between 20–100 liters per day. Notably, 76 households (12.1%) consume exactly 20 liters daily, which corresponds to the *minimum threshold recommended by international standards for emergency situations*. This underscores the severity of

water scarcity, as many households are surviving at the bare minimum.

Access to higher water quantities remains rare—only 34 households (5.4%) use between 100–200 liters daily, while just 8 households (1.2%) report consumption above 200 liters. This distribution indicates that adequate water access is limited to a very small minority, likely due to economic constraints, distance from reliable water sources, or capacity to invest in improved access systems.

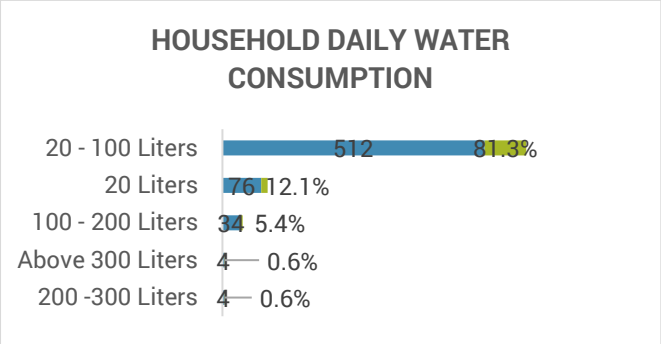


Chart 20: Household Daily Water Consumption

6.3.5 Water Cost

Validation findings revealed that the cost of drinking water on Ringiti is far higher than initial survey data suggested, exposing a hidden layer of economic vulnerability. While the lake itself provides a free and physically accessible source, households frequently incur substantial indirect costs associated with securing safe or drinkable water.

Contrary to the initial survey—which indicated that 94.2% of households paid little or nothing for water—community feedback established that many households (about 30%) spend an average of about Ksh 3,000 per month on drinking water. This spending primarily reflects the purchase of bottled water from local shops, typically 1.5-liter bottles costing around Ksh 70 each, or smaller quantities bought daily according to available income. Such purchases are driven by the absence of safe communal water points and the widespread perception that untreated lake water is unsafe for drinking.

A good proportion of households continue to draw lake water without treatment and therefore report minimal monetary cost, but they bear a higher health risk instead of a financial one. Others adopt a mixed approach—using lake water for domestic tasks such as washing and cooking, while reserving bottled or kiosk-purchased water for drinking.

This pattern reveals a paradox of affordability: water is physically abundant yet economically costly. The island's complete lack of piped infrastructure or collective supply options forces residents into individualized, market-based solutions, which are inefficient and unsustainable for low-income households. The validation findings thus reframe water access not as a problem of availability but as one of cost, quality, and inequality—where reliance on commercial bottled water deepens household expenditure and highlights the urgent need for safe, low-cost community water systems such as rainwater harvesting and localized treatment facilities.

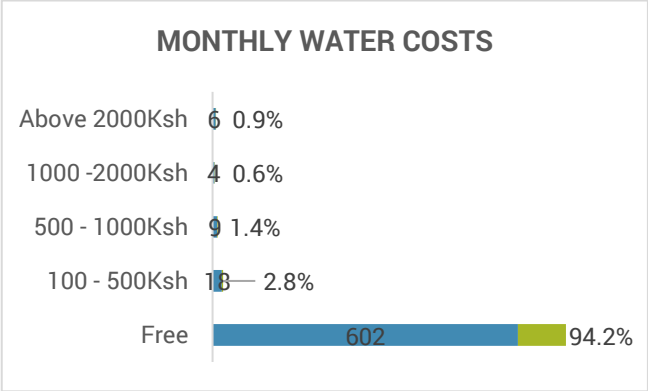


Chart 21: Resident Monthly Water Costs

The implications are clear: The prevalence of minimum-threshold water consumption indicates chronic scarcity and vulnerability, particularly in emergencies. Free access to water for most households reduces direct financial pressure but raises concerns about water quality and health risks. The presence of households paying significant sums for water reflects inequities in access, where only a few can afford safer or more reliable supply options

Water supply reliability emerges as a significant challenge for households. A large majority—179 households (75.2%)—reported experiencing single-day interruptions, while others faced longer disruptions: 28 households (11.8%) reported 2-day interruptions, 12 households (5.0%) reported 3-day interruptions, and another 12 households (5.0%) indicated supply gaps extending beyond 3 days. More severe cases were also documented, with 6 households (2.5%) experiencing week-long interruptions and 1 household (0.4%) facing an outage of more than a month.

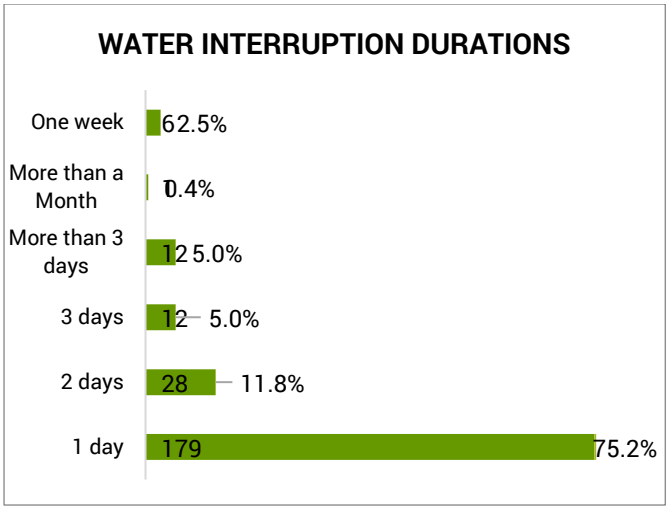


Chart 22: Water interruption durations

These findings are particularly striking because most households source their water directly from **Lake Victoria**, which in principle provides a constant supply. Interruptions in this context are therefore less about water scarcity and more reflective of **access barriers** such as physical challenges (e.g., long distances, difficult terrain, unsafe lake access during storms or at night); Management and infrastructure constraints (e.g., breakdown of storage facilities, limited distribution systems, or conflicts over access points); and Safety and health considerations (households may avoid the lake during periods of contamination risk or insecurity).

As a result, interruptions represent not just temporary inconveniences but deeper structural issues in the governance, infrastructure, and accessibility of water resources. The predominance of short-term interruptions points to systemic instability in household access arrangements, rather than absolute lack of water. Additionally, extended outages (week or month-long) highlight extreme vulnerability for a small but severely impacted minority, with direct consequences for health, hygiene, and productivity. Ultimately, addressing interruptions requires both infrastructure solutions (e.g., storage, treatment, reliable access points) and management reforms to reduce access disruptions despite the physical presence of Lake Victoria as a water source.

6.3.6 Challenges Faced in Access and Use of Water

Table 11: Main Challenges Faced in Access and Use of Water

Main Challenges Faced in Access and Use of Water	Count	Percentage of households
High cost of water	11	1.7%
Water contamination	574	89.7%
Inadequate storage facilities	222	34.7%
Irregular water supply	49	7.7%
Dependence on unregulated water vendors	3	0.5%

Households face multiple and interrelated challenges in accessing and using water, with contamination concerns dominating the responses. **Water contamination** was cited by 574 households (89.7%), reflecting the widespread dependence on untreated water from Lake Victoria. This underscores the significant public health risks and validates household perceptions of **unsafe drinking water**.

In addition, **222 households (34.7%)** reported inadequate storage facilities. This indicates that even when water is collected, households struggle with safe and sufficient storage, increasing the risk of secondary contamination and limiting the ability to cope with interruptions in supply.

Irregular water supply was identified by 49 households (7.7%), aligning with earlier findings on water interruptions that disrupt reliability. For a smaller proportion of households, **high water costs (11 households, 1.7%)** and **dependence on unregulated water vendors (3 households, 0.5%)** represent challenges, suggesting that affordability and regulation issues affect a minority but still contribute to overall vulnerability.

The dominance of contamination as a reported challenge highlights an urgent need for safe water infrastructure and treatment solutions. Furthermore, storage constraints point to the importance of interventions such as affordable, durable containers and household-level storage technologies. While costs and reliance on vendors are less widespread, they illustrate economic and governance inequalities that affect certain households disproportionately.

Photo 6.6: Residents Relying on Polluted Lake Water for Domestic Use. (Source: GCA field visit 2025)

6.4 Sanitation

Sanitation infrastructure and practices within the settlement reveal critical public health challenges that demand urgent attention and comprehensive intervention. The data presents a concerning picture of inadequate facilities, unsafe practices, and severe environmental risks.

6.4.1 Human Waste Disposal methods

Open defecation is alarmingly widespread, with 266 households practicing it within the settlement and a further 113 households defecating directly into Lake Victoria. This means that nearly 59 percent of households engage in open defecation, creating serious risks of disease transmission, environmental degradation, and contamination of the very water body that serves as the primary drinking and domestic water source for most residents. The direct disposal of human waste into the lake perpetuates a dangerous cycle of contamination and exposure that undermines both health and livelihoods.

Pit latrines serve 219 households, making them the most common form of structured sanitation. While they provide a safer option than open defecation, their effectiveness depends heavily on proper construction, maintenance, and safe emptying. Without these, pit latrines themselves risk contributing to groundwater contamination and environmental pollution. The relatively high number of households relying on pit latrines shows that some level of sanitation infrastructure exists, but the persistence of open defecation indicates that even this basic technology remains out of reach for many.

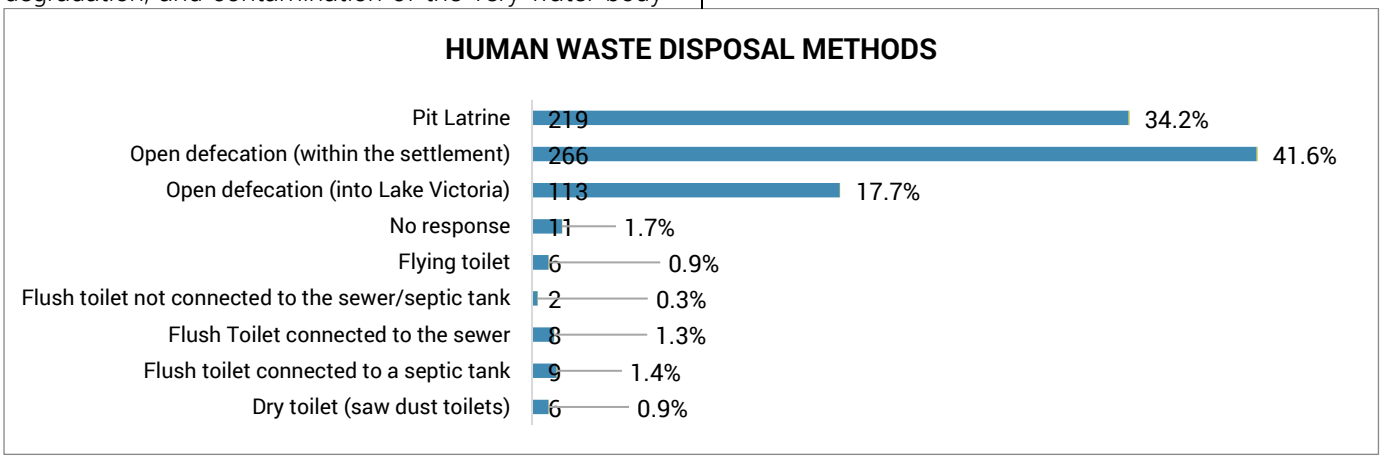


Chart 23: Human Waste Disposal Methods

Modern sanitation facilities are extremely rare, with only 25 households—less than four percent—reporting access to flush toilets. These include a small number connected to septic tanks or sewer lines, while others are not connected to any treatment system at all. Although the presence of sewer connections points to some degree of formal infrastructure, coverage is so minimal that it does not significantly change the overall sanitation landscape.

Alternative practices remain marginal, with a handful of households using dry toilets with sawdust and another group resorting to "flying toilets," which involve the use of plastic bags for defecation that are then discarded in the environment. The use of flying toilets is especially problematic, as it worsens pollution and directly exposes residents to health hazards.

6.4.2 Sharing of Toilet Facilities

Toilet facilities within the settlement are overwhelmingly shared, with 230 households, representing 86.1%, reporting that they share facilities with other households. Only 33 households, or 12.4%, reported having exclusive access to their toilet facilities, while a small fraction of respondents (1.5%) did not provide an answer.

Among those who share, the majority depend on basic plot-level toilets, accounting for 33.3% of shared arrangements, while another 30.3% use free public toilets and 17.3% rely on pay-to-use public toilets. A smaller number of households access community shared toilets (10.4%), institution-based toilets (1.3%), or other arrangements (0.4%), while a handful of respondents (1.3%) even reported open defecation within the settlement as their form of shared sanitation.

The prevalence of shared toilet use highlights the severe shortage of private sanitation facilities. High levels of sharing often lead to overcrowding, rapid deterioration of facilities, and reduced privacy, all of which discourage consistent use and increase the likelihood of reverting to open defecation. In contexts where sanitation facilities are poorly maintained, sharing also raises health risks, particularly for women, children, and the elderly, who may face both safety and hygiene challenges.

6.4.3 Cost of Utilizing Toilet Facilities

Table 12: Costs of Utilizing Toilet Facilities

Price per Use of Toilets	Count of households	Percentage of households
1 – 50 Ksh	29	65.9%
50 – 500 Ksh	14	31.8%
Above 500 Ksh	1	2.3%
Total	44	100%

The cost structure for toilet access reveals additional barriers to sanitation improvement. The majority of households that pay for toilet use (65.9%) spend between 1 and 50 Kenyan Shillings per use, while 31.8% pay significantly higher amounts ranging from 50 to 500 Ksh, and a small fraction (2.3%) report paying above 500 Ksh. These usage fees indicate the presence of commercial or communal toilet facilities within the settlement. However, the cost burden—particularly for those paying on the higher end—may limit access for the poorest households, potentially forcing them to resort to unsafe sanitation practices such as open defecation.

6.4.4 Safety Concerns in Accessing Toilets

Safety while accessing toilets, especially at night, is a major concern for many households. A majority of respondents, 379 households (59%), reported that they do not feel safe using toilet facilities after dark. In contrast, 237 households (37%) indicated that they feel safe, while 24 households (4%) gave no response.

The perception of insecurity reflects the reality of sanitation infrastructure in the settlement, where facilities are often shared, poorly lit, and located at some distance from households. These conditions create particular risks for women, children, and other vulnerable groups, who may face not only physical danger but also a lack of privacy and dignity when accessing toilets at night. The absence of adequate safety measures, such as lighting, proximity, and secure facility design, contributes to this sense of vulnerability and may discourage consistent toilet use, thereby increasing reliance on unsafe practices like open defecation or flying toilets.

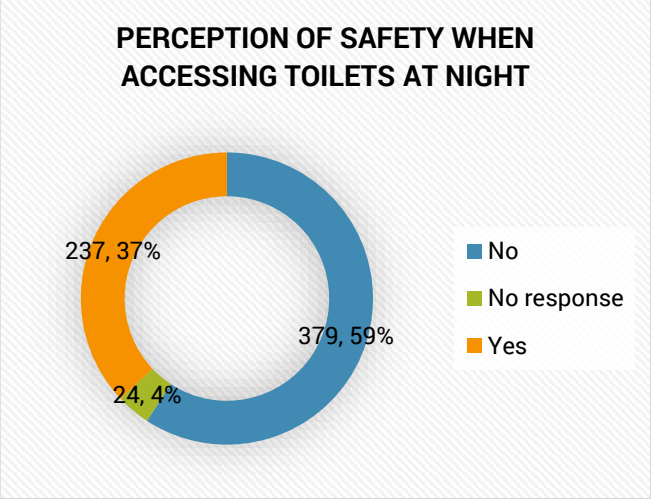


Chart 24: Perception of Safety When Accessing Toilets at Night

6.5 Solid Waste Management

Solid waste management in the settlement demonstrates significant environmental challenges and the near absence of formal waste collection infrastructure. Residents primarily rely on informal and often environmentally harmful disposal methods, reflecting both the lack of comprehensive municipal services and the coping strategies households adopt to manage waste.

The burning of waste emerges as the dominant method, with 378 households (59.1%) reporting that they dispose of their waste this way. While burning reduces waste volume, it generates serious air quality concerns and contributes to respiratory health problems, particularly affecting children, the elderly, and those with pre-existing health conditions. Its widespread use underscores the lack of safer alternatives and aligns with common practices observed in informal settlements where formal collection is unavailable.

A smaller proportion of households, 147 (23.0%), dispose of waste in designated areas. However, the effectiveness and environmental safety of these areas are questionable without adequate management, containment, and treatment systems. This practice shows potential for improvement, as better-managed designated sites could form the basis of a more sustainable waste management system.

Alarmingly, 84 households (13.1%) dispose of their waste directly into Lake Victoria, the same water body that provides drinking and domestic water for most residents. This practice perpetuates a dangerous cycle of contamination, directly threatening water quality, public health, and aquatic ecosystems. It highlights the urgent need for interventions to break the link between unsafe disposal practices and household exposure to environmental hazards.

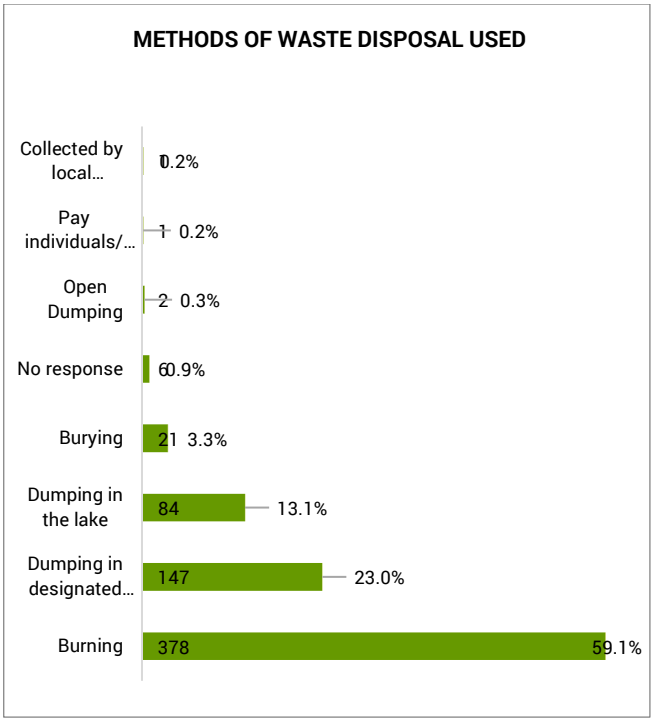


Chart 25: Methods of Waste Disposal

Other disposal methods remain marginal: 21 households (3.3%) bury their waste, which, while preferable to open dumping, can pose risks of groundwater contamination depending on the waste type and soil conditions. A very small number of households reported open dumping (2 households, 0.3%), paying individuals or groups to collect waste (1 household, 0.2%), or collection by local authorities (1 household, 0.2%). Six households (0.9%) gave no response.

6.6 Information, Communication, and Telecommunications

6.6.1 Mobile Network and Internet Coverage

Ringiti Island demonstrates widespread uptake of mobile phones, reflecting national trends of high mobile penetration even within marginalized and informal settlements. Both basic phones and smartphones are in use, though there is a notable shift toward smartphones, which have enabled a wider range of functions including internet access, social media use, mobile money transactions, and informal business activities.

The island is primarily served by Airtel and Safaricom networks, which provide the backbone of mobile communication. Despite their presence, network stability can fluctuate, especially in peak periods, and internet speeds remain inconsistent. Internet access is almost entirely dependent on mobile data subscriptions, with limited or no fixed broadband infrastructure available on the island. A cybercafé exists, but its impact is limited due to unreliable connectivity and low uptake compared to personal mobile phone use.

Social media is a central part of digital engagement. Facebook remains widely used by older residents to share updates and participate in community discussions, while younger generations increasingly prefer TikTok, Instagram, and X (formerly Twitter) to access news, entertainment, and express opinions in real-time. This evolving digital ecosystem has become a key avenue for information exchange, bridging local and national issues. However, high data costs —averaging about Ksh 500 to 1,000 per month for moderate smartphone users— inconsistent connectivity, and gaps in digital literacy remain barriers to broader and more effective use.

6.6.2 Mass Media Communication

Radio remains the dominant mass media channel on Ringiti Island, providing an affordable and accessible means of staying informed. Residents listen to both local and regional stations, including Ramogi FM (97.0), Girwa FM (105.0), Lolwe FM, Mayienga FM, and Victoria Radio, which broadcast in local languages and focus on community-centered content. Popular national stations such as Radio Citizen, Radio Maisha, and Radio Jambo also enjoy wide followings, offering news, entertainment, and national dialogue in English, Kiswahili, and vernacular.

Television access is less widespread and is largely concentrated in entertainment zones such as local cinema halls and video showrooms, where residents gather to watch broadcasts collectively. The most popular channels include Ramogi TV, Citizen TV, KTN, NTV, and KBC, which provide programming that blends national issues with content relevant to Homa Bay County and Lake Victoria communities.

Print media also continues to play a role, particularly through widely circulated newspapers such as The Standard and Daily Nation, which reach the island with some delay but remain important for in-depth coverage of national and regional affairs

7 SOCIAL INFRASTRUCTURE

Social infrastructure forms the foundation of community well-being and human development, encompassing the essential services and facilities that enable residents to access education, healthcare, economic opportunities, and social amenities. The analysis of social infrastructure within this settlement reveals significant insights into the current state of service provision, accessibility challenges, and the various strategies employed by residents to meet their basic social needs. Understanding these patterns is crucial for informing policy interventions and infrastructure development priorities that can enhance quality of life and promote sustainable community development.

7.1 Education

Educational infrastructure and access patterns within Ringiti reveal both progress and persistent challenges in ensuring quality learning opportunities. The data highlights key differences across education levels, showing that while primary education is relatively well served locally, secondary and higher education opportunities remain completely external.

Primary education shows the strongest internal capacity. A total of 204 students (73.9%) attend primary schools within the settlement, while 52 students (18.8%) must travel outside Ringiti for schooling. This means that nearly four in five primary school children access education locally, reflecting relatively strong coverage at this level compared to higher institutions.

During the validation meeting, residents emphasized that Ringiti Primary School plays a central role in the community and that there is an active proposal to introduce boarding facilities. The aim is to accommodate pupils affected by distance, unsafe transport, or unstable home environments. The addition of boarding would strengthen continuity in learning and improve educational retention, especially during adverse weather when transport to and from the island becomes unreliable.

An ECDE facility also exists within the settlement and is vital in supporting early learning. However, validation findings highlighted recurrent flooding and the presence of earth floors in these classrooms, which frequently disrupt lessons and create unsafe learning conditions during the rainy season. The community identified this facility as a key priority for infrastructural improvement—particularly the need for elevated flooring and improved drainage around ECDE compounds.

In addition to public institutions, residents reported the presence of a private school, Rocks of Ages Academy. This demonstrates community-driven investment in education and reflects how informal land governance structures have supported social infrastructure development despite the absence of formal planning.

Secondary education remains the weakest link in the education system. No secondary school exists within the settlement, and all students seeking secondary education must travel outside the island—7 students (2.5%) at the time of data collection. This dependence on external schools imposes additional costs and logistical barriers that discourage sustained attendance, particularly for children from low-income households.

Tertiary education opportunities are entirely absent. Only 4 students (1.4%) attend colleges or universities outside the island, reflecting the absence of local provision and the broader issue of educational outmigration. Vocational and technical training also remains extremely limited, with just 4 students (1.4%) enrolled in Technical and Vocational Education and Training Institutions (TVET) or vocational programs within the settlement and 2 students (0.7%) outside. This gap constrains youth employment opportunities and limits skill development relevant to the fishing and small-trade economy that sustains the settlement.

Table 13: Enrollment in Education Institutions

Institution	Number of Households	Percentage of Households
Primary school within the settlement	204	74.7%
Primary school outside the settlement	52	19.0%
Secondary school within the settlement	0	0.0%

Secondary school outside the settlement	7	2.6%
College/University within the settlement	0	0.0%
College/University outside the settlement	4	1.5%
TVET/Vocational training center within	4	1.5%
TVET/Vocational training center outside	2	0.7%
Total	273	100%

The educational attainment levels of the broader population reveal important patterns that reflect both historical educational access and current educational challenges. Primary education represents the largest category with 407 individuals, indicating that basic literacy and numeracy skills are relatively widespread within the community. However, the fact that primary education represents the highest attainment for the majority of residents suggests limited progression to higher educational levels, which may constrain economic opportunities and limit the community's human capital base.

Educational Attainment

The distribution of educational attainment among Ringiti's population highlights both significant progress in basic education and persistent gaps in higher education. Under Kenya's education system, primary education covers Grades 1–6, while secondary education now includes Junior Secondary (Grades 7–9) and Senior Secondary (Grades 10–12). Preparatory education refers to Early Childhood Development and Education (ECDE), which caters to children aged 3–5 years. Post-secondary levels include Technical and Vocational Education and Training (TVET) and university education.

Primary education is the most commonly attained, reported by 649 individuals (44.7%), followed by **secondary education**, reported by 487 individuals (33.5%). Together, nearly four in five residents have reached at least a primary or secondary level of education, indicating broad engagement with the education system. However, the gap between primary and secondary completion suggests that a considerable number of individuals do not progress beyond basic education, likely due to cost, distance to schools, or household economic pressures.

Recent curriculum reforms introduced through Kenya's Competency-Based Curriculum (CBC) have restructured the old **8-4-4 system** (8 years of primary, 4 of secondary, and 4 of university education) into a **2-6-3-3-3 framework**—two years of pre-primary, six of primary, three of junior secondary, three of senior secondary, and three of tertiary or university training. These reforms are reflected in **70 individuals (4.8%)** reporting **junior secondary attainment**, showing early adoption of the new system among younger cohorts. **Preparatory-level education**, reported by 62 individuals (4.3%), highlights participation in early childhood learning, although relatively low figures point to gaps in infrastructure and affordability for pre-primary education.

Educational exclusion persists, with **69 individuals (4.7%)** having no formal education. This group, though relatively small, is likely concentrated among older residents, women, or persons with disabilities, and reflects barriers to participation in both economic and social opportunities.

Higher education remains extremely limited. Only **60 individuals (4.1%)** reported college-level education, and **16 individuals (1.1%)** reported university-level attainment. Together, this accounts for less than 6% of the population achieving tertiary education, a level far below national average. This constraint directly affects the community's leadership capacity, professional skills base, and readiness to engage with complex development challenges.

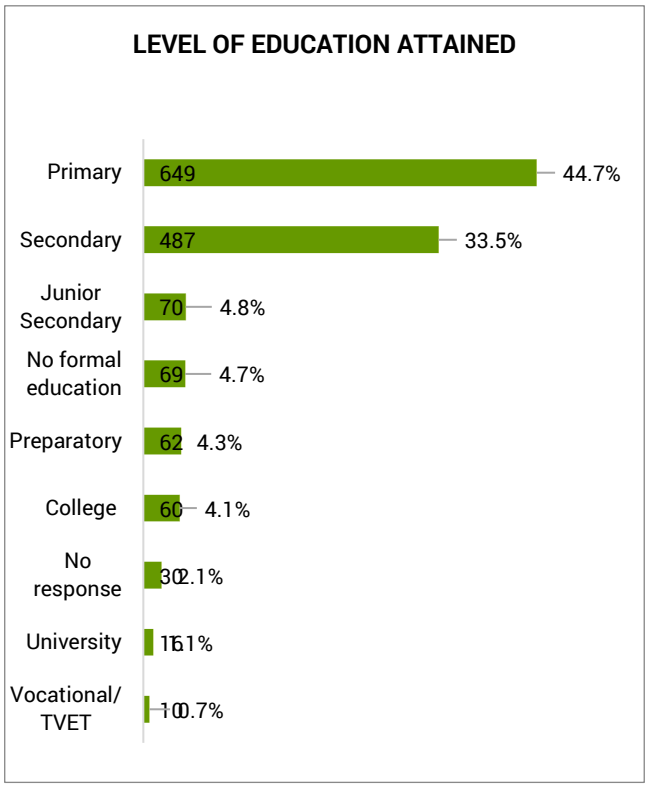


Chart 26: Level of Education Attained

Vocational and technical education is also underrepresented, with only **10 individuals (0.7%)** reporting TVET qualifications. Given Ringiti's reliance on fisheries, informal trade, and crafts, this represents a

missed opportunity to strengthen local livelihoods through practical, skills-based training.

7.2 Health

Healthcare access and outcomes within Ringiti reveal a mixed landscape of limited facilities, persistent disease burden, and systemic service gaps that collectively constrain community well-being. While basic services are available locally, the capacity and quality of these services remain inadequate for the settlement's size and vulnerability context.

Healthcare facility utilization patterns show that community clinics are the primary providers of medical care, with 403 households (63.0%) relying on them. These facilities deliver essential preventive and curative services but face overwhelming demand relative to their staffing and supply capacity. Validation findings confirmed that human resource shortages are a major challenge, with too few qualified health workers to meet the needs of the population. Staff shortages contribute to long waiting times, limited-service hours, and constrained follow-up care.

Public hospitals and dispensaries serve 215 households (33.6%), yet there is only one functional public health facility on the island. Its limited capacity, coupled with the absence of specialized equipment or referral services, leaves residents dependent on facilities outside Ringiti for more complex medical care. Emergency evacuations to the mainland are particularly difficult, as the island lacks an ambulance or organized emergency response system. In urgent cases—such as childbirth complications or severe injuries—patients must rely on costly or ad hoc private boat transport, a delay that can prove life-threatening.

Pharmacies and chemists, serving 75 households (11.7%), fill crucial gaps by providing over-the-counter medicines and first-line treatments. However, heavy reliance on these outlets without medical supervision can lead to misdiagnosis, antibiotic misuse, or delayed treatment of serious conditions. Private hospitals, used by 20 households (3.1%), cater to those with higher incomes, while a small fraction of households report using mobile clinics (0.9%) or traditional healers (0.6%).

Validation discussions also highlighted that many buildings across the settlement are substandard, characterized by poor ventilation, makeshift roofing, unplastered walls, and inadequate sanitation facilities. These include both residential and community structures—such as shops, rental units, and service spaces—most of which are constructed from lightweight materials like timber, iron sheets, and reused metal panels. Such conditions pose direct health and safety risks, especially during storms or floods, when weak structures are prone to leaks, collapse, or contamination. These physical weaknesses not only limit the durability of buildings but also increase vulnerability to disease transmission and injuries during extreme weather events.

Table 14: Health Facilities

Health Facility Used by Households	Number of Households	Percentage of Households
Community Clinic	403	63.0%
Public hospital/dispensary	215	33.6%
Pharmacy/Chemist (several)	75	11.7%
Private hospital	20	3.1%
Mobile clinic	6	0.9%
Traditional Healer	4	0.6%
No response	4	0.6%
Total	640	100%

7.2.1 Distance to Nearest Healthcare Facility

Accessibility of healthcare in Ringiti is shaped not only by the range of facilities available but also by the distance households must travel to reach them. The majority of households, **357 (55.8%)**, reported living within 500 meters—or about a 10-minute walk—of their nearest health facility. Another **220 households (34.4%)** reported being within 500 meters to 1 kilometer, indicating that around 90% of households have relatively close access to some form of health service.

However, the quality and type of care available within these short distances are limited. Households located closer to facilities are typically near **community clinics or pharmacies/chemists**, which provide basic and immediate services but lack the capacity for more complex care. A smaller share of households, **32 (5.0%)**, reported distances of 1 to 2 km, and **25 (3.9%)** reported distances of 2 to 5 km, reflecting those who may need to travel farther for more formal services such as the single **public hospital/dispensary** on the island. Only **2 households (0.3%)** reported being more than 5 km away from the nearest facility, which likely indicates dependence on external hospitals located outside Ringiti.

The relatively short travel times reflect the presence of **basic facilities within the settlement—community clinics, several pharmacies/chemists, and one public dispensary**. Yet the absence of higher-level facilities such as a fully equipped hospital or specialized health center means that households, even when physically close to a facility, may still lack access to comprehensive healthcare. The heavy concentration of care at community-level facilities therefore masks deeper challenges of quality, capacity, and range of services.

In effect, **proximity does not equate to adequacy**. While most residents are within walking distance of some form of healthcare, the absence of robust secondary or specialized services means that advanced care still requires costly and time-consuming travel outside the island. This gap leaves Ringiti residents vulnerable in cases of medical emergencies, maternal health complications, and chronic disease management.

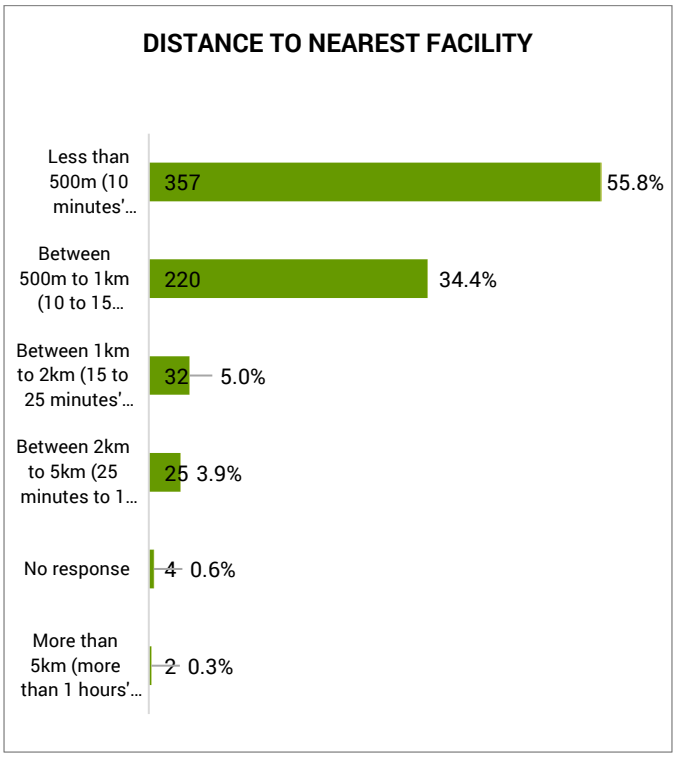


Chart 27: Distance to Nearest Facility

7.2.2 Common Illnesses

Malaria is the leading illness, reported by **393 households (61.4%)**, underscoring the settlement's vulnerability to mosquito-borne diseases given its location on Lake Victoria and likely exposure to breeding grounds.

Diarrheal diseases, affecting **177 households (27.7%)**, are the second most common illness. This pattern strongly reflects challenges in **water quality, sanitation, and food safety**, reinforcing earlier findings on widespread water contamination and unsafe sanitation practices. The burden of diarrheal disease is particularly severe for children, where it contributes to malnutrition, stunted growth, and reduced school attendance. During the validation meeting, the residents also mentioned that typhoid is one of the most prevalent illnesses.

Respiratory conditions are also prevalent, with **14 cases of asthma and 8 cases of pneumonia** reported. These are likely linked to **indoor air pollution from cooking fires, poor ventilation in temporary housing, and environmental exposures**. Such conditions point to the need for safer cooking technologies and improved housing quality.

Table 15: Most Common Illnesses in the Settlement

Illness	Number of Households	Percentage of households
Malaria	393	61.4%
Diarrhea	177	27.7%
Asthma	14	2.2%
Skin diseases	9	1.4%
Pneumonia	8	1.3%
No response	6	0.9%
HIV/Aids	6	0.9%
Hypertension	4	0.6%
Tuberculosis (TB)	4	0.6%
Epilepsy	3	0.5%
Typhoid	3	0.5%
Sickle cell	2	0.3%
Whooping cough	2	0.3%
Ulcers	2	0.3%
Diabetes	2	0.3%
Measles	2	0.3%
Bilharzia	1	0.2%
Flue	1	0.2%
Allergy	1	0.2%
Grand Total	640	100.0%

Communicable diseases show a concerning presence, with **6 cases of HIV/AIDS and 4 cases of tuberculosis (TB)**. These require long-term management, access to specialized treatment, and sustained investment in **health education, screening, and antiretroviral therapy (ART)/TB treatment programs**.

Emerging non-communicable diseases such as **hypertension (4 households), diabetes (2), and ulcers (2)** reflect changing disease patterns in the community, likely linked to dietary shifts, lifestyle changes, and aging. These conditions point to the growing need for preventive care and chronic disease management services, which are currently limited in Ringiti.

Other reported illnesses—including **skin diseases, epilepsy, sickle cell disease, measles, and whooping cough**—illustrate the diverse health challenges faced by residents. Their presence underscores the importance of strengthening the local health system to provide comprehensive services that address both common and specialized needs.

7.2.3 Health Insurance

Health insurance coverage in Ringiti reveals significant gaps in financial protection for healthcare costs. A majority of households, **363 (56.7%)**, reported having **no form of health insurance**. This lack of coverage creates substantial financial barriers to healthcare access, leading to delayed care-seeking, catastrophic health expenditures, and a heightened risk of impoverishment

due to medical costs. For households without insurance, specialized care, emergency services, and expensive treatments remain largely inaccessible.

National government-provided insurance, such as the Social Health Insurance Fund, covers **234 households (36.6%)**. While this represents an important social protection mechanism, the effectiveness of this coverage depends on the range of services included, the availability of contracted providers, and efficiency in reimbursement systems.

Employer-provided insurance was reported by only **11 households (1.7%)**, reflecting the limited number of formal employment opportunities within Ringiti. The vast majority of residents work in the informal sector, leaving them excluded from employer-based benefits.

Privately purchased insurance is almost negligible, with just **2 households (0.3%)** indicating coverage. This extremely low uptake reflects both the economic constraints faced by most households and the limited tailoring of private insurance products to the realities of small island settlements.

Additionally, **30 households (4.7%)** gave no response, suggesting either lack of clarity on their insurance status or absence of awareness about available schemes.

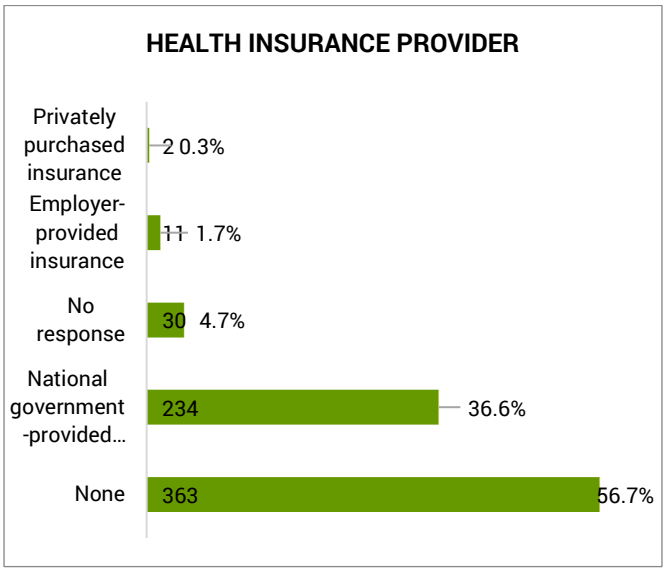


Chart 28: Types of Health Insurance Accessed

The overall pattern reveals that while a notable portion of households benefit from national government insurance, the majority remain uninsured. This underscores the urgent need for expanding affordable coverage, strengthening awareness about available schemes, and ensuring that insurance translates into meaningful healthcare access.

7.2.4 Healthcare Financing

Access to healthcare in Ringiti is heavily shaped by how households fund medical expenses. The data shows that the overwhelming majority of households rely on personal savings, with 303 households (81.5%) reporting this as their primary source of healthcare financing. This reliance indicates the absence of strong financial protection mechanisms and exposes households to significant risks of catastrophic health expenditures.

A further 42 households (11.3%) draw from household income set aside for health, reflecting deliberate planning but also highlighting that only a minority are able to ring-fence resources for medical care. Other sources play a far smaller role. Only 6 households (1.6%) reported support from relatives, while 2 households (0.5%) rely on contributions from friends and another 2 households (0.5%) from chamas (informal savings groups). Loans from financial institutions and daily earnings were reported by just 1 household each (0.3%), underscoring limited access to formal credit or wage-based financing. Meanwhile, 15 households (4.0%) gave no response, which may reflect uncertainty or irregular strategies in financing health expenses.

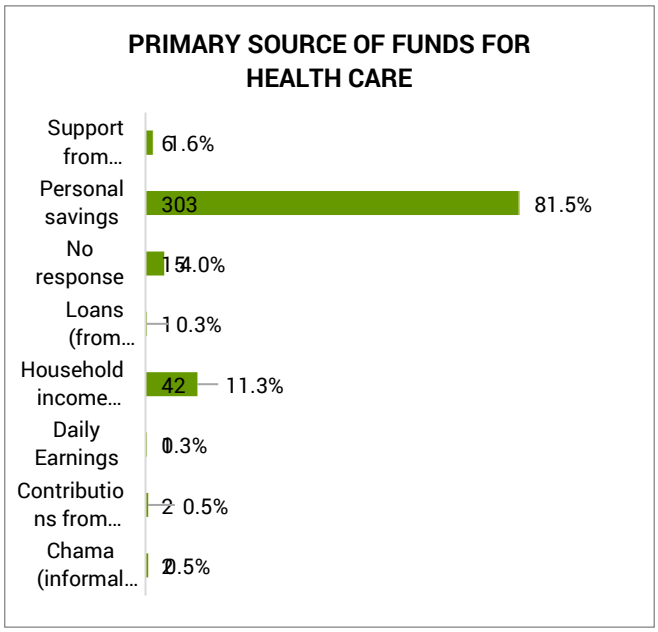


Chart 29: Primary Source of Funds for Health Care

This pattern illustrates a system where out-of-pocket expenditure dominates healthcare financing, leaving households highly vulnerable to economic shocks when illness occurs. Strengthening insurance uptake, community-based financing, and social protection mechanisms is essential to reduce the reliance on personal savings and make healthcare access more equitable and sustainable.

7.2.5 Healthcare Challenges

Healthcare challenges faced by households in Ringiti reveal systemic issues that undermine health outcomes and access to care. The most critical barrier is the lack of medicine, reported by 534 households (83.4%). This widespread shortage of essential medicines reflects supply chain inefficiencies, inadequate funding for public facilities, and limited pharmaceutical availability. Such shortages lead to treatment interruptions, worsening of illnesses, and reduced trust in healthcare services.

The cost of treatment was identified by 260 households (40.6%) as a significant challenge. Despite the presence of a public hospital/dispensary and government insurance schemes, out-of-pocket costs for drugs, consultations, and transport remain substantial. These financial barriers often force households to delay care, seek incomplete treatment, or avoid healthcare altogether.

Poor quality of service, reported by 116 households (18.1%), highlights concern about healthcare delivery standards. Issues such as understaffing, insufficient training, inadequate equipment, and poor patient-provider interactions contribute to dissatisfaction and may discourage preventive care and timely treatment.

While most households live close to at least one health facility, 58 households (9.1%) reported distance as a barrier. For these households, geographic isolation, poor transport, or mobility constraints make it difficult to access care—particularly for emergencies, maternal health, and chronic disease management. A smaller number, 13 households (2.0%), gave no response.

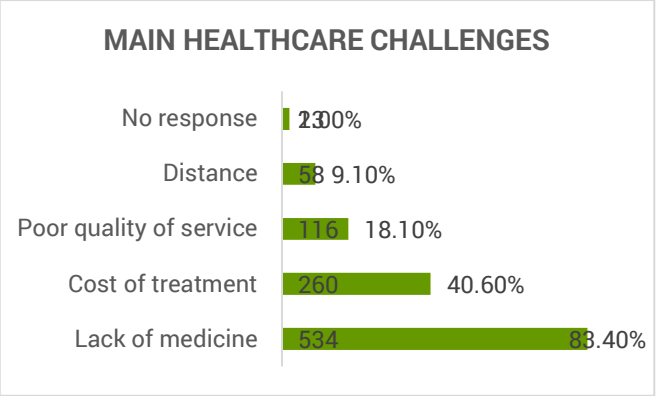


Chart 30: Main Healthcare Challenges

7.3 Markets and Economic Hubs

The economic heart of Ringiti is shaped by informal but dynamic hubs that serve both as centers of trade and as spaces for community interaction. The most prominent is the informal market located near the water bus terminal, which functions as the settlement's commercial and social core. During the day, this area hosts small-scale traders dealing in groceries, fish, household items, and cooking services. By nightfall, the terminal transforms into a lively space with eateries, food vendors, and social gatherings, making it the cultural and economic heart of Ringiti after dark. This dual function—as a daytime market and nighttime event space—illustrates its centrality in both livelihood and social life.

In addition to the water bus terminal market, small shops and kiosks are scattered throughout the settlement, providing essential goods such as dry foodstuffs, household consumables, and mobile phone services. These shops are typically family-run and operate within highly informal frameworks, often without permanent infrastructure or official licensing. Their presence reflects the adaptability of local residents to meet everyday consumer needs despite infrastructural constraints.

Photo 7.1: Waterfront area functioning as a market and landing hub for trade and social interaction. (Source: GCA field visit 2025)

Fishing activities dominate the local economy, reinforcing Ringiti's identity as a fishing-dependent settlement. Fishermen sell their catch in two primary ways: directly to hotels and lodges that buy in bulk for onward processing or preparation, and informally along the lakefront at docking points where smaller traders and consumers gather. These landing sites are characterized by highly active, early-morning or late-evening trade, as boats return with fresh fish that are quickly purchased, processed, or consumed. This system creates a fast-moving and localized fish economy, but one that remains vulnerable to fluctuations in catch levels, middlemen dynamics, and lack of cold storage facilities.

Beyond fishing and basic retail, economic diversification remains limited. Informal eateries, small food stalls, and occasional event-based commerce near the terminal provide employment and income opportunities, especially for women and youth, but they remain small-scale and precarious. The absence of formalized market infrastructure, including designated stalls, cold storage, and regulated trading spaces, restricts the potential for economic growth, food safety improvements, and more organized trade.

7.4 Security

Security within Ringiti Island itself is generally stable, with very low levels of crime or interpersonal insecurity. The island hosts a police station, which provides a formal law enforcement presence and deters major incidents. Although resources are limited, the existence of a permanent station ensures that residents have a reliable point of contact for reporting and resolving disputes.

The social fabric of the island contributes significantly to this sense of safety. Residents know one another well, enabling strong informal surveillance and community accountability. The island's geographic isolation further reinforces security: surrounded by water, it is difficult for offenders to escape undetected, reducing opportunities for theft or violence. As a result, cases of ordinary crime are rare, and day-to-day disputes—such as those arising around the waterbus terminal or informal markets—are typically resolved quickly through community mediation or with assistance from local police.

However, validation findings highlighted a contrasting dimension of insecurity on the lake, where most of Ringiti's livelihoods are anchored. Piracy, harassment, and theft targeting fishers have become recurring problems, particularly along border zones and open-water fishing grounds shared with Uganda and Tanzania. Fishers reported frequent encounters with cross-border patrols and informal enforcement groups, which sometimes involve confiscation of catch, nets, or engines. These incidents have direct economic consequences, leading to income losses, psychological stress, and, in some cases, the relocation of households seeking safer fishing grounds.

This lake-based insecurity reveals a gap between territorial policing and livelihood protection. While the island's internal safety remains high, Ringiti's economic security is undermined by weak cross-border coordination and limited patrol capacity on the water. The situation calls for stronger collaboration between national security agencies, the single Beach Management Unit (BMU) operating on Ringiti, and

regional authorities to establish predictable enforcement protocols, reduce harassment, and protect the livelihoods of legitimate fishers.

7.5 Recreational Areas

Recreational spaces in Ringiti are a mix of informal community hubs and a few designated areas that provide opportunities for leisure and social life. The most prominent recreational hub is the market and water bus terminal area, which transforms into a lively gathering point in the evenings. Beyond trading and food vending, the area becomes a cultural center where residents meet for music, conversation, and informal events, making it the social heart of the settlement after nightfall.

Eateries and small kiosks also function as recreational spaces, where people gather to share meals, watch television—often sports or news—and engage in social interaction. Similarly, **fishing beaches and docking points** serve as gathering spots, doubling as both economic and social spaces where residents exchange news and spend leisure time.

On the **other side of the settlement**, areas without houses are used as **designated bathing and swimming spaces**, with separate spots for men and women. These areas provide both recreational and practical functions, reflecting how the community makes use of available open spaces to meet cultural and social needs.

Ringiti also has a **playground located in the upper part of the settlement near the hospital**, which offers children and youth an important outlet for play and physical activity. While modest, it represents one of the few purpose-built recreational facilities on the island and adds to the diversity of social spaces available.

Photo 7.2: Open field used for community recreation and sports activities. (Source: AMT field visit 2025)

Despite these opportunities, Ringiti lacks formal recreational infrastructure such as community halls, sports courts, or organized event spaces. Recreation remains highly dependent on **multipurpose informal spaces** and a small number of designated areas.

7.6 Other Social Facilities

In addition to health, education, markets, and recreational spaces, Ringiti hosts a number of other social facilities that contribute significantly to community life, social cohesion, and service delivery. While limited in scale, these facilities often play multiple roles, providing both formal and informal spaces for interaction and support.

One of the most notable facilities is the **BMU offices, which include a hall that functions as the de facto community hall. This space serves as a central venue for public meetings, conflict resolution, and decision-making related to fishing, which is the settlement's primary economic activity. The BMU hall is also used for broader community gatherings, awareness sessions, and training events, making it one of the few formalized spaces where the community can assemble collectively.**

Religious institutions are also highly significant. Ringiti is home to **several churches representing different denominations**, and these institutions provide not only spiritual services but also important platforms for social support, moral guidance, and community mobilization. Churches frequently organize community events, charitable activities, and youth or women's programs, thereby playing a central role in the island's social and cultural life.

Schools, particularly those with open grounds, often double as multipurpose facilities. Beyond their educational role, they serve as spaces for social functions, community meetings, and youth activities such as sports or cultural events. In this way, they extend their impact beyond formal education.

Ringiti also has a **cybercafé**, which, although limited in service reliability due to unreliable connectivity, provides a modest point of access to digital services. Residents use it for printing, browsing, and occasional online communication, reflecting emerging digital needs within the community despite infrastructural limitations.

Alongside these formal facilities, there are also numerous informal social spaces, such as eateries, kiosks, and the water bus terminal, which act as everyday gathering points. These places, while primarily economic in function, are also essential to the social fabric of the settlement, supporting casual interaction, information exchange, and cultural vibrancy.

Despite these facilities, significant gaps remain. The island lacks a **purpose-built community center, library, or cultural hall**, which could provide inclusive spaces for recreation, cultural expression, and structured programs targeting youth, women, and vulnerable groups. The existing BMU hall and religious institutions partially fill this gap, but the absence of dedicated social

infrastructure limits opportunities for organized community development

8 SOCIO-ECONOMIC CHARACTERISTICS

The socio-economic profile of the settlement reveals complex patterns of income generation, financial management, and economic vulnerability that significantly influence residents' quality of life and development prospects. Understanding these characteristics is essential for designing appropriate interventions and policies that can enhance economic opportunities, reduce poverty, and build community resilience. The data provides critical insights into household financial strategies, income distribution patterns, and the various mechanisms residents employ to manage economic challenges in an environment characterized by limited formal employment opportunities and economic uncertainty.

8.1 Livelihoods and Income Patterns

8.1.1 Occupations

Livelihoods in Ringiti are diverse but heavily shaped by the settlement's dependence on fisheries and related informal economic activities. Occupation data highlights the prominence of self-employment and fishing-related work, alongside significant levels of casual labor and dependence on external support.

The largest share of the population—382 individuals (26.3%)—reported being **self-employed**, primarily in fishing, fish trade, and small-scale businesses within the settlement. This underscores the centrality of the fisheries subsector, which falls under the broader category of agriculture in official classifications. **Fishing** therefore represents Ringiti's **principal form of agricultural livelihood**, serving as both a direct source of income and the foundation for related activities such as fish vending, boat repair, and informal trade.

Although survey data also lists agriculture as a distinct occupation—300 individuals (20.6%)—validation confirmed that conventional crop or livestock farming does not occur on the island due to limited land and unsuitable soils. Those recorded as farmers are largely engaged in off-island agricultural labor on the mainland or in nearby lakeshore communities. In practical terms, fishing and its associated value chains constitute the entirety of Ringiti's agricultural economy, shaping both livelihoods and local food systems.

Photo 8.1: Fish traders sorting freshly landed catch at the landing site. (Source: GCA field visit 2025)

Casual labor accounts for 212 individuals (14.6%), reflecting the reliance on short-term, low-paying, and often insecure forms of employment. This includes loading and unloading at fish landing sites, construction, and other forms of temporary work. A further **175 individuals (12.0%)** reported being **dependent on full-time earners**, underscoring the high dependency ratios within many households. **Dependent children** make up another **142 individuals (9.8%)**, further highlighting the burden on income earners to sustain large household sizes.

Unemployment remains a challenge, with **112 individuals (7.7%)** reporting no form of work. While this figure appears moderate compared to urban contexts, it reflects significant vulnerability in a settlement where most livelihoods are already precarious.

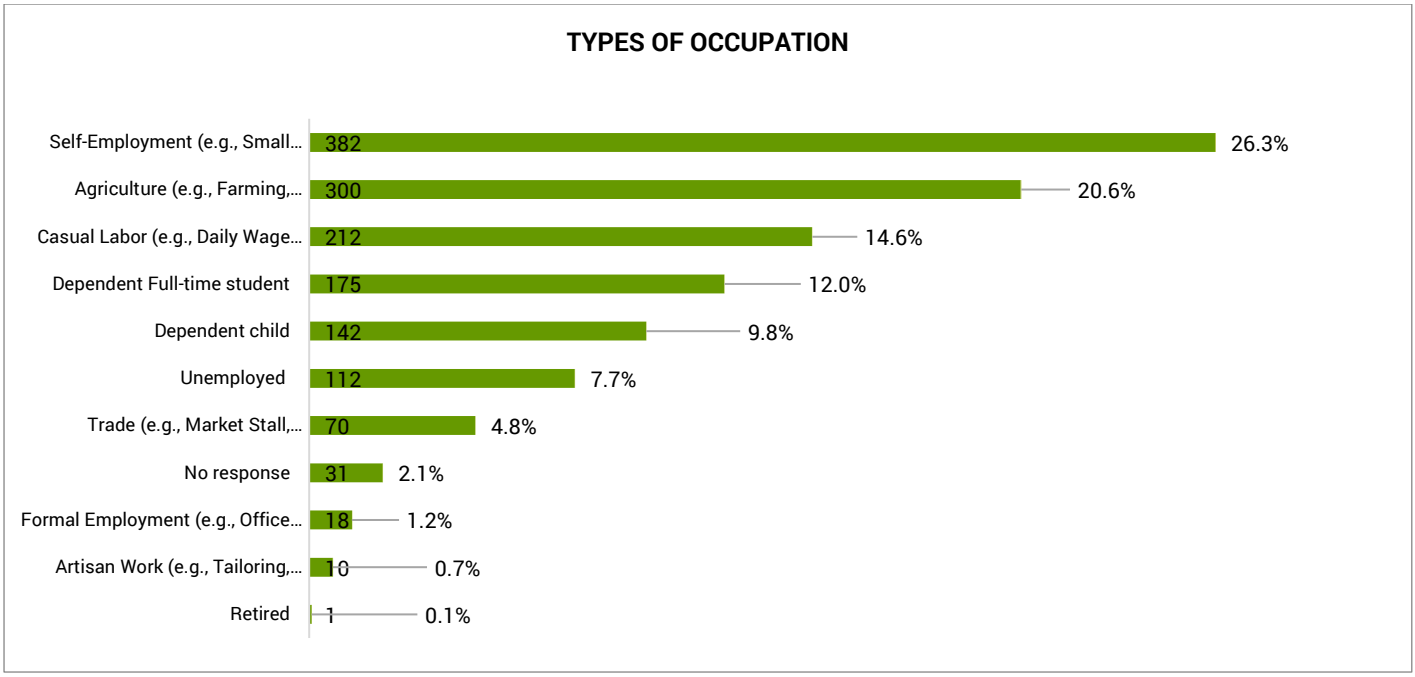


Chart 31: Employment Status and Types of Occupation

Other forms of income generation are less common. Trade (70 individuals, 4.8%) represents small-scale businesses such as kiosks, grocery shops, or eateries. Formal employment is reported by just 18 individuals (1.2%), highlighting the near-total absence of secure, salaried jobs on the island. Artisan work (10 individuals, 0.7%) and retirement income (1 individual, 0.1%) remain minimal. Finally, 31 individuals (2.1%) provided no response.

8.1.2 Household Income

Household income distribution in Ringiti demonstrates wide economic disparities, with households spread across a spectrum from no income at all to over 10,000 Ksh monthly. At the lowest end, 28 households (4.4%) report no income, reflecting extreme vulnerability and dependence on informal support systems such as relatives, neighbors, or non-monetary coping strategies. Alongside these, 104 households (16.3%) earn less than 2,000 Ksh monthly, and another 95 households (14.8%) earn between 2,001–4,000 Ksh. Altogether, this means that over one-third of households (35.5%) survive on less than 4,000 Ksh per month—income levels that fall well below what is needed to sustain adequate nutrition, housing, healthcare, and education.

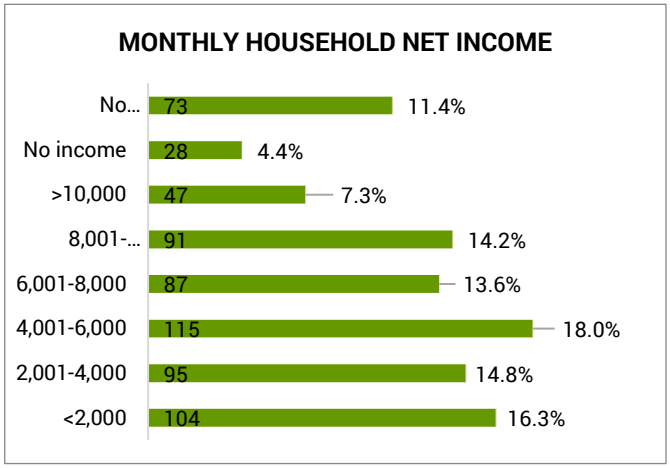


Chart 32: Monthly Household Net Income

The largest single category is 115 households (18.0%) earning between 4,001–6,000 Ksh monthly. This range suggests modest but regular income, primarily linked to small-scale fishing, trade, or casual labor. While these households may manage daily needs, they remain vulnerable to shocks such as illness, food price increases, or fishing restrictions.

The middle-income tiers, comprising 87 households (13.6%) earning 6,001–8,000 Ksh and 91 households (14.2%) earning 8,001–10,000 Ksh, together account for about 28% of households. These families demonstrate greater financial security, with the ability to consistently meet basic needs and occasionally invest in education or productive assets.

At the upper end, 47 households (7.3%) earn above 10,000 Ksh monthly. This relatively small group represents the more economically secure segment of the community, often engaged in lucrative fishing, trading, or business ventures. While limited in number, they play an

outsized role in supporting local commerce, providing employment, and potentially driving small-scale economic development. Finally, 73 households (11.4%) did not disclose their income, reflecting either unwillingness or inability to quantify household earnings.

8.1.3 Household Expenditure

Household expenditure patterns in Ringiti highlight the tight financial constraints under which most households operate. The data shows that 96 households (15.0%) spend less than 2,000 Ksh monthly, reflecting extremely limited purchasing power and subsistence-level living. A further 118 households (18.4%) fall within the 2,001–4,000 Ksh range, and another 118 households (18.4%) spend between 4,001–6,000 Ksh monthly. Together, these three categories account for over half of households (51.8%), underscoring how most residents manage with very modest expenditure levels.

At the middle tier, 89 households (13.9%) spend between 6,001–8,000 Ksh, while 59 households (9.2%) spend between 8,001–10,000 Ksh. These households demonstrate relatively higher purchasing capacity, which may translate to better access to food, healthcare, and education, though savings potential may remain limited.

At the upper end, 67 households (10.5%) report monthly expenditure exceeding 10,000 Ksh, representing the more economically secure segment of the settlement. These households likely engage in higher-yield fishing or trade activities and may act as local economic anchors.

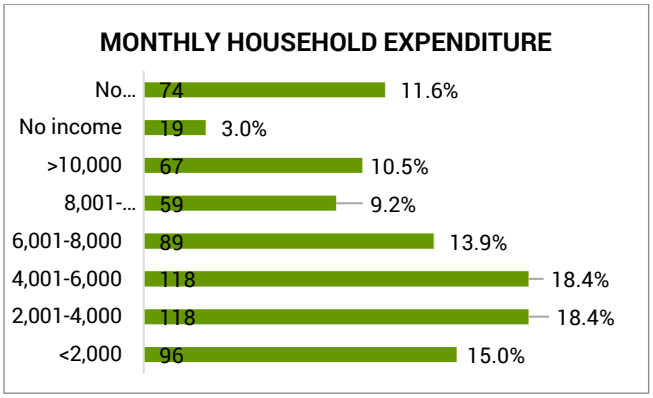


Chart 33: Monthly Household Expenditure

Only 19 households (3.0%) reported no expenditure, a figure that may reflect extreme vulnerability, complete reliance on support systems, or underreporting. Meanwhile, 74 households (11.6%) gave no response, mirroring non-disclosure patterns in household income reporting and pointing to difficulties in capturing reliable financial data in informal contexts.

8.2 Food Security and Economic Resilience

Food security and economic resilience are fundamental to household well-being, directly influencing health outcomes, children's education, and the community's long-term development trajectory. While the current dataset does not capture detailed food security indicators—such as dietary diversity, seasonal shortages, or coping mechanisms during scarcity—the available economic evidence, combined with community validation feedback, highlights deep vulnerabilities in Ringiti's livelihood base.

The income and expenditure distributions reveal that a large share of households live on extremely modest means, with more than one-third earning less than Ksh 4,000 per month and over half spending below Ksh 6,000. For such households, food constitutes the single largest expense, leaving little margin for health, education, or investment. Even small increases in food prices or disruptions to fish supplies can immediately compromise household nutrition.

These vulnerabilities are amplified by the island's heavy dependence on fishing, which remains the backbone of both livelihoods and local food systems. While fishing ensures daily protein availability, it exposes households to economic and environmental volatility. Validation findings revealed that piracy and harassment by border control officers on the lake have caused repeated income losses and heightened insecurity, forcing some residents to relocate. Such disruptions reduce fishing days, increase operational costs, and erode household resilience.

Photo 8.2: Sun-drying of fish as part of local food preservation and income generation. (Source: GCA field visit 2025)

At the same time, fish bandas (storage structures)—critical for preserving catches—were reported to be deteriorated and insufficient, leading to post-harvest losses and reduced earnings. The lack of adequate cold storage or processing facilities means that much of the catch must be sold immediately, often at low prices, leaving little room for value addition or market negotiation. This fragility in the value chain makes local livelihoods extremely sensitive to both weather conditions and enforcement dynamics on the lake.

Land scarcity prevents meaningful engagement in farming, eliminating an important buffer against food insecurity. Most households therefore depend entirely on purchased food transported from the mainland, exposing them to price volatility and supply disruptions when transport is delayed or fuel costs rise.

Economic resilience is further undermined by limited access to credit and savings mechanisms. The heavy reliance on personal savings (81.5% of households) to meet healthcare and emergency costs demonstrates a lack of formal or community-based financial safety nets. The near absence of credit institutions, cooperative societies, or active chamas (informal savings groups) leaves households with few tools to manage shocks or invest in income diversification.

The small proportion of residents with stable or salaried employment limits the community's capacity to absorb shocks collectively. While informal economic activities offer flexibility, they also produce instability, perpetuating cycles of poverty, food insecurity, and underinvestment in social infrastructure.

8.3 Trade, Commerce, and Financial Inclusion

The analysis of household income disaggregated by gender of household head reveals persistent **gender-based economic disparities** in Ringiti. These patterns reflect **structural inequalities in access to economic opportunities, resources, and financial services**, with significant implications for poverty reduction, child welfare, and overall community development.

Female-headed households demonstrate greater vulnerability across nearly all income categories. While 11 female-headed households reported no income compared to 17 male-headed households, this represents a disproportionately higher share of the female-headed population (33.6% of all households) than the male-headed population (66.4%). Similarly, in the 2,001–4,000 Ksh range, only 5.0% of female-headed households are represented, compared to 9.9% of male-headed households—indicating male-headed households are nearly twice as likely to reach this modest but stable income bracket.

At higher income levels, the disparities widen further. For example, in the 8,001–10,000 Ksh category, only 2.5% of female-headed households are present compared to 11.7% of male-headed households, nearly a five-to-one ratio. In the highest income bracket of above 10,000 Ksh, only 1.3% of female-headed households are represented compared to 6.1% of male-headed households. This pattern illustrates systematic barriers preventing women from accessing higher-value economic opportunities.

These barriers may include **limited access to capital and credit** for business ventures, **lower educational attainment or skills training** opportunities, and **restricted mobility** due to cultural norms of safety concerns. Additionally, women face a heavy burden of **unpaid care work**, which reduces their time for income-generating activities, and **discrimination** in trade, employment, or access to formal markets. As a result, female-headed households are more likely to remain trapped in low-income categories, with fewer opportunities to accumulate wealth, invest in their children's education, or build resilience against economic shocks. In terms of **financial inclusion**, earlier data shows that households overwhelmingly rely on **personal savings (81.5%)** to fund healthcare, while credit, loans, or community savings groups (*chamas*) are barely used. This indicates limited integration into formal financial systems, both for men and women, but the impact is more acute for female-headed households who face additional barriers.

Trade and commerce opportunities, while not fully captured in the dataset, are central to the settlement's economy, particularly around the **water bus terminal and market hub**. However, the gender income gap suggests that **male-headed households dominate higher-yield opportunities**, while female-headed households may be concentrated in lower-value petty trade, fish processing, or subsistence activities.

Addressing these gaps will require targeted interventions, including expanding financial services and microcredit tailored to women and supporting women in accessing market infrastructure and trade networks. Furthermore, it is essential to provide skills development and training to improve access to better-paying opportunities, and strengthen community-based savings groups to offer alternatives to formal banking.

9 SYNTHESIS

9.1 Community Perceptions of Pressing Concerns

Community perceptions of the most pressing concerns in Ringiti settlement reveal a strong alignment with structural service gaps and vulnerabilities already identified in the sectoral analyses. Since the question allowed multiple responses, the percentages represent the proportion of households (out of 640) citing each issue; meaning totals exceed 100 percent.

Health care emerges as the top concern, highlighted by 357 households (55.8%). This reflects the community's struggles with medicine shortages, quality of service, and limited capacity of existing health facilities. The prioritization of healthcare underscores its centrality to household well-being and the urgency of investing in improved services.

Safe drinking water is the second most cited concern, raised by 307 households (48.0%). This aligns with the earlier finding that over 90% of households rely directly on untreated lake water, exposing them to waterborne diseases and contamination risks. Additionally, **employment opportunities are a priority for 177 households (27.7%),** showing widespread recognition of economic vulnerability within the settlement. With a majority of residents engaged in informal or low-paying occupations, the demand for stable livelihoods is high.

Sanitation challenges are emphasized by 144 households (22.5%), reflecting the prevalence of open defecation and poor waste management systems. Similarly, **education** (132 households, 20.6%) and **tenure security** (123 households, 19.2%) highlight residents' concern about long-term stability, opportunities for youth, and land ownership or housing security.

Other concerns include **housing** (108 households, 16.9%), **crime and insecurity** (53 households, 8.3%), **substance abuse** (39 households, 6.1%), and **natural disasters** (37 households, 5.8%). Although fewer households cited these issues, they still point to vulnerabilities that affect community safety, resilience, and social well-being. Improved access roads were mentioned by only 3 households (0.5%), reflecting the settlement's island geography where water transport dominates.

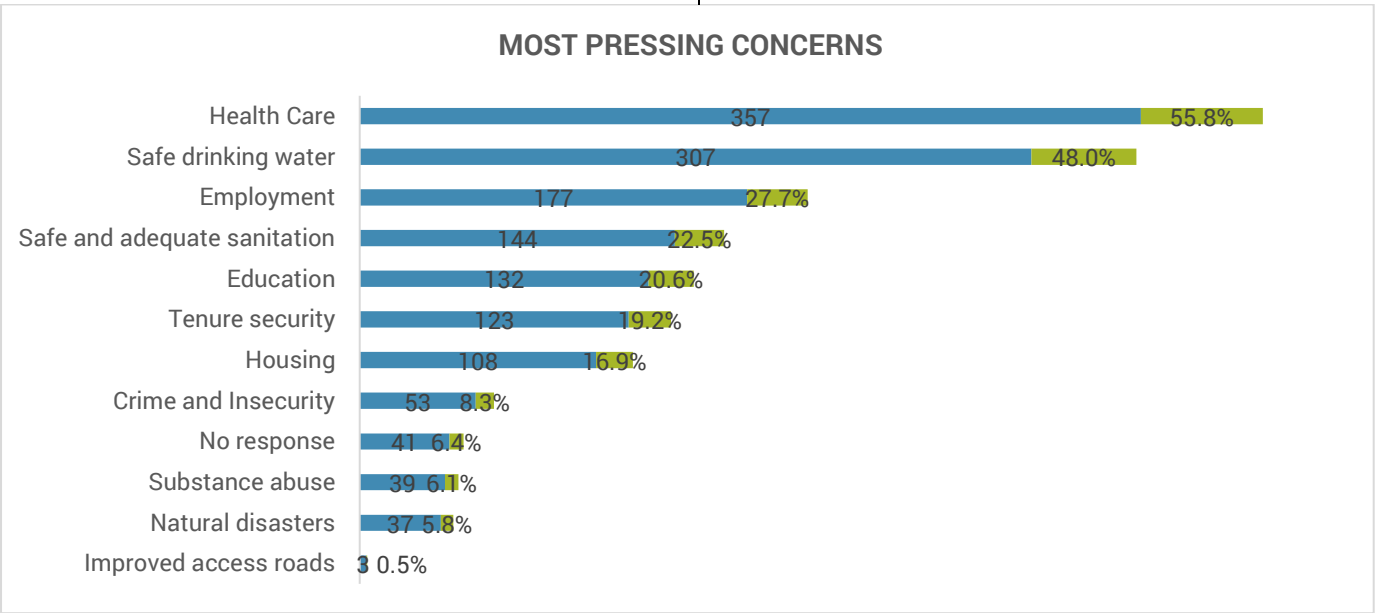


Chart 34: Most Pressing Concerns in the Settlement

Overall, these perceptions validate the structural challenges documented across health, water, sanitation, education, and livelihoods. They also emphasize that for residents, **healthcare and safe water access are the most urgent development priorities**, followed closely by employment and sanitation.

9.2 SWOT Analysis

9.2.1 Strengths

Natural Resource Base

Ringiti's proximity to Lake Victoria provides its most important comparative advantage. The lake is not only the main source of food and water but also the foundation of the settlement's economy through fisheries and related value chains such as fish processing, trade, and boat services. Fishing supports both subsistence and commercial livelihoods, with fish sales extending beyond the settlement to mainland markets. This natural resource base anchors the community's identity, culture, and economy, making it the single most important strength of the settlement.

Community Cohesion and Security

Unlike many urban informal settlements where crime is a constant concern, Ringiti enjoys relatively high levels of security. Strong social ties, familiarity among residents, and the island's small geographic size contribute to a sense of accountability and informal community surveillance. The island's geography—being surrounded by water—makes it difficult for offenders to escape, further reducing incentives for theft or violent crime. The presence of a police station strengthens this sense of security, ensuring a balance between formal law enforcement and informal community mechanisms.

Active Market Hub

The water bus terminal and the surrounding informal market represent the economic and social core of Ringiti. During the day, this area serves as the primary trade center where fish, groceries, and household items are exchanged. At night, it transforms into a lively hub with eateries, cooking spaces, and occasional cultural events, reinforcing its role as the heart of the settlement's economic and social life. This dual function underscores the community's adaptability and its reliance on informal markets as engines of both income and social cohesion.

Proximity and Access to Healthcare

Most households are located within 500 meters of a health facility. This is a significant strength, as it ensures that distance is not a major barrier to accessing basic care, unlike in many remote island communities. The proximity of healthcare services means that residents can seek medical attention relatively quickly in case of illness or emergencies, reducing risks associated with delayed care. Although capacity is limited, the presence of these facilities provides a foundation that can be built upon to improve health outcomes.

Educational Foundations

While gaps exist at higher levels, Ringiti has a foundation of primary schools and ECDE centers within the settlement. This ensures that most children can begin their education close to home without the need for costly travel or relocation. The relatively high attendance in primary schools reflects either government investment or strong community-driven initiatives to ensure children access at least basic education.

Religious and Community Institutions

Several churches representing different denominations serve as central community anchors. These institutions go beyond their spiritual role, acting as social safety nets and gathering points for meetings, celebrations, and charitable activities. The BMU offices, equipped with a hall, also function as the de facto community hall. These spaces are vital for governance, dispute resolution, and training activities. Together, religious and BMU institutions provide both structure and resilience in community life.

Informal Adaptability

Despite limited infrastructure, households in Ringiti have adapted creatively to available space and resources. Areas without houses are designated for bathing and swimming, with gender-separated spaces to respect cultural norms. Eateries, kiosks, and fishing beaches serve as both economic and recreational spaces, while a small playground near the hospital offers structured play for children. This flexibility reflects the community's resilience and innovation in using limited resources to meet diverse social and cultural needs.

9.2.2 Weaknesses

Water and Sanitation Risks

Over 90% of households rely on untreated water sourced directly from Lake Victoria. At the same time, approximately 59% of households practice open defecation—either within the settlement or directly into the lake. This creates a dangerous cycle of contamination, where the community's main water source is also its waste disposal site. The health risks are severe, as seen in high incidences of diarrheal disease.

Poor Waste Management

Solid waste management is dominated by burning (59%) and direct dumping into the lake (13%). With no

structured collection or disposal systems, waste accumulates in informal dumpsites or pollutes Lake Victoria. Burning reduces waste volume but exposes households to air pollution, contributing to respiratory health challenges. The absence of formal waste services reflects infrastructural neglect and creates long-term environmental hazards.

Health System Limitations

Although most residents live close to health facilities, these facilities face major capacity challenges. Community clinics, which serve the majority, are overstretched and frequently lack essential medicines—reported as a challenge by 83% of households. Poor service quality, inadequate equipment, and staffing shortages further undermine trust in the health system. This forces some households to depend on pharmacies, private hospitals, or even traditional healers, often at higher costs.

Secondary Educational Gaps

While primary and ECDE education is available, there is no secondary school within the settlement and no tertiary institutions. This forces families to send children outside the island for higher education, introducing costs, travel risks, and dropout pressures. The absence of local secondary and vocational education undermines skill development, reduces youth opportunities, and contributes to long-term dependency cycles.

Economic Vulnerability

Income and expenditure data show that over one-third of households earn less than 4,000 Ksh monthly, with many living on extremely tight budgets. Heavy reliance on personal savings to fund health care further demonstrates weak financial safety nets. With limited access to credit, insurance, or diversified income sources, households remain highly vulnerable to illness, price shocks, or fishing restrictions.

Gender Inequality

Female-headed households are consistently overrepresented in lower income categories and face structural barriers to accessing higher-paying opportunities. They are less represented in trade and commerce, have limited access to credit, and are more likely to depend on precarious sources of income. Gender-based inequalities intersect with poverty, leaving women-led families more vulnerable to food insecurity and poor health outcomes.

Limited Formal Infrastructure

Recreational and community infrastructure is scarce. The BMU offices function as a community hall, but no dedicated cultural or multipurpose centers exist. Recreational areas are largely improvised, with only one formal playground. Digital infrastructure is also weak, with a single cybercafé that struggles with connectivity, leaving most households dependent on mobile phones with costly data.

9.2.3 Opportunities

Fisheries Value Chains

Expanding beyond raw fish sales into processing, storage, packaging, and transportation could boost incomes and reduce post-harvest losses. Investments in cold storage, drying racks, or cooperative marketing could unlock higher earnings for fishers and traders.

Renewable Energy

The existing use of solar power can be scaled up to improve household lighting, refrigeration for health facilities and businesses, and internet access. Expanded renewable energy infrastructure could reduce reliance on kerosene and batteries, lowering costs while improving environmental sustainability.

Community-based Financial Systems

The presence of informal savings groups (*chamas*) can be strengthened into more robust microfinance systems. Expanding financial literacy, access to credit, and savings programs could help households reduce reliance on personal savings and build resilience to shocks.

Investment in the Healthcare System

Addressing medicine shortages, upgrading the public hospital/dispensary, and supporting the growing network of pharmacies could significantly improve healthcare access. Public-private partnerships or county-level support could expand service delivery capacity.

Secondary and Tertiary Education Expansion

Establishing secondary school facilities and TVET centers would reduce dropout rates, provide vocational skills, and create alternative career pathways for youth. This would address brain drain and strengthen local human capital.

Investment in tourism industry

Ringiti's lakeside location, vibrant market, and cultural life provide opportunities for eco-tourism and cultural tourism. Community events, churches, and fishing heritage could be developed into niche attractions, supporting small-scale hospitality businesses.

Digital Expansion

With widespread smartphone ownership and high mobile penetration, digital solutions can bridge service gaps. Mobile banking, online marketplaces, telemedicine, and e-learning offer opportunities to overcome barriers posed by geography and weak infrastructure.

9.2.4 Threats

Environmental Degradation

Current practices of dumping waste and human waste into Lake Victoria threaten the sustainability of the community's main resource. Environmental degradation not only undermines health but also endangers fisheries, which are the foundation of local livelihoods.

Climate Change

Lake Victoria is increasingly affected by unpredictable weather, rising water levels, and fluctuating fish stocks, all of which compound existing vulnerabilities on Ringiti. Climate shocks such as heavy storms, prolonged rainfall, and intense winds frequently damage boats, homes, and shoreline structures, causing recurring economic and safety losses.

Conversely, periods of drought and declining lake levels reduce fish availability, constrain access to clean water, and strain livelihoods dependent on the lake. The combined effects of these extremes exacerbate food insecurity, health risks, and displacement pressures, particularly for low-income households living in temporary housing.

Without adaptive planning and investment in climate-resilient infrastructure, early warning systems, and sustainable fishing practices, climate variability will continue to destabilize local livelihoods and heighten environmental degradation.

Public Health Risks

The high prevalence of malaria (61%), diarrhea (28%), and other waterborne diseases demonstrates the health burden created by poor water and sanitation. Outbreaks of cholera or other infectious diseases remain a persistent threat.

Economic Shocks

Heavy reliance on fisheries and informal trade creates vulnerability to market and policy shocks. Price fluctuations, fishing bans, or disruptions to boat transport could destabilize household incomes quickly, pushing more families into poverty.

Weak Formal Service Provision

Government investment in infrastructure, healthcare, and waste management remains minimal. Without stronger external support, population growth will exacerbate existing gaps, straining already fragile systems and further widening inequalities.

9.3 Cross Cutting Issues

The situation in Ringiti settlement cannot be understood solely through sectoral analysis. Several cross-cutting issues influence development outcomes across multiple domains and must be addressed holistically to achieve sustainable improvements in livelihoods, health, and well-being.

9.3.1 Gender Inequality

Gender disparities cut across livelihoods, income, education, and health access. Female-headed households are consistently overrepresented in lower-income brackets, with far fewer represented in higher-income categories. This reflects barriers in accessing lucrative fisheries trade, formal employment, and credit facilities.

Women also carry the disproportionate burden of unpaid care work, limiting their time and energy for income-generating activities. In sanitation, women and girls face heightened risks when accessing shared or distant toilets, particularly at night, where many report feeling unsafe. This undermines their dignity, health, and security.

Addressing gender inequality will require interventions that improve women's access to financial services, skills training, and trade opportunities while simultaneously reducing barriers created by safety concerns, cultural norms, and unpaid care responsibilities.

9.3.2 Poverty and Economic Vulnerability

Poverty is pervasive in Ringiti, with more than one-third of households earning less than 4,000 Ksh monthly. Expenditure data reveals that many families survive on very tight budgets, with limited capacity for savings or investment. This economic vulnerability directly impacts food security, education, and health outcomes.

Reliance on personal savings as the main source of healthcare financing (81.5% of households) highlights the fragility of household economies. In the absence of adequate insurance or credit systems, even small health shocks can push families into crisis.

The prevalence of casual labor, unemployment, and dependence on fisheries underscores the lack of diversified income sources, leaving households vulnerable to market fluctuations, fishing bans, or climate shocks. Poverty reduction strategies must therefore go beyond income generation to include safety nets, financial inclusion, and community-based risk-sharing mechanisms.

9.3.3 Environment–Health Nexus

The relationship between environmental management and public health is perhaps the most critical cross-cutting issue. Ringiti's dependence on Lake Victoria for

both drinking water and waste disposal creates a dangerous cycle of contamination. Over 90% of households rely on untreated lake water, while 59% engage in open defecation (including directly into the lake).

These practices directly contribute to the high burden of diarrheal diseases (28% of households), alongside other waterborne illnesses such as typhoid and bilharzia. Solid waste disposal practices—dominated by burning and dumping into the lake—compound the environmental hazards, creating risks of respiratory diseases and long-term ecological damage. Breaking this cycle requires integrated interventions in water, sanitation, and waste management that simultaneously address environmental sustainability and public health outcomes.

9.3.4 Governance and Community Organization

Formal governance structures in Ringiti are limited, but community-based institutions play an important role in organizing social and economic life. The BMU offices, which include a community hall, act as the de facto civic center for meetings, dispute resolution, and training. Churches also provide strong social support networks.

However, governance challenges remain. Limited government investment in education, healthcare, waste management, and infrastructure leaves most services under-resourced. Informal systems—while effective at maintaining order and social cohesion—cannot substitute for formal service delivery at scale. Strengthening links between local governance (BMUs, churches, community leaders) and county/national authorities will be critical for scaling up investments and ensuring that Ringiti's development priorities are integrated into broader policy frameworks.

9.3.5 Youth and Education

Young people make up a significant portion of Ringiti's population, yet their educational and livelihood opportunities are constrained. While primary and ECDE education is available within the settlement, the absence of a secondary school forces children to travel outside the island for further studies. This creates barriers that contribute to dropout rates, particularly for low-income households.

Educational attainment data also reveals limited progression into tertiary education, with less than 7% of the population reaching college or university. This restricts the community's human capital development and perpetuates cycles of poverty. Investing in secondary schools, vocational training, and digital learning opportunities within Ringiti would directly enhance youth skills, reduce dropouts, and create pathways for employment both within and outside the fisheries sector.

9.3.6 Infrastructure and Services Gaps

Infrastructural deficiencies are visible across water, sanitation, waste management, energy, recreation, and digital access. Most households lack adequate sanitation facilities, waste is unmanaged, and electricity access is uneven despite the presence of solar power.

Recreational and community spaces are limited, with only one playground, improvised swimming areas, and informal social spaces such as eateries and kiosks. The absence of multipurpose halls, libraries, or sports facilities reduces opportunities for social cohesion, cultural expression, and youth development.

Digital access remains constrained, with one cybercafé of limited effectiveness and high dependence on costly mobile data. This digital divide restricts opportunities for education, business, and financial inclusion. Closing these gaps would have multiplier effects, improving health, education, economic growth, and social well-being across the settlement.

10 CONCLUSION

Ringiti Island stands as a vivid example of the intersection between opportunity and vulnerability within the Lake Victoria basin. The situational analysis portrays a settlement whose growth has been rapid yet largely unplanned—driven by migration, fishing, and the quest for livelihood security. This expansion, however, has occurred without corresponding infrastructure, governance structures, or environmental safeguards, creating a fragile equilibrium between human need and ecological limits.

The island's social and spatial fabric reveals pronounced imbalances. Overcrowding, insecure tenure, and reliance on temporary housing have entrenched cycles of instability and limited residents' ability to invest in durable improvements. Service delivery—particularly water, sanitation, and waste management—is severely strained, while educational and health facilities remain insufficient for the population's size. Economic activity is narrowly concentrated in the fishing industry, exposing households to market volatility, seasonal fluctuations, and climate-related hazards such as flooding, storms, and unpredictable winds.

Yet amid these vulnerabilities, the study highlights remarkable resilience. The community demonstrates adaptive ingenuity through social cohesion, locally organized governance via the Beach Management Unit, and innovative coping strategies like household-level anchoring, rainwater harvesting, and informal credit systems. These strengths underscore the capacity for locally led development if effectively supported by enabling policies and investment.

To translate these insights into sustainable transformation, the report calls for a multi-sectoral, inclusive, and climate-responsive development strategy built around six key pillars:

Secure Land and Tenure Reform – Formalize and clarify the island's land governance framework, aligning state ownership with community rights to enhance predictability, reduce conflict, and encourage long-term investment.

Upgrading Infrastructure and Services – Prioritize resilient water, sanitation, energy, and transport systems that can function within the island's environmental constraints.

Housing Improvement and Disaster Preparedness – Promote access to safe, durable construction materials, affordable financing, and technical guidance to reduce exposure to floods and high winds.

Livelihood Diversification and Financial Inclusion – Support value addition in fisheries, encourage small-scale enterprise development, and expand access to microcredit and cooperative savings.

Gender Equity and Social Inclusion – Address systemic barriers limiting women's and youth participation in land ownership, leadership, and economic decision-making.

Environmental Stewardship and Climate Adaptation – Integrate waste management, shoreline restoration, and renewable energy expansion into local development planning to safeguard the lake ecosystem.

In conclusion, Ringiti's path toward sustainability depends on coordinated partnerships that link national and county government frameworks with community-driven priorities. With targeted investments in resilience, governance, and human development, Ringiti can evolve from a vulnerable informal settlement into a model of inclusive, climate-adapted island urbanization—one that sustains livelihoods while protecting the natural systems upon which its future depends.

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