Tanzania

Adaptation Home Upgrade Loans: Investment Brief

Climate Adaptation Market Opportunities

Energy, Manufacturing and Infrastructure

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GLOBAL CENTER ON ADAPTATION

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GLOBAL CENTER ON ADAPTATION

ABOUT THE GLOBAL CENTER ON ADAPTATION

The Global Center on Adaptation (GCA) is an international organisation, hosted by the Netherlands, which works as a solutions broker to accelerate action and support for adaptation solutions from the international to the local, in partnership with the public and private sector, to ensure we learn from each other and work together for a climate resilient future.

African Union

ABOUT AFRICA ADAPTATION ACCELERATION PROGRAM

GCA is providing technical assistance under the Africa Adaptation Acceleration Program (AAAP), a joint initiative launched by the GCA and the African Development Bank in 2021.

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CONTEXT

This investment brief is part of a regional analysis undertaken by the Global Center on Adaptation, developed in close coordination with partners including CGAP and GCA's downstream financial institution partners under the Africa Adaptation Acceleration Program, in collaboration with the consulting firm Pegasys. The analysis identifies and operationalizes climate adaptation investment opportunities in infrastructure, energy, and manufacturing across Tanzania, Kenya, Zambia, and the Democratic Republic of Congo. Building on these results, the present brief aims to provide a decision-support resource for commercial banks, microfinance institutions, and other lenders seeking to assess and integrate climate-related risks and opportunities within their infrastructure, energy, and manufacturing portfolios.

Across energy, manufacturing and infrastructure, climate variability is increasingly translating into material credit risk. Erratic rainfall, rising temperatures, flooding, and more frequent extreme events disrupt energy generation and distribution, impair manufacturing operations, and reduce the reliability and service life of physical infrastructure. These impacts weaken borrower revenues and asset values, with direct implications for both clients and lenders, including deteriorating portfolio performance, elevated non-performing loan ratios, and increased volatility in infrastructure and corporate lending

The analytical framework underpinning this investment brief series reframes climate adaptation as a risk-adjusted investment opportunity. It identifies discrete, technology-driven interventions across value chains and assesses their bankability through market sizing, borrower segmentation, and business model analysis. Each brief is structured to align with financial sector requirements, including compatibility with existing lending instruments (e.g. asset finance, value chain finance) and applicability across borrower archetypes such as utilities, project developers, construction firms, and industrial SMEs.

The investment brief series, focused on Climate Adaptation Market Opportunities in Energy, Manufacturing and Infrastructure, aims to support financial institutions in systematically integrating adaptation into core lending operations, with a view to strengthening client and portfolio resilience while capturing emerging market opportunities.

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INVESTMENT BRIEF: ADAPTATION UPGRADE HOME LOANS IN TANZANIA

Executive Summary

Tanzania's housing stock is under mounting climate pressure. The vast majority of the country's 15 million dwellings were built incrementally and without formal engineering oversight, leaving them structurally exposed to the intensifying hazards of extreme heat, flooding, and severe storms. For the millions of low-income families who live in them, a single climate event can be catastrophic: destroying years of accumulated assets, forcing costly displacement, and triggering health impacts that undermine income for months. The burden falls hardest on women, who spend more time in and around the home, face greater physiological vulnerability to heat stress, and carry disproportionate responsibility for managing household recovery after climate shocks.

As these risks intensify, the human and economic costs translate directly into credit risk for the institutions that lend to these households. For Tanzania's commercial banks, this is not a peripheral concern – it is a portfolio issue. When a borrower's home floods income is disrupted, the probability of loan defaults rise. When heat stress degrades housing structures or forces families into emergency spending, repayment capacity weakens. Climate-related damage to housing is arguably already contributing to non-performing personal loans which are fequently used for home improvements, and this pressure will intensify as climate hazards escalate.

This brief makes the case that **adaptation upgrade home loans – small, targeted loans that finance specific physical improvements to existing homes – represent a significant and commercially attractive opportunity for Tanzanian banks.** These products are not philanthropic instruments. They are risk management tools that strengthen borrower resilience, protect collateral, and reduce default probabilities. This represents an underserved lending market estimated at **US$344 million in near-term serviceable demand.**

The Climate Risk Facing Tanzania's Homes – and Bank Portfolios

Tanzania faces converging climate threats with direct implications for housing. Heat stress affects virtually all of the country's housing stock – iron sheet roofing, which covers 85% of Tanzanian homes, can already drive indoor temperatures above 50°C, with severe health and productivity consequences. Climate projections indicate the number of days above 35°C will increase significantly by mid-century with coastal urban areas facing compounding humidity effects, driving a pronounced increase in heat-related mortality.

Flooding is more geographically concentrated but destructive when it occurs. In Dar es Salaam alone, where around 4 million residents live near flood-prone river basins such as the Msimbazi, annual flood events routinely damage housing, disrupt livelihoods, and displace tens of thousands of people.

For families, these events can be catastrophic. Homes represent 60–90% of household assets in many lower-income African countries. A single flood event can destroy years of accumulated wealth, force expensive temporary relocations, trigger health costs, and permanently damage the structural integrity of a self-built home. For banks, this translates into correlated credit deterioration: when climate events strike a neighbourhood multiple borrowers are affected simultaneously, spiking arrears and collateral losses.

From Climate Risk to Financeable Solution: The Case for Adaptation Upgrade Home Loans

Tanzania's housing stock can be meaningfully protected through a well-defined set of practical, targeted improvements to existing homes. These are not full rebuilds — they are incremental upgrades that fit naturally into the way Tanzanian households already construct and improve their homes over time: strengthened roofing, improved drainage and flood barriers, passive ventilation, and waterproofing of walls and floors.

Many of these measures are low-cost, technically straightforward, and deliverable through local supply chains and contractors. Critically, they do not require formal land title or planning permission — removing two of the most significant barriers that have historically excluded low-income households from formal housing finance.

The obstacle is not the value of these investments — GCA analysis shows that every US$1 spent on adaptation yields US$4–10 in adaptation benefits — it is the upfront cost. For households operating on irregular incomes and without savings buffers, even a modest improvement requiring US$50–500 is out of reach without access to credit. This is the market failure that adaptation upgrade home loans are designed to address: converting a high upfront cost into an affordable, structured repayment that matches household cash flows. The result is a microfinance product that simultaneously serves household resilience needs and creates a commercially attractive, high-volume lending opportunity for banks.

A Large and Underserved Market

Market sizing conducted by GCA and Pegasys identifies a Total Addressable Market of approximately US$2.7 billion – the aggregate value of priority heat and flood resilience upgrades across all exposed Tanzanian households if all structural barriers were removed. Within this, a **Serviceable Available Market of US$344 million** reflects what existing financial institutions could plausibly reach, given current levels of financial inclusion, provider capacity, and household willingness to invest.

The upgrades required are practical and affordable. **Heat adaptation packages – principally reflective roof coatings and passive ventilation improvements – cost between US$15 and US$180 per home. Flood adaptation packages – plinth raising, perimeter drainage, and waterproof wall sealing – range from US$300 to US$600.** These costs are within the range of short-tenor loans (6–24 months), allow rapid capital recycling, and are sized to be affordable for low- and middle-income borrowers. Rural areas represent 58% of the serviceable market (US$199 million) – driven by the concentration of climate-vulnerable construction materials – with urban centres accounting for the remaining 42% (US$145 million).

The Commercial Opportunity for Banks: Four Routes to Market

This brief identifies four go-to-market routes through which commercial banks can access this opportunity, each with a distinct commercial logic:

Direct retail lending to homeowners and households captures a large, cash-financed market currently bypassing the formal financial system. These have relatively short tenors (6–24 months), high turnover, and strong repayment motivation – borrowers are protecting their family home – create attractive yields and repeat lending potential.

Lending to small-scale lessors who supply the majority of affordable urban rental housing. Upgrades increase rentability, stabilize cashflows, and protect the asset – creating alignment between borrower incentives and lender risk. Rental income streams provide a stable basis for cashflow-based underwriting.

Partnership lending via Savings and Credit Cooperatives (SACCOs) and Village Community Banks (VICOBAs) and cooperatives provides a high-trust, low-cost customer acquisition channel. Group-based peer discipline reduces default probability and origination costs significantly, enabling banks to reach informal settlements and peri-urban areas without branch infrastructure. CRDB Bank's documented SACCO linkage model – which scaled to over 78,000 clients through 157 partner institutions – offers a proven Tanzanian template.

Vendor- and supplier-linked finance ties loan disbursements directly to vetted suppliers of roofing, water storage, and ventilation materials. This reduces fraud risk and misuse of funds, ensures upgrade quality, and mirrors the asset finance model that banks already use in other sectors.

Why Act Now

The foundations for adaptation upgrade home loans in Tanzania are already in place. Proof-of-concept lending models demonstrate that home upgrade finance is operationally viable. Innovations in the way capital can be mobilised— including resilient bond issuance and a newly approved refinancing facility to

help lenders extend the volume of loans to homeowners — provides the liquidity pathways needed to scale.

What is needed is not the development of a new market from scratch, but the integration of climate adaptation objectives, technical standards, and risk-reduction logic into existing financing models. The Bank of Tanzania's 2025 *Guidelines on Reporting of Climate-Related Financial Risk Management and Disclosures* further heightens urgency: banks are now required to assess and disclose their physical climate risk exposures. Adaptation upgrade home loans offer a direct, verifiable mechanism to demonstrate active portfolio de-risking – and to attract the growing pool of ESG and adaptation-aligned capital from DFIs and institutional investors.

The case for banks to act

Defensive: Stronger, climate-resilient homes reduce borrower default risk, protect collateral value, and lower non-performing loan rates – turning adaptation lending into a core risk management tool for banks already exposed to Tanzania's housing sector.

Opportunity focused: A US$344 million near-term serviceable market – spanning direct retail lending, lessor finance, SACCO partnerships, and supplier-linked disbursement – offers a high-volume, repeat-lending commercial pipeline for banks willing to develop fit-for-purpose adaptation microloan products.

Enabling Conditions and Next Steps

Realizing this opportunity requires an integrated and phased approach that reduces both credit and execution risk by tightening the link between finance, technical standards, and supply-side capacity.

In the near term, banks can begin by screening existing portfolios to identify the clients who are most exposed and vulnerable to physical climate risk and to segment potential demand. This would be followed by the design of standardized adaptation microloan products linked to clearly defined upgrade packages. These products can be underwritten consistently, disbursed directly to vetted suppliers, and verified using established tools such as the IFC's Building Resilience Index (BRI). At this stage, building or deepening partnerships with both upgrade suppliers and SACCOs, VICOBAs, and women's savings groups is also critical, as these institutions provide trusted origination, monitoring, and repayment discipline for informal and low-income households.

During the pilot phase, concessional capital and grant-funded technical assistance play an important role. Targeted support for product design, staff training, supplier network development, and verification systems can materially reduce market-entry costs for early-mover banks and allow new products to be tested. This phase is essential to generate performance data, refine underwriting standards, and demonstrate the credit-risk benefits of adaptation-linked housing finance.

As products are proven and standardized, liquidity and scaling mechanisms can be activated. Digitisation of origination, disbursement controls and repayments will be a key mechanism to lower unit costs and enable scale. Refinancing support from the Tanzania Mortgage Refinance Company (TMRC) for eligible adaptation portfolios, alongside blended finance from development finance institutions, can help extend tenors, improve affordability, and accelerate portfolio growth. In parallel, alignment with the Bank of Tanzania's climate-related disclosure framework and with ICMA Climate Bond Standards positions banks to access a growing pool of adaptation-aligned capital through green or resilience bond issuance.

Full analysis of market sizing, value chain constraints, product design considerations, and a three year phased implementation pathway is set out in the sections that follow.

1. The Adaptation Challenge

Housing plays a frontline role in protecting human health (Li, 2025) **and climate-linked disasters disproportionately impact and displace those in poorly built housing.** Housing upgrades, improvements and retrofits can deliver stronger, better-protected homes which experience less damage from extreme weather events and provide better conditions for improved health of households and resilience against chronic climate change phenomena like increased heat[1]. Conversely, housing can amplify health risks and accentuate inequalities when it is insecure, or unsuitable for current climate realities.

Tanzania's housing stock is shaped by a predominantly incremental, self-built model, in which households construct and upgrade homes over years as resources become available. Formal mortgage finance remains limited, and an estimated 70 percent of residential properties lack formal title, meaning most households rely on small, flexible sources of finance for home improvements rather than long-term mortgages. As a result, housing investment in Tanzania takes the form of upgrades rather than comprehensive rebuilds.

This is the context in which specific climate risks impact Tanzania's housing sector. A detailed Climate Risk and Vulnerability Assessment was conducted to support this assignment and identified four hazards with direct and severe consequences for Tanzania's housing stock.

- **Extreme heat** is already pervasive and intensifying. Under mid-century projections, the number of days above 35°C are projected to increase significantly with coastal urban areas facing compounding humidity effects. Iron sheet roofs — used on 85% of homes — provide low thermal insulation and can drive indoor temperatures to dangerous levels, directly increasing health risks and reducing habitability.

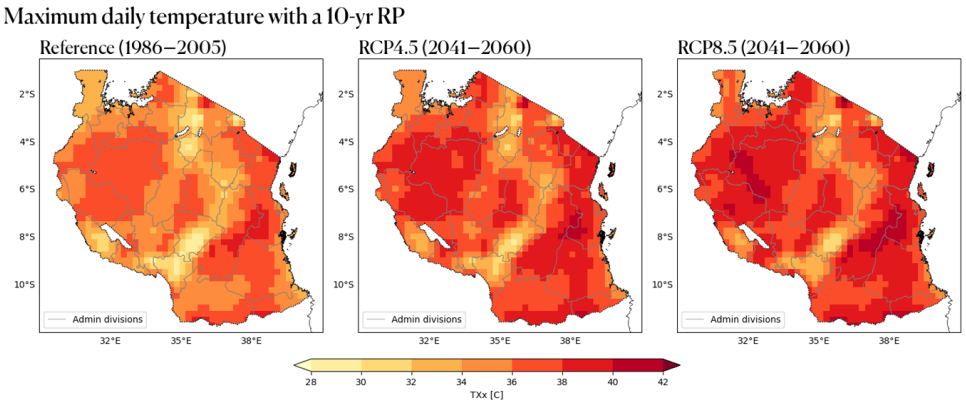

Figure 1: Increasingly high maximum daily temperatures under different climate scenarios[2]

- **Flooding** is a real and growing challenge in Tanzania. It can undermine housing by eroding foundations, causing wall failure, and rupturing water and sanitation systems. Maximum daily rainfall is projected to increase by ~14 % in key urban centres by mid-century, with flood extents expanding across Morogoro, Mtwara, Tanga and Manyara. Critically, national flood models significantly

[1] We recognize there is also a significant housing gap and demand for new housing – both social housing provided by the state and affordable housing. As such Banks have two distinct pathways to support residential climate adaptation: (1) financing adaptation upgrades for existing homes/incrementally built homes, and (2) financing new resilient homes. This brief focuses on the first pathway: financing adaptation upgrades for existing homes/incrementally built homes. The two pathways create fundamentally different business models. Home upgrades resemble consumer lending — high-volume, small-ticket, risk-reducing products that strengthen the resilience of the existing mortgage book. New resilient homes resemble real-estate development finance — larger-ticket, project-driven opportunities that shape the future collateral base. Treating these as one market obscures the unique revenue streams, risk profiles and capabilities needed for each. This brief focuses on upgrades, improvements and retrofits.

[2] Comparison of the maximum daily temperature with a 10-year return period during the reference period and the projected values for 2041-2060 under RCP4.5 and RCP8.5 scenarios. Phase 1 Climate Risk Analysis, GCA 2026, Tanzania Country Report page 26.

underestimate real exposure because they do not capture fine-scale flooding along smaller watercourses where most informal settlements sit.

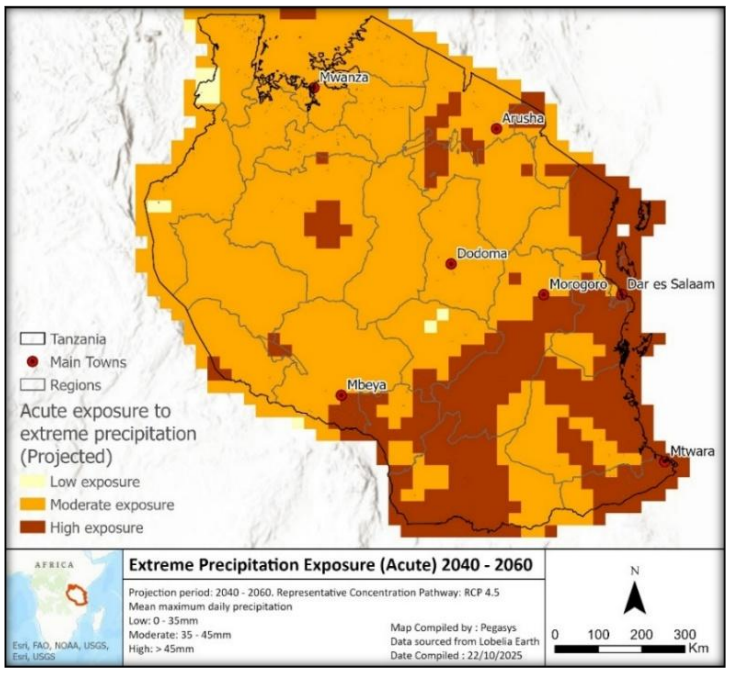

Figure 2: Projected medium term (2040 – 2060) distribution of acute exposure to extreme precipitation

Sea-level rise threatens coastal settlements with chronic inundation and saltwater intrusion. Placing low-lying areas of Dar es Salaam, Bagamoyo and Zanzibar at accelerating risk of structural degradation. Extreme wind can also pose risk to housing, particularly roofs which are highly vulnerable to uplift and dislodgement, with wind exposure projected to increase by up to 20% in highland zones and 11–14% in coastal and island regions.

The severity of these hazards is amplified by the material composition of Tanzania's housing stock. This is typified by features including use of corrugated iron roofing and minimal thermal insulation. In flood-prone areas, low plinth heights and unsealed wall materials allow water ingress that undermines structural stability and habitability. These vulnerabilities are not design anomalies; they are the outcome of informal and incremental construction practices.

These create risks that are not theoretical. The human cost of climate-vulnerable housing is already tangible in Tanzania. The 2023–2024 El Niño cycle triggered floods, landslides, and debris flows across all 26 regions of the country (World Bank, 2024). By April 2024, over 51,000 households had been displaced to temporary camps, with tens of thousands of homes destroyed or severely damaged (International Federation of Red Cross and Red Crescent Societies, 2024).

Investments in adaptation upgrade home loans contribute to creating durable, long-lived and protective infrastructure at the household level. Well-built, energy and water-efficient housing can help communities adapt to climate-linked disasters, including extreme heat, flooding, drought, and tropical cyclones. Distributed, small-scale resilience investments like flood resistant plinths and heat-mitigating ventilation punch above their weight, providing climate protection at relatively low costs. This helps manage acute and chronic climate change risks. The upgrading of housing, much of it informal, is therefore a vital climate adaptation measure and is recognised as such by organisations including the UNFCC (IPCC, 2022), World Bank (World Bank, 2019) and Habitat for Humanity.

Housing also represents material stores of wealth with homes representing 60–90% of total household assets in many African and lower-income countries (De Soto, 2000). Climatic hazards increasingly undermine this wealth. In East Africa alone, climate-related disasters cause billions in losses annually, disproportionately affecting low-income households and households in informal settlements. For low-income households, these events do not just damage homes; they wipe out the primary asset against which families build financial security, forcing costly repairs that consume savings and deepen vulnerability to the next climate shock.

However, many households cannot pay upfront for adaptation upgrades, even if they are cost-effective. The economic benefits of housing upgrades are substantial. GCA's analysis shows that e**very $1 spent on adaptation yields $4–$10 in adaptation benefits** (GCA, 2019), while for housing, benefit–cost ratios are even higher in flood-prone and heat-stressed regions[3]. However, households underinvest in adaptation because upgrades require upfront capital but pay off over time.

The role of financial products in addressing this gap

There are a range of financial tool available to households seeking to adapt their homes. Research by CGAP (2022) identifies a spectrum of climate-responsive financial products across four categories: savings, credit, insurance, and payments. These products differ fundamentally in whether they operate *before* a climate shock (ex-ante) or *after* one (ex-post).

Ex-ante products - those that help households prepare and protect in advance - include adaptation savings accounts, broad climate adaptation loans, and asset financing for resilient materials. Ex-post products - those that help households recover - include relief loans, recovery loans, and parametric or traditional insurance pay-outs. Grants and conditional cash transfers from governments or donors represent a further layer, typically targeting the most vulnerable households who cannot service debt at all. Each has its place. Insurance is essential for recovery but does not by itself motivate households to build more resilient homes before disaster strikes. Savings are valuable but accumulate too slowly relative to the pace of climate risk. Grants reach the poorest but cannot achieve the scale needed across millions of homes. Recovery loans help households rebuild but address damage already done, at significant cost to both families and lenders.

Adaptation upgrade home loans occupy a distinctive and strategically important position in this landscape: they are the primary ex-ante instrument capable of reaching scale through commercial channels. By converting the upfront cost of resilience upgrades into manageable repayments, they enable households to act *before* climate damage occurs rather than after. This brief therefore focuses on adaptation upgrade home loans as a central intervention.

Commercial banks have a clear opportunity to develop financial products that respond to households' home adaptation needs, and their existing customer relationships provide a natural starting point.

Tanzanian households are already embedded in the formal banking system as both depositors and borrowers. Personal loans represent the single largest segment of bank lending in Tanzania, accounting for ~38% of the total loan portfolio across the sector (Bank of Tanzania, 2022).

Banks are already lending money for housing adaptation measures in Tanzania. While formal mortgage products may be limited[4], household surveys provide evidence that material portions of personal loans from banks in Tanzania and across the region are spent on housing upgrades, rebuilds and extensions[5]. Banks are, in effect, already financing home adaptation; they are simply not doing so intentionally, systematically, or with a climate logic embedded in the product.

This gap represents a product development opportunity. By designing dedicated adaptation home loan products - with terms, pricing and verification structures calibrated to housing upgrades - banks can serve an existing demand more effectively while simultaneously reducing their own climate-related credit risk.

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[3] According to the Inter-American Development Bank, for every dollar invested in adaptation in informal housing, US$3.50 of material losses can be avoided without even considering other non-monetized benefits (IDB; cited in Frediani et al., 2023).

[4] Tanzania's mortgage sector remains comparatively small with mortgage penetration at 0.3% of GDP, with an estimated US$237 million in outstanding residential mortgages.

[5] Consultant Team analysis of the National Panel Survey (NPS 2020–21) and 2023 Finscope Survey which provides detailed household borrowing data.

Why Create Bespoke Adaptation Finance Products?

From a commercial bank's perspective, upgrading homes is not only a social imperative - it is a core risk management strategy. Stronger, climate-resilient homes protect both households and the lender's collateral. When borrowers face fewer climate-related shocks, they experience fewer income disruptions, leading to a lower probability of default. At the same time, improved structures hold their value better, reducing loss given default. The result is simple: stronger homes → more stable borrowers → safer collateral → fewer losses and a more resilient loan portfolios for banks[6].

While traditional lending treats an adaptation upgrade like *any* home improvement—adaptation upgrades often reduce property-level climate risk, preserve (or increase) asset value and lower the probability of damage-induced loan default. They can also improve insurability.

Specialized adaptation housing loans can offer better pricing to the borrower when the upgrade reduces risk and incorporates risk-based incentives (e.g., lower rates for verified resilience measures). As a result, purpose-built adaptation upgrade home loans could:

- Offer longer tenors matched to upgrade life, which could become increasingly possible as the sector scales.
- Use **property-linked** or **on-bill repayment** structures: for instance, for property linked approaches repayment obligation could be tied to property rather than the individual borrower — meaning that if the property changes hands, the outstanding balance transfers with it rather than defaulting[7].
- Be offered alongside technical support to assess suitable adaptation measures, ensure good quality installation, build the supply chains for delivery – building on the work of the International Finance Corporations (IFC) Building Resilience Index.

For Banks, offering defined housing adaptation products could also help provide scalable, standardized loan pools against which to mobilize capital markets e.g. through issuance of resilience bonds. Today, housing adaptation borrowing is scattered and hard to classify. By offering defined products, banks will be able to provide clearer data on performance. In time, this could create product portfolio structures suitable for securitization, helping unlock global capital looking for adaptation aligned returns.

[6] See appendix for a breakdown of the relationships between adaptive home upgrades and bank financial performance metrics

[7] For informal or customary tenure, a similar outcome can be achieved through community-based registry mechanisms or by structuring the loan as a lien on building materials and fixtures rather than land — an approach piloted in several Sub-Saharan African housing microfinance programmes (see: Habitat for Humanity, *Housing Microfinance in Tanzania*, 2023; CGAP, *Climate Adaptation, Resilience, and Financial Inclusion*, 2024).

2. Market Context, Solution Readiness and Track Record

Why Financing Housing Upgrades to Protect against Heat and Flooding in Tanzania Matters

Tanzania is urbanising at extraordinary speed. By 2040, close to half of the population will live in cities, with Dar es Salaam consistently identified as one of the fastest-growing urban centres in the world. This rapid expansion generates enormous demand not only for new housing[8], but also for **upgrading the existing housing stock**.

In both formal and informal settlements, a long tradition of **incremental, self-built construction** shapes housing development in Tanzania (Gardner, Lockwood, & Pienaar, 2020). Families typically build in stages over many years, expanding or improving homes as resources become available. This model meets immediate housing needs but can also create vulnerabilities—especially to climate risks such as heat, flooding, poor ventilation, and inadequate drainage.

With climate change adding new pressures, the imperative to invest in **home improvements**—better roofing, improved ventilation, water harvesting, efficient cooling, flood protection, and more—is stronger than ever.

Financing instruments tailored to these incremental upgrades can unlock adaptation benefits for millions of Tanzanians. Supporting small scale landlords to improve their rental units can also create a more balanced and equitable housing sector, providing decent living conditions for a significant portion of the urban population.

Core Characteristics of the Housing Market and The Central Role of Home Upgrades

While new builds are important, housing upgrades present a central adaptation opportunity in Tanzania for several reasons including:

Dominant incremental self-build model | Incremental construction is not only culturally embedded—it is also an adaptive, climate-resilient way of building. Households invest in improvements as funds become available, allowing gradual adoption of more durable materials, improved layouts, increased floor areas to meet the evolving needs of households, and resilience upgrades. As The Centre for Affordable Housing Finance (CAHF) in Africa 2024 Yearbook highlights, strengthening systems around incremental construction—local materials, regulatory streamlining, and a national housing finance databank—would substantially improve strategic planning and market transparency.

Co-existence of formal and informal housing markets | While Tanzania's cities are often described as predominantly informal, the boundary between formal and informal is fluid. Informal settlements and unplanned settlements supply the majority of new housing in Dar es Salaam, Mwanza, Arusha, and Dodoma. Over the last many years, the government has shifted from exclusionary to more inclusive strategies to address urban informal settlements, out of an acknowledgement that these informal settlements are an integral part of the urban fabric. Crucially, these areas contain most of the buildings that require upgrading for climate resilience.

Land tenure constraints | Approximately 70% of residential properties lack a title deed, limiting access to formal mortgages and shaping households' reliance on short-term, incremental financing (Centre for Affordable Housing Finance in Africa, 2024).

Characteristics of Tanzania's Borrowing and Lending Market for Housing Upgrades

Despite innovation in recent years, most studies conclude that the supply of housing finance in Tanzania remains limited, relative to demand (Habitat for Humanity, 2023). While the number and value of mortgages have increased thanks to government initiatives, improved macroeconomic conditions, and reforms to land administration—the sector remains small. Mortgage penetration is **0.3% of GDP**, with an

[8] CAFH's 2024 report identifies estimated demand of 200 000 homes annually and a backlog of over three million units in Tanzania.

estimated **US$237 million** in outstanding residential mortgages[9]. Mortgages remain largely inaccessible to low- and middle-income households and do not meet the needs of many incremental builders who require small, flexible loans (CAHF, 2024).

At present commercial banks continue to focus on larger, collateralised lending segments. Small-ticket loans for home upgrades may be perceived as high-cost and administratively burdensome, especially where properties lack formal titles. However, recognizing that loans are already being made for this purpose at scale, but are not recognized as housing loans, and that they represent economically sound investments for borrowers could incentivize banks to reconsider. Banks could also consider that at present alternative lenders are filling the gap. Tanzania has a rich ecosystem of non-mortgage finance providers[10] These include **microfinance institutions** (e.g., FINCA Tanzania) offering small home improvement loans as well as **housing cooperatives** (e.g., Mwanza Housing Cooperative Society) and Savings and Credit Cooperative Organizations (**SACCOs)** with deep community penetration[11]. These channels align well with the incremental upgrade model and already serve segments exposed to climate risks.

Existing Financing Solutions and Track Record

Although large-scale, adaptation-specific housing finance products are still emerging in Tanzania, there is already a meaningful track record of **home-upgrade lending, green finance instruments for housing, and performance-linked building finance** that demonstrates market and institutional appetite.

Commercial banks have successfully piloted **supplier-linked and materials-based financing models**. A prominent example is the **National Microfinance Bank and Ceramic Tile Market (CTM) partnership** (Daily News Tanzania, 2023), which enables households to purchase finishing materials such as tiles and fittings through retail finance. While not explicitly framed as adaptation finance, these loans function in practice as **home improvement credit**, supporting upgrades that improve durability, thermal comfort, and water resistance. The partnership demonstrates banks' ability to underwrite small-ticket housing investments when linked to defined use cases and trusted suppliers.

At the same time, **microfinance institutions and SACCOs have established a long operational history of housing-related lending**, particularly for roofing replacement, wall finishing, room extensions, sanitation improvements, and water tank installation. These lenders benefit from deep community penetration, flexible underwriting approaches, and borrower familiarity. However, typically interest rates will be higher than those offered by Banks, creating affordability issues for borrowers and presenting banks with a potential structural advantage.

Targeted programmes have further demonstrated the viability of structured housing microfinance. **Habitat for Humanity Tanzania's Makazi Bora programme** piloted dedicated housing microfinance products aimed at low-income households and small-scale landlords. The programme combined technical guidance with financing, helping ensure loan proceeds were used for durable, quality upgrades.

In parallel, Tanzania has a **credible track record in climate-aligned finance** that is directly relevant to housing upgrades. **CRDB Bank's Kijani Bond**, developed with IFC participation, was Tanzania's first internationally listed green bond. While proceeds support a range of green investments, the bond

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[9] Although as highlighted above this is changing. Mortgages numbers are increasing in tandem with increasing land title formalisation and strong support from the government through, for example creation of the Tanzania Mortgage Refinance Company (TMRC) with a mandate to act as a catalyst for the development of the mortgage market by refinancing banks' mortgage portfolios.

[10] Alternative financing options to traditional mortgages include microfinance institutions like FINCA Tanzania; housing cooperatives such as Mwanza Housing Cooperative Society; Savings and Credit Cooperatives (SACCOs) like Tandale SACCOs; rent-to-own schemes from developers like Watumishi Housing Company; and community based savings groups such as Village Savings and Loan Associations (VSLAs). Other alternatives include peer-to-peer lending platforms like Kiva, equity financing for real estate projects, government housing schemes of the National Housing Corporation, and Islamic financing options from banks like Amana Bank.

[11] Other institutions include| Developer-led rent-to-own schemes (e.g., Watumishi Housing Company), Village Savings and Loan Associations (VSLAs) offering highly flexible community-based finance, Peer-to-peer lending (e.g., Kiva) enabling micro-scale home improvement loans, Islamic finance (e.g., Amana Bank) providing Sharia-compliant product and government housing schemes, primarily through the National Housing Corporation

demonstrated that domestic banks can originate, report on, and attract investor capital for climate-aligned assets—including buildings—under internationally recognised frameworks. This creates a clear pathway for scaling climate-aligned housing upgrade portfolios in the future.

At the building level, the International Finance Corporation's Building Resilience Index (BRI) has been introduced in Tanzania through early pilot applications with developers and financial institutions. The BRI provides a standardized, adaptation-focused framework that assesses the resilience performance of buildings across hazards that are relevant in the Tanzanian context, including heat stress, flooding, wind hazards, and moisture-related risks. Although initial uptake has focused on new construction, the tool is increasingly applicable to major housing upgrades and retrofits because many measures, such as roof strengthening, ventilation improvements, and flood mitigation, can be verified and scored through the BRI methodology. For lenders and investors, the BRI offers a practical mechanism to link home-upgrade finance to measurable resilience outcomes and to substantiate climate-adaptation claims in line with emerging disclosure and reporting requirements.

Taken together, these examples suggest that some of the essential building blocks for adaptation-focused housing finance are already present and could move towards scale. What remains is not to invent an entirely new market, instead to integrate climate adaptation objectives, technical standards, and risk-reduction logic into existing, proven financing models, creating products that protect households, strengthen lender portfolios, and deliver measurable resilience outcomes that align with emerging reporting and disclosure requirements.

3. Market Opportunity

Loans that allow for adaptation upgrades in homes is not only a resilience need; it's a financial services market in Tanzania - one that spans millions of households.

Climate risks are driving a fast-growing need for adaptation upgrades and retrofits across Tanzania's domestic housing stock. Most homes were not designed for today's flooding, heat, and water challenges which have been intensified by climate change, as well as the including related environmental and vector ecology shifts, creating strong and rising demand for practical improvements such as strengthened roofs, improved drainage, passive cooling and ventilation upgrades, vector proofing and flood-proofing. This presents a significant market opportunity for banks to finance high-volume, small-ticket investments that enhance household resilience while protecting the quality of their housing loan portfolios[12].

Tanzania's adaptation upgrade market represents only one part of the wider housing resilience opportunity. The overall resilience market is significantly larger because Tanzanian housing is also exposed to non-climate risks, including seismic risk in regions such as the Rift Valley zone. These broader hazard profiles increase the potential demand for structural strengthening and site-stabilization measures, indicating that the full housing resilience market exceeds the adaptation-specific segment.

Market analysis identifies a substantial and growing demand for specific physical upgrades to homes which can be grouped into four core categories:

- **Structural Materials** - This includes retrofitting existing buildings using pedestals and elevated foundations to manage flood risk, and upgrading of structural materials to improve robustness to wind, extreme weather fluctuations and flood events
- **Building façade enhancements** - Green roofs and reflective coatings on roofs and walls are a low-cost option that increase reflectance of heat away from the house, reducing interior temperatures and providing immediate thermal comfort gains to the occupants. Fire resistant cladding, coatings and reflective/solar control glass are also in demand.
- **Insulation materials** – insulation is increasingly relevant as temperatures rise and metal-roofed homes become heat traps. Options include insulated roof panels, spray foam, rigid foam boards, fiber-based insulations and cellulose or other bio-based insulation.
- **Water resistant materials** – **Epoxy sealants**, **waterproof renders**, and **roofing membranes** protect walls, floors, and roofs from water ingress—reducing structural rot, mould. Water resistant coatings on walls are in demand in flood-prone areas as these improve the ability of the materials used in construction to resist damage from prolonged exposure to extreme moisture from flooding.
- **Land plot and site improvements** - This category includes interventions that improve how the land around the home manages heat and water. Examples include runoff infiltration trenches, basic soil grading to redirect water away from foundations, small retaining walls to stabilize slopes, and shading

[12] This brief focuses on heat and flooding because these represent the most material, widespread, and financeable climate risks to Tanzania's existing housing stock. Extreme heat affects most homes nationwide—particularly metal-roofed dwellings—directly undermining habitability, health, and productivity. Flooding, while more spatially concentrated, causes severe and recurrent structural damage in urban floodplains, riverine settlements, and low-lying coastal areas, leading to asset loss, displacement, and repeated repair costs. This was clear from phase 1 analysis conducted to support this project.

Crucially, both heat and flooding align closely with Tanzania's dominant incremental, self-built housing model. The vulnerabilities they create—poor thermal performance, inadequate drainage, low plinth heights, weak roofing and ventilation—can be addressed through targeted, modular upgrades that households already undertake over time. These measures are technically straightforward, relatively low-cost/affordable, and do not require full reconstruction, formal land titles, or large-scale engineering interventions, making them well suited to household-level adaptation finance.

Other climate risks, including drought and fire, are highly significant for livelihoods and ecosystems, but they are less directly financeable through housing micro-upgrades. Drought primarily affects water availability, agriculture, and income generation rather than housing structures themselves, while effective fire risk reduction typically depends on settlement-level planning, building code enforcement, and collective infrastructure rather than incremental household investments. As such, while these risks remain important in the broader climate context, heat and flooding are prioritised here because they combine high housing exposure with practical, financeable responses that self-builders can realistically implement.

through trees or simple structures such as pergolas. These measures reduce local flood and erosion risk and provide passive cooling, and they introduce more nature-based solutions that complement building-level upgrades.

Figure 3: Major categories of climate resilient housing upgrades

From climate challenge to financeable demand

Market sizing analysis conducted by GCA and Pegasys suggests that the theoretical opportunity for household-level climate adaptation in Tanzania is very large, but only a modest share is realistically reachable under current conditions.

Household demand for adaptation upgrades is shaped by three reinforcing factors: the availability of information about climate risks and suitable upgrades, access to technologies and delivery channels that make those upgrades feasible, and access to appropriate finance. Evidence shows that limited climate risk awareness, uneven access to reliable delivery channels, and constrained financial capacity are the primary reasons households do not undertake adaptation measures even when they clearly need them (CGAP, 2024). These constraints suppress near term demand relative to the full underlying need.

In 2026, we estimate a Total Addressable Market of ~US$2.736 billion. This represents the *aggregate value of priority upgrades (for heat and flood resilience) across all exposed formal and informal households* that could be justified on need and basic technical suitability, regardless of whether those households currently have access to finance, information or delivery channels. In other words, it reflects the full potential demand if all structural barriers were removed and every at-risk household that would benefit from adaptation implemented a minimum package of improvements.

By contrast, the Serviceable Available Market (SAM) of just over US$344 million reflects what the existing ecosystem could plausibly serve in the near term, given today's levels of financial inclusion, provider capacity, which is likely to be a key constraint, and policy support. This SAM estimate already factors in constraints such as the limited penetration of housing microfinance and climate-responsive credit, the current footprint of NGOs and contractors capable of delivering upgrades, and realistic adoption rates derived from observed willingness to act on climate risks. It therefore approximates the "bankable" short to medium term opportunity that financial institutions, developers and impact investors could target

without assuming transformational shifts in policy or infrastructure. The roughly eight to one gap between TAM and SAM highlights both the scale of unmet need and the importance of complementary interventions in market development, subsidy design, concessional capital and institutional strengthening.

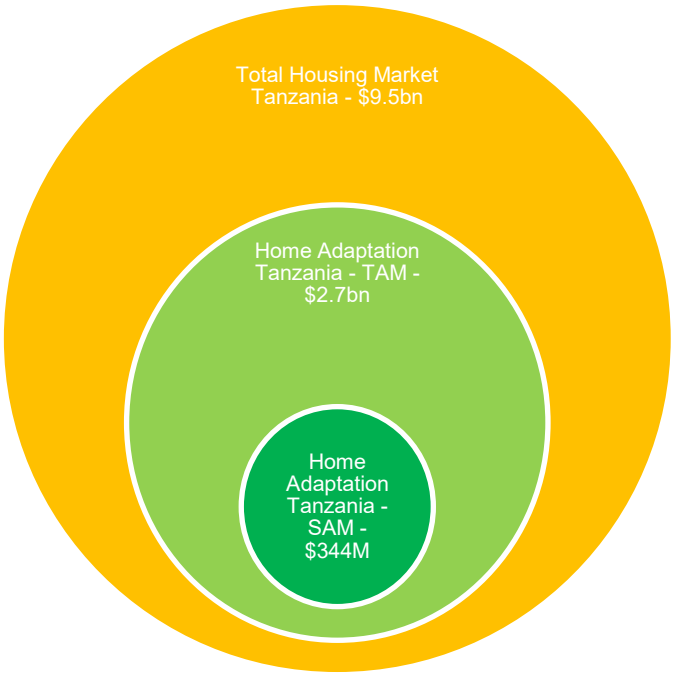

Figure 4: Relative Market Size of the Adaptation Upgrade Home Loan Market in Tanzania[13]

[13] TAM and SAM numbers where estimated as part of this specific study. The Total Housing Markethe US$9.5 bn figure reflects an estimate of the overall scale of Tanzania's housing / residential construction market (new build + major upgrades), not adaptation-specific finance. This is an indicative estimate drawn from the Centre for Affordable Housing Finance in Africa (CAHF)/Tanzania Investment Climate Group Limited. It is provided as a contextual benchmark; not derived in this study.

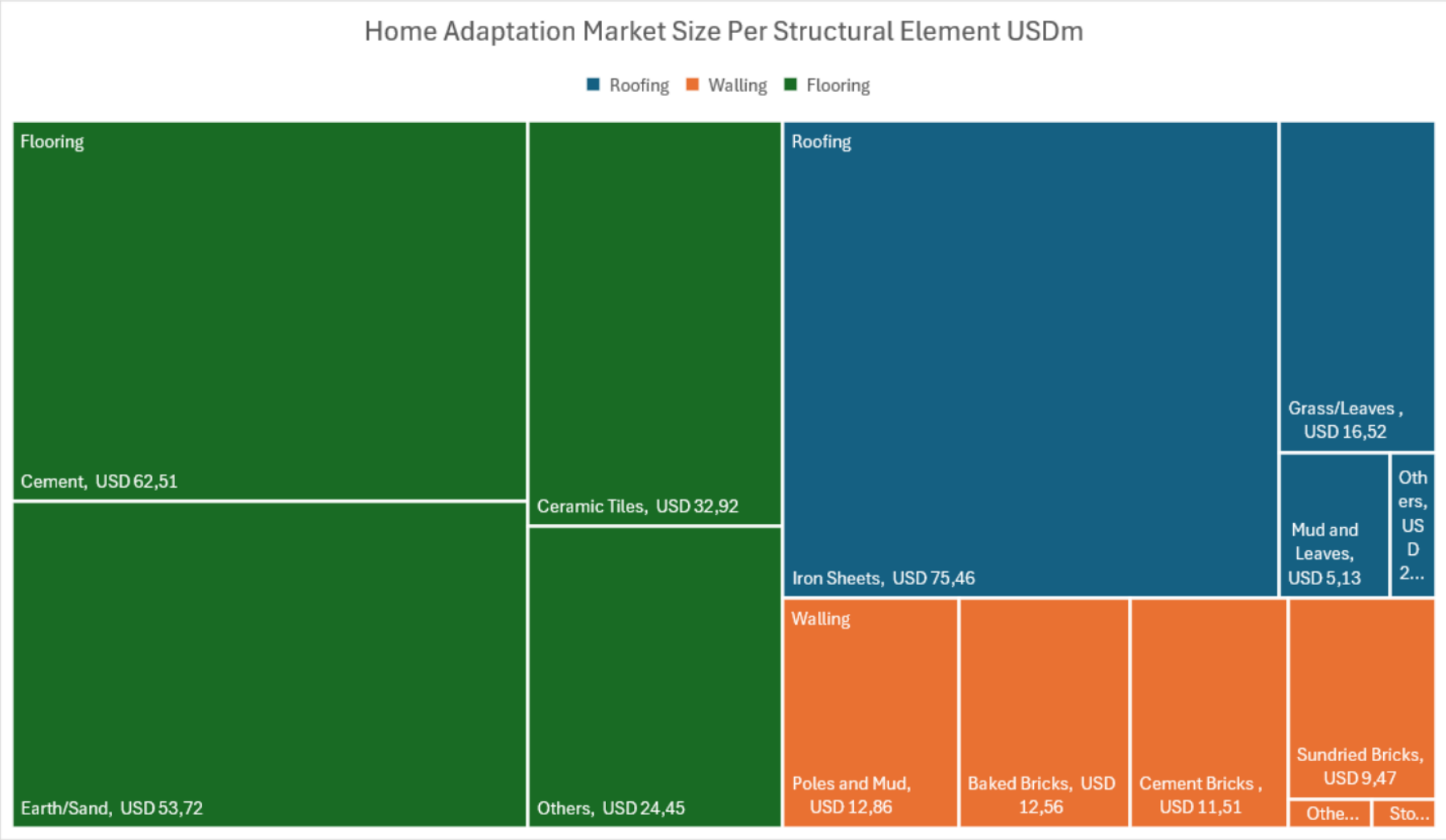

Figure 5: Market Size of Adapting Structural Elements of the Tanzanian Housing Market

Segmenting the opportunity

To understand the drivers of this market opportunity, it is essential to first establish the broader context of infrastructure shortfalls and escalating climate risks. This provides the foundation for analysing the contrasting rural and urban dynamics that influence market distribution, followed by a detailed climate risk segmentation assessing demand for heat and flood adaptation.

The **US$344 million** SAM market size must be understood within the context of Tanzania's broader housing infrastructure landscape and its intensifying climate vulnerability profile. Tanzania's housing stock comprises approximately **14 million buildings** serving a population of **61.7 million**, with urban areas exhibiting significant infrastructure deficits (Tanzania Investment Climate Group Limited (TICGL), 2024). The identified upgrade market represents targeted interventions concentrated in the most climate-vulnerable segments of this housing system, primarily informal settlements and low-income residential areas where adaptive capacity remains minimal (Climate and Vulnerability of African Cities (CLUVA), 2013); (GIZ, 2021).

The magnitude of the market reflects the severity of underlying climate risks. Tanzania faces twin climate threats that are following an alarming trajectory. **Heat-related mortality is projected to increase by more than threefold by 2080**, while flooding vulnerability is expected to expand significantly, particularly in coastal urban areas such as Dar es Salaam (GIZ, 2021). Informal settlements, which house approximately **70 percent of Dar es Salaam's urban population**, face disproportionate exposure to these risks due to their location on flood-prone riverbanks and coastal areas. This is compounded by substandard construction practices using materials poorly suited to climate extremes (Climate and Vulnerability of African Cities (CLUVA), 2013).

Market Distribution: Rural and Urban Dynamics

The following section examines the geographic distribution of the adaptation market, specifically why rural areas represent a larger share of the investment potential than urban centers despite higher capital concentration in cities.

The finding that **rural areas capture 58 percent of the market** (**US$199 million**) versus **42 percent in urban centers** (**US$145 million**) is counterintuitive given the typical concentration of capital in cities. This distribution is driven by three interconnected factors that diverge from standard market concentration patterns (AUHF, 2021).

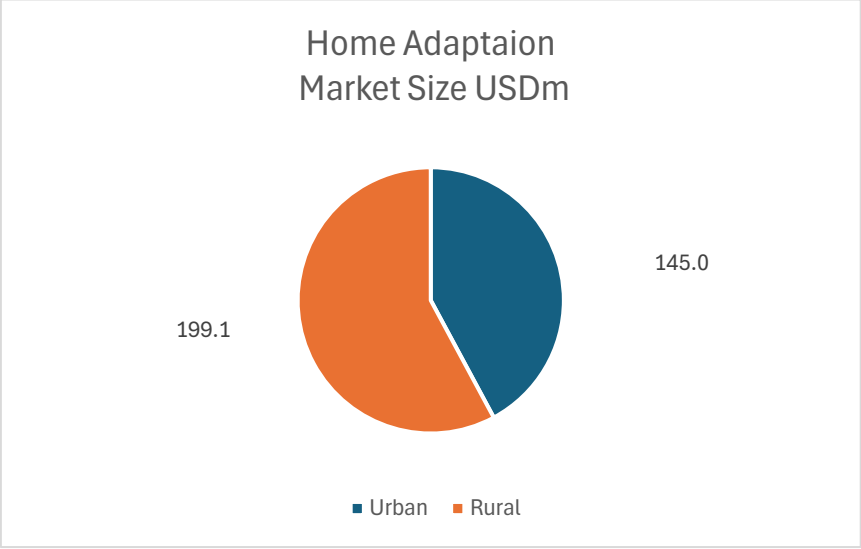

Figure 6: Market Size Rural-Urban Split

Rural Housing Concentration and Material Vulnerability: Rural Tanzania's housing stock is predominantly constructed using climate-vulnerable materials, including mud walls, grass or leaf thatch roofing, and earth or sand flooring. These materials provide minimal protection against both heat stress and flooding (AUHF, 2021). Rural settlements frequently lack the investment capital and technical capacity for material

substitution, creating an immense captive market for upgrade interventions, albeit one with barriers to commercial bank participation – particularly those associated with collateral and rural supply chains[14].

Lower Rural Incomes and Financial Exclusion: Approximately 60 percent of the Tanzanian population resides in rural areas and operates predominantly outside formal financial systems. These households depend largely on subsistence agriculture with limited liquidity for homestead improvements (Tanzania Investment Climate Group Limited (TICGL)., 2024). This structural poverty paradoxically expands the addressable market, as rural households upgrade housing incrementally through self-build methods using available materials. This generates persistent demand for low-cost adaptation solutions. In contrast, urban formal housing tends toward either fully constructed units purchased through limited mortgage markets or consolidated informal rental arrangements where tenants have limited incentives to invest in permanent upgrades (Centre for Affordable Housing Finance Africa (CAHF), 2020).

Climate Risk Concentration in Rural Landscapes: While Dar es Salaam and coastal cities face acute and highly visible flood risks, rural Tanzania experiences both flood and heat vulnerabilities with greater geographic spread (GIZ, 2021). Annual precipitation variability and extreme heat periods affect vast agricultural regions, motivating rural households to prioritize housing adaptation as a fundamental concern for both survival and economic productivity.

Climate Risk Segmentation: Heat vs. Flood Adaptation

Having established the geographic spread, the analysis now shifts to segmenting the market by specific climate risks. This highlights the dominance of heat adaptation requirements over flood mitigation and explores the systemic nature of thermal vulnerability in the Tanzanian context.

The dominance of heat adaptation over flood adaptation has profound implications for understanding Tanzania's primary climate vulnerability patterns and the current state of adaptive capacity.

Heat as a Systemic and Pervasive Threat: Heat stress affects virtually all Tanzanian housing across urban, rural, formal, and informal segments because it targets the core thermal performance of structures. The exposure of Tanzania's GDP to heatwaves is projected to increase from approximately 2 percent in 2000 to 16 percent by 2080. This represents one of the most significant economic climate risks in East Africa (GIZ, 2021). Heat adaptation for iron sheet roofing alone represents 24 percent of the total market. This reflects a widespread informal reliance on corrugated iron sheets, which offer zero thermal insulation and can lead to internal temperatures exceeding 50 degrees Celsius (AUHF, 2021). This segment demonstrates mass-market demand. Iron sheet is the dominant roofing material across informal settlements due to its low cost and ease of construction, yet it creates severe thermal stress requiring immediate remediation.

Concentrated Flood Risks: are geographically clustered in riverine and coastal areas, particularly in Dar es Salaam, where an estimated 4 million residents out of the total population of 8.1 million live in proximity to highly flood prone basins such as the Msimbazi River. Households in these areas experience flooding on a regular basis, including during average rainfall events, because of a combination of inadequate drainage, rapid urbanisation, and high levels of impervious surface cover. Although flooding affects fewer households than extreme heat, it is far more destructive when it occurs. Annual flood events in Dar es Salaam affect tens of thousands of people, frequently causing the collapse of housing structures, damage to essential services, and large scale population displacement. (GIZ, 2021)

[14] Consultations suggest that two related sets of constraints are most prominent. A) Collateral and tenure: ~70% of rural properties lack formal title, removing the primary mechanism through which commercial banks assess and secure lending risk. Without it, adaptation loans must be underwritten as unsecured consumer credit — with pricing implications. B) Rural supply chains for resilient materials are plausibly thin, contractor networks are informal and uncertified, and bank branch coverage is sparse. The two are connected: the first makes the *financing* hard, the second makes the *delivery* hard. A product that solves one but not the other still fails.

4. Value Chain, Business Models and Value Proposition for Financial Institutions

The Value Chain for Adaptation Upgrade Home Loans in Tanzania

The value chain for delivering adaptation upgrade home loans includes providers involved in identifying, financing, supplying, installing, and maintaining resilience improvements for domestic housing. Understanding this value chain is critical because weak or missing links—such as lack of certified contractors or limited distribution of quality materials—directly constrain the bankability and scalability of housing adaptation lending in Tanzania.

The section below lays out key players in this value chain but also acknowledges two structural realities that complicate market entry:

Dominance of Informality: The formal industry provides less than 10% of housing stock in many areas, with most construction and upgrades happening incrementally through informal channels (AUHF, 2019). This necessarily makes tracing and neatly classifying suppliers and providers challenging due to the dearth of secondary data. It implies that any successful financing model must interface with informal actors rather than bypassing them.

Data Asymmetry: There is a significant lack of data on resilient building practices within these value chains, necessitating initiatives to fill that gap. Without this data, lenders face informational barriers that contribute to the mispricing of debt—often treating resilient, risk-reducing upgrades as standard consumption loans with higher risk premiums.

1. Financing Ecosystem: Providers and Enablers

The financing landscape is bifurcated between formal banks, which hold capital but lack reach, and decentralized microfinance actors, who hold relationships but lack capital depth.

- Commercial Banks: The market is highly concentrated, with five banks holding the majority of market share: CRDB Bank (38.02%), Stanbic Bank (8.11%), Azania Bank (7.13%), NMB Bank (6.82%), and NCBA Bank (4.6%) (Centre for Affordable Housing Finance in Africa (CAHF), 2024). While these institutions possess the balance sheet capacity to scale housing adaptation lending, they remain constrained by limited technical information on adaptation technologies and the absence of standardized loan products for home upgrades outside of the higher end of the market.
- Liquidity Facilities: The Tanzania Mortgage Refinance Company (TMRC) is a wholesale liquidity facility that supports lenders by refinancing housing loan portfolios (rather than lending directly to households). This model has helped extend mortgage tenors in Tanzania (up to 25 years) and is associated with lower mortgage rates relative to earlier market conditions (SDG Opportunities Portal, Tanzania Investment Centre, 2022). A similar refinancing approach could be applied to standardized portfolios of resilient home-improvement or housing microfinance loans helping participating lenders reduce liquidity constraints and potentially pass through affordability benefits to end borrowers. Notably, TMRC and Habitat for Humanity report that a housing microfinance refinancing product received central bank approval in November 2025, creating a practical precedent for refinancing portfolios that enable low-income and informal-sector households to build or upgrade homes.
- SACCOs and Microfinance: These entities are the primary interface for the informal economy and low-income communities. As of 2021, there were 1,620 SACCOs managing a total loan portfolio of TSh 17,979 billion approximately US$6.88 billion (Centre for Affordable Housing Finance in Africa (CAHF), 2024). SACCOs offer the relationship-based lending required for small-ticket upgrades but often face liquidity and capability gaps. Unlike banks, their proximity to borrowers allows for "soft" monitoring of loan usage, yet their struggle with loan recovery and credit risk management limits their ability to scale without external support or technical assistance.

2. Customer Demand and Origination Pathways

Households typically pursue upgrades reactively after climate shocks. Demand typically flows into the finance system through four channels:

- Physical applications through loan officers: Borrowers approach SACCOs or banks directly. This channel is typically passive by design, and creates a potential barrier to uptake. Unlike a consumption loan or emergency credit, an adaptation upgrade requires a household to first recognise a climate risk, identify an appropriate technical solution, and then seek financing for it. In practice, most households may not spontaneously arrive at a loan officer with a defined upgrade in mind. Demand therefore needs to be actively generated upstream of the application — through awareness campaigns, community-level outreach by loan officers or partners, and the availability of simple, pre-defined upgrade packages that give households a concrete and affordable starting point
- Digitization: The high unit cost of originating and servicing small loans is increasingly being reduced through digitized workflows, including digital applications, automated reporting, and payment system integration, which lowers marginal processing costs and improves scalability for MFIs and SACCOs. In Tanzania, sector initiatives led by the Tanzania Association of Microfinance Institutions (TAMFI), including the April 2024 partnership launch with Wakandi to support digitization of savings and loan management and faster operations, illustrate the shift toward shared digital infrastructure and standardized processes. (Tanzania Association of Microfinance Institutions) This matters for adaptation finance because many resilience investments are small, high-volume purchases, and digital origination and repayment channels can make these small-ticket loans commercially viable at scale.
- The friction of originating small loans is being addressed through technology. Emerging partnerships, such as the April 2024 collaboration between Wakandi and the Tanzania Association of Microfinance Institutions (TAMFI), are digitizing the sector to streamline origination and reduce transaction costs for small loans. This digital infrastructure is crucial for adaptation finance, as it allows lenders to process high volumes of small-ticket loans (e.g., for water tanks or ventilation) efficiently.
- Women's Saving Groups: Women are pivotal decision-makers in home improvement and resilience planning. Tanzania Commercial Bank reports that 90% of their group savings portfolio (valued at TSh 15 billion) comes from women (Centre for Affordable Housing Finance in Africa (CAHF), 2024). Women's savings groups therefore represent a primary origination channel, serving as pre-vetted aggregators of demand where peer pressure ensures high repayment discipline.
- Supplier- and Contractor-Referred Origination: Material suppliers and contractors, for example roofing distributors, water tank retailers, or hardware stores are already in direct contact with households at the point of upgrade decision. A referral arrangement between a vetted supplier and a bank, where customers can apply for financing at the point of sale is a promising channel to increase uptake.

3. Distribution and Supply of Home Adaptation Materials and Services

The supply chain for materials and technologies is fragmented, presenting availability and quality risks.

- Wholesalers and Importers: Approximately 16% of intermediate housing inputs are imported (AUHF, 2019). This reliance creates "leakage" from the local economy and exposes borrowers to forex-driven inflation. When the Tanzanian Shilling depreciates, the cost of essential imported resilience materials, such as high-quality roofing sheets, waterproofing compounds, and steel, rises, directly eroding the purchasing power of a fixed-sum loan.
- Local Hardware Stores: These form the backbone of last-mile distribution but exhibit considerable variability in product quality. Strengthening the link between financing and these local suppliers is essential. Without vetted supplier networks, funds intended for resilience may be wasted on substandard materials (e.g., weak cement mixes) that fail during the next climate event, leaving the borrower with debt but no protection.

4. Design, Planning, and Technical Assessment

Tanzanian households often determine upgrade needs without technical guidance, relying on traditional knowledge or advice from informal builders.

- The Technical Gap: There is currently no recognized cadre of resilience upgrade assessors and no standardized adaptation packages that banks can underwrite. This limits lenders' ability to evaluate technical soundness. For example, a lender cannot easily verify whether a proposed drainage solution is adequately sized for the projected flood risk of a specific neighbourhood. To address this, financial institutions could partner with certified engineers, construction training institutes, and initiatives such as the IFC Building Resilience Index to develop simple, pre validated upgrade packages for common hazards. These partnerships would support quality assurance, create a consistent basis for underwriting, and reduce the technical uncertainty that has historically constrained lending for home upgrades (IFC, 2022).
- Standardization Needs: Without technical assistance or "approved lists" of adaptation measures, banks face the risk of financing ineffective upgrades (maladaptation). To scale, the market requires simple, pre-validated "kits" (e.g., a "Cool Roof Kit" or a "Flood Defence Package") that lenders can finance with confidence, knowing they technically meet resilience standards. Trusted local suppliers and contractors are also needed to ensure the funds are utilised effectively and the quality of work remains high.

5. Installation and Execution

Upgrade delivery is dominated by the informal sector, which presents a "quality vs. access" trade-off.

- "Massive Small" Contractors: The African Union for Housing Finance (AUHF, 2019) describes the sector as dominated by the "massive small" movement: a vast network of informal contractors, masons, and small builders who operate outside formal regulatory oversight. These actors are the de facto builders of the city, yet they are invisible to the formal banking sector.
- Implementation Risk: Because small contractors lack formal certification, quality assurance mechanisms are minimal. For banks, this introduces implementation risk: financed upgrades may not be delivered to specification, reducing both household benefits and the resilience of the collateral. A majority of the implementation in the sector is done through Owner Driven Construction, where homeowners directly manage the design, material procurement, and labour, often supported by the informal contractors. Traditionally, it has empowered owners and ensured cultural and situational appropriateness, however, without the required knowledge, quality assurance often lacks. Bridging this gap requires training programs that certify these informal builders, allowing them to become "bank-approved" installers. Financial institutions could partner with accredited training bodies, vocational colleges, and organizations such as Habitat for Humanity to create short certification programs for informal builders. These programs would enable informal artisans to become bank approved installers and would help ensure that financed upgrades meet basic resilience standards, reducing implementation risk for lender (Habitat for Humanity, 2023).
- Verification /validation - To reduce implementation risk, lenders require a simple and reliable way to confirm that upgrades have been completed to an acceptable resilience standard. At present, verification is inconsistent because most contractors operate informally and households manage upgrades without technical supervision. Financial institutions could address this by establishing basic verification protocols linked to the IFC Building Resilience Index or similar tools. These protocols would include pre upgrade checks to verify the suitability of the proposed measure and post upgrade confirmation using photos, geotagging, supplier receipts, or inspections by certified installers. Creating this consistent verification layer would help lenders ensure that financed measures deliver actual resilience gains and would reduce uncertainty around the performance of upgrade portfolios.

6. Operation and Maintenance

Once upgrades are installed, long-term performance depends on homeowners and small-scale maintenance service providers. Where pumps, drainage systems, or ventilation improvements form part of the upgrade, periodic servicing is required. There is currently no systematic monitoring or data feedback loop that would allow lenders or insurers to assess whether upgrades reduce climate-related damages over time and whether the combinations upgrades and materials used in them should be modified.

Considerations for a housing microloan product for home adaptation: household clients' reality

Households and communities in informal settlements spend a significant proportion of their income and savings on coping with climate conditions. Research indicates that residents of informal settlements spend between 15% and 30% of their monthly income on housing repairs and improvements (Habitat for Humanity, 2020), suggesting that a market for financing already exists but is currently served by cash savings.

Key considerations when designing a housing microloan product for home adaptation (direct to household route – see below):

- Small, repeatable tranches to suit the incremental built reality: Urban housing development in Tanzania takes between 3 and 20 years, with an average duration of about 8 years (Millanzi, 2019). Because households build and upgrade their homes in phases, financing must match this incremental process. Adaptation microloans that provide small, repeatable tranches of capital, for example approximately TSh 2 million every 18 months, align more closely with household cash flow than a single large loan. This structure allows borrowers to complete upgrades step by step, lowers repayment stress, and improves loan performance. One off loans for discrete upgrades may also be required.
- Need for unsecured microloans and long repayment duration: Borrowers strongly prefer unsecured loans with simple access requirements (e.g., single ID and one guarantor) and longer repayment schedules to match their cash flows (Habitat for Humanity, 2020). The requirement for formal title deeds is a major bottleneck, therefore alternative collateral strategies, such as chattel mortgages or group guarantees, can help reach low income and informally employed households while maintaining lender risk controls. These flexible mechanisms ensure that adaptation loans reflect the financial realities of Tanzanian households.
- Affordability First Loans Sizing: There is a significant risk of over-leverage. Studies indicate that over-indebted micro-borrowers in Tanzania may spend 75% or more of their monthly income servicing debts across multiple credit commitments (Taylor & Francis, 2020). Adaptation loans must therefore be carefully sized and, where possible, designed to be cost-neutral: meaning the loan repayments should ideally be offset by savings in avoided repairs or reduced utility costs (e.g., water or energy savings from reduced cooling requirement). Financial institutions could also incorporate affordability safeguards, such as instalment caps, phased disbursements, and basic financial literacy support, to ensure that adaptation loans reduce household vulnerability rather than contribute to financial stress.

Unit Economics: Defining the Minimum Effective Adaptation Package

The commercial viability and scalability of a mass-market retail microloan product are entirely dependent on the low-cost, high-impact nature of the financed intervention. To help define the likely adaptation finance product needs, this assignment has structured a Minimum Effective Adaptation Package, a set of targeted, affordable home improvements designed to mitigate the most common and localized climate risks—specifically chronic indoor heat stress and localized pluvial flooding—prevalent in high-density urban informal and peri-urban settlements.

The cost estimates for these targeted interventions confirm their suitability for high-volume, short-term, lending:

Table 1: Heat Adaptation Package Costs

Roof Type	% Dwellings	Package description	Adaptation Cost[1] USD	Adaptation Cost Range USD
Iron Sheets	85%	Basic reflective coating (whitewash or cheap paint, four coat reflective coating system (primer and three coats) with rust removal, cleaning and basic reinforcement of weak trusses, 60-70 sqm) + improved roof space	50	15-60

		ventilation (soffit openings) using scrap materials		
Grass/Leaves	12%	Replacement with second-hand iron sheets (salvaged) or new corrugated iron + basic whitewash	80	50-120
Mud and Leaves	2%	Full roof replacement with corrugated iron sheets + labour for installation by local artisan (15,000-30,000 TZS/day)	120	80-180
others	1%	Baseline roof upgrade; case-by-case assessment	100	60-150
Wall Type	**% Dwellings**	**Package description**	**Adaptation Cost USD**	**Adaptation Cost Range USD**
Cement Bricks	28%	Lime-based or whitewash coating (reflective, 120-150 sqm, basic labour) + passive ventilation improvements	20	10-30
Baked Bricks	35%	Reflective lime wash or paint coating + basic ventilation openings	18	10-40
Sundried Bricks	19%	Lime-based reflective coating + lime mortar improvements	25	20-30
Poles and Mud	16%	Reflective mud plaster coating; or replacement with baked bricks for lower section	40	30-50
Stones	1%	Lime mortar repointing + reflective lime wash	25	20-30
Others	2%	Assumed baked brick equivalent	18	10-40

1 Cost estimates are based on prevailing retail material prices collected from Tanzanian hardware suppliers between 2023 and 2025, combined with labor rates reported for informal artisans in urban and rural markets. Full costing methodology and sensitivity assumptions are available in the Market Sizing Excel Model (GCA and Pegasys, 2025).

Table 2: Flood Adaptation Package Costs

Floor Type	**% Dwellings**	**Package description**	**Adaptation Cost USD**	**Adaptation Cost Range USD**
Cement	28%	Plinth raising 600-800mm + cement skirt (1m wide around perimeter)	500	400-600
Earth/Sand	35%	600mm plinth + 150mm cement stabilization layer + perimeter drainage channel	350	300-400
Ceramic Tiles	19%	Plinth raising + tile grout sealing + perimeter drainage	400	350-450
Others	16%	Assumed Earth/Sand category (worst case)	350	300-400
Wall Type	**% Dwellings**	**Package description (minimum effective flood adaptation)**	**Adaptation Cost USD**	**Adaptation Cost Range USD**
Cement Bricks	28%	Waterproof cement sealing to 80cm height (basic liquid cement, not membrane) + improved external drainage grading	40	20-80
Baked Bricks	35%	Waterproof cement sealing up to 80cm + rubble/soil compaction at base for drainage	35	18-70
Sundried Bricks	19%	Lime mortar stabilization of lower wall section + basic cement sealing	50	25-90
Poles and Mud	16%	Partial replacement of lower 80cm with cement blocks + basic	80	60-150

		waterproofing; or earth stabilization with lime mortar		
Stones	1%	Repointing with cement mortar + basic sealing	45	25-80
Others	2%	Assumed baked brick equivalent	35	18-70

These low intervention costs—ranging from $15 to $500—are critical enablers for financial institutions. They permit the deployment of high-volume transactions, ensure rapid capital recycling and attractive yields on short tenors, and, crucially, keep the loan size highly affordable to vulnerable households. By mitigating the household's exposure to catastrophic climate-related damage, this finance reduces financial volatility and contributes to reducing the credit risk associated with the loan itself. The focus on minimum effective packages ensures that financing is streamlined and directed towards verified resilience outcomes, addressing the technical gap identified in section 4. Because these represent minimum effective packages, they can be standardized and verified, which supports consistent underwriting. Field testing is required to confirm benefit cost ratios under Tanzanian conditions, in line with international evidence of significant avoided loss benefits from small scale housing adaptation measures (Frediani, 2023).

Product fit and go-to-market routes for commercial banks to consider

Commercial banks in Tanzania have a significant opportunity to support access to home upgrades for adaptation and resilience. Four main customer routes and financial product offerings would be most beneficial to consider:

1. Direct to homeowners/households
2. Lending to small-scale lessors
3. Lending via SACCO/VICOBA groups
4. Vendor-linked borrowers

Each offers distinctive benefits that together create a scalable, low-risk, high-demand market.

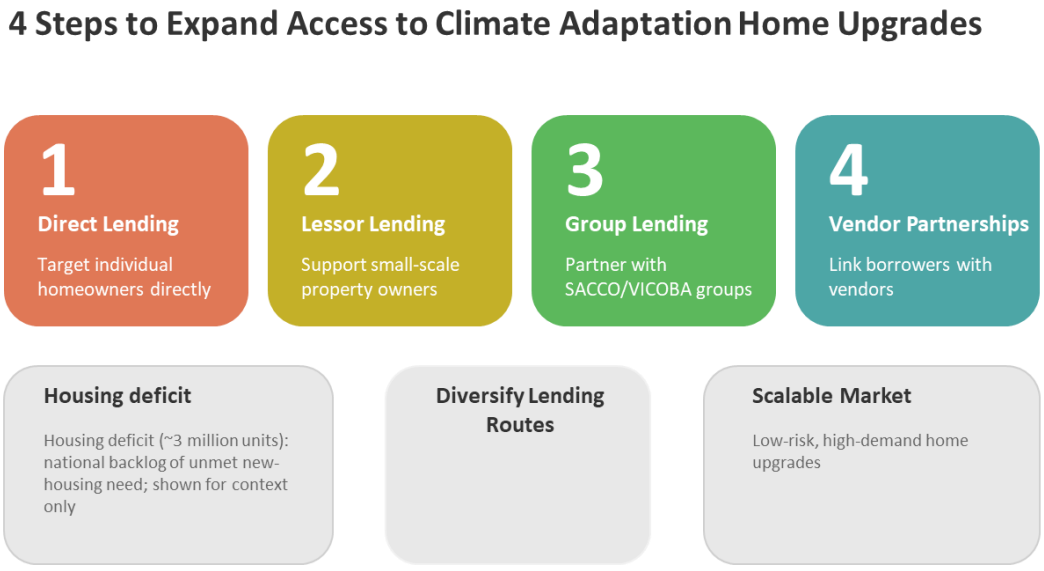

Figure 7: Four main customer lending routes

1. Direct Lending to Homeowners (Retail HMF)

Strategic Rationale: Homeowners/households in Tanzania already invest heavily in incremental building and (climate-related) repairs, representing a large, cash-financed market that formal credit can capture. These borrowers exhibit strong repayment behaviour because upgrades are essential expenditures that protect the family residence, the home value and the health of family members.

Commercial Benefits:

- High turnover, attractive yields: tenors (6–24 months) allow rapid capital recycling. While housing microfinance (HMF) interest rates and cost of capital remain high (interest rates historically in excess of 25%) in the sector, this creates a significant margin opportunity for well-structured retail products.
- Stable repayment: Borrowers are motivated to maintain their home and avoid disruptions to household wellbeing, leading to lower-than-typical unsecured credit losses.
- Lower climate-related default risk: Upgraded structures (e.g., reinforced roofing, improved water storage) reduce the financial shocks that frequently lead to arrears.
- Repeat lending potential: Improvements occur in stages, generating long-term customer value and fostering client loyalty.

2. Lending to Small-Scale Lessors

Strategic Rationale: Small lessors provide the majority of affordable rental housing in urban Tanzania. Upgrading their units increases rentability, stabilizes cashflow, and protects the asset, creating a natural alignment between borrower incentives and lender risk. Upgrades tied to essential services, security, and infrastructure are key drivers of rental price increases in urban settings (Ibrahim Nor, Audu, & Mohamed, 2025) , providing a clear pathway for lessors to service the debt.

Commercial Benefits:

- Repayments backed by rental income: Rental income streams are often more stable than informal wage earnings; suitable for cashflow-based underwriting.
- Potential for Income-enhancing loans: Upgrades could reduce vacancies, support modest rent adjustments, and extend building life. Investment in amenities like reliable electricity and enhanced security can justify higher rental fees (Ibrahim Nor, Audu, & Mohamed, 2025).
- Lower performance volatility: Investing in resilient, better-maintained rental stock mitigates the impact of climate events on lessors' cashflows and property value. In some cases, lessors may also have borrowed to construct the unit(s) and used the property as collateral so their lenders would have an interest in mitigating risk to their collateral.

3. Partnership Lending via SACCOs, VICOBAs, and Cooperatives

Strategic Rationale: Savings and Credit Cooperatives (SACCOs) and Village Community Banks (VICOBAs) serve millions of low- and middle-income Tanzanians and already finance housing informally. Partnering with these groups provides banks with a high-trust, low-cost customer acquisition channel and significantly reduces underwriting and monitoring costs. Successful SACCOs demonstrably increase members' assets, incomes, and improve their housing quality (International Journal of Economics, Commerce & Management , 2019).

Commercial Benefits:

- Low cost to serve: Group screening, monitoring, and peer discipline reduce operational expenses and default probability. This "social collateral" often results in higher repayment rates.
- Market access: Enables cost-effective penetration of informal settlements and peri-urban areas where banks lack branch infrastructure. Historical evidence shows that commercial banks have successfully used this linkage strategy to expand rural financial access

  A practical Tanzanian precedent for this linkage approach is CRDB Bank's microfinance linkage strategy with SACCOs. In a documented case study, CRDB deliberately used SACCOs as local financial intermediaries to reach underserved rural customers cost-effectively, rather than relying on branch expansion alone (Piprek, 2007). CRDB formalized its first SACCO linkages in 2001 (starting with pilots in four regions) and later institutionalized the model by registering the CRDB Bank Microfinance Company Limited as a separate entity in 2004, enabling dedicated systems and cost attribution for the channel (Piprek, 2007). The model combined on-lending to SACCOs with a cash-based risk control (partner institutions placed deposits as loan security—typically 10%–25% depending on performance), and it scaled rapidly—reportedly reaching more than

78,000 clients through 157 partner institutions (Piprek, 2007). The case study emphasizes that CRDB's results depended on senior management commitment, an up-front investment in the model, and a long-term strategic view of serving lower-income markets on commercial principles.

- Strengthened Partners: Recent consolidation in the cooperative banking sector (e.g., the launch of Coop Bank Tanzania in October 2024) suggests a trend toward larger, more stable cooperative partners, making them increasingly reliable for commercial bank wholesale lending.
- Flexible structuring: Banks may lend to the group, co-lend, or provide wholesale liquidity to the cooperative.

4. Vendor- and Supplier-Linked Finance

Strategic Rationale: Linking loan disbursement to vetted suppliers of materials (roofing, water storage, windows, ventilation products, etc.) ensures loan integrity and materially reduces the risk of misuse of funds—a common driver of default in unsecured lending. Standardized menus of eligible improvements reduce appraisal cost—directly applicable to climate adaptation. The construction sector itself is a powerhouse in Tanzania, having shown leading annual credit growth from commercial banks Bank of Tanzania reported that bank credit to building and construction recorded the strongest annual growth among selected economic activities (e.g., 31.2% annual growth in 2020) highlighting strong demand and bankable momentum in the construction ecosystem that can be leveraged through supplier-linked disbursement models. (Bank of Tanzania, 2020)

Commercial Benefits:

- Controlled use of proceeds & fraud reduction: Disbursement directly to suppliers (e.g. roofing material producers) limits diversion and guarantees spending on the intended, resilient upgrade.
- Reduced credit and operational risk: Materials invoices and supplier verification reduce appraisal cost and fraud exposure. Banks can mirror the asset finance model, entering into MOUs with vetted suppliers to ensure quality, discounted materials.
- Improved works' quality: Supplier networks and trained artisans enhance installation quality, improving resilience outcomes and asset durability. Some assets and materials may also come with warranties that further reduce risk for lenders.

5. Development and Climate Adaptation Benefits

Economic Inclusion and Market Catalysation

Blended finance products for resilient housing deliver transformative development outcomes by expanding access to collateral-free loans for low-income earners who are traditionally excluded from the formal mortgage market.

The economic multiplier effect of enabling greater access to finance for adaptation is significant. Small-scale interventions, such as **US$200 individual loans** or **US$2,000 group-based facilities**, empower community savings groups to initiate and complement incremental building cycles. Data from **Vision Fund Tanzania** indicates that these targeted microloans demonstrate superior repayment rates compared to traditional unsecured lending, as improved housing quality reduces household displacement and in some instances depending on the upgrade type, health-related income shocks. Furthermore, the local construction value chain benefits directly, with increased demand for certified materials and skilled labour generating sustainable employment in green supply chains.

Quantifiable Climate Resilience Gains

Adaptation upgrade home loans mitigate systemic climate risks through the application of hazard-map-based ratings and tiered interventions. These protocols achieve an estimated **20 percent uplift in Building Resilience Index scores** per pilot loan, substantially lowering household exposure to the floods, storms, and heatwaves prevalent in informal settlements[15]. In coastal urban areas like Dar es Salaam, where annual flood events can cause catastrophic asset loss, verified structural retrofits act as a critical form of self-insurance (UN-Habitat, 2022).If scaled to a national level, a portfolio of **5,000+ loans** could reduce disaster recovery costs while preserving local ecosystems by incentivizing safer-site construction over high-risk builds (IFC, 2022).[16]

Climate mitigation co-benefits

Beyond physical protection some adaptation measures can deliver secondary environmental benefits. Retrofitting informal structures with durable, locally sourced materials can extend building life and reduce the need for repeated reconstruction. Improved ventilation and shading can reduce indoor heat stress without mechanical cooling, which may limit future energy demand as appliance use expands. These co benefits are secondary to the core adaptation objectives and do not require mitigation oriented certification schemes.

Health, Productivity, and Gender Equity

The social benefits of resilient housing extend into public health and economic productivity. Heat adaptation measures are particularly critical in the Tanzanian context, where extreme temperatures

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[15] The Building Resilience Index (BRI) is a standardised assessment tool developed by the International Finance Corporation (IFC) to measure the physical resilience of buildings against climate and disaster hazards. The BRI evaluates a structure across multiple hazard dimensions — including flood, wind, heat stress, and moisture — and produces a composite resilience score that reflects the likelihood of a building maintaining its structural integrity and habitability under defined hazard conditions. Scores range from 0 to 100, with higher scores indicating greater resilience. A 20 percent uplift represents a meaningful improvement in the structural performance of a dwelling relative to its pre-upgrade baseline. For full methodology, see: International Finance Corporation (2022). *Building Resilience Index: Technical Overview*. Washington DC: IFC. Available at: www.ifc.org

[16] It can do this by reducing the structural damage that climate events inflict on the housing stock. It may also deliver a secondary benefit, which operates through site selection and construction practices. The introduction of adaptation-linked finance products that condition lending on minimum resilience standards — such as adequate drainage or set-back from riverbanks — create a financial incentive for households to avoid building in the highest-risk locations in the first place. Over time and at scale, this could reduce the encroachment of informal construction into flood plains, riverine corridors, and coastal buffer zones that serve as natural drainage and filtration systems. Preserving these areas from incremental settlement reduces household exposure to flood risk and the degradation of the natural infrastructure — wetlands, riverbanks, mangrove edges — that provides passive flood protection for surrounding communities and ecosystem benefits.

directly impair work capacity and increase morbidity. Furthermore, these financial products are powerful tools for advancing gender equity.

Women and girls bear a disproportionate share of the impact of temperature increases, spending more time indoors and facing compounded risks during pregnancy. Informal housing in Africa is frequently 4–6°C warmer indoors than outdoors, and pregnant women may have little or no means of reducing their heat exposure. Studies in South Africa suggest that severe hypertensive disorders in pregnancy increase by as much as 80% when temperatures exceed 23°C in early pregnancy (Chersisch, Scorgie, Filippi, & Luchters, 2023).

Further, women in Tanzania often are disproportionately more vulnerable to climate hazards due to limited land tenure and a lack of formal credit history and a concomitant reduction in their ability to make consumer and household purchasing choices that would reduce their risk (such as buying cooling fans). Innovative lending models that use **alternative credit scoring** and flexible group guarantees allow women-headed households to access the capital necessary for home improvements. By targeting the specific needs of low-income women earners, resilient housing microloans reduce domestic inequality and supports government-led initiatives for safer, more inclusive infrastructure development.

Integration with National and Global Sustainability Reporting Standards

The formalization of resilient housing finance products is increasingly dictated by the adoption of global transparency frameworks within the Tanzanian financial sector. As the **Bank of Tanzania (BoT)** issues the **2025 Guidelines on Reporting of Climate-Related Financial Risk Management and Disclosures** (Bank of Tanzania, 2025), local financial institutions are mandated to assess their portfolios in relation to physical climate risk and transition risk. This regulatory shift transforms resilient housing from a corporate social responsibility initiative into a core risk management opportunity. By financing verified upgrades through the **Building Resilience Index**, Banks can provide the granular climate-risk data necessary to satisfy international investor demands for managing physical risk in the housing and construction sectors.

Furthermore, the standardization of these assets allows Tanzanian banks to access a broader pool of adaptation and **ESG linked capital**. Projects that demonstrate measurable resilience gains in the informal housing sector are highly attractive to global impact investors and DFIs. Compliance with International Capital Markets Association (ICMA) and Climate Bond Initiative standards enables Banks to package these home upgrade loans into **resilience**, **green or social bonds**. Such instruments are beneficial for securing long-term, lower-cost capital for resilience bonds, as seen with the successful issuance of subnational green bonds in the Tanga region.

Synergy with National Climate Commitments and SDGs

Resilient housing finance is a primary lever for achieving Tanzania's **Nationally Determined Contributions (NDCs)** and the **National Climate Change Response Strategy 2021–2026**. The government's adaptation agenda requires an estimated **US$750.0 million per year** through to 2030, with a significant portion allocated to infrastructure and human settlements. By incentivizing private capital to flow into housing upgrades for adaptation, Banks contribute to reducing the fiscal burden on the state and support the **Sustainable Development Goals (SDGs)**, particularly **SDG 11 (Sustainable Cities and Communities)** and **SDG 13 (Climate Action)**.

Tanzania's Sustainable Finance Principles (2024), also encourage Banks to innovate in the development of products for vulnerable groups, including women and youth. Because climate-resilient upgrades such as flood-proofing and passive cooling directly improve the creditworthiness of households by preventing asset destruction, these products align with the **"Social" (S) and "Governance" (G)** pillars of ESG. This holistic alignment ensures that housing finance supports the **National Adaptation Plan (NAP) 2025–2035**, which positions the residential sector as one of nine core sectors for action in Tanzania's resilient economy.

6. Implementation and Scaling Pathway

Unlocking Tanzania's climate-adaptation upgrade market requires an **integrated delivery model that reduces both credit risk and execution risk by tightening the link between finance, technical standards, and supply-side capacity.** Loan integrity can be strengthened by disbursing funds directly to vetted suppliers and installers for predefined items such as roofing, ventilation, windows, and water storage, using direct payment controls that are widely recognised in development finance disbursement practice (Asian Development Bank, 2022).

Standardised menus of eligible upgrades **further improve scalability by reducing design ambiguity and enabling repeatable verification**. To reach low- and middle-income households efficiently, partnering with SACCOs and savings groups such as VICOBAs provides a high-trust acquisition and monitoring channel because these groups hold member-level information and social capital that can reduce information asymmetry and lower outreach costs (Magumula & Ndiege, 2019).

Tanzania also has an established precedent for linkage-based expansion: CRDB's SACCO linkage strategy was explicitly designed to cost-effectively extend services into rural areas through local intermediaries, supported by deliberate institutionalisation and risk controls (Piprek, 2007). The bank's subsequent reporting demonstrates continued scale-up of last-mile delivery channels that operationalise this approach at national level. Addressing structural constraints on the supply side is essential because affordable housing delivery in many African contexts is constrained by gaps or weak coordination across foundational inputs such as materials, delivery processes, and finance. Tanzania-specific research similarly positions housing microfinance as an emerging market that benefits from coordinated product design and ecosystem development (Habitat for Humanity, 2023)

Practical evidence from IFC-supported housing microfinance programmes shows **that bundling credit with construction-related support,** including cost estimates for defined improvements and facilitated access to quality materials, **strengthens the likelihood that loans translate into completed, durable assets.** Finally, these adaptation upgrades can generate climate mitigation co-benefits by improving resource efficiency and enabling credible verification through internationally recognised green building standards and market-scaling mechanisms, including EDGE certification and the Market Accelerator for Green Construction programme that supports financial institutions to scale certified green construction and retrofit portfolios

To resolve this, interventions must move beyond "last-mile distribution" to actively prime the supplier market. This involves:

- **Supplier Market Priming:** Engaging with manufacturers and distributors to de-risk the stockpiling of certified green, resilient materials (such as quality cement – preferably low-carbon, or thermally efficient roofing).
- **Technical Value Chain Integration:** Addressing the "skills gap" by training for local suppliers and small-scale contractors in the technical application of adaptation technologies. Discussions with CRDB and the IFC highlighted that lenders face significant implementation risk when contractors are not trained to install resilient materials correctly. To address this, financial institutions could partner with vocational training centres, professional engineering bodies, and organisations such as Habitat for Humanity to establish short, modular training programmes on approved adaptation measures. Additional potential partners in Tanzania include the Vocational Education and Training Authority, the National Construction Council, the Tanzania Building Agency, selected polytechnic colleges such as Dar es Salaam Institute of Technology, and technical NGOs including BRAC Tanzania and Engineers Without Borders. These institutions can support curriculum development, training delivery, and verification of installer competence. Such partnerships would help create a pool of installers who understand basic resilience standards

and correct material application, which reduces implementation risk and strengthens lender confidence in adaptation lending.

- Financial-Supply Feedback Loops: Creating incentives where insurance or credit terms are tied specifically to the use of verified resilient materials, thereby providing suppliers with the predictable demand needed to shift their inventory.

To transition from the current fragmented landscape to a bankable, standardized lending ecosystem where both finance and the right materials arrive at the project site simultaneously, a phased implementation pathway is required. This pathway progressively reduces credit and operational risks while building market maturity over an indicative 36-month horizon.

Phase 1: Adaptation-linked Housing Microloan Product Design (Month 1-6)

The first phase focuses on designing a viable adaptation microloan product and identifying target borrower segments. This includes using climate risk screening tools on personal loan and construction portfolios to identify clients whose climate exposure increases repayment vulnerability.

Early engagement with organisations such as the Tanzania Mortgage Refinance Company (TMRC) and Habitat for Humanity can support the design of product structures and ability to borrow, define eligible upgrade packages aligned with the Building Resilience Index, and establish appropriate verification and risk control mechanisms.

This phase also includes identifying delivery partners, mapping supplier networks, and defining implementation standards. In tandem an extensive pipeline of potential borrowers would be identified and vetted to support a subsequent product proof/testing phase.

Phase 2: Product Proof and Risk Containment (Month 6–12)

The initial stage focuses on demonstrating that adaptation-linked home upgrade microloans can be delivered with controlled risk and predictable outcomes. Success in this phase relies on building internal appetite and readiness within Banks aligning with local microfinance models (Habitat for Humanity, 2023).

Key Strategic Actions:

- Refine Standardized Upgrade Packages: High-priority measures, such as flood-resilient roofing and heat reduction ventilation, must be defined by scope and cost in detail. These packages allow banks to underwrite loans based on known parameters, linked to Building Resilience Index standards.
- Supplier-linked Lending Models: Loan disbursements are tied directly to pre-approved vendors and installers. This mechanism reduces the misuse of funds and limits fraud risk, which is a primary concern for lenders in the informal sector.
- Staff Upskilling and Stakeholder Mapping: Banks must train teams on systems such as the Building Resilience Index as a foundational validation tool. This period of preparation ensures that teams can manage the technical nuances of (green and) resilient building protocols (Vision Fund Tanzania, 2024).
- Catalytic Concessional Capital: During this pilot stage, grant-funded technical assistance would allow lenders to test products without absorbing full market-building costs.
- Establish Pilot Target Success Metrics: for instance initial pilots could aim for 500+ loans in Year 1, targeting low-earners who traditionally lack mortgage access.

Phase 3: Replication and Market Expansion (Month 12–24)

Once delivery models are proven, the focus shifts to expanding geographic reach and lowering unit costs through urban pilots before extending into rural landscapes.

Key Strategic Actions:

- Demand Aggregation Mechanisms: Lenders should leverage SACCOs, VICOBA groups, and housing cooperatives to build loan pipelines. These groups improve borrower discipline and significantly reduce origination costs through collective accountability.
- Bank Led Verification Protocols: Banks should assume full responsibility for the verification of funds usage and structural quality. Because they possess the deepest technical understanding of their clients, they are best positioned to conduct Index-based pre- and post-validation of upgrades (UN-Habitat, 2022).
- Early Insurance Engagement: Although home insurance penetration is low in Tanzania, exploratory engagement with insurers can help assess long term opportunities for linking verified upgrades with reduced loss ratios.

Phase 4: System Integration and Balance-Sheet Scale (Month 24-36)

At maturity, adaptation upgrade home lending could become an embedded asset class within Tanzania's broader housing finance system, supported by commercial capital and reinforced by policy frameworks.

Key Strategic Actions:

- Engagement with the TMRC: Once products are standardized, TMRC can provide essential liquidity support and refinancing for eligible upgrade-linked portfolios.
- Portfolio Consolidation and Data Infrastructure: Lenders should demonstrate stable performance and differentiated risk profiles for upgraded homes. Contributing to emerging housing data platforms will support regulatory oversight and investor confidence.
- Alignment with Government Reforms: Scaling should be synchronized with streamlined titling through the Ministry of Lands' One-Stop Centre. This formalization helps bring informally built housing into the regulated financial fold without excluding vulnerable populations.
- Long-term Impact Goals: For instance the framework could target a 5,000+ loan volume by Year 3, achieving an average 20 percent uplift in the Building Resilience Index.

RESOURCES

This brief directly builds on the following technical report:

- GCA (2026), Rapid Climate Risk Assessment and Adaptation Investment Opportunities Mapping in Infrastructure, Energy and Manufacturing, Tanzania Country Report. Developed in cooperation with partners including CGAP, and consulting firm: Pegasys.

Relevant bibliography and selected resources used for these technical reports include:

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APPENDIX

ANNEX 1. CLIMATE RISK IMPACT PATHWAYS FOR HOUSING

Grouped Climate Hazard	Housing Climate Impact Mechanisms	Health Impact	DALY-Relevant Impacts[17]
1. Thermal Stress ***(Rising temperatures, heatwaves, hot nights)***	• Indoor overheating (metal roofs, poor insulation/ventilation)• Nighttime heat retention• Increased urban heat island effects in dense settlements	• Cardiovascular strain• Dehydration & acute kidney injury• Respiratory symptom exacerbation• Sleep disruption → cognitive decline, accidents	↑ Heat-related mortality↑ Cardiovascular & renal DALYs↓ Productivity & learning outcomes
2. Excess Moisture & Flooding ***(Extreme rainfall, flash floods, storm surges)***	• Structural damage, wall collapse, roof failure• Contaminated water/latrines overflow• Displacement → overcrowded shelters	• Cholera, diarrhoea, typhoid• Malaria/dengue from standing water• Injuries & drowning	Major under-5 diarrhoeal DALYs↑ Vector-borne disease DALYs Injury and trauma-related DALYs
3. Dampness & Mould ***(Flood aftermath + humidity changes)***	• Persistent damp in mud/timber walls• Mould growth from poor drying & ventilation	• Asthma & COPD• Respiratory infections• Allergic reactions	↑ Chronic respiratory DALYs↑ School/work absenteeism
4. Air Quality Stress ***(Drought, heat, biomass reliance, wildfire smoke drift)***	• Reliance on wood/charcoal increases in drought• Indoor smoke trapped in poorly ventilated homes	• Pneumonia (especially children)• COPD• Ischaemic heart disease	One of the **largest DALY contributors** in East Africa (child pneumonia + cardiopulmonary disease)
5. Structural Integrity & Habitability Loss ***(Cyclones, windstorms, heat-driven material degradation, sea-level rise)***	• Collapse of informal dwellings• Heat + humidity degrade mud/timber structures• Salinisation weakens coastal foundations• Habitability loss → forced relocation	• Trauma & crush injuries• PTSD, anxiety, depression• Disrupted maternal/child health services	Injury DALYs Chronic mental health burden Maternal/child health DALY losses
Cross-Cutting Economic & Housing Stability Shocks ***(Drought-driven income loss, climate damage costs)***	• Inability to pay rent/repair homes• Migration into informal settlements• Overcrowding increases transmission risk	• Malnutrition (from income shocks)• TB and respiratory diseases (crowding)• Stress-related disorders	↑ Malnutrition DALYs↑ Infectious disease DALYs Lower long-term wellbeing & economic capacity

[17] Daily Adjusted Life Years (DALYS) are a measure of overall disease burden. One DALY essentially equals one year of healthy life lost. So if a disease kills someone 10 years early, that's 10 DALYs.

ANNEX 2. BREAKDOWN OF HOW ADAPTED HOMES TRANSLATE TO FINANCIAL PERFORMANCE FOR BANKS

Credit Risk Metric	How Home Upgrades Improve It	Evidence / Why It Matters for Banks
Probability of Default (PD) ↓	Fewer climate-related shocks reduce unexpected expenses (roof repair, flooding, medical costs) → more stable cashflows → lower arrears.	**World Bank:** retrofitted homes experience dramatically fewer structural failures after storms, reducing borrower shock exposure[18]. **IPCC AR6:** substandard housing is a key driver of household vulnerability in Africa.
Loss Given Default (LGD) ↓	Stronger, more resilient structures maintain asset value and suffer less damage → higher recovery value → lower losses.	**World Bank**[19] **post-disaster assessments** show housing upgrades reduce structural damage by 40–80%, directly improving collateral recoverability.
Exposure at Default (EAD) Stabilizes	Improved resilience reduces need for emergency borrowing; prevents overextension; stabilizes repayment behaviour.	**Microfinance research (Philippines, India, Kenya):** households with improved housing took on fewer emergency loans after floods and storms.
Non-Performing Loans (NPLs) ↓	Borrowers in resilient housing are less impacted by climate events → fewer missed payments → healthier portfolios.	Studies of **post-typhoon microfinance portfolios** show borrowers with reinforced homes had **significantly higher repayment rates**. Similar patterns observed after **Kenyan flood events**.
Portfolio Volatility ↓	Less climate-driven delinquency spiking → smoother performance over the credit cycle.	**IFC studies** link climate-resilient assets to more stable retail banking performance[20].
Capital Efficiency ↑	Lower EL (expected loss) → less capital needed under Basel frameworks → higher profitability per loan.	Risk modelling literature ties lower PD × LGD to improved RWA efficiency for retail portfolios[21].
Market Expansion Opportunity ↑	Safe, structured home-upgrade lending opens low-/middle-income segments previously excluded due to perceived risk.	**Habitat for Humanity / IFC** studies: housing microfinance has default rates **below traditional microfinance** when upgrades are verified[22].

[18] World Bank *Global Program for Resilient Housing* (2022): notes that for every $1 invested in pre-disaster housing resilience, up to $10 can be saved in reconstruction costs, with retrofitted homes experiencing dramatically fewer structural failures after storms.

[19] World Bank *Lifelines: The Resilient Infrastructure Opportunity* (Hallegatte, Rentschler & Rozenberg, 2019): estimates the overall net benefit of investing in resilient infrastructure in developing countries at $4.2 trillion, with $4 in benefit per $1 invested, based on reduced structural damage and improved asset recoverability after disaster events.

[20] IFC's *SBFN 3rd Global Progress Report: Accelerating Sustainable Finance Together* (2021),

[21] Basel Committee on Banking Supervision (BCBS), *An Explanatory Note on the Basel II IRB Risk Weight Functions* (2005): explains that under the Internal Ratings-Based (IRB) approach, Risk-Weighted Assets (RWAs) are calculated as a function of PD × LGD × EAD, meaning that lower expected loss parameters directly reduce capital requirements.

[22] *The State of Housing Microfinance* (2015–16 edition): documents that housing microfinance, when bundled with construction technical assistance and upgrade verification, has historically exhibited lower default rates than general microfinance products.

ANNEX 3. MARKET SIZING RATIONALE

The Tanzania market sizing methodology establishes a Total Addressable Market (TAM) anchored in the national housing stock, which comprises approximately 15 million household dwellings (National Bureau of Statistics (NBS) and Office of the Chief Government Statistician). This robust, high-confidence figure serves as the essential baseline for the TAM, ensuring the market size is physically grounded and avoids overestimation. The TAM is further defined by a set of segment-specific "minimum effective" adaptation packages. The housing stock is rigorously segmented according to the structural elements used as per census data and housing-quality evidence.

For each segment, we define and cost a minimum effective adaptation package specific to each major climate hazard (heat and flooding). For example, heat packages may include cool/reflective roofs and basic ceilings, while flooding packages involve plinth raising, floor sealing, and simple drainage. Costs are determined using regional evidence on low-cost passive cooling, small-works construction, and typical material prices. Multiplying these per-home package costs by the number of dwellings exposed to risk produces a physically grounded TAM, reflecting the total investment required to achieve a basic level of heat and flood resilience across the Tanzanian housing market. Additionally, it is crucial to acknowledge the differences when procuring materials in rural markets relative to urban markets. Due to transport costs and stained supply chains rural communities often pay a premium for construction materials. This is factored into the market sizing rationale by applying an estimated 20% price premium for rural buyers.

The exposure factor, which filters the housing stock to determine TAM, is defined by the intersection of climate risk and inherent structural vulnerability. It is assumed that all buildings are fundamentally vulnerable to these risks, as the percentage of structures that would pass international standards for adaptation is negligible. For heat exposure, this means dwellings in regions exceeding critical heat thresholds (like Dodoma or dense urban cores in Dar es Salaam) that also utilize high-heat-absorbing roofing materials without insulation. Flooding exposure targets homes situated within defined flood plains or low-lying areas with poor drainage, often found along major river basins (e.g., Rufiji) or in coastal metropolitan zones susceptible to flash flooding. This has been estimated to be +/- 25% of households accounted for in this study.

To derive the Serviceable Addressable Market (SAM) from the TAM, the model applies two explicit, demand-side constraints: Affordability/Finance (A), and Willingness/Behaviour (W).

The demand-side constraints applied are:

- Affordability/Finance (A): This reflects the share of exposed households that can realistically mobilize the necessary capital via savings, VSLAs, SACCOS, MFIs, mobile money, or bank loans. Calibration uses Tanzania's financial inclusion evidence which show high overall service access but limited effective credit capacity for housing-scale investments.
- Willingness (W): This represents the proportion of exposed and finance-able households likely to prioritize and act on adaptation investments, calibrated based on adaptation-behaviour evidence that shows only a minority (20% to 50%) of households report taking concrete action even when aware of risks.

Affordability and willingness to pay (WTP) are treated as distinct, non-overlapping modifiers in this methodology. Affordability captures a household's *capacity to transact*, parameterised using quantitative data on incomes and credit constraints. In contrast, the Willingness modifier is derived from attitudinal and revealed-preference signals (such as Afrobarometer surveys) that capture *behavioural intent*—who will pay, given their stated adaptation priorities. By first applying the affordability screen (who can pay) and then applying the WTP modifier only within the affordable subset (who will pay), the two parameters operate sequentially on different dimensions of demand (financial capacity versus behavioural choice) without double counting the same constraint.

Formally, the Tanzania SAM for each segment is calculated as:

$$SAM = TAM \times A \times W$$

This deliberate design choice focuses the analysis squarely on demand-side constraints: financial capacity (A), and behavioural uptake (W), without layering in an explicit supply filter. Through these coefficients and considerations, the methodology robustly accounts for the adaptive capacity of households—defined as the ability of households, communities or systems to adjust to climate-related

hazards, moderate potential damage, take advantage of opportunities, and cope with the consequences of climate variability and change, given their resources, institutions and knowledge base. The initial definition of TAM, grounded in hazard exposure and structural vulnerability, ensures the final SAM estimates are based on homes truly at risk. The result is a transparent, replicable framework that produces SAM estimates grounded in Tanzania-specific data on housing conditions, climate risk, and financial inclusion, while clearly articulating the core assumptions that drive adoption scenarios.

The market sizing model is available and can be shared. Please contact climatefinance@gca.org.

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