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Extent of Green Construction Finance Adoption in Kenya's Construction Industry

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Abstract

With the world moving towards sustainable development, and with the great impact that construction has on the environment, the extent of green construction in Kenya is low, and this has been partly attributed to a low uptake of green construction finance. The objective of this paper was to evaluate the determinants of green construction uptake in Kenya's construction industry. A survey research design was adopted. The target population comprised registered developers in Kenya's construction industry. The study found green construction finance uptake in Kenya to be extremely low, averaging 1.06% of projects among architects and developers over a period of five years. Most respondents had no green construction finance experience, with residential projects slightly leading in adoption. EDGE certification was the most common, followed by LEED and Green Star. Green loans were the dominant financing option, with green bonds, private capital, and mortgages being less used. Project values ranged widely (KSh 25 - 550 million), indicating applicability across scales. While the uptake remains very low, 98% of developers would recommend green construction finance, showing strong latent interest. The study concluded that the adoption of green construction finance in Kenya's construction sector is at an early, low-penetration stage.

Keywords

Green Construction, Green Finance, Kenya, Survey, Uptake

1. Introduction

At the heart of the UN's 2030 Agenda for Sustainable Development adopted in 2015 are 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries to make the world a better place through good health and

well-being, clean water and sanitation, clean energy, sustainable cities and communities, responsible production and consumption, climate action, and conservation of life on land and below water [1]. According to the UN Commission on Environment and Development's report, it is clear that the sustainable development of countries and cities requires reduced pollution, lower energy and material consumption, and better protection of natural resources [2]. Poor development models in the past have often led to overcrowding and inefficient use of land, and the results have been greater energy consumption, water pollution, loss in productivity, and fragmented housing, among other negative effects [3]. It is in this sense that the concept of sustainable development has a direct linkage to the construction industry and its activities.

Finance plays a key role in distributing resources in any economy and can be seen as the core of sustainable development and the fight against climate change, among other environmental concerns. It is in response to increased environmental regulations and the development of more sustainable corporate strategies that green finance, also known as sustainable finance, has emerged [4]. Green finance attempts to incorporate ideas such as environmental pollution reduction and energy conservation into financial services [5]. Through tools like investments, corporate loans, and financial products such as green bonds, private or public funds can support projects that expedite the transition to a low-carbon and sustainable economy [6]. Previous research [7] suggests that these tools seek to offer solutions that strike a balance between economic growth and environmental sustainability. However, green finance projects and programmes vary greatly, encompassing a wide diversity of sectors and domains, and this has created difficulties in the definition and formulation of principles, rules, and policies [5]. In light of the expanding implementation of environmental governance across industries and domains, it is imperative to accurately define and have a better understanding of the green finance concept. Such an understanding is crucial for developing effective strategies that optimize available resources for the benefit of both companies and society as a whole.

Africa and much of the developing world have been lagging in the push for more sustainable construction. Indeed, Financial Sector Deepening (FSD) Africa, a development agency, notes that Africa, one of the most climate-vulnerable regions of the world, currently captures just three percent of sustainable investment flows despite half of Africa's GDP being exposed to climate change [8]. This demonstrates the challenge for low-income developing countries to capitalize on the green finance boom. The market for green bonds is expected to grow by 20% to reach $200 billion in 2024 compared to 2023, which is even significantly higher compared to the $87 billion raised in 2016 [9]. According to the author, while the global market continues to grow, there are very few bonds available across Africa. Further, [8] argues that at the same time, the greening of the global financial system must consider the unique challenges and opportunities in these regions to avoid entrenching existing barriers to funding experienced in Europe and North

America.

2. Study Problem and Objective

With the world moving towards sustainable development, and with the great impact that construction has on the environment, the extent of green construction in Kenya is low, and this has been partly attributed to the low uptake of green construction finance (GCF). Despite the efforts by the UN and governments around the globe, [10] asserts that the construction industry globally is falling behind in transitioning to sustainability, and the construction industry in Kenya is no exception. According to [8], in the absence of foundational skills, data, policies, and regulatory frameworks to promote green finance, developing nations like Kenya will struggle to offer adequate scale, quality, and returns for private investors. The country faces particular challenges in mobilizing green finance both in relation to: 1) the need for external capital flows for investment in sectors such as energy, transport, waste, water, and agricultural improvements, and 2) underdeveloped financial systems in areas crucial for green investment, such as structuring major projects and in providing credit and insurance to enable large and small businesses and households to make investments and manage the risks they face [11]. [9] also asserts that the lack of proper financial structures prevents the Kenyan government from unlocking more green finance. [12] points out that the two main challenges in developing countries are the lack of access to green finance products and inadequate awareness and understanding of what green finance entails. Further, [13] observes that while policies such as the interest rate cap in Kenya continue to exist, the pricing of green bonds will be prohibitively expensive in comparison to long-term bank finance, and therefore, we run the risk of stalling the momentum that currently exists in Kenya for green bonds. The premise of this study is that globally, every country and economic sector needs to play its part in the realization of the SDG goals. The objective of this paper, therefore, was to evaluate the extent of green construction uptake in Kenya's construction industry.

3. Literature Review

3.1. Concept of Green Finance

The debate surrounding green financing is very active currently. "Financing green" and "greening finance" are two other terminologies that are currently being used in reference to this concept. The former refers to the financing of projects that contribute or intend to contribute to the conservation, restoration, and sustainable use of biodiversity and its services to people [14]. Meanwhile, "greening finance" is focused on directing financial flows away from projects with a negative impact on biodiversity and ecosystems, and towards projects that mitigate the negative impact or pursue positive environmental impact as a co-benefit. However, these concepts are two sides of the same coin, and they enable a response to the climatic challenge by providing an opportunity for improved coherence and depth in efforts to achieve the restoration of ecosystems [15].

3.2. Defining Green Finance

There is no precise and commonly agreed-upon definition for green finance. Either most articles on the subject do not attempt to define it, or the definitions provided vary greatly [16]. According to [17], green finance is a broad term that can be used to describe financial investments for sustainable development initiatives, projects, products, and policies. [18] argued that green finance and green investment can be used interchangeably, though the former is wider in scope as it includes operational costs associated with green investments. In the banking sector, green finance can be defined as financial products and services that consider environmental factors during lending decision-making, ex-post monitoring, and risk management processes, provided to encourage ecologically responsible investments and support low-carbon technologies, industries, projects, and businesses [19]. Green finance is that which promotes better environmental and sustainable outcomes, using various financial instruments such as loans, debt structures, and different investments [12]. Simply put, green finance is an investment or loan that promotes environmentally positive activities, such as the purchase of ecologically friendly goods and services or the construction of green infrastructure [20] [21].

From the foregoing, green finance could be described as having three components: 1) the financing of private and public green investments, 2) the financing of public policies that encourage the implementation of environmentally conscious projects and initiatives, and 3) components of the financial system that deal specifically with green investments, including their specific legal, economic, and institutional framework conditions.

3.3. Rationale for Green Finance

Climate change has emerged as the predominant political and economic issue of this century and is expected to remain so in the foreseeable future. Governments, businesses, investors, and private individuals worldwide are initiating steps and measures to address the climate crisis, with a particular focus on implementing decarbonization techniques [21]. Transitioning to a low-carbon or green economy requires significant amounts of fresh capital investment, notably in the form of green financing [20]. Such investment would be used to support initiatives that reduce greenhouse gas emissions and assist firms in adapting to the impacts of climate change.

Green finance provides both economic and environmental benefits to everybody. It widens access to environmentally friendly products for individuals and firms, equalizing the shift to a low-carbon society, leading to greater social inclusivity and economic growth [21]. This results in a "great green multiplier" effect whereby both the economy and the environment gain, making it a win-win situation for everyone.

3.4. Types and Sources of Green Construction Finance

Green Mortgages: These allow lenders to provide favourable conditions to

home buyers of properties with a high environmental sustainability rating, or if the buyer is willing to invest in enhancing the environmental performance of the property [21]. In most countries, just like traditional mortgages, local financial institutions are the main providers of green mortgages. This type of debt instrument requires long-term finance in local currency that is not typically offered directly to borrowers by international financial institutions or other investors [22]. However, debt and equity issuances in global capital markets, together with conventional and concessional finance from development finance institutions, are increasingly becoming an important source of finance for this asset class for mortgage providers in middle-income economies [23]. It is in this context that green mortgages provide consumers with preferential conditions, such as reduced interest rates and/or extended payment duration, to buy properties with lower carbon emissions and energy consumption. In most cases, green mortgages have lower down payments than conventional alternatives since green buildings consume less energy and thus have lower utility bills, which may count as part of the borrower's income [24].

Outside the United States and the European Union, the use of green mortgages has been constrained by the high due diligence costs required for green buildings and the absence of information on the default rates of these instruments for domestic financial institutions [25]. That may not be the case everywhere, however. In the year 2016, Bancolombia, Colombia's largest commercial bank, issued a green bond of $400 million in three tranches [26]. This financing was used to fund many green construction projects and offered green mortgages in the local currency with a discount rate of 65 basis points. In Peru, IFC is supporting BBVA, one of the largest Peruvian banks, to finance green mortgages for homebuyers in local currency, and is providing advisory and certification services through IFC's EDGE green building certification program [27]. Green mortgages require robust regulatory and prudential capacities, well-established local financial markets, sufficient sustainability frameworks, and a thriving demand from sustainability-oriented investors and owners [28].

Green Loans: Bank loans are one of the most common financial tools used to finance green building projects, mainly due to their flexibility in terms such as long-term or short-term options, and types such as unsecured, secured, concessional, and subsidized. In the last two decades, many banks across the globe have continued to provide loans to finance sustainable construction [29]. According to [21], green loans are used to support environmentally conscious initiatives such as household solar panels, energy efficiency projects, electric automobiles, and more.

Green Credit Cards: Green credit cards, such as Aspiration's Zero card, plant a tree every time a customer makes a purchase [21]. This enables customers to direct their expenditure toward green finance, thereby enabling a lasting impact on the environment.

Green Banks: Function similarly to traditional banks, except they employ funds

to stimulate investment in environmentally friendly initiatives such as renewable energy. According to research in 2020, the number of green banks in the United States increased from 1 to 20 between the years 2011 and 2020, investing $7 billion in renewable energy [21]. Awareness of green finance has helped grow its relevance in the banking sector, with both commercial and investment banks starting to take action in this regard [30]. Some of the actions include incorporating environmental factors into bank strategy and governance [31]. They also include raising capital for specific green assets through initiating loans, providing credit and savings products, and engaging in capital markets activities such as green bonds.

Green Bonds: Green bonds can be issued by either the government or private corporations and allow issuers to raise money specifically for environmentally friendly projects. [32] defines a green bond as a type of debt security that is specifically issued to raise capital for supporting environmental projects, including green construction projects. According to its review, green bonds' attention has grown in the past decade, both from financial institutions (e.g., multilateral banks) and institutional investors, as tools for financing green construction projects. [21] asserts that green bonds account for the greatest proportion of green funding and include bond investments, the earnings from which are used to support various green initiatives such as clean transportation, renewable energy, and conservation, among others. [33] also agree that green bonds are among the earliest and most well-established green financial products available in the market. The awareness of green bonds as investment instruments has grown exponentially, as witnessed by the double-digit growth rate of issuance of green bonds in the last five years [33]. According to a recent report by the Climate Bonds Initiative (CBI), the issuances of green bonds exceeded US$500 billion in 2021 and predicted that the market will continue to grow to reach US$5 trillion by 2025 [34].

Government Grants and Tax Incentives: To promote green construction, governments across the globe also provide an increasing amount of financial support in terms of grant preferences [35]. These have, however, been mostly witnessed in the developed world [36]. According to [5], a large part of grants for green projects is publicly funded by governments and international organizations like the World Bank, the EIB, ADBI, among others.

Green Private Capital: According to [37], private corporations in the real estate sector initially made investments in sustainable construction primarily to enhance their corporate image, but over time, they have come to understand that these investments also have the potential to generate reasonable economic returns.

International Assistance Programs: These are international financing institutions that provide international assistance programs to support sustainable development around the world, particularly in developing countries [35]. These include the Global Environment Facility (GEF) Trust Fund, Special Climate Change Fund, Least Developed Countries Fund, Nagoya Protocol Implementation Fund, Market Accelerator for Green Construction (MAGC) by the IFC, and Adaptation Fund,

among others [38].

3.5. Green Construction Project Financing: Global and Local Perspectives

Despite the good accounts of green buildings, the construction research community has yet to holistically develop, investigate, and promote the ideal financing models that align with this innovative building model [39]. The authors further assert that green construction is still funded by traditional project financing models, which are out of touch with the core principles of green building, coupled with numerous regulatory and practical limitations [40]. Moreover, the green building model is still in its developmental stages in many parts of the world, and research on it remains limited, including the identification of suitable financing models such as green finance tailored for green buildings [41].

According to [42], between 2012 and 2021, green financing grew more than 100-fold from $5.4 billion to $540 billion globally. This growth is partly attributed to the growing recognition of various environmental crises, and specifically, the climate crisis. Foreign and domestic private finance is increasingly flowing into green construction globally. In the years between 2017 and 2021, green debt financing had a twentyfold increase, from about $10 billion to a record high of $230 billion [43]. Green bonds accounted for about 70 percent of that financing; however, some emerging debt instruments, such as green sustainability bonds and loans, have been experiencing faster growth, as shown in **Figure 1**.

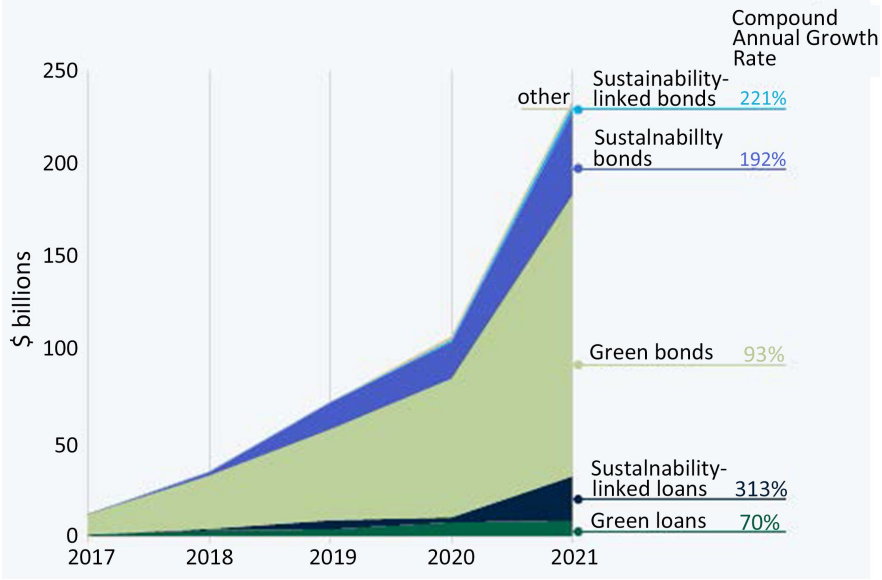


Figure 1. Global private green debt finance [23].

Equity instruments are infrequently used, though Real Estate Investment Trusts (REITs) have the potential to scale the financing of green construction and operations [22]. Other innovative tools of green finance, such as carbon retirement portfolios and transition bonds, are almost non-existent in developing countries

[44]. These countries are mostly missing out on these growing flows of private green finance for greening construction. Since 2017, they have issued only 10 percent of the total global green debt financing [45]. However, there is still hope. According to [27], private green debt finance for green construction has been growing faster in Sub-Saharan Africa, even though such finance is still extremely low, as shown in **Figure 2**.

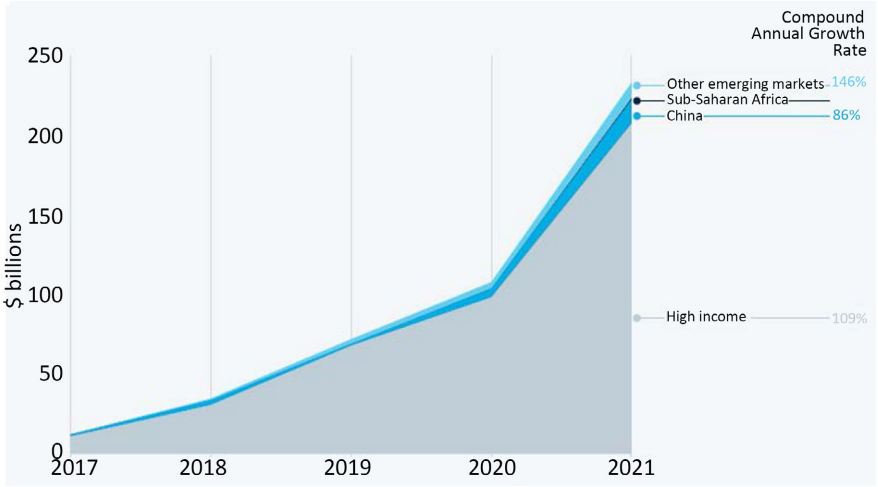


Figure 2. Global domestic and foreign private green debt finance [27].

About 90 percent of this green construction financing in 2021 globally was channelled to green buildings rather than to "hard-to-abate" construction materials such as cement and steel, which account for approximately 19 percent of global carbon emissions [46]. According to the [47], out of the total private green debt finance for green building issued in developing countries, about 54 percent was issued in the Caribbean and Latin America, followed by the Pacific and East Asia (19 percent), and Central Asia and Europe (12 percent). The Middle East, South Asia, North Africa, and Sub-Saharan Africa together issued only 15 percent [48]. Within Sub-Saharan Africa, South Africa accounts for about 75 percent of this financing [47].

In 2021, green construction project financing registered an unprecedented high of about $27 billion globally, with 70 percent of that going to the decarbonization of construction materials. Steel and cement each received about 50 percent of the total green finance for construction materials, with the share of steel growing more rapidly since 2019 [43]. Green loans are the most preferred instruments for financing the decarbonization of construction materials, representing about 86 percent of total financing; however, green bond issuance increased sevenfold between 2019-2021 [46].

Kenya's green building market development has progressed steadily. The certified green building market was 3 percent of new buildings in 2020 [49]. Most of these certified buildings were offices and high-income housing. As of 2020, there were several Real Estate Investment Trusts (REITs), but the market did not record

any green building construction loans or mortgage products. Although the government has a green economy strategy, the implementation and impact of these green building targets on market development are yet to be seen [49].

In Kenya, sources of green finance are primarily external grants and loans from international public institutions; however, the national government also disburses billions of shillings from its revenue to climate and green-related projects [50]. Analysis of national budget data shows that for the fiscal years 2017/18 and 2019/20, the government disbursed KShs 414.23 ($3.19) billion and KShs 427.24 ($3.29) billion, respectively, to climate change sectors. On average, 40% of these funds were raised domestically, and 60% came from international sources. Out of these funds, the actual investment in green projects was KShs 103 ($0.79) billion in 2017/2018 and KShs 120 ($0.92) billion in 2018/2019. The extent of private sector contributions to green finance is not exactly known but is conservatively estimated at an average of KShs 100 ($0.77) billion per year. Out of this investment, it is estimated that KShs 30 ($0.23) billion is sourced domestically and KShs 70 ($0.54) billion is from international organizations.

Acorn Holding Limited was the first private entity to benefit from the green bond issue in 2019, where it was able to raise KShs. 4.3 billion ($40.5 million) to construct and develop affordable, environmentally friendly student hostels [51]. The Qwetu Hostels are built using climate-resilient designs, are green and resource-efficient, and adhere to the EDGE requirements.

The IFC, in collaboration with International Housing Solutions (IHS), established the IHS Green Housing Fund, whose aim is to provide financial support to investors of green affordable houses [51]. The houses must meet the IFC's EDGE standards, which advocate for the efficient use of energy, water, and construction materials. The fund seeks to invest in 5,000 newly developed, green, affordable properties with an initial focus on Nairobi County and other selected counties in Kenya.

3.6. Challenges Facing Green Construction Financing

The low levels of foreign and domestic private capital for green construction in developing countries could be partly explained by market failures within green finance and construction value chains [43]. These failures are often more prominent and widespread in low-income countries. For example, the fragmented structure of the construction industry, the presence of informational imbalances between the segments of the industry and policymakers, extremely localized regulations, and the prevalence of small and medium-sized construction companies hinder finance for green construction [44]. Financial decisions mostly involve multiple stakeholders such as developers and owners, investors, construction professionals, and materials producers, with conflicting interests. Further, in the absence of green codes, regulations, and standards, investors face difficulty in identifying investment opportunities in green construction [52]. Small and medium-sized developers, particularly in economies characterized by high levels of informality,

also face financial constraints for green construction. Additionally, the lack of skilled workers in green construction techniques further constrains the potential for investments in green construction [47].

Green construction alternatives may also appear to be more expensive than they ought to be due to current market prices failing to reflect the social costs imposed by emissions from conventional construction methods and materials, thereby reducing expected returns for green construction projects [53]. Consumers and investors may be reluctant or unable to pay an initial extra cost of 1 to 5 percent for green buildings compared to traditional ones, especially in affordable housing intended for lower-income households. This is even more challenging in low-income countries that have few commercially viable green construction investments [45]. Further, the lack of comprehensive data on default rates and the monetary benefits of green construction investment portfolios also plays a role in reduced investment in green construction [52]. Financial markets also tend to underprice climate risk, which includes issues such as economic losses resulting from climate hazards [30]. For instance, residential property values frequently fail to consider the risks of extreme climatic events, even in cases when such information is public [31]. This increases the capital costs for green buildings relative to traditional alternatives. This problem can be more severe in developing countries, which are geographically exposed to frequent catastrophic disasters and lack well-structured financial and insurance markets [47].

Private investors may encounter high costs associated with measuring and monitoring environmental performance in green construction projects, especially in "hard-to-abate" materials such as cement and steel [23]. These costs are usually high in developing economies due to lower transparency, inadequate governance and disclosure standards, weaker regulations, and insufficient technical capabilities for the issuance and regulation of green financial instruments [24]. Developing countries may also face constraints in supply. There is often a limited number of viable green construction projects to finance in these markets [36]. This could be attributed to the absence of innovation, lack of economies of scale, limited green technical capacity for implementation, and limited concessional finance resources [38]. Regulatory, currency, macroeconomic, and political risks, coupled with volatility, can also increase costs, hence reducing the profitability of green construction investments [54].

4. Research Methodology

4.1. Research Design

This research adopted the survey research design. This entails the collection of quantitative or quantifiable data on more than one case, and at a single point in time, in connection with two or more variables, which are then examined to detect patterns of association, among other relationships [55]. Once the target population had been identified, an appropriate sample was drawn for data collection. Once the extent of adoption of GCF and its determinants had been established

based on the sample, a generalization was made about the entire population.

4.2. Target Population and Sampling Procedures

The target population included architects and developers. The research first surveyed registered architects in Kenya. This is because, in Kenyan practice, the architect is, in most cases, the lead consultant and is engaged by the client early on. Further, the architect is a present figure in all registered construction projects in Kenya. Given that the number of registered developers was expected to be small, the inclusion of architects enabled access to a much wider sample for the researcher to accurately determine the extent of GCF uptake. The architect was required to provide data regarding the green construction projects he/she has been involved in, including details of the developers.

According to the online register published by the Board of Registration of Architects and Quantity Surveyors of Kenya (BORAQS), the number of registered Architects as of March 16th, 2025, was 1,321 [56]. For the first survey, a sample size of 307 Architects was calculated using the following formula developed by [57].

$$n = \frac{N}{1+Ne^2} = \frac{1,321}{1+1,321(0.05)^2} = 307 \text{ Architects}$$

where:

n = sample size;

N = total population (1,321 architects);

e = margin of error (0.05).

The sample was selected from the target population using simple random sampling. This was achieved by reproducing the register as it appears on the BORAQS website and then numbering it from 1 to 1,321. A random number generator was then used to select the 307 architects. The Lead Architect or the next available architect from each of these selected firms was relied upon as the respondent for the survey. The sample size for the second phase of the study was the number of green-financed construction projects identified during the first phase.

The second survey involved developers. According to the online register published by the Kenya Property Developers Association (KPDA), the number of registered developers as of March 12th 2025 was 69 [58]. Due to the small population, the sample in this survey was based on a census of the 69 Registered Developer Firms. This number was also adjusted based on the suggestions of individual private developers suggested by Architects in the first survey.

4.3. Data Collection

Data were collected in two phases. In the first phase, questionnaires were administered to the established sample of 307 Architects. This survey aimed to evaluate the overall extent of the adoption of green finance in construction projects in Kenya. The Architects were required to provide the number of green-financed

construction projects they had been involved with in their portfolio within a span of five years. The second survey involved the administration of another questionnaire to the registered developers. This survey went further to determine the specific GCF instruments adopted.

4.4. Data Analysis

Statistical Package for Social Scientists (SPSS v.25) was used to analyze quantitative data. At the initial stages, descriptive statistics were used to describe and understand the underlying features of the dataset. The overall extent of GCF uptake was calculated as a percentage of the green-financed construction projects within the portfolio of the participating architects. The extent of uptake of various GCF tools and instruments was calculated based on the responses provided by the developers.

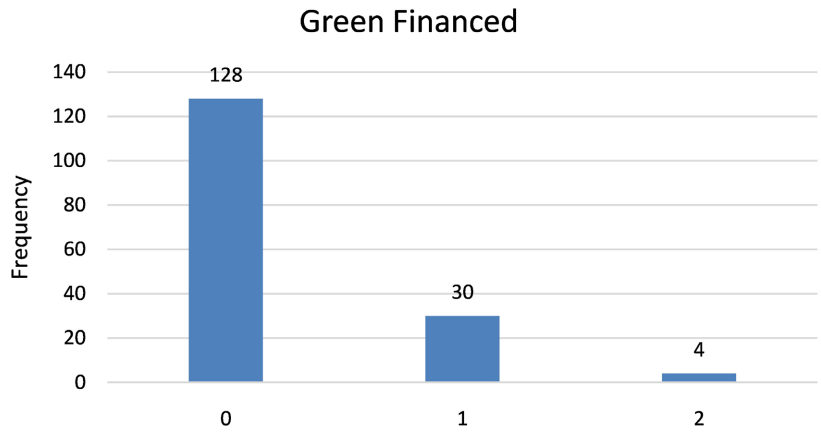
5. Findings

In the first survey, out of a total of 307 Architects, 163 responded, representing a response rate of 53.1%. This rate is moderate, representing just over half of the targeted Architect population. The relatively low response rate could be attributed to professional demands and survey fatigue, limiting participation. In the second survey, out of a total of 72 Developers, 55 responded, representing a response rate of 76.4%, which was deemed adequate. The results from these respondents have been presented and discussed as follows.

5.1. Number of Green-Financed Construction Projects

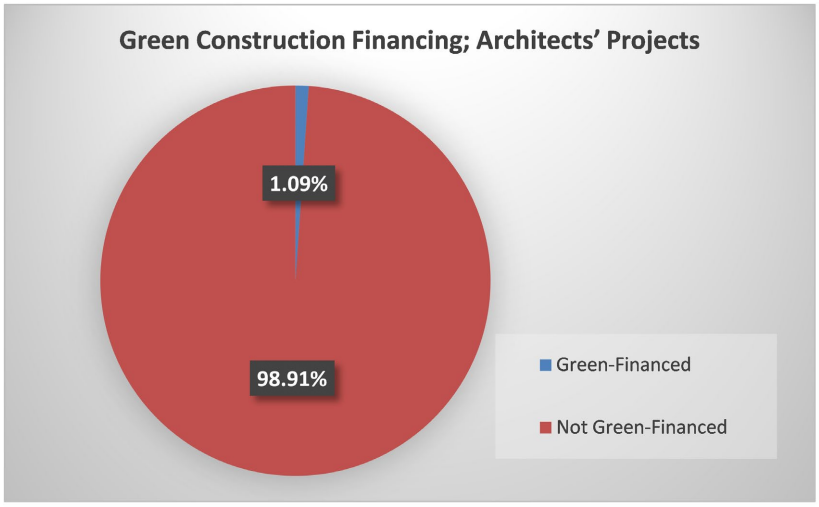
In this section, Architects and Developers were asked to indicate the total number of building projects that had been green-financed in the last five years. The Architects' results presented in **Figure 3** showed that 79.0% (n = 128) of architects had not undertaken any green-financed projects, 18.5% (n = 54) had completed one such project, and only 2.5% (n = 4) had undertaken two green-financed projects within that timeframe. Therefore, in total, the respondents had undertaken 38 green-financed building projects in the last five years. It is evident from these findings that an overwhelming majority of developers have not been involved in green-financed projects. As shown in **Figure 4**, the number of green-certified buildings as a proportion of the total number of projects (n = 3,488) undertaken by Architects is 1.09%.

An overwhelming majority of developers have not used green financial instruments for any of their projects. The results presented in **Figure 5** showed that 83.6% (n = 46) of developers had not undertaken any green-financed projects, 10.9% (n = 6) and 3.6% (n = 2) had completed one and two such projects, respectively. Only 1.8% (n = 1) had undertaken three green-financed projects within that timeframe. Therefore, in total, the respondents had undertaken 13 green-financed building projects in the last five years. As shown in **Figure 6**, the number of green-certified buildings as a proportion of the total number of projects undertaken by developers (n = 1,265) is 1.03%.



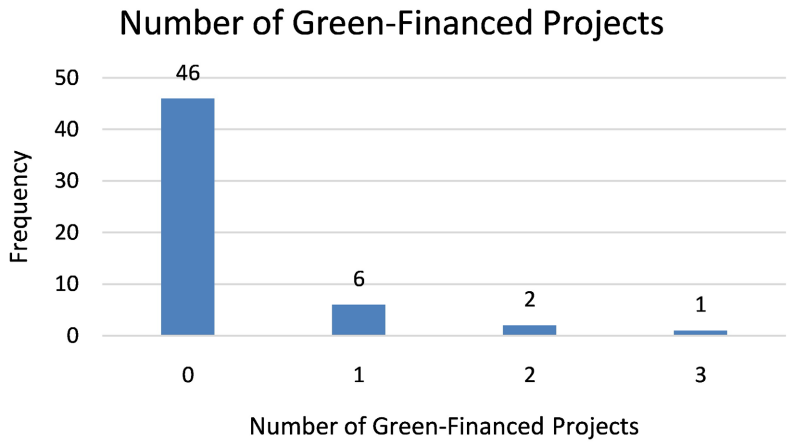
Source (Fieldwork, 2025).

Figure 3. Total number of green-financed projects undertaken by architects.



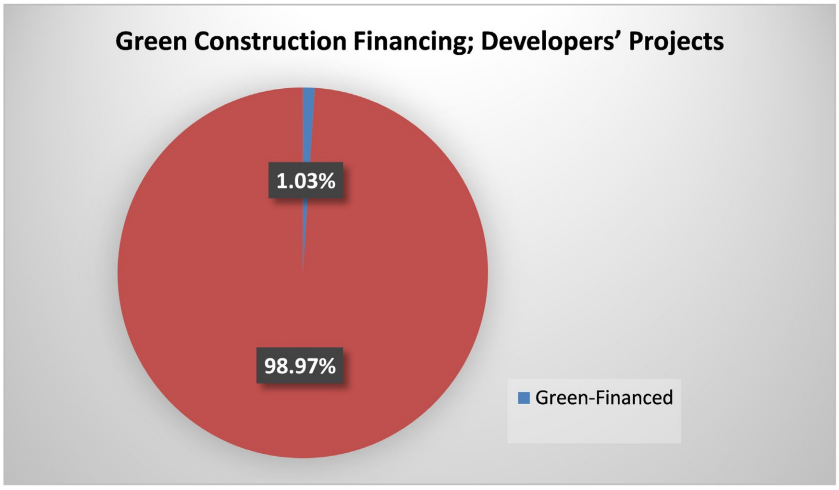
Source (Fieldwork, 2025).

Figure 4. Proportion of green-financed building projects undertaken by architects.



Source (Fieldwork, 2025).

Figure 5. Total number of green-financed projects undertaken by developers.



Source (Fieldwork, 2025).

Figure 6. Proportion of green-financed building projects undertaken by developers.

An average GCF adoption of 1.06% across the two surveys (1.09% and 1.03%) indicates that the use of green financial instruments in building projects in Kenya is extremely limited, with the vast majority of developers and architects having no direct experience. This finding is consistent with broader trends in Kenya and many emerging markets, where the green finance ecosystem, especially in the real estate sector, is just emerging and immature. The results point towards an infant green finance ecosystem in Kenya's construction industry. According to [59], Kenya is in the early stages of green finance adoption within construction, with pilot bonds and targeted bank products only recently entering the market. Previous research [51] has shown that, even with increasing policy attention and the introduction of products such as green bonds and green mortgages, actual market penetration is limited. Several studies have identified key barriers behind this limited uptake. First, there is limited awareness and expertise. According to [60], developers in most African and developing market contexts lack sufficient knowledge about the availability, requirements, and benefits of green financial products. Second, there is perceived complexity coupled with uncertain returns. According to [61], green finance options are sometimes perceived as complex, with unclear short-term financial benefits, leading to risk aversion among developers. The third barrier is an underdeveloped product market. Until recently, Kenya had only a handful of green bonds issued and few mainstream financial institutions actively promoting green loans targeted at property development. [62] points out that the struggle to attract significant access to green financing is due to multiple barriers, including complex regulatory requirements, limited access to diverse financial instruments, and a lack of capacity to develop investable projects.

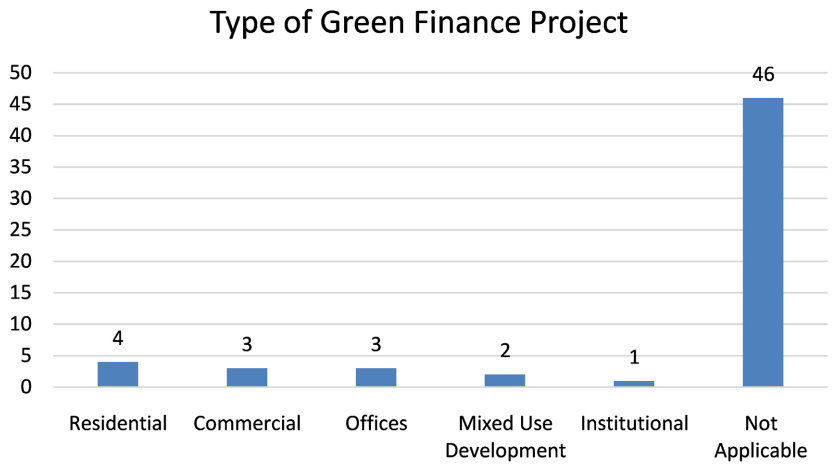
Though the early adopters of GCF are rare, they are significant, and their experiences may help drive broader market acceptance. The presence of even a few green-financed projects indicates that market structures, however limited,

do exist and can be leveraged with further support. Early adopters can showcase feasibility and help reduce perceived risk among peer firms, supporting the "demonstration effect" described in adoption literature. To enhance uptake, concerted efforts are needed to address informational, financial, and regulatory barriers.

These findings have several implications. First, there is a need for capacity building. The high proportion of developers with no experience in green finance underscores the need for targeted awareness, capacity-building, and technical support. Second, the government needs to develop policy incentives. To catalyze wider adoption, policies such as concessional interest rates, tax incentives, and streamlined certification processes may be necessary, as suggested in the literature [39] [51] [63]. Third, the findings reinforce the importance of scaling up and promoting accessible green financial products, tailored to the needs and capabilities of local developers.

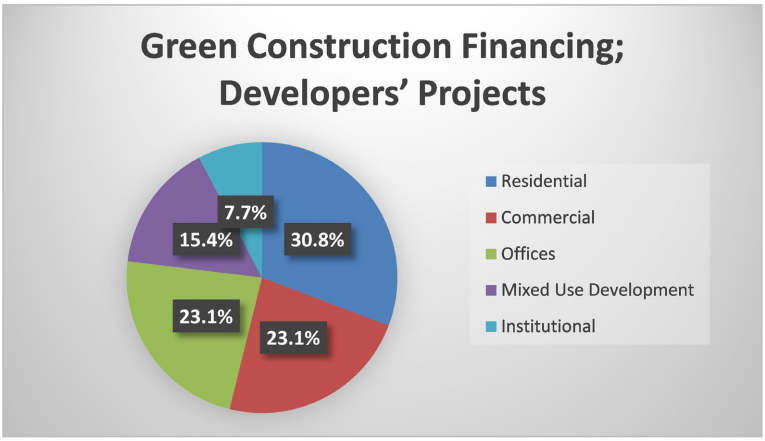
5.2. Type of Green-Financed Construction Projects

In this section, developers were asked to describe the nature of the project that was financed using green financial instruments. The results are presented in **Figure 7**. As expected, based on findings in previous sections, the significant majority of developers (83.6%, n = 46) had not financed any projects using green financial instruments. The total number of responses for the GFCPs was 13 (instead of 9), since some developers had undertaken more than one GFCP and were required to provide the extra information separately. Out of the total GFCPs, residential projects comprise the largest share (30.8%, n = 4) of green-financed projects among developers. Commercial buildings and offices each account for 23.1% (n = 3) of green-financed developments. Mixed-use developments and institutional facilities account for 15.4% (n = 2) and 7.7% (n = 1), respectively. This is demonstrated in **Figure 8**.



Source (Fieldwork, 2025).

Figure 7. Types of green financed building projects (Overall).



Source (Fieldwork, 2025).

Figure 8. Types of green-financed building projects undertaken by developers.

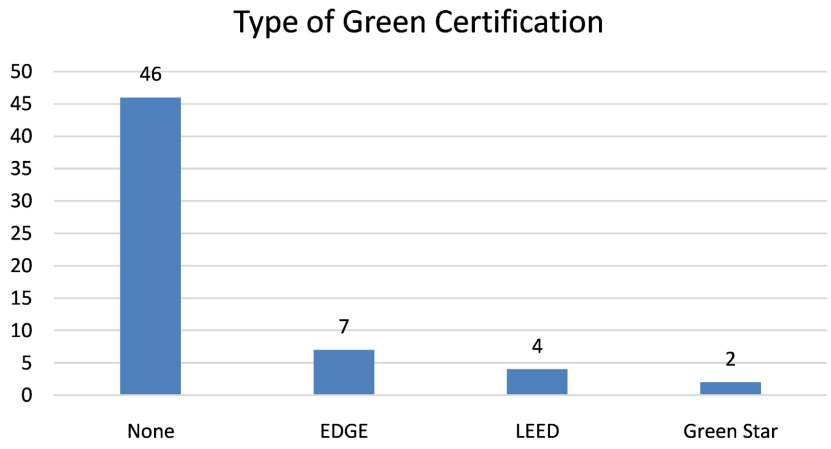
The findings reveal that among developers utilizing green financial instruments, residential projects are a slight majority, albeit in low absolute numbers. This contradicts previous findings by [64], which suggest that as green buildings are doubling in Kenya, the residential sector is lagging behind. In another report, [65] points out that as of 2023, out of more than 100 registered or certified green buildings in Kenya, only 2 were in the residential category. However, global reviews [66]-[68] confirm that residential projects are commonly the entry point for green finance in emerging economies, given their direct links to end-user utility savings and shorter payback horizons. The Kenyan experience, as echoed in this study, underscores the importance of targeted strategies and market development to extend green finance to a broader array of project types, including commercial and office buildings.

The reason for the slightly higher number of green-financed residential projects could be attributed to the sector often benefiting more directly from incentives, such as concessional mortgages and demonstration effects, aimed at promoting greener lifestyles and reducing the carbon footprint of housing stock. The occurrence of commercial, office, institutional, and mixed-use developments also being financed with green instruments highlights some diversity in the market; however, the depth is limited, with only a handful of projects reported in each category. Prior studies suggest that non-residential projects may face higher capital costs, more complex certification and financing requirements, and less direct end-user demand for green amenities, all of which hamper the rapid sectoral uptake of green finance.

5.3. Type of Green Certification

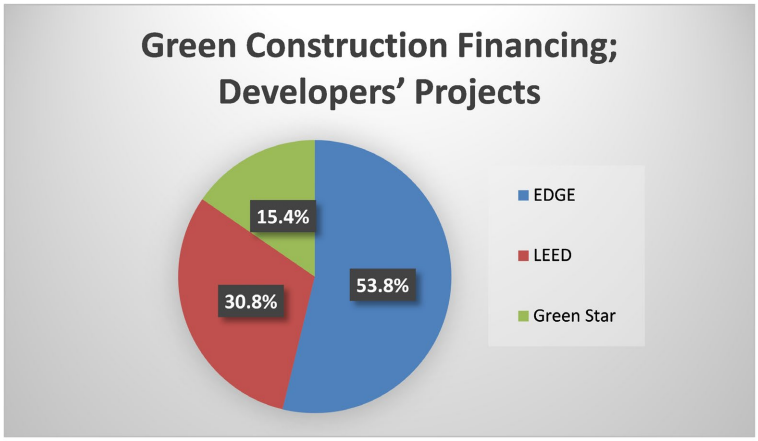
In this section, developers were asked to indicate the type of green certification in each of the green-financed construction projects. The results are presented in **Figure 9**. As expected, based on findings in previous sections, the significant majority of developers (83.6%, n = 46) reported no green certification. The total

number of responses for the GFCPs was 13 (instead of 9) since some developers had undertaken more than one GFCP and were required to provide the extra information separately. Out of the total GFCPs, a significant majority (53.9%, n = 7) had the EDGE certification. LEED and Green Star certifications account for 30.8% (n = 4) and 15.4% (n = 2) of the GFCPs. This is demonstrated in Figure 10.



Source (Fieldwork, 2025).

Figure 9. Type of green certification (Overall).



Source (Fieldwork, 2025).

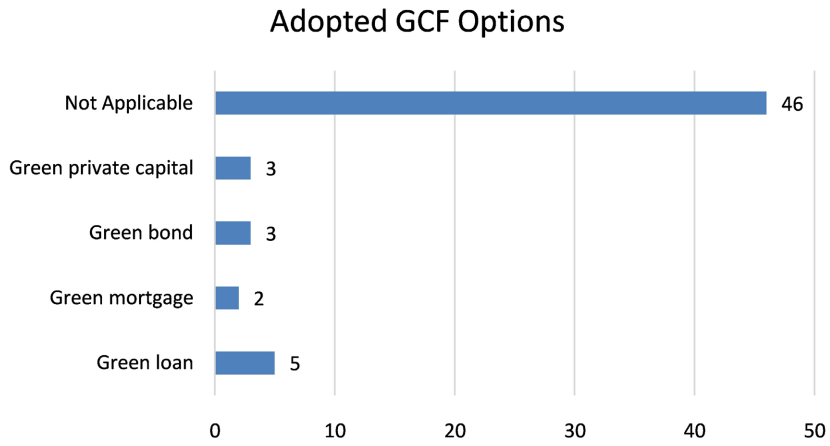
Figure 10. Types of green certification in building projects undertaken by developers.

Green building certifications are critical in unlocking financing by providing measurable environmental benefits, thus increasing investor confidence and access to green finance. Among the certified projects, EDGE was the most frequent certification reported. EDGE, developed by the International Finance Corporation (IFC), is particularly tailored to emerging markets like Kenya, emphasizing resource efficiency with a straightforward and accessible certification process [65]. It focuses on achieving a minimum 20% reduction in energy, water, and embodied energy in materials, making it attractive for developers balancing cost with sus-

tainability benefits [69]. LEED, a globally recognized certification, was the second most cited certification. LEED's rigorous standards are often associated with higher-cost developments targeting international benchmarks or higher-end markets [69]. Green Star, originating from South Africa and gaining traction in Kenya, was slightly less prevalent. It is increasingly adapted to East African contexts with local considerations [69]. According to [70], while international certifications like LEED and Green Star provide robust sustainability frameworks, their adoption in African contexts is often slower due to higher costs and complexity, supporting the trend observed in the data.

5.4. Green Construction Finance Options

Developers were asked to indicate the specific type of finance adopted in each of the green-financed construction projects. The results have been presented in **Figure 11**. As expected, based on the findings in previous sections, the significant majority of developers (83.6%, n = 46) did not finance any of their projects using GCF. The total number of responses for the GFCPs was 13 (instead of 9), since some developers had undertaken more than one GFCP and were required to provide the extra information separately. Out of the total GFCPs, a significant majority (38.5%, n = 5) had utilized green loans. Green private capital and green bonds each accounted for 23.1% GCF. Green mortgages had the least uptake at 15.4% (n = 2). This has been demonstrated in **Figure 12**.



Source (Fieldwork, 2025).

Figure 11. GCF options adopted by developers (Overall).

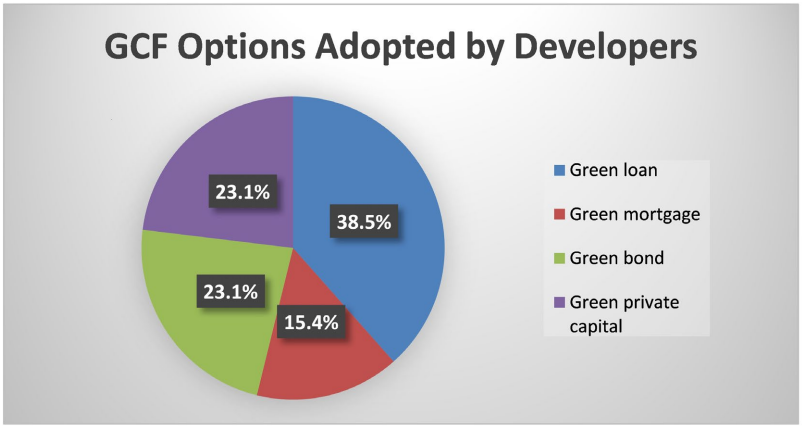
Among the green-financed projects, green loans were the most frequently adopted instrument (38.5%, n = 5). Green loans typically provide targeted financing for projects that meet environmental standards, enabling developers to access lower interest rates or better terms for sustainable building initiatives [42]. This trend is consistent with findings from [71], which highlight green loans as a viable entry-level financing mechanism supported by local financial institutions such as KCB Bank and HFC, aiming to promote affordable climate-resilient housing. Ac-

cording to [72], KCB advanced Sh53.2 billion in 2024 to different customers undertaking diverse projects, up from Sh22.1 billion in 2023.

Green bonds and green private capital each account for 23.1% of the total GCF. Notably, green bonds have gained increasing attention as Kenya develops its capital markets for sustainable finance, supported by initiatives from the Climate Bond Initiative and local regulators [73] [74]. These instruments typically target larger-scale developments with institutional investment support [75]. However, Kenya's green bond market is still emerging and is primarily concentrated in specific sectors, limiting broad developer access at present.

The uptake of green mortgages (15.4%) highlights an emerging financing mechanism focused on incentivizing homeowners and developers to invest in sustainable housing through preferential mortgage products (KGBS, 2025). Such products remain limited but are gaining momentum through partnerships between developers and housing finance providers, addressing Kenya's housing deficit [66].

The limited but diverse adoption of green financing options indicates early-stage market development with promising foundation stones but substantial room for expansion. Increasing awareness, capacity building, and regulatory support for green financial products, especially green mortgages and bonds, will be critical in scaling uptake [65]. The high reliance on conventional finance highlights the need for creating enabling environments, including incentives and risk mitigation, to attract wider developer participation in green finance [68].

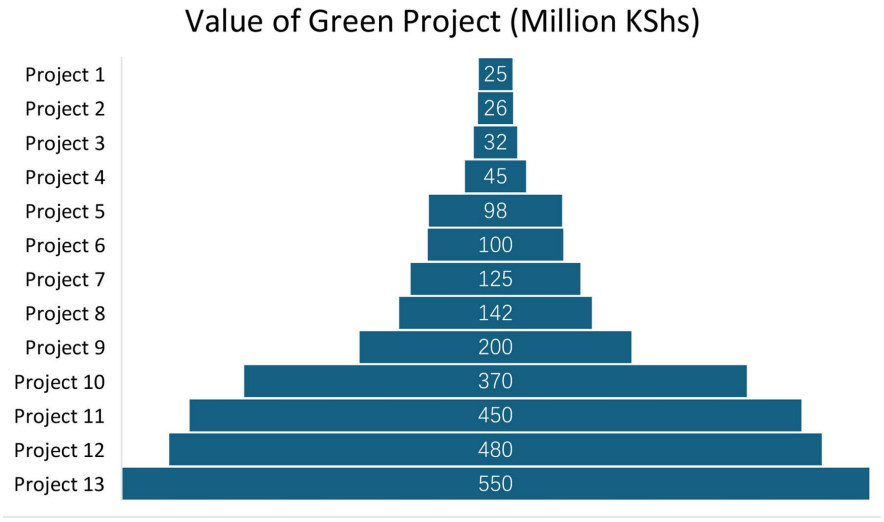


Source (Fieldwork, 2025).

Figure 12. GCF options adopted by developers.

5.5. Value of Green-Financed Construction Projects

Developers were asked to indicate the value of each of their green-financed construction projects in million KShs. The results ranged between KShs 25 million and KShs 550 million as presented in **Figure 13**. This wide range indicates that green construction finance is being applied across projects of varying scales in Kenya. The median GFCP value was KShs 125 million, while the mean was KShs 203 million.



Source (Fieldwork, 2025).

Figure 13. Value of green-financed construction projects.

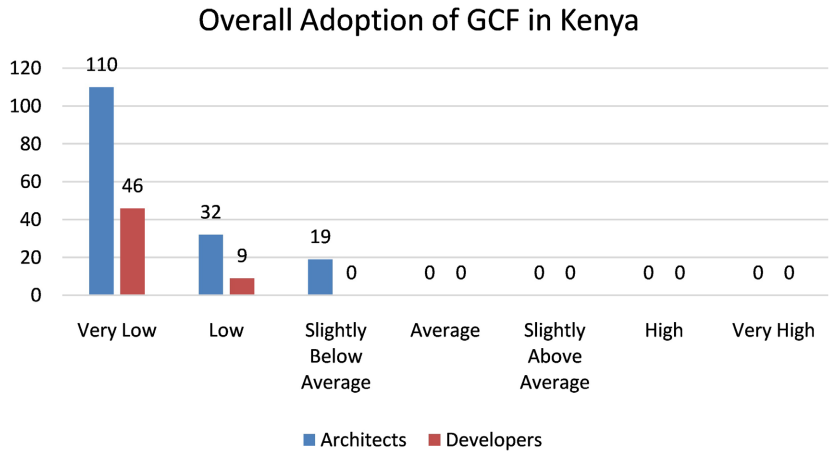
The presence of projects with values as low as KShs 25 million and as high as KShs 550 million suggests that green construction finance is not exclusively limited to large-scale, high-value developments. The presence of both smaller and larger GFCPs points to potential market segmentation. Different financial products might be required for different project value ranges (e.g., green mortgages for smaller residential units, green bonds for large mixed-use developments). This is a positive indicator, as it implies that the benefits of green finance, such as potentially lower interest rates or improved marketability, are being accessed by a range of developers, including those undertaking small- to medium-sized projects. Evidently, the data suggest that green finance is becoming accessible across different project sizes, which is crucial for increasing its overall uptake. If green finance were only available for mega-projects, its impact on the broader construction sector would be limited.

While there are a few smaller projects, a substantial portion of the reported green-financed projects falls into the mid to upper range of values (e.g., KShs 100 million to KShs 550 million). There are three projects under KShs 50 million, indicating some entry points for smaller-scale green developments. Four projects fall between KShs 98 million and KShs 142 million, representing mid-sized green construction efforts. Six projects are valued at KShs 200 million and above, signifying engagement in larger green building endeavors. This distribution is logical given that larger projects often have more extensive financial needs and potentially greater scope for incorporating green features that can qualify for specific financing instruments. Larger projects also tend to attract more sophisticated financing, including green bonds or specialized green loans, which are designed for substantially heavy capital investments with higher environmental impact. Indeed, according to [74], larger projects typically involve higher investment risks but also offer greater potential for significant environmental impact reductions

(e.g., CO_2 emissions, energy savings). The ability to secure green finance for these projects demonstrates growing confidence among financiers in the viability and returns of green developments.

5.6. Overall Adoption of GCF in Kenya: Subjective Assessment

Architects and developers were asked to rate the overall adoption of green finance in construction projects in Kenya. A 7-point Likert scale was used to measure these perceptions. The results ranged between very low and slightly below average, as presented in Figure 14. No responses were recorded in moderate, slightly above average, high, and very high. 72.2% (n = 156) of the respondents rated the uptake of GCF in Kenya as very low, while 19.0% (n = 41) and 8.8% (n = 19) rated it as low and slightly below average, respectively. The mean rating of these responses was established to be 1.4, indicating a very low adoption rate of GCF. Even though subjective, this finding supports the earlier calculated uptake of 1.06% based on the number of GFCPs as a proportion of the total number of projects undertaken by architects and developers.



Source (Fieldwork, 2025).

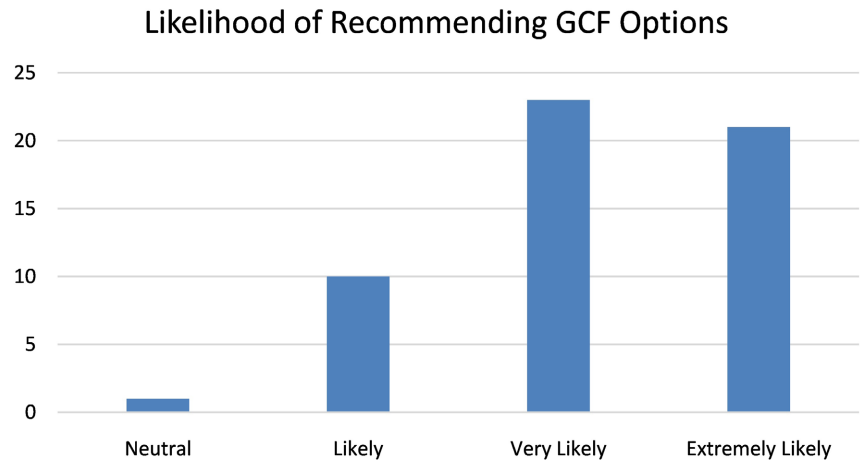
Figure 14. Overall adoption of gcf in kenya (Perception).

Both architects and developers perceive the current adoption of green finance in Kenyan construction projects as very low to low, with over 88% of architects and 100% of developers selecting these lower categories. The data indicate that the market penetration of green finance solutions remains minimal in Kenya's construction industry. This perception echoes existing literature underscoring the infancy of green finance adoption in Kenya. Despite increased awareness and policy efforts [51], GCF uptake is hindered by structural, informational, and financial barriers, among others discussed earlier.

5.7. Likelihood of Recommending Adoption of GCF to Other Developers

Developers were asked to rate the likelihood that they would recommend green

financing options to others in the construction industry using a 7-point Likert scale from "extremely unlikely" to "extremely likely". In contrast to the results reported on the extent of GCF uptake, the obtained responses demonstrated overwhelmingly positive sentiment toward recommending green finance. With only a single (1.8%) respondent indicating neutral, all the others (98.2%) selected between likely and extremely likely, as shown in **Figure 15**.



Source (Fieldwork, 2025).

Figure 15. Likelihood of recommending adoption of GCF.

Approximately 98% of developers indicated a positive inclination ("likely", "very likely", or "extremely likely") toward recommending green financing options, suggesting strong confidence and satisfaction among those engaged in green finance projects. This enthusiasm reflects a receptive and optimistic stakeholder base that can be leveraged to accelerate the adoption of green finance products in Kenya's construction industry. Willingness to recommend is critical in driving peer influence and wider diffusion of innovative financial products [76]. Developers who actively endorse green finance can stimulate demand among industry actors, financial institutions, and investors, further expanding the green finance ecosystem. This aligns with insights from emerging market studies, which highlight word-of-mouth and peer recommendation as pivotal for overcoming initial market inertia in green building finance [60].

The positive developer attitude corresponds with Kenya's growing institutional support for green finance. Initiatives such as the IFC's Green Housing Fund, Kenya's Green Bond programme, and the Guarantee Facility under the Environment Facility (EEF) provide critical technical assistance, credit enhancement, and risk mitigation that increase developer confidence [71] [75]. Although the actual uptake remains very low, as demonstrated in this study, the strong positive recommendation sentiment signals that where green finance is experienced, it is valued, making education, capacity building, and risk-sharing mechanisms crucial to broaden access.

6. Conclusions, Recommendations, and Limitations

6.1. Conclusions

The paper makes the following conclusions: 1) GCF adoption in Kenya's construction sector is at an early, low-penetration stage, 2) GCF uptake is hampered by limited awareness, underdeveloped product markets, and regulatory complexity, 3) Residential projects dominate GCF use, though adoption spans various project sizes and types, 4) EDGE certification leads, probably due to accessibility and cost-effectiveness in emerging markets, and 5) Positive developer sentiment toward GCF suggests potential for rapid growth if barriers are addressed.

6.2. Recommendations

The paper makes the following recommendations. First is the need for capacity building. The government and other relevant bodies need to intensify training and awareness programs on GCF options, benefits, and certification processes. Second is regarding policy incentives. The government needs to introduce tax breaks, concessional loans, and streamlined approval processes for green projects. The third recommendation is on market diversification. Financial institutions need to expand green finance products, especially green mortgages and bonds, to serve varied project scales. Fourth concerns certification support. The government and certification bodies should subsidize certification costs and promote locally adapted frameworks to increase participation. Lastly, there is a need for peer-led promotion. The government and other relevant bodies should leverage enthusiastic developers as ambassadors to encourage wider industry uptake.

6.3. Limitations

This study has several limitations that should be acknowledged. First, the sampling constraints focused specifically on registered Architects (via a simple random sample) and registered Developers (via a census), which may not account for the large number of unregistered or informal construction players, especially developers, in Kenya, potentially limiting the generalizability to the entire construction sector. Second, the reliance on self-reported data introduces the risk of both social desirability bias and reporting or recall bias. Third, the use of a five-year recall period (2020-2025) to identify green-financed projects means that the reported data were dependent on the respondents' accurate memory over an extended timeframe, a common challenge in survey research.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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