EFFECT ON CLIMATE FINANCE PRACTICES FOR SUSTAINABLE INVESTMENT AMONG COMMERCIAL BANK IN KENYA

BY

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DECLARATION

I attest that I authored this dissertation entirely on my own initiative and that it was never published or included in another student's application for a degree. I further state that any material authored or published by others is not included in this, save for instances where appropriate citation is given and the author is properly acknowledged.

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ABSTRACT

Climate change is considered as more than just an environmental danger since it affects so many economic sectors; it is also anticipated to worsen. The goal of this study was to look at the present condition and developments in green and climate financing techniques used by Kenyan commercial banks. The need to address social, economic, and environmental issues while generating new ideas and best practices is central to the concept of sustainability. Economic growth is made more sustainable by taking into consideration social and environmental problems. Climate funding may lead to the improvement of financial institutions' risk management capabilities, the capacity building of various actors in the climate finance sectors, and the tightening of relationships between financial institutions.Convenient financial instruments include grants, subsidized loans, and credit guarantee funds.If effective strategies are to be implemented to draw climate money in support of extensive mitigation action, a varied, demand-responsive approach to financial innovation is required. Population, conceptual, and contextual gaps are found in the literature review of the study, which supports the need for greater research on the topic. The study's conclusions can help regulatory organizations like NEMA and the CBK improve the way they create and enforce policies and ensure that banks engage in sustainable projects while generating anticipated fair profits. The study ought to, ideally, also offer more details about the significance of green financing and its prior impacts on the financial performance of Kenya's listed commercial banks in terms of sustainable investment. The research also contributes to the existing body of knowledge as efforts are made to slow down climate change, not just in the Kenyan context but also on a regional and global scale.This firm must be sustained due to the crucial role the financial industry plays in ensuring national prosperity. Financial institutions are contributing in the funding of projects in Kenya's extractive, industrial, housing, infrastructural, and agricultural sectors. As a result, bank financing to and investment in green assets is seen as being significantly dependent on efforts to combat climate change by moving toward a net-zero carbon economy. The paper proposes developing a model to promote sustainable banking in Kenya, with a focus on climate funding, as a solution to the main practical obstacle of the lack of finance.

Key words: Climate change, Resilience, Climate Finance practices,Sustainable Finance,

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DEDICATION

This entire research is dedicated to my wonderful parents, who have consistently provided me with moral, spiritual, emotional, and material support and who have served as my sources of inspiration and strength when I felt like giving up.Thank you to my brothers, sisters, cousins, mentor, friends, and classmates who encouraged me to finish my study and contributed their words of advice.By dedicating this work to the Almighty God, I would want to conclude by expressing my appreciation to Him for giving me protection, wisdom, strength, mental acuity, direction, skills, and a long and healthy life. Each of these is offered by me.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADF	Asian Development Fund
CETs	CO2 Emission Trading Scheme
COP	Conference of the Parties
Ci-Dev	Carbon Initiative for Development
co2	Carbon Dioxide
CRGE	Climate resilient green economy
CPI	Consumer Price Index
CPF	Climate Finance partnerships
DFIs	Development Finance Institutions
ESAF	Expanded Structural Adjustment Facility
EIB	European Investment Bank
ESG	Environmental, social, and governance
EPRA	Emission Reduction Payment Agreement
TFCA	Transfontier Conservation Areas
FCPF	Forest Carbon Partnership Facility
FAD	Fical Affairs Department
GDC	Geothermal Development Company
GHG	Green House Gases
GBPS	Gigabit per second
GDP	Gross Domestic Product
HIPC	Heavily Indebted Poor Countries
IDA	International Development Association

IPCC's Intergovernmental Panel on Climate Change's

IMF International Monetary Fund

KEGC Kenya Electricity Generating Companies

LDCs Least Developed Countries

LICs Low Income Countries

MDBs Multilateral Development Banks

MDRI Multilteral Debt Relief Initiative

NAPs National Adaptation Plans

NDCs Nationally Determined Contributions

ODA Official development Aid

PRGT Poverty Reduction and Growth Trust

RRS Resilience rating system

SDR Special Drawing Rights

SDGs Sustainable Development Goals

SCCFM Special Climate Change Fund Management

UNEP United Nations Environment Programme

UNFCCC United Nations Framework Convection on Climate Change

OPERATIONAL DEFINITION OF TERMS

Climate Change	Long term shifts in temperatures and weather patterns. (UN 2020).
Climate Finance	Local, nationl or transnational financing which may be drawn from public,private and alternative sources of financing that seeks to support mitigation and adapatation actions that will address climate change (UN 2022)
Climate Resilient Rating System	An approach to enhancing and monitoring climate change resistance(World Bank 2021).
Concessional Finance	All the fiscal and financial tools that politicians have provided to companies to promote new investment and development initiatives. (International Monetary Fund 2023)
Emission Reduction Payment Agreement	A enforceable agreement that permits the delivery of certified carbon credits from one party to another (World Bank 2021).
Resilience	The process and the outcome of successfully adapting to difficult or challenging life eperiences (APA 2020).
Sustainability	Meeting the needs of the present without comprising the ability of future generations to meet their own needs (UN Bruntland Commision 1987).
Sustainable Investment	Variety of actions taken by investors to increase

short- and long-term financial returns while fostering environmental or social value.(Havard Business School 2021).

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The transition to a more urbanized society and global environmental change have combined to create a serious problem for us with planetary sustainability. Environmental, social, and governance (ESG) factors are taken into account while choosing investments for a portfolio and managing it. In order to encourage the convergence of global change research and sustainable development, the notion of sustainability blurs the distinction between environment and development (Turner 1997). Given the growing interest and need for monitoring and reporting among many stakeholders, the absence of suitable indicators, measurements, and data to assess the success of climate efforts is a key issue (GFLAC & UNDP, 2018). A broader role is being given to institutional investors and funds by the global greening of financial markets in addition to commercial financial institutions.The multilateral development banks, for instance, devised a framework for fostering alignment during the COP24 in Katowice (MDBs, 2018). Failure to reallocate resources would lock in high-carbon activities that would cause temperatures to exceed 1.5 °C thresholds, as well as expose governments and private investors to transition and physical climate risks that could amplify as they move through the economy, cause significant income loss, and consequently lower living standards.(2019c CPI; 2018 OECD). Public finance is essential in inspiring private participation because it helps people see the value of every dollar spent on resilience or mitigation. Additionally, one must comprehend the various nations' low-carbon growth strategies In fact, a sizable number of bilateral and

multilateral development finance institutions (DFIs) have recently reaffirmed their commitments to quickly increase investment levels in the short term and work toward making all development bank financing compatible with climate and Sustainable Development Goals (SDG) targets in the long term (IDFC, 2019; MDBs, 2018).

Africa is experiencing global warming, and governments must deal with it while still pursuing a variety of other development objectives. The task at hand is difficult. Africa's immediate priority should be to lessen the susceptibility of its most vulnerable people because the effects of climate change will almost certainly get worse until at least the middle of the century. The most efficient way to lower preventable fatalities from droughts, floods, and other natural catastrophes is to strengthen disaster risk governance. Although Africa is making progress in terms of development, the continent lacks the resources needed to adapt to climate change, and vulnerable populations are expanding.Low levels of development and occasionally poor government capacity, particularly in Sub-Saharan Africa, make it difficult to respond to climate change. Legislative support for energy efficiency measures waning in 2017 suggests that obtaining private investment may becoming harder in the future. The required annual investment in resilience of USD 180 billion between 2020 and 2035 would yield a return on investment of USD 7.1 trillion, or three times, in net benefits. Commercializing these benefits demands new alliances and economic models, opening up new opportunities for expanding investment in adaptation and long-term climate resilience.It is vital to invest in adaptation in sectors like food that are being severely impacted by the climate catastrophe. The following areas, including food production, water and the environment, urban services, infrastructure, and catastrophe risk management, all urgently require investment in adaptation (GCA, 2019).

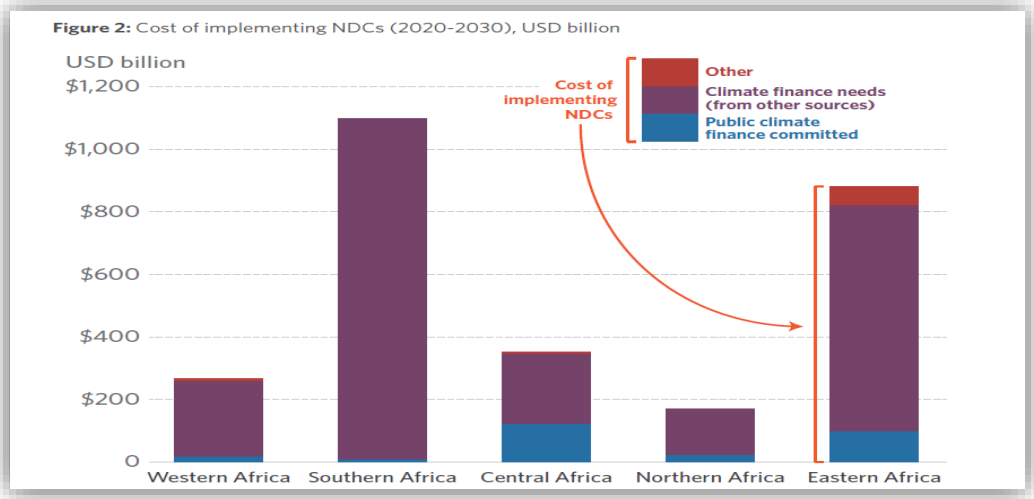
The National Development Goals (NDGs) of Kenya include adaptation and mitigation goals. According to predictions, Kenya will need KES 4,040 billion to reach its NDC goal by

2030. Approximately $40 trillion USD. To meet the nation's aim of reducing GHG emissions, as stated in the NDCs, climate change must be considered in government spending and policy.

However, because of their anticipated economic expansion and expanding populations, developing nations may produce more greenhouse emissions than emerging ones. According to (Akram and Hasmid 2015), this would have a large negative economic and climate change impact.

FIGURE 1 1

Nationally Determined Contributions



SOURCE :Climate Policy Initiative (2020)

Kenya has the chance to take on an exciting position as a regional leader in the promotion and development of renewable and clean energies (Wolde-Rufael, 2009; Uddin et al., 2013).The geographic location of Kenya provides access to a variety of appealing and inexpensive renewable energy options (Ndiritu and Engola 2020; Oluoch et al. 2021). With

one of the world's greenest power mixes, Kenya is a global leader in renewable energy (Kiplagat et al. 2012). Kenya is in a fantastic position to achieve a successful and global leading energy transition given its grid expansion techniques and low cost in comparison to fossil fuel sources (Njoroge et al., 2020). In order to start and lead the implementation of Sub-Saharan Africa's CO2 Emission Trading Scheme (CETs), Kenya has the potential to do so (Huho and Kosonei, 2014; Carvallo et al., 2017; Juma and Khademi-Vidra, 2019).

1.1.1 Climate resilience initiatives of commercial banks

In order to address climate change, Kenya has made significant efforts over the years to alter the country's plans, policies, initiatives, strategies, and programs (The National Treasury; Climate Policy Initiative; The Kenya Climate Innovation Center, 2021). The United Nations Framework Convention on Climate Change, the Paris Agreement, and the Kyoto Protocol are all signed by Kenya. Kenya is committed to the sustainable environment program, despite the fact that the government understands that these green initiatives are underfunded and that this is because there aren't enough public resources (Mooldijk & Lütkehermöller, 2021). Banking institutions have been urged to promote green investments in cooperation with other institutions through the Kenya Bankers Association, an umbrella group of regulated commercial banks in Kenya (Kenya Bankers Association, 2021).

Given that they are aware of the advantages of a green economy that is resistant to climate change, many developing nations are already making major efforts to smooth the transition.Banks are regarded as important contributors who aid in the expansion of the financial system that supports any country's economy, in accordance with (Pinto, Hawaldar, Rahiman, & Sarea 2017). They are seen as being essential parts of modern civilization. Sustainability in this area of the economy is needed, given the considerable contribution the

financial sector contributes to a nation's development. Financial institutions help Kenya's infrastructure, housing, industrial, and extractive sectors. Sustainable finance is crucial because of the serious negative effects these expenses have on both society and the environment.

Kenya has committed itself to the program of a sustainable environment; nevertheless, the administration accepts that these eco-friendly projects do not receive enough funding, which can be linked to the country's constrained public finances (Mooldijk & Lütkehermöller, 2021). The Kenya Bankers Association, an umbrella organization of Kenya's regulated commercial banks, has requested banking institutions embrace green investments (Kenya Bankers Association, 2021). Green finance ought to be given top priority in the banking industry, particularly in commercial banks, in order to support initiatives that support sustainable development and keep people and businesses operating through unforeseen challenges like the supply chain and economic disruptions brought on by the Covid-19 outbreak.

Notably, these banking institutions serve as a middleman, sending money to financiers who engage in green initiatives deemed to be profitable by getting access to cash from companies leading the charge to promote environmental sustainability. The sustainable financing project began in Kenya in 2009, according to the Kenya Bankers Association (2021) and was enthusiastically supported by the country's commercial banks. According to some analysts, Kenya was a pioneer on the continent in implementing sustainable funding. Although green banking is a crucial part of ethical banking, green financing also includes the financial support of commercial operations (Bohara 2018). Utilizing eco-friendly banking practices including Automated Teller Machine (ATM) banking, green credit cards, mobile banking, green mortgages, green loans, and green reward checking accounts, it includes measures that attempt to help the environment by lowering their carbon footprints.

1.1.2 Linkage between Climate Finance Practices and Sustainable Financing

The globe is well aware of its disastrous sensitivity to climate change, despite being an innocent victim.Even if climate-related disasters are becoming more resilient, they nonetheless cause significant economic losses by slowing down economic growth and impeding efforts to reduce poverty. The failure of climate change programs and other environmental dangers, such as extreme weather, are increasingly seen by world leaders as the most pressing global issues (World Economic Forum, 2020).GHG emissions, deforestation, and the degradation of natural resources as a result of certain countries' hurry to speed economic development have grown to be important sources of worry.The effect of climate change on many industries have a domino effect, which indicates that the effects on one industry have an impact on other industries. In numerous international development agendas, the tight relationship between addressing climate change and sustainable development is underlined. Global warming and sustainable development must be integrated into nations' development plans and goals, and they must complement one another at all levels and in all spheres of society.

The banking sector must supply the significant sums of money needed for the deployment of NDCs in emerging economies. Significant funding hasn't been mobilized yet due to a number of issues, including a lack of knowledge about climate finance opportunities and a lack of a clear plan. According to the study, local climate finance markets should be formed in alliance nations to increase climate financing (van Rooijen & van Wees, 2006). While reducing and correcting any unfavorable effects like stranded assets, job losses, and a weakened local economy, integrating a fair transition logic into financial sector operations can

produce favorable social and environmental outcomes.There is a large financial gap that has to be closed in order to achieve these goals, according to numerous studies (Buchner et al., Citation2019; IPCC, Citation2018; UNCTAD, Citation2014). Since central banks and regulators are growing more interested in this subject, the impacts of climate change on financial stability are receiving more attention (Carney, 2015; Lagarde, 2020).

A key driver of development today is sustainable financing. Sustainable development is therefore given more attention. In Kenya's case, making sustainable investments, particularly in the areas of the environment, education, health, power, and financial inclusion would help address the continent's needs for sustainable development and the expansion of the financial sector. Additionally, the strategic integration of Kenya's various sustainable finance practices with the SDGs would create new opportunities and spur innovation. Access to private capital is frequently seen as a means of bringing about this change (African Development Bank et al., 2015), but the enabling political, regulatory, and economic conditions that would encourage refocusing the majority of private sector investment toward achieving these goals remain unchanged (Parker et al., 2012; Almassy et al., 2015).

International organizations and central banks have been involved in a variety of programs that have increased their interest in climate change. For instance, in 2015 the Financial Stability Board (FSB) formed the Task Force on Climate-associated Financial Disclosures (TCFD) with the goal of developing voluntary and standardized disclosures of financial risk related to climate change. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS) was established in 2017 by eight central banks and supervisors with the goals of exchanging best practices, advancing environmental and climate risk management in the financial sector, and mobilizing mainstream finance to support the shift

to a sustainable economy. Nevertheless, despite the potential for "a massive increase in productivity for a wide variety of goods and services,".Digital technologies do not come without risk, despite the potential for "a massive increase in productivity for a wide range of goods and services" (Sachs, 2019).

A coordinated approach across the two strands of finance would be necessary to increase the effectiveness of climate and sustainable development spending given the significant interconnection of these two spheres of policy (OECD, 2019). Additionally, alignment between donor and recipient nation goals is necessary to increase the financial effectiveness and ownership of climate and sustainable development policies, particularly with regard to the emphasis placed on mitigation vs. adaptation (UNFCCC, 2017, Bouyé et al., 2018). A major issue for development and economic policy now is the tracking and reporting of climate money flow. In order for the government to make informed judgments on climate policy, tracking helps to provide accurate data on budgets and spending related to climate change. The basis for the nation's data-driven decisions on climate investments will be climate finance data, along with other climate data such as GHG inventories and risk assessments. The establishment of a uniform framework for identifying climate-related activities and monitoring the nation's public climate money necessitates the need for climate finance monitoring.

1.1.3 Climate Resilient Rating System

Climate change resilience is the ability to adapt to pressures that are unpredictably produced by socioeconomic, environmental, physical-functional, organizational, and site-specific factors (IPCC, 2022). Resilience, as it relates to the interaction between urban systems and climate change, is the ability to respond to unanticipated climate shocks through system prevention, adaptation, reorganization, and evolution. A framework for climate resilience could aid in better preparing governments and decision-makers to address climate change-related problems.

Governments and policymakers should adopt a more all-encompassing approach by focusing on climate resilience, which tries to decrease the negative effects of climate change impacts before they manifest (Brown, Katrina 2007).

Resilience has emerged as an essential concept in the creation of policies and programs in order to deal with these novel and unexpected risks (Barrett & Constas, 2014). The World Bank Group has created a rating system for resilience in order to assess it along two complementary dimensions (World Bank, 2021). The World Bank states that this strategy offers guidance and precise standards. Resilience via the project will be defined depending on whether investments are meant to foster climate resilience in the larger community or a particular business (World Bank, 2021). Long-term growth and development are threatened by the financial losses brought on by natural disasters and climate change. In order to recognise the shift toward finance, organizations like the United Nations Environment Programme (UNEP) have started high-level conferences and "Inquiries into the Creation of a Sustainable Financial System." They have pledged to step up their efforts to improve humanity as a whole's resilience. It is more crucial than ever to keep track of resilience-related performance, progress, and development results given the rising emphasis on and investments in disaster risk reduction and climate change adaptation. As a result, depending on one's ability to respond and available resources, similar climatic occurrences may have repercussions of varying intensity (GAFD, 2010).

The Intergovernmental Panel on Climate Change (IPCC) concept of resilience was integrated with those of other definitions in order to address climate resilience for growth (IPCC'S 2012). In addition, designed roads that are climate resilient are one example. Planning for roads, dams, and bridges must take into account future climate change, notably storms and flooding, in order to build infrastructure that is climate resilient. Buildings for mining, manufacturing, and housing must be constructed with as little harm to wetlands and natural

forests as possible. A mapping of the risk of flooding and landslides should be done before building begins. Disaster management, which includes setting up early warning systems, identifying vulnerabilities, and lowering community-based catastrophic risk, is necessary for creating an adaptation strategy.

Kenya has not effectively investigated the financial possibilities available to prevent climate change (World Bank 2021). Although they cannot be relied upon, the new Green Climate Fund and rapid start money might dramatically increase financial support for mitigation and adaptation in the world's least developed nations. Despite its size, Kenya won't receive enough money from the global campaign to fight climate change to successfully carry out the Plan. The government must produce domestic revenue sources in order to use private funding to support adaptation and low-carbon measures. A resilience rating system (RRS) would be created, in accordance with the World Bank's Action Plan on Climate Change and Resilience, to more efficiently track activity linked to adaptation and resilience. It aims to raise the bar for climate-aligned development and broaden the scope of the methods now used to track climate-related financing in order to better inform decision-makers, client governments, and other stakeholders. Moreover, it supports extended and improved climate flexibility. Then, offer suggestions based on best practices. The selection of indicators is significantly more difficult when measuring resilience because it calls for incorporating complex adaptive systems and all of its components in a dynamic approach (Resilience Alliance, 2010).

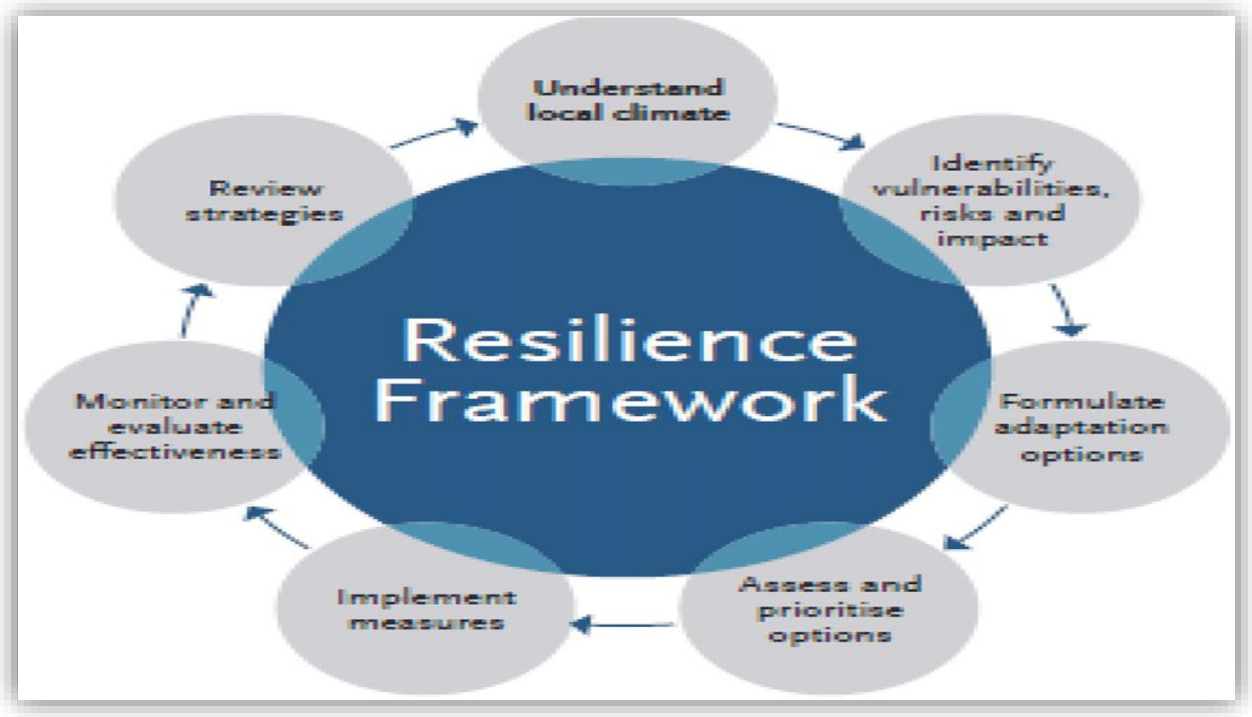
The government should show its dedication to resolving the climate problem and build the capacity of local institutions and integrated systems to properly prepare for and manage climate consequences. New local planning will support integration of climate risk and resilience into regular development planning as it emphases on incorporating local voices which will reduce the risk of the being dysfunctional. To accomplish its long-term climate and development goals, it should also request financial, technical, and capacity-building support. It

should also implement a climate resilient green economy (CRGE), similar to Ethiopia's, which is an ambitious plan to lead the nation toward becoming climate resilient and middle class by the year 2030. The CRGE facility should have access to money for CRGE priorities to build mechanisms to track spending connected to climate and disasters and institutionalize local climate resilient development plans. Local government administrators and communities, partners, and government counter parts should be supported by the national government to further expand budget tagging to the ministries and devolve it to regional government. The budgets should be tagged and tracked to make related expenditures more transparent within and beyond Kenya.

Kenya ought to create a resilience framework similar to the one Singapore has (figure 2) to direct its strategies for climate change adaptation. The framework assists in identifying risks associated with climate change to people and property and in developing adaptation strategies to lessen the negative consequences of climate change on our way of life. While some adaption strategies will take time to adopt, others would need for the construction of pricey infrastructure. Plans must be adaptable and dynamic to take into account current scientific knowledge and future needs. In order to put our policies into action in the most effective and efficient way possible, it is also crucial to think about how they will interact.

FIGURE 2 1

Staying Resilient



SOURCE:Singapore Climate Change Resilient Framework (2019)

1.1.4 Sustainable Green loans

Floods, emmisions, storms, and droughts are becoming more frequent and severe due to climate change, endangering sustainable development. As carbon dioxide emissions increase, there are growing environmental concerns on a global scale (Schumacher et al., 2020). Although many people believe that the 1960s and 1970s saw the beginning of the first fully concentrated

societal movement in favor of ecology, many of the current "going green" programs actually had their roots in those years. Public sector involvement is predicted to be significant in the shift to a green economy. In order to achieve sustainable development based on the Paris climate agreement, money from carbon-dense projects must be transferred to sustainable green investments (Tolliver et al. 2020).

Many nations are expanding their public investments in infrastructure and renewable energy, seizing the opportunity to aid in the epidemic's recovery and the requirement to boost energy security and resilience in reaction to the Ukraine crisis's detrimental economic repercussions. Despite the enormous expansion of green finance, there is still a considerable funding shortfall. Green bonds and loans totaling more than 450 billion euros were offered in 2021, which is more than half the amount required for Europe to invest yearly to become carbon neutral by 2050. In order to demonstrate concern and accountability for the actions taken by businesses, it is anticipated that the concept of "green finance" will not only help reduce carbon emissions but also mitigate climate risk, facilitate the transition to a zero-carbon economy, and enhance community quality of life (Kemfert et al., 2020).

The Green Fund's capacity to immediately mobilize resources, serving as a bridge to longer-term sources of funding, would be an important feature. It is anticipated that despite the encouraging statements made at or before Copenhagen, at least some contributing states will find it difficult to implement financial transfers to provide the necessary subsidized resources in the near future. What void might the Green Fund fill? Green finance has done very well when it comes to factors influencing national and global economies. The research on the subject is primarily concerned with how green finance links to other environmentally beneficial practices like renewable energy, despite several attempts to examine the topic (Li et al., 2021; Taghizadeh-Hesary & Yoshino, 2020; Zhang et al., 2020).

In terms of economic issues affecting both national and global economies, green funding has performed well. Yet, a variety of elements influence economic expansion, calling for a careful analysis of climate change and green finance. The green finance variables, such as green investments, green security, or green credit, which aid nations in achieving the evident goal of environmental improvement, have a direct bearing on the world economy (Chien et al., 2021d). Financing or investments for sustainable endeavors conducted through financial institutions are referred to as "finance" (He et al., 2019). The basic pillar of the Green Deal is the restructuring of the nation's primary energy, transportation, building, and food production systems. This is based on laws that were passed to combat climate change ten years ago.

The Green Fund would need to give its creditors believable assurance before it could access private funding through international capital markets. In return for their contributions, contributors would get ownership shares in the fund, which would allow the fund to be capitalized. This buffer may be increased over time using revenue from a low lending rate levy on fund borrowers and additional budgetary transfers from contributing nations in order to avoid losing equity in the fund in the event that borrowers from the Green Fund default. In order to make donors' equity shares liquid and countable, it would also probably be required to incorporate a margin up front to account for prospective encashment demands. The initial endowment may need to be raised by about 20%, or approximately $120 billion, as a result, in my opinion. To work toward an early agreement on one of the more straightforward carbon pricing concepts currently under discussion, and to send at least some of the proceeds to the Green Fund. This would be done using a current UN High-Level Advisory Panel on Climate Change Financing report. Estimates of the possible revenue from global taxes on shipping and aviation, for example, range from $10 billion to $20 billion annually. In fact, a combination of these alternatives may be employed as required to make sure the fund is able to achieve its financial objectives throughout the start-up phase.

1.1.5 Concessional Finance

Concessional loans have been made available since 1987 by the Expanded Structural Adjustment Facility (ESAF) Trust and its successors, who get the majority of their funding from bilateral contributions. The International Monetary Fund (IMF) provide financial assistance in the form of concessional loans to eligible low-income countries. Such aid is offered by the Poverty Reduction and Growth Trust (PRGT), which assists qualified nations in achieving and maintaining a stable and sustainable macroeconomic position associated with strong and long-lasting economic growth. Nonetheless, the dynamics of public debt have changed and require attention. This is especially true for countries that export commodities, but it also holds true for the majority of the other Asian Development Fund (ADF) nations. Large dependency on foreign financing is typical, as seen by huge current account deficits.

Despite the added financial and economic risks, low-income members should nevertheless have access to the scant resources available for Fund borrowing at a reduced rate. Between 2010 and 2015, China's total financing to low-income nations (those with per capita incomes under $2,350) topped that of the World Bank, the IMF, and private sources (Horn et al., 2019). Due to the flexibility of the Fund's financing in addressing balance of payments requirements, these nations can create stable and long-lasting macroeconomic conditions conducive to strong and sustained growth and poverty reduction while reducing the risks of debt distress. Countries should no longer require low-interest loans from the Fund once they reach these levels. Many Low Income Countries (LICs) have flourished in this region over the past ten years. Frequent evaluation of PRGT eligibility enables the eligibility list to be updated to reflect these advancements. Although there has been substantial progress in removing people

from extreme poverty, many millions of people still face financial insecurity and live at or below the poverty line.

Recently, several Multilateral Development Banks (MDBs) have employed two strategies for obtaining more resources. The merger of the Asian Development Fund (ADF) and the Asian Development Bank's Ordinary Capital Resources is one (ADB). The other option is borrowing on the market, as International Development Association (IDA) has planned. The viability of these methods for the Bank Group was examined by the ADF Lab. This evaluation leads the panel to the conclusion that the size of the ADF can only be increased by a small amount, at most. The Bank Group balance sheet may face significant downside risks, and there are several challenges that must be overcome, such as governance. Until the prerequisites for governance and enhanced creditworthiness of ADF countries are realized, scaling up ADF by imitating the merger and market borrowing choices is unlikely to produce significant benefits. The Bank Group will need to significantly improve its knowledge and financial services to support this ambitious agenda. In addition to the funding options mentioned, there is a need to significantly expand the knowledge services catered to the needs of each nation. By stepping up the delivery of knowledge services and utilizing its brand value as a convener in collaboration with other African entities and the international community, the Bank Group, as a reliable partner, can take the lead and act as a catalyst while also acting as a leader.

As part of the reform package, the Board also decided to increase the adaptability of the Fund's concessional financing mechanism under the newly titled Poverty Reduction and Growth Trust (PRGT). To strengthen the adaptability of the Fund's concessional financing structure, it was decided to establish general loan and general subsidy accounts to accept and provide funds for all facilities covered by the Trust. Furthermore, each of the new facilities would have its own loan and subsidy accounts, allowing member countries to earmark their contributions for particular purposes if they so choose. In order to aid in the mobilization of

loan resources, the Board also determined that the Trust's overall borrowing ceiling should be raised from Special Drawing Rights (SDR) 20 billion to SDR 30 billion.

1.1.6 Emission Reduction Payment Agreement (EPRA)

The Energy and Petroleum Regulatory Authority was established by Kenya's Energy Act (2019) as the industry's regulatory agency. In addition to managing the value chain for coal, it is responsible for the economic and technical regulation of electric power, renewable energy, downstream, midstream, and upstream petroleum. Several climate financing programs, with the general objective of lowering greenhouse gas (GHG) emissions, are housed within the World Bank. These efforts support environmental action and low-carbon, climate-resilient development. While some projects employ a sort of contract that pays governments, communities, or individuals after activities have reduced GHG emissions, other initiatives use climate money that is supplied upfront to assist a project. These Emission Reductions Payment Agreements, or ERPAs, can also assist developing nations establish a history of producing and reselling carbon credits or utilizing them to meet their own emission reduction goals. For instance, the Mozambique government pledged $50 million as part of an ERPA that the Forest Carbon Partnership Facility (FCPF) signed in 2019 to reduce 10 million tons of CO2 emissions. The pact, which will last until 2024, focuses on sustainable land management, climate-smart agriculture, and forest conservation. First payment is anticipated later in 2021.

Simply providing public funds will not be sufficient to address the climate catastrophe, so we need tried-and-true financial strategies like ERPAs to encourage more private participation in the cause. At this important time, when national budgets and conventional development aid are already under strain to finance a green, resilient, and inclusive recovery, Results-Based Climate Financing offered through ERPAs also provides a critical, alternative source of funding. The reason for this is that the financial commitment suggested by an ERPA

may increase investor confidence, draw more financiers to a program, and eventually drive greater investment and emission reductions. Additionally, by utilizing the strength of markets and results-based finance, instruments like ERPAs offer an innovative, secure, and results-based framework to assist nations in building a climate-smart recovery.

In order to fund initiatives that protect forests, lessen dependency on fossil fuels, and promote the use of renewable energy sources, the Climate Change Fund Management Unit (SCCFM) uses ERPAs (World Bank, 2021). The SCCFM is the location of the Carbon Partnership Facility (CPF), the Forest Carbon Partnership Facility, the Carbon Initiative for Development (Ci-Dev), and the Carbon Partnership Facility. The CPF focuses on clean energy generation and distribution, low-carbon transportation, and sustainable waste management. Clearly, ERPAs reduce GHG emissions, which is advantageous to everyone. Yet, they also give local populations important new opportunities and encourage actions that directly impact them, such as lowering local pollution, the cost of living, and health problems.

1.1.7 Sustainable Investment

Sustainable development is an idea gradually being integrated with global policy agendas. The terms "green development," "inclusive and sustainable economy," and "sustainable investment" are used in a variety of formal and informal pronouncements and initiatives. Trade, investment, and finance, the three cornerstones of international economic law, have grown more concerned with the issue of sustainable development in recent years. The Sustainable Development Goals (SDGs) of the United Nations are intended to address the recent regional and global developments that are having an impact on societies. The actions made by both state and non-state actors, as well as corporations, are essential to achieving these aims and protecting the needs and interests of the relevant parties and companies. Sustainable investing has so far established itself as a potent addition to the investment universe. Yet, as sustainability

moves from a specialty to revolutionize the rest of investment management, establishing a new main stream in the process, the years to come are expected to be more volatile. Moving towards a low-carbon economy can be accelerated with the help of financial institutions (Schoenmaker & Van Tilburg, 2016). Sustainable development's primary goal is the long-term stability of societal demands and the environment. The financial sector should encourage more sustainable and environmentally friendly economic growth in order to achieve this. Busch, Bauer, and Orlitzky (2015) looked into how financial markets support sustainable development and made the case that adopting a long-term paradigm is essential for making.

The climate issue is essentially a development issue for emerging nations, which account for more than 50% of the world's population and the fastest-growing share of emissions (UNEP 2022).Broadly speaking, for the purpose of addressing social and environmental problems of global industrialization, investors in Western Europe and the United States are growing more interested in making investments with those factors in mind (Eurosif 2008). The objective of sustainable finance is to allocate the whole permitted "budget" for the next 100 years in a manner that minimizes ecological disturbance and fosters sustainable development. A number of significant "fairness" issues related to climate change are brought up by the social dimension of sustainability. They can be separated into outcomes and process (Banuri et al., 1996; Raynerand Malone, 2000). To do this, a variety of dynamic trajectories can be employed. In the next 10 to 20 years, emissions will peak before progressively decreasing over the course of the following century to a sustainable (i.e., absorbable) level of roughly 5 GtCO2 per year (Stern 2006). He contends that the speed of future emission reductions will need to be increased if the peak is postponed, and a delay of more than 20 years will make the targets unattainable and, thus, unsustainable.

Setting thresholds for CO2 concentrations or rates of temperature change over a specified time period may be important to meet durability goals in the climate area, according

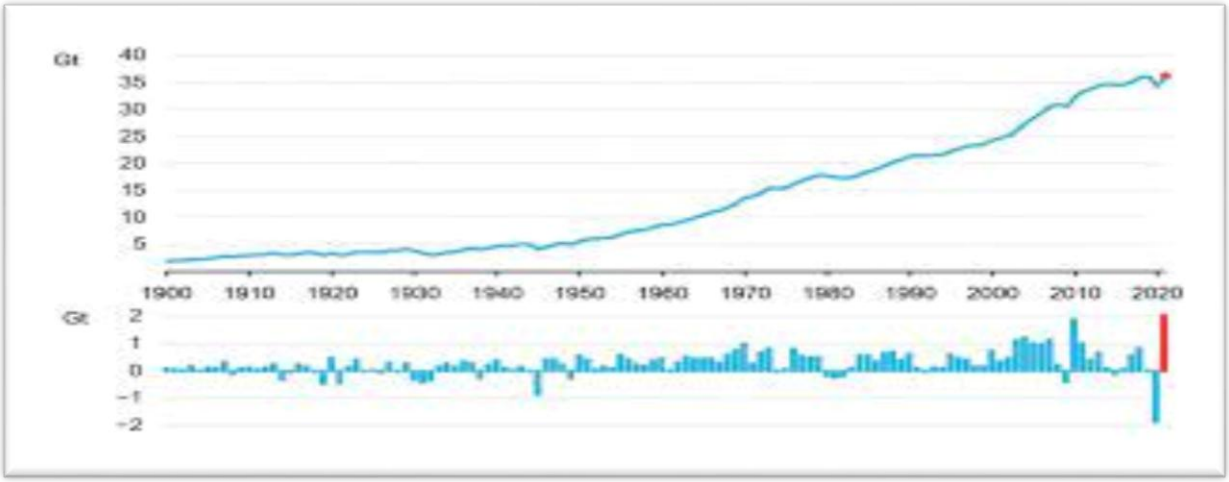
to (Munasinghe 2001), (Yohe and Moss 2000), and (Tothe et al. 2001). Sustainable development may help to lessen this vulnerability, but there are some concerns about whether it will happen quickly enough to make a difference given the rate of climate change and the economic growth patterns in less developed nations. Studies that take into account dynamic reactions to continuously rising greenhouse gas (GHG) concentrations and the effects of various stress factors are few and few between. Yet, mitigating the effects of climate change can provide developing countries the chance to reevaluate their development policies from a fresh angle. Economic expansion and a decline in poverty are undoubtedly the top concerns for policymakers in developing countries. Climate change considerations provide energy efficiency, renewable energy, and sustainable land-use policies a new sense of urgency. They also necessitate a deeper understanding of the links to other environmental issues. Additionally, they make a case for enhancing how development and environmental issues are integrated with other issues, like income inequality. Climate change policies may benefit the local environment significantly despite the lack of attention they have received from policymakers.

***Renewable Energy*:** The world community is up against a formidable challenge when it comes to reducing the amount of fossil fuels utilized in the energy system and more particularly, when it comes to substituting renewable energy sources for those fossil fuels. Nonetheless, the quantity of greenhouse gases, such as carbon dioxide (co2) is increasing due to human activity, which has led to forecasts that the planet might warm by 1 to 5 °C over the next century (IPCC, 1996a). Around 80% of the world's current primary energy supply comes from carbonaceous fossil fuels (coal, oil, and natural gas) (Nakicenovic et al., 1998). The traditional renewables, 10% wood (assumed to have been burned sustainably), 5% hydropower, and 4% nuclear fission make up the carbon-free portion of the world's energy supply. Less than 1% of energy is

produced by "high tech" renewables like solar electric, solar thermal, wind, biomass, and geothermal combined yield 1% or less.

FIGURE 3 1

Total Co2 Emmissions from Energy Combustion and Industrial processes and their Annual Change,1990-2021



SOURCE:Hydrogenation of co2 to olefins over iron Based Catalyst

The usage of energy and industrial processes resulted in the release of 36.3 billion metric tons of carbon dioxide into the atmosphere (Olefin catalyst 2021). According to these data, carbon dioxide emissions have increased by about 6% over the previous year, when they had fallen due to the COVID-19 epidemic.The state of the power industry today is crucial to the evolution of national emissions and, consequently, to long-term attempts to decarbonize

the economy. Increasing energy efficiency and lowering carbon intensity are two ways to reduce emissions. Energy efficiency gains are necessary, but energy decarburization is also necessary, especially for ambitious emission reduction targets. Compared to other industries, power generation is more promising because it is one of the few with alternative production methods accessible and has a high emissions burden. Thus, it is anticipated that 17% of the installed capacity is used for self-supply of energy, often utilizing dangerous and inefficient diesel generators (Banerjee et al. 2012).

Almost 30 nations in Sub-Saharan Africa have frequent blackouts and brownouts, with the resulting economic losses often exceeding five percentage points of gross domestic product (GDP) (Foster and Briceo-Garmendia 2010).The quality of life and capacity to make a living are both enhanced for both adults and children when access to stable power is available. The domestic air pollution from solid fuels, which is thought to have killed 3.5 million people in 2010 and caused countless more cases of respiratory, cardiovascular, and other ailments, is exposed to everyone who spends hours gathering and hauling firewood and other types of biomass. Millions of people's lives could be significantly improved by modern cooking and heating techniques (Lim et al. 2012). Electricity is essential for the effective delivery of social services, which help fight poverty and promote economic growth in addition to making it easier for people to reach their homes.

The Kenya Electricity Generating Companies (KEGC) have a commitment from the European Investment Bank (EIB) to assist green energy projects in Kenya (KenGen). The institutional perspective on the subject that was expressed ten years earlier (Feinstein 2002) is reaffirmed in Inclusive Green Growth, which also underlines prospects for the energy industry to contribute to inclusive green growth. The major objective of the corporation is to create value for its stakeholders while offering the nation safe, dependable, and competitively priced electric energy in a sustainable and ecologically friendly manner. Olkaria 1 unit 6 is 86

megawatts, and Kengen got financing from the EIB for about 72 million euros to assist finance it (Shs 9.7 billion). Over the past 41 years, the European Investment Bank has supported Kengen's visual Geothermal investment enter Olkaria as part of its commitment to advancing renewable energy in Africa. Olkaria is an example of renewable energy, and through lowering carbon emissions and the consequences of global energy shocks, it benefits the globe and Kenya.

Non-renewable resources, particularly petroleum fuel, continue to be Kenya's primary energy source. The usage of petroleum-based fuel causes higher greenhouse gas emissions, which contribute to global warming and climate change. The adoption of sustainable and renewable energy sources is required due to the worldwide rate of fossil fuel depletion and the damaging consequences of greenhouse gas emissions. Despite the fact that Kenya has adopted and exploited renewable energy, just a small portion of it is now employed to generate electricity. Given its natural surroundings and geographical features, Kenya has the ability to use renewable energy sources as geothermal, solar, biomass, wind, and hydropower. Given the problem of sustainability and the existing predominance of centralized non-renewable energy production, sustainable energy is essential. To support project initiators and managers as we move toward a future with renewable energy, comprehensive and user-friendly planning tools are required. The tool fills this gap by providing basic yet comprehensive assistance for regional communities to move closer to the promise of locally produced sustainable energy. (Hoffman and High-Pippert 2009) emphasize the importance of creating a system with local participation.

1.2 Statement of the Problem

Kenya's thriving, fast expanding economy is one of the largest in Africa's eastern area, serving as a commercial and investment hub for both central and eastern Africa. Despite diversification, the economy remains strongly reliant on natural resources. As a result, Kenya is very vulnerable to the effects of climate change, environmental changes, and the socioeconomic implications. Green finance has a terrible track record in Kenya; historically, investments in Kenya have come from NGOs using money with no cost of capital to replace contributions, which is a tremendous move on their part. However, the financial rewards were not enormous, giving rise to the misconception that investing in the environment and climate was a philanthropic gesture rather than a viable sector of business. Even banks are not immediately influenced by the blatantly harmful effects of climate change, banking operations do significantly contribute to environmental protection. The bulk of commercial endeavors rely on bank support for capital generation through loans that support investment, manufacturing, or consumption of particular goods or services. Since they function as middlemen, banks are crucial in ensuring that businesses engage in lucrative but long-lasting commercial activity (Bohara, 2018).

Long-term climate change spending continues to fall short of what is required to meet the NDC, with adaptation bearing the brunt of the burden. Increased public and private climate finance is required to meet the climate change targets outlined in the Nationally Determined Contributions (NDC). In order to find and connect projects with long-term financing, the financial industry is anticipated to play a crucial role. The estimated resource requirements for 2020- 2030 are USD 17.7 billion, with the domestic economy providing USD 3.7 billion (21%), meaning a growing reliance on the financial sector GOK (2021a). Poor countries make up a small portion of the problem despite being the most susceptible to the effects of climate change

and having the least ability to adapt (Dell ET, al., 2008). As a result, in order to achieve its NDC goals and establish a resilient economy, Kenya must increase its adaptation investment. To satisfy the SDGs' investment objectives, the global community must shift the conversation from "billions" in official development (ODA) aid to "trillions" in all forms of investments: public and private, national and global, in both capital and capacity. A worldwide transformation in attitudes, processes, and responsibility is required to reflect and modify the new reality of a developing world with vastly different national settings (African Development Bank et al., 2015).

A study assessing the effect of green banking policies on the financial performance of commercial banks in Bangladesh was carried out by (Akhter, Yasmin, and Faria 2021). They discovered that these actions significantly improve the financial health of commercial banks. Because they were all conducted in different continents and countries, the studies by (Bohara 2018), (Danye 2020), (Julia & Kassim 2016), (Mamun & Rana 2020), (Xi, Wang, & Yang 2021), (Nanda & Bihari 2012), (Song, Deng, & Wu 2019), (Tawfik, Kamar, & Bilal 2021), and (Zhang 2018) share similar contextual gaps. Since the regions of application are different, it is likely that the conclusions drawn from their analysis will not apply to the Kenyan environment. As a result, this offers a gap that needs to be investigated, and new information may be gathered from the Kenyan border.

The results of recent empirical studies on climate financing are conflicting. With a focus on developed economies, climate risk scores (Weyzig et al., 2014; Battiston et al., 2017; Neito, 2019; Wambui, 2020) and climate scenario stress testing analysis (Ojea-Ferreiro, 2022; Allen et al., 2020; BOE, 2021) have been used to evaluate the impact of transitory and physical risks on financial stability. In addition (Batten et al. 2016) and (Bovari et al. 2018), macro-ecological models (Dafermos, Nikolaidi, and Galanis (2018), (Dietz et al. 2016), and (Dell 2014), as well as macro-econometrics models (Blickle et al., 2022; Koetter et al. 2020;) (Noth and Schuewer,

2018; Klomp, 2014). The literature claims that developed countries are safeguarded with regard to regulation, capital sufficiency, asset portfolio, and relationship lending. Relevant factors include age, company size, and other funding sources. However, there are gaps in the information on climate finance for underdeveloped countries. Despite the fact that the effects of unpredictable weather clearly go beyond the agriculture sectors (BIS, 2021a; IPCC, 2018; Carney, 2015; CBK, 2021a), there hasn't been much research on climate finance as a problem of practice for bank stability.

Environmental degradation not only offers a challenge to global socioeconomic system governance, but it also has an impact on financial systems (Bolton, Despres, Silva, Samama, and Svartzman 2020).Climate change is expected to cost the country up to 2% of its yearly GDP, (SEI, 2009). Despite the fact that a number of research on green finance and company financial performance are being conducted in other countries, nothing has been explored in the Kenyan context. Kenyan banks, being key intermediaries in enabling investments by big corporations as well as individuals, bear a significant duty in promoting long-term growth and investment. Despite several studies being carried out in other countries, little study has been done in Kenya on green finance and the financial success of firms. Since they serve as a substantial middleman for both large enterprises and private investors, Kenyan banks have a crucial role to play in fostering sustainable growth and investment. Additionally, listed commercial banks that are publicly traded and owned are more inclined to adopt green practices in their company operations because they want to draw clients, which results in greater business prospects and possible revenue development. This is as a result of the general public's strong passion for environmental preservation. Given this background, research on green banking and the health of Kenya's listed commercial banks is essential.

There have been a number of private sector commitments in climate finance, primarily from developed countries, in which a variety of policy tools such as regulatory frameworks and

market tools have been used to encourage firms to contribute climate finance through various investment options, primarily cap-and-trade and carbon tax (Stern, 2008). More money must be channeled into climate-related investment by the corporate sector, and incentives must be put in place to promote this. Civil society is campaigning for enabling conditions and accepting innovative and mixed finance with conservation goals, such as green and blue sustainability bonds. To satisfy this requirement, this study examines the evidence on previously recognized World Bank climate finance instruments in order to acquire early insights into how these Climate Financing tools have really functioned in practice. The research investigates which climate funding schemes are effective, which are not, and under what conditions certain policies appear to perform better.

1.3 General objective

The general objective of this study was to investigate the effect of climate finance practices for sustainable investment in Kenya among commercial banks.

1.3.1 Specific objectives

The specific objectives for this study were set as follows:

I. To evaluate the effect of Sustainable green loans on long-term investments related to climate change among commercial banks in Kenya.
II. To evaluate the effect of concessional financing on long-term investments related to climate change among commercial banks in Kenya.
III. To evaluate the effect of climate change using a climate change-resilient scoring system on long term investment among commercial banks in Kenya .

IV. To evaluate the effect of emissions reductions payment agreement has affected climate change on long term investment among commercial banks in Kenya.

1.3.2 Hypothesis

The research was guided by the following null hypothesis which were linked to the research's specific objectives:

H01. Sustainable Green loans has no effect on sustainable investment among commercial banks in Kenya .

H02. Concessional Loans has no effect on Sustainable investment among commercial banks in Kenya.

H03. Climate resilient scoring system has no effect on Sustainable investment among commercial banks in Kenya.

H04. Emissions reductions payment agreement has no effect on Sustainable investment among commercial banks in Kenya .

1.4 Significance of the Study

Key knowledge and comprehension of the impact of climate financing tools on sustainable investment in poor nations, particularly Kenya, was provided by this research. For many players in the climate change field, it served as a guiding principle. It served as a roadmap for developing and putting into action facilitative strategies for sustainable investment, climate change mitigation, and adaptation.

The government and its agencies are extremely concerned about the threat posed by climate change since it has an impact on all facets of development, halts further growth, and even poses a risk of undoing the advancements previously made in development (Dell and Benjamin 2008). In addition to the civil society, community-based organizations, and development partners who support and facilitate climate change adaptation and mitigation, the business community will gain from this research as they develop mechanisms to protect their operations from the dangers of climate change and to seize opportunities presented by this regime.

By extending their areas of inquiry and expertise, the academic and research institutions that are crucial to studying and evaluating behaviors, technologies, and methods for coping with climate change will gain from the study. The ordinary populace, who actually bears the brunt of climate change's impacts, will benefit from the research, albeit to a lesser extent due to accessibility. The public's vulnerability and capability to acclimate to a changing climate have both been harmed by the low levels of climate change awareness and knowledge.

1.5 Scope of the Study

The study's objective was to assess the effectiveness of climate financing techniques for sustainable investment in Kenya. Given the amount of money required and the existing pressure on public finances, we must move quickly to reach a consensus on some innovative forms of climate funding. Additionally, this was to strengthen the bonds of solidarity between developed and developing nations.The purposive selection target demographic for the study was made up of the principal Kenyan commercial banks that have climate resilience plans that were registered and subject to central bank supervision as of December 2022. Panel data from 2018 to 2022 were used in the study, which combined quantitative and qualitative methods.

The majority of commercial banks with climate resilience programs provided papers, regulatory documents, and reports from which secondary data were gleaned in order to understand more about the current incentives.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

Our current knowledge of the sustainable climate system and how human activity has changed it is the result of numerous and diligent scientific studies that serve as the inputs for sustainable investment analysis. This part covers the literature on the assessment of climate financing tools on sustainable investment and makes a case for this study activity by reviewing the development of theoretical and empirical research.

2.2 Theoretical Literature

A wide range of parties must get involved, along with large financial resources, in global climate mitigation and adaptation. In their most recent book, "Public-Private Partnerships for Climate Financing," authors Ann Gardiner, Matthieu Bardout, and Francesca Grossi claim that sufficient funding is required for the implementation of the Paris climate agreement and the shift to a low-carbon economy. Public finance is significant, even though private investment is necessary for creating and implementing fresh, creative ideas. Yet, it has been estimated that in order to achieve the 2 °C goal by the year 2050, it will require between 340 billion and 1.1 trillion USD annually (World Bank, 2010; IEA, 2013; SCF, 2014).

The production cycle as a result of climate variability, the policies dealing with mitigation and adaptation as they affect important sectors of the economy and the fact that the emitters do not cover the full cost of their actions and are not compensated by market forces are three factors that contribute to the economic issue of GHGs that calls for funding.

Contributors give up some control over how resources are used when they contribute money to climate funds, with the assumption that other governments will do the same as them in the interest of burden sharing (Milner and Tingley, 2012).

Emissions of greenhouse gases must be reduced and achieve the 2 °C target in order to promote adaptation to shield the global community from the effects of a changing climate, there is sufficient evidence to support the a pressing need to expand climate financing. Nonetheless, it is the duty of public actors to use climate financing. Hence, in order to engage the business community and guarantee that money provided for combating climate change are successfully leveraged and deployed, the government must make a firm commitment. In this case, employing sustainable financing techniques to help deliver climate funding is a realistic alternative. Here, three of the hypotheses that have been advanced to explain these linkages are mentioned.

2.2.1 Contingency theory

Researchers at Ohio State University studied leadership behavior, and their findings led to the development of contingency theory in 1950 (Donaldson, 2001; Nohria & Khurana, 2010). According to the research, exemplary leadership techniques develops from the development of outstanding rapport and interpersonal connections, as well as the adoption of structure that ensures task completion and goal achievement. Contingency theory is now widely accepted and so no longer debatable (Meyer et al. 1978). His assessment is supported by the prominence of contingency theory in the management and applied literature. While commonly acknowledged as an alternative, pragmatic public relations theory, it has been criticized for failing to meet a major condition for a good theory, parsimony (Blumer, Ehrenfeucht, Haussler, & Warmuth, 1987).

The contingency hypothesis has received a lot of attention and criticism for being extremely simple and failing the reality test. Theoretical statements lack precision and give no hints as to the required level of involvement. The first two variables interact, according to contingency theorists, when they assert that a relationship between two variables predicts a third (Namboodiri, Carter, and Blalock, 1975). Rarely is the mathematical basis for the proposed relationship between structure and technology (or environment) explicitly stated. This ambiguity makes it possible for the mathematical function defined by verbal theory to be represented in practice by a function with entirely different characteristics. The implied purpose of the verbal theory is only a statement about how structure is meant to interact with technology (or the environment) for increased effectiveness.

Despite the shortcomings, the environment has changed in recent decades, becoming more complicated, turbulent, and unpredictable than it formerly was. As a result, stakeholders now confront new difficulties when trying in order to decide in unpredictable circumstances (Baines and Langfield-Smith 2003; Chenhall 2003; Otley 2016). A number of decision-makers have recently faced difficulties as a result of environmental uncertainty, concerns about the accuracy of information flows, illogical behaviors of the financial markets, and excessive economic volatility. An extraordinary situation has arisen as a result of the COVID-19 outbreak. The uncertainty of the scenario makes decision-making in this situation uncommon (Aon 2020).

In addition to the likelihood of catastrophic disasters, other climate-related events, such as the implementation of new regulations, technology, and costs, might have an influence on climate funding. Because these catastrophic incidents are not isolated and regularly reoccur, organizations find it difficult to plan for the consequences of climate change. Contingencies are external events that have an influence on organizations but that they cannot directly control (Sousa and Voss, 2008).Climate change is an issue that creates worldwide hazards and

uncertainties as a result of a recent series of extreme weather occurrences (Winn et al., 2011; Slawinski et al., 2015) (Kuklicke and Demeritt, 2016; Carrao et al., 2016). These incidents have had a negative impact on both companies and individuals. These occurrences have had a negative impact on both industrial operations and enterprises (Gasbarro and Pinkse, 2016). Because there is no one strategy to applying the concept of contingency (Horisch, 2013), this work utilizes the words sustainability and resilience for climate change (Lee, 2012a, 2012b) as organizations manage with risk-related contingencies from climate change that influence their operations.

More transparent, externally-focused, non-financial information and a stronger dependence on flexible and interpersonal management accounting have both been linked to environmental uncertainty (Chenhall, 2003). Several of these technological and political rules and constraints are causes of environmental uncertainty (Chenhall 2003),. Changes in any of the environmental variables may prompt the organization to respond by altering its policies (Woods, 2009). Businesses deciding on capital investments face considerable strategic risks related to technology availability and carbon price (Deloitte 2007),. Due to the lack of technology that may currently be used to mitigate carbon emissions and the costs associated with electricity generation using fossil fuels, high-energy consumers are particularly at danger (Lund, 2007; Reinaud, 2005). Current emissions are at a level where the physical effects of climate change will be apparent in the future at a broad scale (Slawinski et al. (2015).

In order to meet demand related to climate change, using low-carbon operational methods may be regarded as a strategic skill. Carbon efficiency is incorporated into the planning, execution, and control of business processes in low-carbon operations to gain a competitive edge. Low-carbon operations comprise the development of low-carbon products as well as low-carbon production and logistics processes (Böttcher and Müller 2015),. Low-carbon processes include those that monitor and maintain a process's carbon footprint as well

as those that minimize greenhouse gas emissions through the creation of energy-efficient methods (Tang and Zhou, 2012; Furlan Alves Matos, et al., 2017). The three techniques studied by (Weinhofer and Hoffman 2010), who examined a global sample of power producers, are carbon reduction, carbon independence, and carbon compensation. Examples of these strategies include investing in carbon offset projects and utilizing emissions trading systems (creating carbon-free goods and processes).

Notwithstanding the fact that climate change is a global issue that affects both the current generation and generations to come, contingency literature advocates for government intervention to limit the impact of climate change's negative externalities through effective sustainable financing. Because there are no "World Governments" or other institutions to control GHG emissions on a global scale by monitoring compliance, encouraging continuous improvement, and providing data for internal decision-making as well as for external reporting, it is very difficult to regulate and mitigate climate change (Henri & Journeault, 2010).

2.2.2 Theory of Innovation

Schumpeter famously defined innovation as "the doing of new things or the doing of things that are already being done in a different way" (Anderson, N., & De Dreu, C. K. W. 2004).Innovation With the influx of new researchers in the 1980s and 1990s, innovation theory became much more diverse. In the diffusion of innovation theory, (Rogers 2010) proposed the perceived risk of adopting technology. All breakthroughs rely on educated actors to implement new technology and enable the potential provided by technology (Helpman, 1998; Bresnahan & Trajtenberg, 1995; Garcia & Calantone, 2002). However, technological advancements need interpretation. The use of new technology is contingent on actors recognizing what a new

product is great for and developing things for customers that they would find useful (Rosa et al., 1999; Read et al., 1999).

Local or regional innovation capabilities is thus limited by power imbalances that manifest at various scales and through the interaction of multiple institutions. On the other side, innovation might help to address these power disparities. Companies may strengthen their positions in the relationship between the local and the global by creating conditions that allow their operations to become more competitive and less 'disposable' (Coe et al. 2004). For firms that rely on a value chain, innovation may entail the creation of own brands or the discovery of new means to reach final clients without the involvement of an intermediary organization (Tokatli 2007).

The subject of technology and innovation study has been acknowledged as being highly interdisciplinary since the early studies by Liker (1996) and Chen (1999). Studies like Linton and Thongpapanl (2004), Ball and Rigby (2006), Linton and Embrechts (2007), and more recently Hall (2018) and Pitt et al. (2021) have further investigated the disciplinary links within the subject. These studies collectively demonstrate the broad and extensive range of applications for innovation. Research on innovation systems is a noteworthy area of study (Lundvall, 1992; Nelson, 1993; Edquist, 1997; Watanabe et al., 2000; Tukker et al., 2008), with firm innovation activities at the center of economic and innovation processes and related systemic contexts supporting or impeding innovation capabilities. Instead of geoengineering, the majority of innovation literature emphasizes mitigation and adaptation. As shown by our research, innovation studies within the mitigation theme frequently looked at how the interplay between organizations, legislation, and user practices influences or is influenced by the adoption of alternative sources of energy technologies.

In order to enable national and subnational decarburization operations as the consequences of climate change grow more pronounced, innovation is expected to be essential. Most technologically advanced innovations targeted at lowering the causes of or lessening the effects of climate change are riskier and less certain (Wu et al. 2020), . Innovations in the fight against climate change include energy efficiency, low- and non-carbon technology, carbon reduction technologies, and technologies for carbon capture and storage (Newell, 2009). However, addressing global challenges through innovation requires organizational, social, and economic changes in addition to technological advancement, as acknowledged by the field of innovation studies and its diverse range of perspectives, including technology, innovation management, and innovation policy. In order to combat the effects of global warming, both the public and private sectors currently have access to a wide range of technological solutions, from carbon-free or low-carbon technologies to reduce the sources of greenhouse gases (GHGs) to advancements in carbon capture and storage (Sovacool, 2021b; UNGC-Accenture, 2015).

One conclusion is that innovative technologies like renewable energy (particularly solar photovoltaic and micro inverters), smart electricity systems, and decentralized energy storage are now more practical due to expanded deployment, which has led to significant cost reductions (IRENA, 2021; Viardot et al., 2013). A further finding is that without more support from governments, investments in low-carbon innovation are still too low and unlikely to expand much. (Reid and Toffel, 2009). The use of "geoengineering" techniques to stop or reduce global warming through the purposeful, significant modification of the environment is one of the more controversial technologies (Sovacool, 2021b; winter, 2014). In order to reflect the sun's rays, geoengineering proposals include dispersing reflecting particles into the atmosphere, burying carbon in the ground, and creating large mirrors in space (Sovacool, 2021b; CB Insights, 2019).

The 2030 vision is not a deception because it states unequivocally that Kenya wants a healthy, safe, and sustainable environment by that year. It also outlines a number of signature projects aimed at reducing climate variability and preparing for it. Other initiatives to incorporate climate change issues include the 2004 energy policy, which required the government to invest heavily in geothermal and renewable energy. This paved the way for the establishment of the Geothermal Development Company (GDC) as well as numerous energy sector reforms to improve efficiency and sustainability.

2.2.3 Conspiracy Theory

Conspiracy theories thrive in an environment of uncertainty around the public's knowledge of climate change. Conspiracy theory acceptance has been linked to a variety of factors, including uncertainty (van Prooijen and Jostmann, 2013), feelings of helplessness (Abalakina-Paap et al., 1999), political cynicism (Swami, 2012), magical thinking (Barron et al., 2014), and mistakes in logical and probabilistic reasoning (Brotherton and French, 2014). By addressing these issues, the need for conspiratorial justifications can decline. Conspiracy theories alleging that climate change is a fraud and was created to deceive the public persist, despite the fact that active climate scientists unanimously agree that it is happening, harmful, and human-caused (Cook et al., 2016).

The stifling of essential desires may be fostered by conspiracy theories, creating a feedback loop that encourages the individual to hold onto and expand their conspiracy theory beliefs (Douglas et al., 2017; van Prooijen, 2020). For instance, it has been shown that exposure to conspiracy theories increases feelings of impotence and lowers feelings of control and autonomy (Jolley and Douglas, 2014a,b; Douglas et al., 2017). This is hardly surprising given

that conspiracy theories undermine the quest for autonomy by emphasizing how individual actions cannot impact the existing quo, even while they offer a different explanation for unfortunate events. In addition, they underline how numerous things are connected to one another and how the public is kept in the dark about the facts, which may annoy people since they feel incompetent. By highlighting how the ingroup is mistreated by the outgroup and how the ingroup is the subject of hostile plots, conspiracy theories can eventually intensify feelings of social alienation. In addition, conspiracy theories frequently lead to interpersonal conflict between conspiracy theorists and non-theorists, which could endanger friendships and relationships as well as exacerbate the dissatisfaction with the desire for relatedness.

The climate deniers implicated in Climate gate in 2009 asserted that researchers falsified data in their research publications and suppressed their opponents in order to secure funding (i.e. taxpayer money). There is no scientific agreement on the matter, according to certain skeptics of climate change, and they occasionally claim that any evidence showing there is an agreement is false. Some of them even claim that governments have skewed science by diverting cash from research grants to other endeavors. In 2002, in response to Clive Hamilton's criticism of the group, the Lavoisier Group asserted that thousands of climate scientists had falsified their studies to promote the idea of climate change in order to maintain their research funding. An article written by the Cooler Heads Coalition provided support for this assertion. Climate change poses a major danger to these fundamental and beloved beliefs about people's morality and the legitimacy of societies (Bandura, 2007). The ability of climate change conspiracies to defy the apparently overwhelming evidence that humans are harming the environment may therefore be their main psychological attraction. On people's sense of calm in general, denial of climate change is likely to have a significantly higher favorable effect.

Furthermore, the widespread belief in climate change conspiracies has led to ineffective or nonexistent mitigation efforts for the harm caused by global warming. There is proof that

some of individuals who make such conspiratorial claims are involved in well-funded information campaigns intended to sow discord, challenge the scientific consensus on climate change, and minimize the expected effects of global warming. Long after the majority of scientists had come to their conclusions, individuals and groups continued the global warming argument. It is currently unclear how much belief in climate change conspiracies affects people's pro-environmental activities in daily life (also known as private-sphere pro-environmental behavior; Stern, 2000), which is also crucial for climate change mitigation (Dietz et al., 2009).

According to a conspiracy theory, those who have invested heavily in renewable energy firms stand to lose a great deal of money if it turns out that global warming is a lie. This theory contends that environmental organizations pay climate scientists to falsify their research in order to protect their financial investment in renewable energy sources. In addition, in October 2020, a commentary titled "Avoiding a Climate Lockdown" that appeared on Project Syndicate, a reputable nonprofit media outlet that offers commentary and analysis on current events, was connected to about 3,500 accounts, 498 of which appeared to be bots, and another 49 of which appeared to be connected to influencers who provide false information. What can (or should) be done about climate change denial ideas then? These tactics include outright outlawing conspiracy ideas, imposing financial penalties (like as taxes) on those who spread them, and participating in "cognitive infiltration"—joining conspiracy organizations and refuting their conspiracy theories (Sunstein and Vermeule, 2009). These recommendations, however, could be argued to be undemocratic, irrational, and unrealistic. Since climate change denial increasingly reflects ideological perspectives, they may also backfire and the possibility of "conversion" using scientific data is limited (Bain et al., 2012).

Although though they are sometimes ridiculed as the frivolous fantasies of outcasts on the edge of society, conspiracy theories have the power to influence people's intentions in

important ways. It is vital and necessary to look into how those who deny climate change affect society. They don't have little or no significance. Environmentalists and elected leaders should be aware that conspiracy theories can undermine government initiatives to encourage environmentally beneficial behavior. The challenge of future study will be to identify ethical alternatives to counteract the negative impacts of climate change denial through resilient finance.

2.3 Empirical Literature

Over the past nine years, the Intergovernmental Panel on Climate Change (IPCC) has attempted to walk a narrow line between being politically and scientifically acceptable. The IPCC was founded in 1988. Sustainable development and climate change are closely related in many ways. Considering sustainability at various spatial scales will require careful consideration of climate policy and the effects of climate change. Investments in innovative technologies, renewable energy, and energy-efficient economic practices are all necessary for limiting climate change and preventing global warming.Since Mark Carney began emphasizing it as Governor of the Bank of England, central banks have been concerned about the financial system's vulnerability to climate change, and policymakers have debated the proper role for monetary, financial stability, and banking supervisory and regulatory policy.

2.3.1 Sustainable Green Loans

Some of the biggest financial advances in the field of sustainable finance over the past ten years have been the development of green bonds and the growth of the markets for those securities as well as other "labelled bonds" About 10 years ago, the World Bank and the EIB both played

key roles in the development of green bonds. The World Bank issued the first "green" bond in 2008 in response to a special request from Scandinavian pension funds that wished to support initiatives focusing on the environment as well as to advance financial innovation.The market is currently estimated to be worth roughly $100 billion by the Climate Bonds Initiative. The creation of green bonds is periodically stressed as a way for institutional investors to increase their investments in environmentally friendly infrastructure by increasing the liquidity of infrastructure assets (Merk et al. 2012; Della Croce and Yermo 2013; Bhattacharya, Oppenheim, and Stern 2015; OECD 2016). According to the GBPs (ICMA 2018), a green bond can be used to support a variety of initiatives, including those involving renewable energy, resource efficiency, pollution reduction, water and waste management, conservation, and climate adaption.

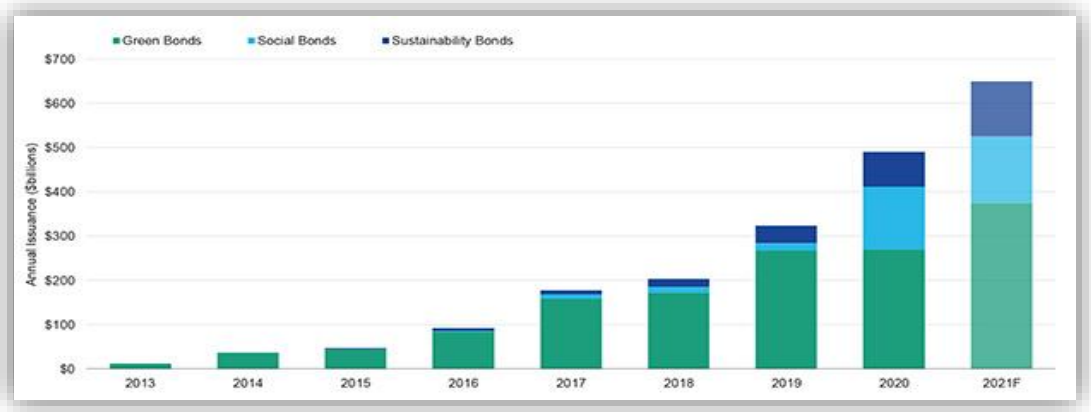
Environmentally and socially conscious investors have generated demand in the Green Bond market, which is why numerous organizations have issued Green Bonds throughout the years. However, public sector financing is already stretched thin, with large budget components dedicated preferences (Zerbib, 2019).Green bonds, in particular, can assist investors in implementing long-term climate actions and provide options for ethical investors seeking to diversify their asset portfolios. While these benefits may be enough to warrant the creation of green bonds, their actual contribution to the low-carbon transition has been negligible thus far. Despite the growing popularity of green bonds, several important aspects remain unclear. Notably, there is a lack of understanding regarding their effectiveness, contribution to climate change management, potential bottlenecks that inhibit implementation, and existing public legislation to ensure enforceability (Zhou & Cui, 2019). As a result, a more comprehensive evaluation of the literature is necessary.

Sustainable, long-term infrastructure financing is made possible through green bonds. The development of green bonds has only been accelerated by the introduction of the Green

Bond Principles (GBPs) in 2014, which now unites more than 200 financial and non-financial entities. The database of the Climate Bonds Initiative shows that the total number of green bonds issued increased from one in 2007 to more than 2000 in 2017, a stunning annual growth of more than 113% over the same time (Climate Bond Initiative, 2021). Although some of this expansion is due to pandemic-related financings, there has been increasing diversity in sustainability bond issuance. We envision a long-term trend in this category toward a larger focus on corporate sustainability, which will contribute to our prediction of 58% increase in sustainability bonds in 2021 to $125 billion Kuchtyak (2021).As a result, investors' desire for green bonds has expanded significantly Pham (2016), as they recognize climate change as a new investment return variable worthy of major attention Mercer (2015).

FIGURE 4 1

Sustainable Bonds to hit $650 Billion



SOURCE: Climate Bond Initiative (2021)

Sustainable development goals necessitate not just energy system optimization, but also efficient finance strategies (Rahman et al., 2022; Wang et al., 2021a). Green financing is crucial for allowing long-term growth in the face of global climate risks (Zheng et al., 2022). As a new technological paradigm, green innovation has the potential to reduce resource consumption and increase resource efficiency (Dangelico and Pujari, 2010; Barbieri et al., 2020). Green innovation is crucial to achieving the carbon peak goal by balancing economic growth and environmental protection (Hao et al., 2022; Zhang and Li 2020; Du et al., 2021; Lv et al., 2021). One of the successful green bond projects listed in the World Bank's green bonds impact report is a renewable energy project in Turkey. Another is a hydroelectric plant in Rampur, India, and a program to promote energy efficiency in Tunisia. (World Bank, 2017).As a result, there is an urgent need to rebuild trust in the green bond market and gain a better understanding of the financial characteristics and risks associated with this asset class.

2.3.2 Concessional Finance

The lives and livelihoods of millions of people worldwide are increasingly in jeopardy due to climate change. This note expands on earlier climate research by the IMF that was centered on African climate financing scaling-up alternatives (Belianska and Colleagues 2022). Concessional climate financing, which is defined as capital provided at below-market rates through grants, loans, or other instruments with the intention of advancing goals related to climate change, is emphasized as being essential. In order to hasten the demonstration, adoption, and transfer of low-carbon technologies in renewable energy, energy efficiency, and sustainable transportation, the Climate Investment Fund (CIF) has provided middle-income nations with over USD5 billion in concessional loans during the past ten years.In order to raise

additional cash for sustainable development in underdeveloped nations, concessional financing is the strategic use of development finance (OECD, 2018).

In certain cases, climate funds provide basic grants as a means of granting concessionary resources. Concessionality is also given under other conditions, such as when loans have extended terms or discounted interest rates, which lower the cost of investments related to climate change. From major bilateral donors, multilateral development banks (MDBs), and global climate funds, Africa now has access to grants or loans with favorable terms for climate projects. Concessional climate flows acquired by the region in 2020 were $15.7 billion, falling well short of the region's needs but making up 70% of overall climate flows—a nearly fourfold increase from a decade earlier. The world's most vulnerable region to global warming is Africa, despite having made minimal contribution to the accumulation of greenhouse gases. In terms of efficiency, climate action is a glaring example of a global public good since concessional funding may bridge the gap between the region's private costs and the social benefits seen by the rest of the world, particularly in terms of mitigation. Concessional financing still predominates the flow of climate funding to the region in practice.

Debt sustainability is still a major worry. Loans, according to Lerrick and Meltzer (2002) and Radelet (2005), have perverse incentives, owing to demands on creditors to issue new loans in order for nations to repay previous ones, but grants can be designed to provide positive incentives.Concessional loan maturities indicate that the considerable increase in loans given between 2005 and 2015 as a result of increased resources made available to concessional financing windows would have an impact on the public budgets of borrowing nations, notably between 2020 and 2025. This condition may expose countries to external shocks, especially those that borrowed from capital markets but at significantly higher interest rates - these loans will mature at the same time.

Furthermore, issues with execution and technical competence may prevent concessional loan flows from achieving scale in developing nations, particularly LDCs and SIDS. While the idea and concepts of concessional financing are becoming more established in the international community, knowledge and comprehension in poor countries remain restricted (Taskin, Bellesi, and Moller, 2020). Furthermore, crucial 'how-to' information for developing-country players is lacking. Any set of norms aimed at poor countries should be accompanied by actionable takeaways, capacity building, and institutional assistance.

Given the vast sums required to assist adaptation and mitigation, it should be noted that concessional finance is unlikely to meet the region's needs for transition and adaptation on its own. Nevertheless, concessional funding can be a significant factor in expanding access to private sector capital, for example, by accelerating high-priority projects that can help unlock follow-on private investment or by enabling risk-sharing arrangements that address the most pressing concerns of risk-averse investors. Africa desperately requires creative methods that integrate public, private, and concessional financing in this situation to increase investment and close the resource-needs gap. The international community as a whole, including donors, private investors, development finance institutions, MDBs, and international organizations, will need to work together and be more innovative on this topic because it is frequently challenging.

2.3.3 Climate Resilient Rating System

Resilience is defined by the Intergovernmental Panel on Climate Change (IPCC) as "the capacity of social, economic, and political systems to withstand shocks, and environmental systems to cope with a hazardous event, trend, or disturbance, responding or reorganizing in ways that preserve their essential function, identity, and structure while also preserving the

capacity for adaptation, learning, and transformation" (IPCC 2018). Climatic resilience is a new concept that is increasingly being used to symbolize the durability and consistent functioning of energy systems in the face of major climatic events. Despite increased interest in climate resilience, it has yet to be thoroughly investigated in connection to current improvements in climate change modeling (Sharifi A Yamagata 2016). After an extreme occurrence, a resilient system should be able to adjust to change and return to equilibrium or stability (MT Frame, D. Randalls 2010).

To identify climate hazards and assess and reward resilience in public and private investments, climate risk screening and resilience metrics are being developed at an increasing rate. One such is the Resilience Rating System (RRS) of the World Bank Group, which was created to support climate resilience in project design and outcomes and to direct investment decisions (World Bank Group 2021). The RRS provides guidance and specific criteria for evaluating resilience across two complementary domains of project design: (1) the project's resilience rates the confidence that expected investment outcomes will be achieved despite climate and disaster risks, based on whether a project has considered these risks in its design, incorporated adaptation measures, and demonstrated economic viability in the face of climate risk uncertainty; and (2) the project's resilience rates the confidence that expected investment outcomes will be achieved despite climate and disaster risks

Resilience investments and decisions are frequently avoided, despite the economic logic and potential benefits. When it comes to investing in resilience, individuals and families face obstacles like a lack of risk awareness, a behavioral tendency toward the status quo, and financial constraints. Despite the fact that catastrophic shocks have long-term implications on human capital accumulation and poverty reduction, poor households, in particular, frequently face difficult trade-offs between investing in adaptation and maintaining food security. (Hallegatte S, Bangalore M 2016). Similar information asymmetries, market failures, financial

constraints, constrained time horizons, and an inability to fully utilize the benefit of cash flow resilience are faced by businesses (Stout S 2022). Governments also face challenges brought on by a lack of coordination, conflicting interests, and policy goals, and they routinely underinvest in infrastructure. Governments must also deal with coordination problems, conflicting interests, and policy objectives. They also regularly underinvest in adaptation and resilience capacity and underprice climate hazards in laws, regulations, and budgetary planning (Dolsak N., Prakash A. 2018).

Financial markets and commercial financial institutions are becoming more and more interested in metrics that can account for climate resilience factors, particularly physical climate risks, in financial decision-making and quantify the contributions of financing activities to climate resilience. This information is crucial to sparking much wider financial market engagement on climate resilience and to facilitating the crucial shift from billions to trillions of dollars needed to meet the demands for global, regional, national, and local adaptation. Thus, by informing decision-makers and giving them a stronger incentive to take climate resilience into account when allocating resources, assessments of climate resilience might be useful. These indicators, in general, can enhance the qualities of good governance that foster resilience. The involvement of various stakeholders from the public and private sectors and levels, for instance, increases climate resilience. Additionally, flexible metrics that permit the comparison and evaluation of inputs and outputs may contribute to more effectively integrated decision-making.

2.3.4 Emission Reduction Payment Agreement

An ERPA is a legal agreement between carbon credit buyers and sellers. A carbon credit is a certificate or authorisation that permits the holder to emit CO2 or other greenhouse gases

(GHG) into the atmosphere (World Bank 2021). The Kyoto Protocol, agreed by 192 industrialized countries in Kyoto, Japan, in 1997, is the closest approach to a practical global accord to combat climate change. Signing countries will get a maximum CO2 emission limit (United Nations Climate Change 2021). The ERPA's goal is to document the parties' agreement. It sets roles, responsibilities, and rights in order to manage project risks. It also specifies the business terms of the project, such as the price, volume, and delivery date for emission reductions. Kenya must cut its GHG emissions by at least 42.9 MtCO2e relative to the BAU scenario by 2030 in order to meet the mitigation NDC target. As a result, Kenya will need to implement policies, programs, and technology that support emission reductions and propel the country toward a low-carbon development path. Priority initiatives to minimize GHG emissions have been identified and prioritized for implementation in the NCCAP 2013-2018.

However, there was a protracted period of uncertainty regarding the future applicability of carbon market instruments after 2020 as a result of the 2009 Copenhagen conference's failure, the protracted period needed to negotiate a replacement agreement for the Kyoto Protocol, as well as criticisms of the Kyoto Mechanisms. The market virtually stopped from 2013 forward due to the extremely low demand for Kyoto mechanism credits. This was caused by the uncertainty surrounding the global climate policy framework as well as perceived shortcomings of the Kyoto Mechanisms, which resulted in the shutdown of the emissions trading systems for Kyoto credits.

A framework for international climate action is established in the Paris Agreement's provisions. Each party is required by the agreement to develop, announce, and maintain a series of Nationally Determined Contributions (NDC) that represent their respective contributions to the global objectives. To assist developing countries in achieving their goals, the World Bank established the Transformative Carbon Asset Facility (TCAF) as a trust fund. The TCAF seeks

to promote transformative climate action through results-based payments for verified emission reductions (VERs).Numerous legislative initiatives that place a cost on GHG emissions are referred to as carbon pricing (World Bank, 2021). It aims to encourage businesses, industries, and consumers to reduce emissions and spend money on goods, services, and manufacturing processes that are more environmentally friendly and sustainable. Additionally, it might assist governments in generating revenue, encouraging low-carbon development options, and achieving local environmental advantages. A carbon tax can be implemented in a number of ways and at different levels, including global, national, sub-national, and regional. Governments are not compelled to adopt a single carbon pricing instrument; rather, it may be better in some cases to deploy a number of complementary carbon pricing methods. It is also possible to create an emissions threshold. Governments can impose specific tax exemptions or set an emissions threshold that will allow them to charge only major GHG emitters.

A low-carbon technology adoption program or an incentive program can be used to support initiatives that directly cut CO2 emissions. These may focus on technical upgrades, infrastructure and equipment purchases, and public green procurement, all of which could proactively encourage low-carbon growth. The development of intelligent transportation system infrastructure or electric vehicle charging infrastructure, government procurement of low-emission vehicle fleets, feed-in tariffs for renewable energy sources, tax credits for low-carbon technology, government procurement of low-emission vehicle fleets, direct government investment in energy-efficient equipment and processes, public investments in green financial infrastructure, such as the establishment of microfinance institutions, and extensive secrecy measures are examples of this type of strategy. Governments and international organizations may directly or indirectly sponsor expenditure programs by way of intermediaries like foundations.

Transportation technology and innovation are critical to satisfying future passenger requirements while lowering overall system carbon emissions. Greater emphasis on information sharing between the public and commercial sectors, new internet platforms, and big data can promote more effective management of the transportation network and lower carbon emissions. Enhancing data quality and comprehending how VMT and land use are related can result in better decision-making and a future transportation system with lower overall emissions. When evaluating development and predicting trends related to the switch to electric and other zero-emission vehicles registered in Indiana, data from the Bureau of Motor Vehicles (BMV) can be helpful. Emerging technologies like automated transportation and unmanned aerial vehicles provide fresh approaches to solve transportation issues while reducing carbon emissions. Innovation will be necessary during the following 30 years to achieve all Indiana transportation goals and to find ways to lower emissions from on-road traffic.

In addition, the Paris regime's definition of international cooperation reflects many Parties' desires to give cooperating nations more control over creating their cooperative programs, to shift away from crediting isolated mitigation projects in favor of transformative and sector-based cooperation and to reframe international cooperation as a tool to raise mitigation ambition. Parties also need to come up with workable solutions to protect the environment while achieving a range of mitigation goals in order to reduce the risk of duplicate counting mitigation results amongst countries.

2.4 Conceptual Framework

The conceptual framework for the inquiry is depicted in the figure below. The model below was created and deployed using theoretical underpinnings pertinent to the various parts of green finance, a literature assessment, and the factors considered while evaluating the Sustainable Investment of Kenya's listed commercial banks. The financial performance of sustainable investments is predicted using green finance components such Sustainable Green Loans, Concessional Financing, Emission Reduction Payment Agreements, and Climate Resilient Rating Systems. The dependent variable of sustainable investment was assessed in relation to renewable energy, energy efficiency, eco-friendly building techniques, sustainable water management, pollution prevention, and sustainable agriculture. Thus, the effect of green finance on the sustainable investment of Kenya's listed commercial banks was assessed by looking at these parameters. The mismatch between emerging market and developing country needs for climate financing and present investment flows has resulted in a sizable financial gap. In turn, preserving environmental quality is necessary for sustainable development. In the research, this conceptual framework is used

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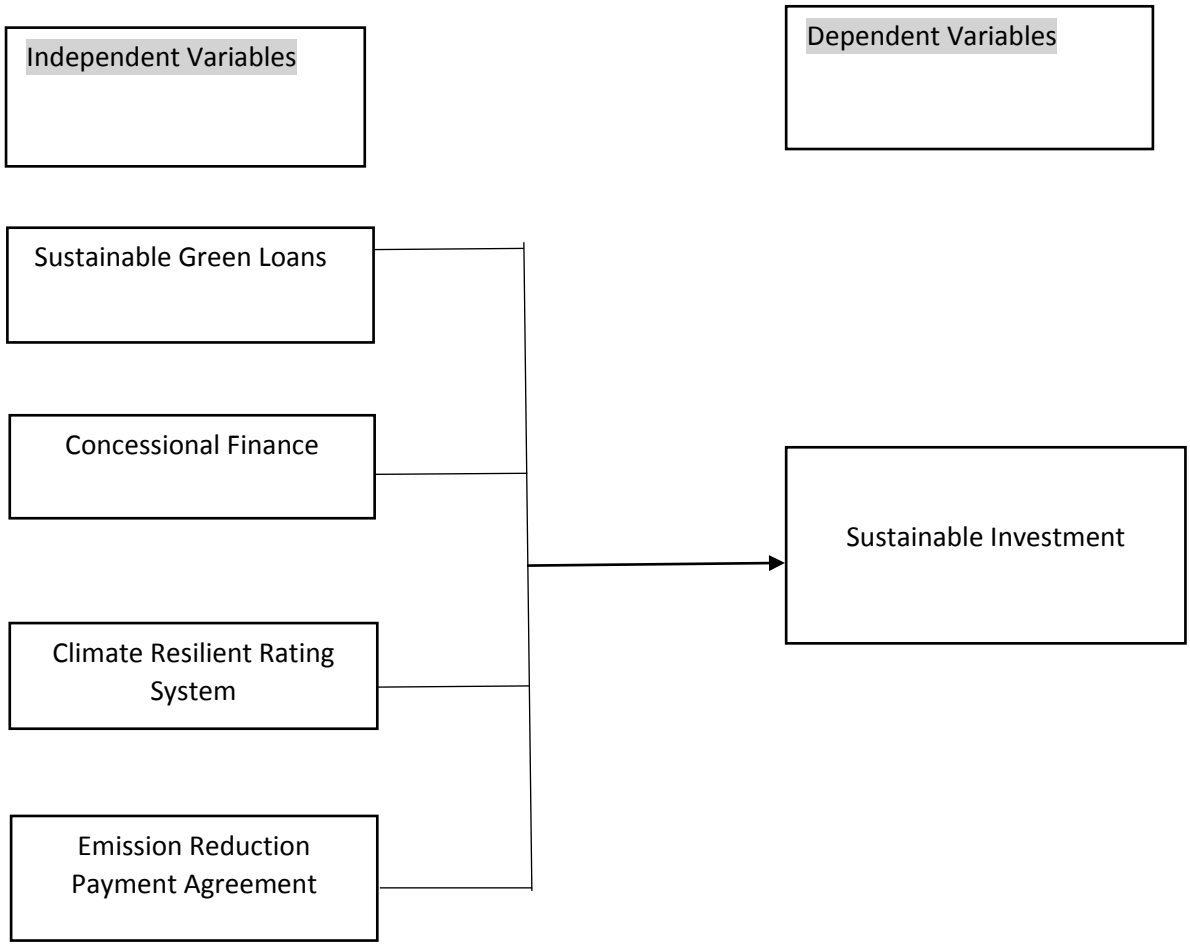
FIGURE 5 1

Conceptual Framework



SOURCE:Author 2023

2.5 Operationalization of Variables

Operationalization is the process of transforming variables into precisely quantifiable components. Ardelt (2004), the method specifies fuzzy concepts and enables their quantitative and empirical measurement. Sustainable investment will be the dependent variable in this study, while programs to reduce greenhouse gas emissions and adapt to them as well as financial practices as evaluated by climate finance instruments will be the independent factors. In order to account for climatic fluctuation and change, we use percentage change for the relevant data collection years 2018-2022 and their long-term values for calculating the impact of climate financing strategies for sustainable investment across commercial banks in Kenya.

TABLE 2.1 1

Operationalization of the Study Variables

Variable	Definition	Indicator	Reference
Climate Rating System X1	An approach to enhancing and monitoring climate change resistance (World Bank 2021)	Index of Climate Change Performance (CCPI) *As an impartial monitoring tool, it attempts to improve openness in international climate politics by allowing comparisons of specific nations' climate protection initiatives and progress.*	Germanwatch (2021), J Burck, CB Franziska Marten (2016)

Concessional Finance X2	All the fiscal and financial tools that politicians have provided to companies to promote new investment and development initiatives. (International Monetary Fund 2023)	Multidimensional Vulnerability Index *Debt relief and assistance are unfairly denied to SIDS due to the use of inappropriate, obsolete, and unsophisticated GNP measures. A multidimensional vulnerability index has the potential to guarantee truly inclusive sustainable development.*	Justin Ram, J. Jason Cotton, Raquel Frederick, Wayne Elliott (2019)
Sustainable Green Loans X3	Loans for long-term, environmentally good goals, such as lowering CO2 emissions, or for reasons that contribute society's green transition, such as creating new environmentally friendly technologies.(Nordea 2022)	Sustainable Development Goals *Incorporate disaster risk management, sustainable natural resource management, and human security measures into national development strategies.*	T Hák, S Janoušková, B Moldan (2016), KW Robert, TM Parris (2005)

Emmission Reduction Payment Agreement X4	A enforceable agreement that permits the deliveryof certified carbon credits from one party to another (World Bank 2021).	Climate Change Data *Monthly Carbon Dioxide Concentrations in the World's Atmosphere*	KE Trenberth, A Dai, G Van Der Schrier- Climate Change, (2014)
Sustinable Investment	Variety of actions taken by investors to increase short- and long-term financial returns while fostering environmental or social value.(Havard Business School 2021).	MSCI Climate Action Indexes *1. Alternative Energy* *2. Energy Efficiency* *3. Green Building* *4. Sustainable Water* *5. Pollution Prevention* *6. Sustainable Agriculture*	L Casselryd, A Lantto, AJ Zanic – (2021)

SOURCE: Author (2023)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The methodology that was utilized to examine the data was briefly explained in this chapter. Additionally, it provides information on the research design, the model that was used, and the data analysis techniques that were employed to achieve the intended goals .

3.2 Research Design

The plan, technique, or approach used in order to identify solutions to the problems raised by the study is known as the research design, according to Orodho (2005). (Polit, Beck, and Owen 2003) define a research design as "the overall strategy for determining the answers to the research questions under consideration as well as resolving some of the potential issues."As a result, an exploratory research strategy was used in the study. Exploratory research (qualitative research) was used to provide first ideas and insights and to offer direction for any additional study required (Churchill & Iacobucci, 2005; Aakeret al. 2007). In order to gather information for the current study on climate resilience strategies and financial performance, Kenyan commercial banks' financial statements were used. All of the research's variables were extracted, computed, and analyzed to achieve this. It also made it possible to understand data conceptually and analytically.

3.3 Target population

Lavrakas (2014) defined a population as any finite or infinite group of singular objects. A population, in contrast, consists of all the "things" that we are interested in, according to Hyndman and Booth (2009). The 39 Kenyan commercial banks that held licenses as of December 2022 (Appendix I) are included in the target population; the CBK administration published a list of these businesses.Both the target population and the accessible populations will be included in the current study. The target population, according to Scheiber and Scheiber (2014), is made up of the actors who are most adversely affected by the issue that initiatives are attempting to address. They are the projects' intended direct beneficiaries and, in certain circumstances, indirect recipients. Using purposive approach, all 39 commercial banks in Kenya having climate resilience strategies and licenses as of December 2022, will be evaluated (Appendix I).

3.4 Sampling and Sampling Procedure

According to Polit, Beck, and Owen (2003), the group of components from which the sample is drawn is known technically as a sampling frame. Kothari (2010) defined a sample frame as a list containing the names of each element in the universe. A sample is a collection of people who have been picked at random from a population (Polit & Beck, 2010). The sampling frame for this study consisted of all 39 licensed commercial banks that were still in operation in Kenya as of December 2022, as stated in the Central Bank of Kenya database. Appendix I contains the relevant details. Every target demographic participant was to be subjected to a purposive sampling approach as part of the study.

3.5 Research Instrument

The population of the research includes 39 significant commercial banks with climate resilience strategies.Because of the small number of businesses registered with the Central Bank of Kenya and the lack of adequate data, the research applied the Purposive approach.As a consequence, data was obtained from 12 of the commercial banks. As a result, the research included financial accounts, government records, and publications as of December 2022.

3.6 Data collection procedure

The dependent and independent variables' data was to be gathered via secondary sources, mostly from the financial statements of the various commercial banks under investigation in Kenya between 2018 and 2022 (Appendix I). Data will be gathered over a five-year period from 2018 to 2022. This time frame was chosen for the study to allow for the most recent data to be included in the analysis while also allowing for the establishment of changes in commercial bank data that is climate resilient over time. According to Kosikoh (2014), a time frame longer than five years might aid in the computation of various ratios of both the independent and dependent variables for multiple years to aid in a more thorough study. In light of this, information regarding the dependent and independent variables is to be gathered from the financial accounts of various financial institutions.

Many studies have employed secondary data to acquire information, especially when quantitative data is required. Ongore (2013) avoided using primary data in favor of an exploratory approach that relied exclusively on secondary data from public statements of accounts during a ten-year period. To begin, research questions will be determined by

establishing the research problem. Finding information in government financial statements and reducing it down to data references.Third, analyzing relevant data by operationalizing ideas and having a greater understanding of factors to the analysis.In fourth place, determining if the data has been utilized in any reliable published study is critical. Finally, there is analysis, which includes a variety of statistical processes.

3.7 Data Processing and Analysis

The volume of data created during a research project, (Polit and Beck 2006), cannot be analyzed and addressed using only basic numerical statistics; rather, the data must be processed and reviewed in a methodical manner. The study gathered data from financial institutions that included both qualitative and quantitative information.The data was cleaned, explored, and analyzed using Ms-Excel and Stata. The panel data was then quantitatively analyzed using mathematics and regression equations, and answers were found using Statistical Software of Data Science (STATA), a statistical tool.The dependent variable was sustainable investment, which was to be investigated in STATA using descriptive statistics and a multiple linear regression technique. Olweny (2012), multiple regression techniques yield conclusive and trustworthy results in both quantitative and qualitative areas. The descriptive analysis's findings were graphically conveyed, particularly through the use of graphs, charts, tables, and narratives.

Panel regression techniques were used to examine the data because the independent variables' temporal fluctuations precluded either cross-sectional data analysis or time-series data analysis from providing the optimum results. When examining change dynamics, panel data, which use more observations of the data, are particularly beneficial. The pooled ordinary least squares (POLS), fixed effects, and random effects models for panel data regression were

employed to analyze the data. The fixed effect model, used as an analysis tool, adjusted for the subjects' heterogeneity by allowing each subject to have a unique value for the intercept while assuming that the slope's coefficients are constant between the firms. In the Statistical Software of Data Science (STATA), multiple linear regression analysis and descriptive statistics were used to evaluate coded data. Diagnostic tests were conducted before and after the study in order to examine and validate the results. The adequacy of each model was assessed using a Hausman specification test to decide which of the two should be chosen to best explain the estimation. To investigate the link between the independent factors and the dependent variable, a panel data regression model was used.

The fitted pooled OLS, fixed and random effects models will be as follows:

1. Pooled OLS: $Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$

Where ε_{it} = error term

2. Fixed effects: $Y_{it} = \alpha_i + \beta X_{it} + \mu_{it}$

Where μ_{it} = error term

3. Random effects: $Y_{it} = \alpha + X_{it}\beta + \varepsilon_{it} + \mu_{it}$

Where ε_{it} = within entity error term

μ_{it} = between entity error term

From the equations:

Y_{it} = The Sustainable Investment Gap for i^{th} Firm in t^{th} year.

X_{it} = vector representing independent variables (Climate Rating System, Concenssional Finance, Sustainable Green loans, Emmission Reduction Payment Agreement) for firm *i* in year *t*

β = Vector of Coefficients of the independent variables

α = the intercept for each entity, i= 1, 2 … 40 (indicator of the firms) and t= 1, 2 … 10 (time indicator)

Time series and panel data were both included in our data set. This is due to the fact that the data was gathered over a five-year period for a number of institutions at particular times (i.e., once a year). Panel data analysis was chosen as the best method because the preceding section indicated simple pooled regression models to be inadequate. This is so that panel data analysis (PDA) can capture the impacts of both time and cross-sectional data. When employing panel data analysis, we had two choices: either use a fixed effects (FE) model or a random effects (RE) model. The fixed effects model is used when it is known that panel specific effects and the predictor variables are correlated. The FE model enables us to forecast the panel specific effects—in this case, the impacts specific to banks—that have an effect on sustainable investments. The FE model does have the disadvantage of lowering degrees of freedom, particularly if there are several panels and more time invariant variables are excluded from the analysis. The panel-specific effects are assumed in the RE model to be random and unrelated to the predictors, in contrast. This has the advantage of enabling the study to take time-invariant variables into account. The RE model, however, cannot be used if the panel effects are linked to the independent variables. To determine whether to use the RE or FE model, we would need to assess if the banks-specific effects are closely related to the predictor variables. Hausman (1978) nonetheless recommends a test that compares the coefficient estimates under as the impacts particular to certain banks are unknown. In order to choose between using the RE or FE model, we would need to assess if the impacts particular to the banks are closely related to the predictor variables. While the effects specific to certain banks are unknown, Hausman (1978) provides a test that compares the coefficient estimates under the assumptions of RE and the assumption of correlation panel specific effects. Consequently, the Hausman test was used to determine whether approach was appropriate for this investigation. The results of the exam are shown in Table 3.2 1 below. The findings show that the estimates were significant, hence

the Random effect model was chosen to be utilized in the presentation of the panel data analysis results for the variables.

The following equation for a multiple linear regression will be constructed as analytical model.

The regression equation …….($Y_{it} = \alpha + \beta 1X1_{it} + \beta 2X2_{it} + \beta 3X3_{it} + \beta 4X4_{it} + \varepsilon_{it}$)

Where:

Y-is the value of the climate finance performance as a dependent variable

β1-is the co-efficient of Climate Rating System

β2- is the co-efficient of Concessional Finance

β3- is the co-efficient of Sustainable Green Loans

β4-is the co-efficient of Emmision Reduction Payment Agreement

X1- Value of Climate Rating System

X2- Value of Concessional Finance

X3- Value of Sustainable Green Loans

X4- Value of Emmision Reduction Payment Agreement

α- the intercept for each entity

ε- error term

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

Panel data analysis of secondary data from this chapter's sources included 39 commercial bank reports in Kenya—of which only 12 banks provided substantial data for study—is presented. The exploratory and diagnostic analyses of the panel data were presented first in this chapter. Serial correlation, heteroscedasticity, multi-collinearity, and criteria for selecting random effects models over fixed effects models are all covered in the section on diagnostic analysis. Additionally, it looks for significant variations in climate finance among Kenya's commercial banks. Panel data was then used to examine the study's findings to determine how the four independent variables affect sustainability investments.

4.2 Descriptive Analysis.

All variables of Banks registered on the Kenyan Stock Exchange were subjected to a descriptive statistical study using annual data from 2018 to 2022. The mean value provides the average percentage financing of variables, whereas the standard deviation measures dispersion from the mean. The maximum value represents the highest percentage amount ever recorded in the study's data, while the minimum value represents the lowest percentage amount ever observed.

TABLE 2.1 2

Sustainable Investment

Variable		Mean	Std. Deviation	Min	Max
SI	Overall	23.69333	8.343837	12	48

Sustainable investing methods employed by Kenyan commercial banks are represented by the dependent variable, demonstrating their commitment to preserving the environment, promoting social responsibility, and putting in place effective governance frameworks. Environmental indicators, on the other hand, have a direct or indirect relationship with the environment. In order to compute the environmental sustainability score, which combines economic, social, and environmental sustainability, they take into consideration energy consumption, which is represented by fuel prices (zçelik & AVCI ZTÜRK, 2014). As a result, when looking at Table 8, we can see that the average percentage funding of sustainable investments spans from 12% (min) to 48% (max), with a mean of 23.69%.

TABLE 2.1 3

Sustainable Green Loans

Variable		Mean	Std. Deviation	Min	Max
SGL	Overall	21.71383	14.58396	3.7	53.4

Table 2.1 9 shows that, with a mean of 21.71%, the average percentage funding of sustainable Green loans ranges from 3.7% (min) to 53.4% (max).

TABLE 2.1 4

Emission Reduction Payment Agreement

Variable		**Mean**	**Std. Deviation**	**Min**	**Max**
ERPA	Overall	19.45917	17.75626	0	63.4

Table 2. 1 10 reveals that the median percentage funding for EPRAs ranges from 19.45% to 63.44%, with a range of 0 to 63.44%.

TABLE 2.1 5

Concessional Finance

Variable		**Mean**	**Std. Deviation**	**Min**	**Max**
CF	Overall	24.986	21.6696	0	75.2

Table 2.1 11 shows that the median percentage financing for CF ranges from 0 (minimum) to 75.2% (maximum), with a mean of 24.986%.

TABLE 2.1 6

Carbon Rating System

Variable	**Mean**	**Std. Deviation**	**Min**	**Max**

CRS	Overall	22.25783	11.12834	3.9	50.5

As shown in Table 2.1 12, the median percentage financing for CRS ranges from 22.25% to 23.69%, with a range of 3.9 to 50.5.

4.3 Study Variables

4.3.1 Sustainable Investment

A significant amount of money will need to be spent to transition to an economy that is climate-neutral, climate-resilient, and environmentally sustainable. Regression was studied utilizing random effects with respect to sustainable investment. The dependent variable was found to account for 10.88% of the fluctuations in Sustainable Investment, according to the total r-squares of 0.1088, which was calculated. The inside r-squared number, which is displayed, is 0.61, and it indicates that the model accurately predicted 6.10 percent of the changes in the variables. With an r-squared value of 0.1125, the model was able to account for 11.25% of the variability between the variables. Thus, we can observe that the mean percentage funding of sustainable investments ranges from 23.69% to 48%, with a minimum of 12% and a maximum of 48%.

4.3.2 Sustainable Green Loans

All stakeholders must be aware of environmental concerns if sustainable growth is to be achieved, which calls for the implementation of a green economy through green financing and investment (J. Sustain. 2020). The trade-off theory proved correct in that there is a favorable

correlation between green loans and sustainable investments. This implies that there will be more green money and loans available as levels of sustainable investment rise. Sustainable Green Loans rose by 0.0104714. If commercial banks assist or employ sustainable green loans and to cut emissions, their linkages to sustainable investments will be more successful. Therefore, with a mean of 21.71%, the average percentage funding of sustainable Green loans spans from 3.7% (min) to 53.4% (max).

4.3.3 Emission Reduction Payment Agreement

These ERPAs, or agreements for the payment of emissions reductions, can also assist developing nations in establishing a history of producing and reselling carbon credits or using them to meet their own emission reduction goals. Sustainable investment and emission reduction payment agreements were found to be negatively correlated.This suggests that a point increase in Sustainable Investment reduced Emmision Reduction Payment Agreement by 0.0078798. The median percentage funding for EPRAs spans from 19.45% to 63.44%, with a range of 0 to 63.44%.

4.4.4 Concessional Finance

Therefore, just 17% of all climate financing deals, as reported by (OECD DAC 2020), are comprised of blended concessional finance arrangements geared toward LDCs. A positive association exists between sustainable investment and concessional funding. This implies that there would be more available concessional finance if levels of sustainable investment rose. Concessional financing increased by 0.0505885 in total.Sustainable investments will gain more from their relationships with commercial banks if they give funding or special financing to

reduce emissions. With a range of 0 (lowest) to 75.2% (highest), the statistics show that the mean percentage financing for concessional loans was 24.986%.

4.4.5 Carbon Rating System

Carbon emissions measurements have recently become available for most large enterprises worldwide (The GHG 2004). It was also discovered that Carbon Rating System was substantial and negatively associated to Sustainable Investment.This equates to a point rise in Sustainable Investment and 0.1129741 in the Carbon Rating System.The median percentage financing for CRS ranges from 22.25% (Lowest) to 23.69% (Highest), with a range of 3.9 to 50.5.

4.4 Diagnostic analysis

This section discussed the feasibility of fitting pooled regression models in comparison to panel data models and the presence of time-related fixed effects. It also checked for serial correlation, multi-correlation, and heteroscedasticity. Finally, a comparison was made to see if the fixed effects or random effects models should be applied.

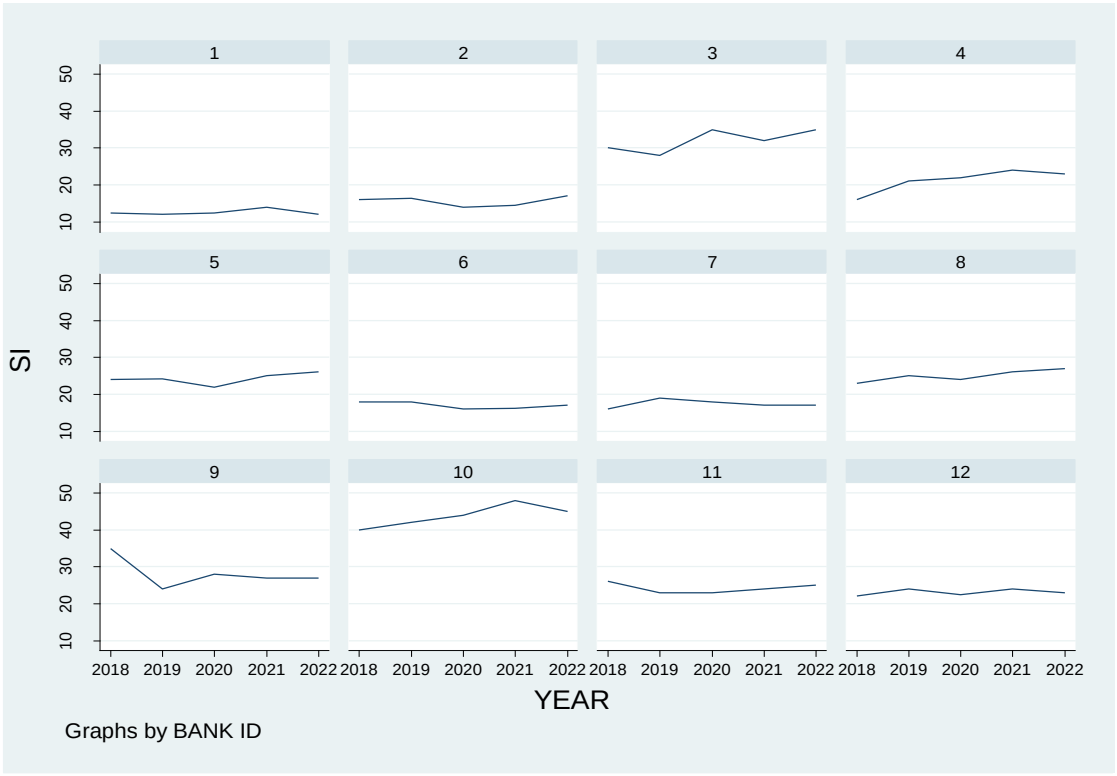
Exploring the study's data came first in the data analysis process. Heterogeneity between banks and over time was investigated using exploration data analysis. The choice of using the panel models or the POLs model was made as a result of this analysis. The

sustainability trend within and between banks was investigated using exploratory data analysis and visualizations. Following are the analysis's specifics.

First, the study examined the viability of climate finance in particular institutions using empirical growth plots. The empirical development of climate finance options over a five-year period is depicted in Figure Six (6) below. The empirical growth plot demonstrates that sustainability remained relatively stable over time for the vast majority of enterprises. But in a few instances, sustainability seems to have undergone a significant adjustment over time. Banks 1 and 10 demonstrated a reduction in overall climate finance, while Banks 2 and 8 demonstrated an increase, although Banks 3 and 9 underwent significant changes. However, these changes do not suggest the existence of any large fixed effects on time.

Growth Plots of each Bank's Climate Finance

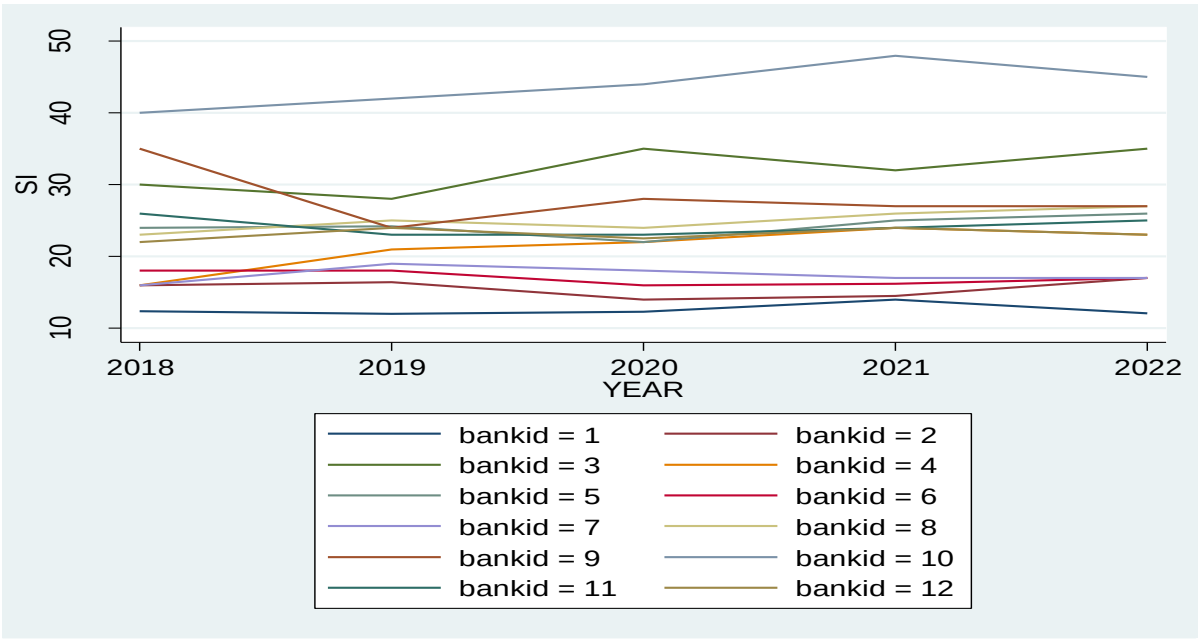
FIGURE 6 1



Further analysis of the Climate Finance time plot overlaid with the slopes revealed that most banks' intercepts did not appear to differ considerably from one another's slopes. Figure Seven, which follows, shows this. Once more, time-related fixed effects are minimal, indicating a lack of time-related fixed effects, and as a result, the RE Model would be suitable for study.

Overlain Plot of Climate Finance

FIGURE 7 1



Additionally, the study aimed to determine whether the study variables were correlated. According to the results in Table 2.1 2 below, no two variables are highly or perfectly correlated, ruling out multi-collinearity. A negative correlation between carbon rating systems, emission reduction payment agreements, and sustainable investment was also found.Furthermore, not all factors demonstrated a perfect association to sustainable investment. Due to the lack of evidence of multi-collinearity, the study decided to include every variable in the analysis.

Environmentally friendly policies improve the quality of the environment, according to numerous research. Mathews et al.'s (2010) work for an example of how important sustainable practices are in reversing environmental harm. Similar to this, green funding, as reported by Tolliver et al. (2019), led to a 108 million ton decrease in CO2 emissions. According to Flammer (2018) and Wang et al. (2018), green funding encourages green innovation and improves environmental performance. Green financing provides money for investments in low-carbon utilities, low-carbon water and waste services, low-carbon utilities, renewable energy, and eco-friendly mobility in an effort to gradually lower the environmental load. However, in order to do this, we require efficient methods for financing climate-friendly investments.

TABLE 2.1 7

Correlation Matrix of the Study Variables

	SI	SGL	EPRAs	CF	CRS
SI	1.0000				
SGL	0.1370	1.0000			
EPRAs	-0.1027	-0.0797	1.0000		
CF	0.0752	0.5190	-0.0438	1.0000	
CRS	-0.4278	-0.1628	0.0148	-0.3145	1.0000

The Breusch-Pagan LM test was first used to assess the suitability of fitting a POLS in comparison to panel models. It is nonsensical to utilize POLS because, as shown in table 2.1 3 below, P<0.001 indicates that there are large disparities in sustainable investment among commercial banks.

TABLE 2.1 8

Chi-Square values for the Breusch-Pagan LM Test

Dependent variable	**χ^2-value**	**p-value**
Sustainable Investment	93.62	0.0000

To check for the existence of time-related fixed effects, the testparm test was employed. If such effects are present, one would need to account for them by either including dummy variables to capture the effects or constructing a two-way random effects model. Using dummy variables or building a two-way RE model is not necessary since, as shown in Table 2.1 4 below, prob > 0.05 indicates that there are no time-fixed effects.

TABLE 2.1 9

Test Results for Time Fixed Effects

Dependent variable	**F-value**	**p-value**
Sustainable Investment	2.99	0.0909

Thirdly, the Modified Wald test was applied to check for heteroscedasticity. Heteroscedasticity was evident in Table 2.1 5 below because $p<0.0001$. Heteroscedasticity was removed from the model by using a robust standard error.

TABLE 2.1 10

Test Results for Heteroscedasticity

Dependent variable	**p-value**
Sustainable Investment	0.0000

The Prais-Winsten technique was then utilized in the study to check for serial correlation. No two variables displayed significant serial association at high levels, as seen in the table below.

TABLE 2.1 11

Test Results Serial Correlation

Dependent variable	**Chi^2**	**Prob>chi^2**
Sustainable Investment	38.41	0.0000

Finally, a multi-collinearity test was performed to help identify highly correlated factors that contribute to the presence of collinearity. A VIF of 1.24 is low (less than 5) and indicates the absence of multi-collinearity. The outcomes are displayed in the table below.

TABLE 2.1 12

Test Results for Multi-collinearity

Variable	**VIF**	**1/VIF**
CF	1.48	0.676335
SGL	1.37	0.727428
CRS	1.11	0.901085
EPRAs	1.01	0.993641
Mean VIF	**1.24**	

Hausman Test Results

In this investigation, the choice between the fixed effect model and the random effect model was made using the Hausman test. The alternative hypothesis (H1) argues that the fixed effect model is preferable to the null hypothesis' (H0) assertion that the random effect model is suitable.

The Hausman test, which compares the coefficient estimates under the assumptions of RE and the assumption of correlation panel particular effects, is required to distinguish between the two when the specific effects are unknown. If the p-value is statistically significant (less than 0.05), the fixed effect model is regarded as the best option. Similar to this, the random effect model is thought to be a suitable option if the p-value is more significant than 0.05.

TABLE 2.1 13

Results for the Hausman test

Dependent variable	**Chi^2 (4) value**	**Prob>Chi^2**
Sustainable Investment	0.82	0.9362

4.5 Model Fitting

$$Y_{it} = \alpha + -0.1130X1_{it} + 0.0506X2_{it} + 0.0105X3_{it} - 0.0079X4_{it} + 2.200_{it}$$

Table 2.1.14 below presents the Random fixed effects regression for Sustainable Investment. From the table, the overall r-squares is 0.1088 which means overall 10.88% of the variations in Sustainable Investment were explained by the dependent variable. The within r-squared is 0.61 which means that 6.10% of the variations within the variables were explained by the model. The between r-squared is 0.1125% which means that 11.25% of the variations between the variables were explained by the model. It was also observed that Emmision Reduction Payment Agreement and Carbon Rating System were significant and negatively related to Sustainable Investment while Sustainable Green Loans and Concessional Finance were also significant and positively related to Sustainable Investment. This means that a point increase in Sustainable Investment reduced Emmision Reduction Payment Agreement and Carbon Rating System by 0.0078798 and 0.1129741 respectifully. However, Sustainable Green Loans and Concessional Finance increased by 0.0104714 and 0.0505885 respectifully.

TABLE 2.1 14

Random Effects Panel Regression on Sustainable Investment

Fixed-effects (within) regression				Number of obs = 60		
Group variable: Company				Number of groups = 12		
R-sq:	within = 0.0610	Obs per group: min = 5				
	between = 0.1125			avg = 5.0		
	overall = 0.1088			max = 5		
				(Chi2) = 3.99		
corr(u_i, Xb) = 0 (assumed)				Prob > F = 0.4073		
si	Coef.	Std. Err.	Z	P>/z/	[95% Conf.	Interval]
Sgl	.0104714	.0358419	0.29	0.770	-.0597775	0.807203
epras	-.0078798	.0764639	-0.10	0.918	-.1577463	.1419867
cf	.0505885	.0498269	1.02	0.310	-0470703	.1482474
crs	-.1129741	.0730134	-1.55	0.122	-2560777	.0301295
_cons	24.86985	3.696038	6.73	0.000	17.62575	32.11395
sigma_u	9.0665737					
sigma_e	2.1998001					
rho	.9444049	(fraction of variance due to u_i)				

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.1 Introduction

This chapter presents the analysis of the study's findings as well as its conclusion. The discussion examines the four study objectives as well as the findings in respect to those objectives. The results are also compared to the body of prior work in this chapter. This study's objective was to evaluate the effect of climate finance practices for sustainable investment among commercial banks in Kenya. The four goals that the study had set were finished, and the parts that follow will cover them. The Random effects panel data model was used to report the results.

5.2 Summary

The panel data analysis of secondary data only included 12 of the 39 Kenyan commercial banks that provided enough information for the study. The study concentrated on the 12 banks out of the 39 because there was a dearth of data on the variables, and most of the data was gathered from Tier I and Tier II banks.These banks were chosen in order to assess the extent and viability of projects among locally incorporated, internationally incorporated, and banks with a substantial government ownership, as well as for the sustainability initiatives they have started.

Data analysis began with a review of the study's data. Exploration data analysis was used to examine heterogeneity between banks and over time. The primary objective was to ascertain how climate financing approaches will affect sustainable investment in Kenya. According to the analysis, there is a considerable negative correlation between sustainable investment and emission reduction payment agreements and carbon rating systems. Since there is an inverse relationship, a rise in sustainable investment will cause the utilization of emission reduction payment agreements and carbon rating systems to decline significantly. This implies that the Emission Reduction Payment Agreement and Carbon Rating System funds will be lower the higher the Sustainable Investment. As a result, commercial banks with high levels of ERPA and the Carbon Rating System will have low levels of sustainable investment.This is consistent with the pecking order theory, which holds that climate financing practices and sustainable investment have a bad relationship. Commercial banks' relationships with sustainable investment will be adverse if they do not finance or employ emission reduction payment agreements and carbon rating systems to reduce emissions.

In addition, There is a positive association between sustainable investment, sustainable green loans, and concessional financing, as predicted by the trade-off hypothesis, which predicts a positive link. According to this, there would be more sustainable green loans and finance available as sustainable investment levels rise.Commercial banks will have more successful links with sustainable investments if they fund or employ sustainable green loans and concessional financing to reduce emissions.The results of this study are comparable to those of Abor & Biekpe (2018), who discovered a favorable correlation between sustainable investments, concessional finance, and green loans.

The empirical results are consistent with hypotheses H1 and H2, according to which the independent variable accounted for 10.88% of the variance in sustainable investment. The model's ability to explain differences within the variables was measured by the within r-

squared, which was 6.10%. The model explained 11.25% of the variances between the variables according to the r-squared. Hence, In contrast to Sustainable Green Loans and Concessional Finance, which were likewise significant and positively associated to Sustainable Investment, Emission Reduction Payment Agreement and Carbon Rating System had a considerable and negative impact on Sustainable Investment. Accordingly, a point rise in sustainable investment will result in a corresponding reduction in emissions reduction payment agreement and carbon rating system of 0.0078798 and 0.1129741, respectively. Concessional Finance, however, will rise by 0.0505885 and 0.0104714, respectively, in order to keep pace with sustainable green loans.

5.3 Conclusion

The findings suggest that Kenyan commercial banks may contribute significantly to finance for a sustainable climate while minimizing threats to financial stability. In order to make it easier to analyze the risks posed by climate change, risk assessment frameworks should be established together with mitigation and adaptation methods. The synergies between public and private sustainable financing of prioritized projects need to be strengthened.

However, the analysis discovered that only a small portion of money came from the banks themselves. This sparked concerns about the long-term viability of those foundations' programs. Some banks are adopting sustainability reporting in addition to the traditional publishing of a balance sheet, a profit and loss account, and a directors' report. Despite the commendable efforts made by banks, there should be industry-wide sustainability norms given the variety of sustainability projects. Additionally, reporting on sustainability differs and is

based on each bank's policy. The paper also reveals that most banks, regardless of their size, origin, or ownership, have created programs that carry out various aspects of sustainability.

This research will greatly add to the amount of evidence presently available on the topic and will broaden our understanding of the connection between green financing and commercial banks' financial success in sustainable investments. More theoretical knowledge and actual investigation will both benefit researchers in this field of finance. The general public is also expected to benefit from the study as a stakeholder because recommendations are likely to support investments in green opportunities, provide a pathway to funding for green projects, and ensure the preservation of the environment through the production of sustainable goods and the provision of environmentally conscious services that will noticeably increase people's standards of living.

5.4 Recommendation

In Kenya, sustainable banking is a relatively new concept. Therefore, capacity building is required for officials to determine whether a bank is running sustainably or not. Additionally, relatively few banks were producing sustainability reports, and the majority of institutions lacked sustainability policies. Sustainable investment must be included into all corporations' daily operations as a core idea and guiding philosophy. The banking industry may become sustainable as a result of the adoption of sustainable banking. Sustainable banking is thus not only morally necessary but also legally required in Kenya. Therefore, the banking industry must incorporate sustainable banking and implement sustainable finance concepts for climate reduction and adaptation in order to meet regulatory requirements and assure long-term financial success. The survey found that Kenyan banks' sustainability initiatives are inconsistent, dispersed, and uncoordinated.

Furthermore, the regulator needs to monitor the implementation of sustainability. In this situation, it is crucial to consider other approaches as well, such as evaluations of the effects of sustainability, regulations, poverty, and the environment on strategic levels. These tools should be used to assess each bank's progress in moving toward sustainable banking and climate financing based on their capabilities.This strategy combines both by utilizing voluntary, approved self-regulation as well as aspects of command and control.

5.5 Recommendation for Future research

In this study, Kenyan commercial banks were investigated to see how climate financing strategies affected sustainable investment. In order to find a solution, more research can be done in other countries to determine whether the findings are consistent. Additionally, more research may be done to determine how well the environmental and climate change policies of commercial banks would fare in the face of global warming. Finally, given the setting and scope of the study, an analysis of the literature on climate financing strategies and sustainable investment may be helpful.

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APPENDIX:I

Secondary Data Colletion Sheet

COMMERCIAL BANKS IN KENYA	YEAR	BANK ID	SI	S G L %	EPRA's%	CF%	C R S%
Standard Chartered Bank	2018	1	12.4	6.20	63.00	3.12	25.00
Standard Chartered Bank	2019	1	12	6.10	63.10	3.20	28.40
Standard Chartered Bank	2020	1	12.3	7.30	63.00	3.00	27.10
Standard Chartered Bank	2021	1	14	13.40	63.40	3.12	13.30
Standard Chartered Bank	2022	1	12.1	16.00	63.00	3.12	23.45
NCBA Bank Kenya PLC	2018	2	16.00	6.30	3.12	46.40	33.00
NCBA Bank Kenya PLC	2019	2	16.40	50.00	6.30	46.10	33.10
NCBA Bank Kenya PLC	2020	2	14.00	50.70	6.30	54.20	32.00
NCBA Bank Kenya PLC	2021	2	14.50	48.00	6.00	38.00	33.40
NCBA Bank Kenya PLC	2022	2	17.00	53.40	6.60	46.10	33.00
Absa Bank of Kenya	2018	3	30.00	14.15	32.40	75.00	5.53
Absa Bank of Kenya	2019	3	28.00	26.00	32.40	75.20	16.20
Absa Bank of Kenya	2020	3	35.00	25.00	32.30	53.00	11.90
Absa Bank of Kenya	2021	3	32.00	28.10	32.00	55.00	5.34
Absa Bank of Kenya	2022	3	35.00	46.00	33.00	75.00	5.60
Equity Bank	2018	4	16.00	32.95	5.65	41.20	10.80
Equity Bank	2019	4	21.00	38.00	5.80	65.00	10.80
Equity Bank	2020	4	22.00	35.00	5.50	65.00	8.50
Equity Bank	2021	4	24.00	25.90	5.65	65.00	8.50
Equity Bank	2022	4	23.00	32.90	5.65	65.00	3.90

Kenya Commercial Bank	2018	5	24.00	6.00	5.00	10.00	10.00
Kenya Commercial Bank	2019	5	24.20	11.00	3.00	11.00	11.00
Kenya Commercial Bank	2020	5	22.00	7.00	2.30	11.90	23.00
Kenya Commercial Bank	2021	5	25.00	8.40	4.80	11.10	17.00
Kenya Commercial Bank	2022	5	26.00	12.30	6.10	11.00	11.00
Co-operative Bank of Kenya	2018	6	18.00	24.00	3.59	13.90	31.00
Co-operative Bank of Kenya	2019	6	18.00	20.00	2.59	13.90	32.00
Co-operative Bank of Kenya	2020	6	16.00	26.00	3.90	13.90	32.50
Co-operative Bank of Kenya	2021	6	16.20	13.10	12.20	14.00	31.00
Co-operative Bank of Kenya	2022	6	17.00	29.00	9.60	13.70	31.00
Diamond Trust Bank	2018	7	16.00	9.75	20.00	14.00	47.55
Diamond Trust Bank	2019	7	19.00	9.00	12.00	16.00	46.00
Diamond Trust Bank	2020	7	18.00	10.00	15.00	16.00	47.00
Diamond Trust Bank	2021	7	17.00	9.00	33.00	15.30	44.60
Diamond Trust Bank	2022	7	17.00	10.00	20.00	15.30	50.50
CFC stanbic	2018	8	23.00	25.00	18.00	18.00	23.00
CFC stanbic	2019	8	25.00	33.80	16.30	19.00	11.00
CFC stanbic	2020	8	24.00	11.70	17.00	19.00	23.00
CFC stanbic	2021	8	26.00	47.60	19.00	19.00	17.00
CFC stanbic	2022	8	27.00	6.90	13.00	19.00	22.00
Eco Bank	2018	9	35.00	4.23	21.00	19.00	20.00
Eco Bank	2019	9	24.00	4.60	18.00	18.00	22.00
Eco Bank	2020	9	28.00	4.60	20.00	25.00	24.30
Eco Bank	2021	9	27.00	3.70	21.00	23.00	25.00

Eco Bank	2022	9	27.00	4.00	32.00	23.00	26.20
Family Bank	2018	10	40.00	32.20	15.00	8.50	12.00
Family Bank	2019	10	42.00	31.00	16.00	3.90	15.00
Family Bank	2020	10	44.00	32.50	18.00	10.00	33.00
Family Bank	2021	10	48.00	33.30	23.00	11.00	20.00
Family Bank	2022	10	45.00	32.00	22.00	23.00	18.00
Access Bank of Kenya	2018	11	26.00	10.15	0.00	0.00	17.00
Access Bank of Kenya	2019	11	23.00	9.80	0.00	0.00	16.00
Access Bank of Kenya	2020	11	23.00	9.10	0.00	0.00	19.00
Access Bank of Kenya	2021	11	24.00	9.00	0.00	0.00	16.00
Access Bank of Kenya	2022	11	25.00	12.70	0.00	0.00	16.00
Development Bank of Kenya	2018	12	22.00	32.00	42.00	32.00	21.40
Development Bank of Kenya	2019	12	24.00	30.00	41.00	32.00	21.00
Development Bank of Kenya	2020	12	22.50	34.00	38.00	20.00	21.20
Development Bank of Kenya	2021	12	24.00	41.00	35.00	35.00	19.80
Development Bank of Kenya	2022	12	23.00	42.00	35.00	40.00	22.60

APPENDIX II

COMMERCIAL BANKS IN KENYA

BANK CLASSIFICATION	DESCRIPTION	COMMERCIAL BANK
TIER 1	Banks with an asset base of more than kes. 40 Billion.	1.Standard Chartered Bank 2.NCBA Bank Kenya PLC 3. Absa Bank of Kenya 4. Equity Bank 5. Kenya Commercial Bank 6. Co-operative Bank of Kenya 7. Diamond Trust Bank
TIER 11	Banks with an asset base of less than kes.40billion but more than kes.10billion.	1.CFC stanbic 2. DIB Bank 3. Bank of India 4. I & M Bank 5. Eco Bank 6. Bank of Africa 7. Family Bank 8. Prime Bank 9. Bank of Baroda 10. Citi Bank 11. National Bank of Kenya 12. Access Bank of Kenya 13. Imperial Bank

TIER 111	Banks with an asset base of less than kes. 10 Billion	1.Guaranty Trust Bank Ltd 2. Victoria Commercial Bank 3. Credit Bank 4. Habib Bank (K) Ltd 5. First Community Bank Limited 6. Oriental Commercial Bank 7. Sidian Bank Limited 8. Development Bank of Kenya 9. Middle East Bank 10.Kingdom Bank limited 11.Mayfair CIB bank limited 12. Paramount Universal Bank 13. SBM Bank Kenya Limited 14. Consolidated Bank 15. Guardian Bank 16. Gulf African Bank 17. First Community Bank 18. UBA Bank Ltd

		19. Spire Bank Ltd