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EFFECT OF CARBON MARKETS ON PERFORMANCE OF CLIMATE ADAPTATION INITIATIVES IN KENYA: A CASE STUDY OF KOKO NETWORKS.

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ABSTRACT
Climate change has had severe impacts globally and across different sectors. The global South, Kenya included, is bearing the brunt of these changes, which necessitate the process of adjusting to the change. In this regard, several adaptation initiatives have been initiated to address this need. To ensure the sustainability of these initiatives, financing should be sustainable, which has been a major challenge. This study, therefore, seeks to investigate the influence of carbon markets on the performance of climate adaptation initiatives in Kenya. This study is anchored on the theory of financial intermediation. Employing a descriptive research design, the study targeted 31 climate adaptive initiatives in Kenya with a focus on KOKO Networks and shall utilize census sampling. Data collection will be done using structured questionnaires administered through Survey Monkey. Data analysis will be done through descriptive and inferential statistics. This study will be useful to policymakers in creating policies that ensure project sustainability. Project managers shall also benefit through this in understanding best ways to structure future projects using the most suitable financing mechanisms for the project.
Keywords: *Carbon Markets, Climate Adaptation Initiatives, Kenya*

INTRODUCTION
Human activities such as burning fossil fuels in cars have caused the atmosphere to fill with greenhouse gases, which trap heat and cause global warming (World Bank, 2021). To address this, communities need to adapt and/or mitigate climate change. IPCC (2022) defines mitigation as efforts to prevent or reduce greenhouse gas emissions, which address the root cause of climate change, aimed at limiting future climate change. Adaptation is then defined as the process of natural or human systems adjusting to actual or expected climate impacts to moderate harm. The process of promoting and mainstreaming adaptation requires funding and resources, hence the pooling of resources to support implementation.

Climate financing is the process of raising and allocating of funds or resources for dealing with climate change, whether through mitigation or adaptation approaches. Mechanisms for climate finance include grants, concessional loans, equity investments, and guarantees. European countries like Germany have developed robust frameworks and have been at the forefront of climate finance through leveraging innovative mechanisms to drive transition (KfW, 2021). Africa, while minimally contributing to greenhouse gases globally, it remains disproportionately vulnerable to climate change impacts. UNEP (2021), noted insufficient funding with current flows being far below the target. Complex funding application processes, limited technical and institutional capacities limit Africa's capacity to absorb funds effectively (Nakhooda et al., 2020). Bwana et al. (2019) in Tanzania reported improved food security and resilience as households utilized micro-loans noting the role of micro-finance institutions and savings groups in promoting climate adaptation at household level. For Kenya, climate financing mechanisms are key in the implementation of adaptation initiatives, especially in rural and marginalized communities profoundly affected by climate impacts (GCF, 2023).

STATEMENT OF THE PROBLEM

Globally, development has led to climate change, which is now presenting serious concerns like drought and floods, and has increased in frequency (World Bank, 2020). Kenya has undertaken the implementation of adaptation initiatives to reduce effects. And according to GCF (2023), the efficacy of these adaptation efforts is disproportionate even with fund mobilization from bilateral donors. As it stands, mitigation is often given greater priority during funding processes (Nyangema et al, 2021), and a lack of institutional capacity to handle finances, insufficient monitoring, are some of the major obstacles faced in adaptation efforts (UNEP, 2020). Most existing studies are done on a global context and this study looks to fill the gap within the local Kenyan context.

OBJECTIVE OF THE STUDY

To examine the effect of carbon markets on performance of climate adaptation initiatives in Kenya: A case study of KOKO Networks.

RESEARCH HYPOTHESIS

$H_{0:}$ Carbon markets have a significant influence on performance of climate adaptation initiatives in Kenya.

JUSTIFICATION OF THE STUDY

This study aims to understand how carbon markets influence performance and sustainability of climate adaptation initiatives in Kenya. These findings shall offer a roadmap to understand how financing models influence and shape the implementation of climate adaptive initiatives.

LITERATURE REVIEW

Theoretical Review

The concept of financial intermediaries and their roles was initially developed by Fisher (1930) and Keynes (1936), It was later emphasized that the role of financial markets and intermediaries influences investment and economic activity. Gurley and Shaw (1960) brought it together and formally identified that financial intermediaries bridge the gap between savers and borrowers. This theory states that financial intermediaries have the ability to reduce transaction costs through pooling of funds, providing economies of scale, and diversifying risks (Benston, 1976). Financial intermediaries are able to have information asymmetry and screen borrowers, monitor investments, and reduce adverse selection and moral hazard (Weiss, 1981). This theory provides a theoretical lens to explain how climate financing mechanisms can mobilize, allocate, and manage funds to climate adaptation projects, leading to increased performance. Carbon markets facilitate the trading of emission allowances also known as carbon credits. Financial intermediaries help reduce transaction costs, ensure transparency, and provide trading platforms.

Empirical Literature Review

A systemic assessment on 14 studies evaluating 2,346 carbon mitigation projects globally was done by Probst et al. (2024) was done to determine if credits reflect real mitigation, if adaptation initiatives from carbon sales are uncertain, if carbon revenues are smaller than contractual expectations and trust in carbon sales. The study used project type (e..g. cook stoves, improved forest management), issued credit volumes, achieved emission reduction and offset achievement ratio (OAR) as variables. The study found that less than 16% of credits issued corresponded to real emission reductions. Within the sample, there was a negative to no statistically significant reductions detected. This study indicated the risk of depending on carbon revenue and my study aims to cover the evidence gap on the link between carbon markets and adaptation performance.

With a focus on carbon offset programmes from 45 in the global south, Aggarwal and Narain (2020) , conducted a study on carbon markets and adaptation using revenue from carbon markets, the pricing of carbon credits and funding allocation for adaptation initiatives as variables through panel data from carbon offset programmes under the CDM and did an econometric analysis. This study noted mitigation initiatives receive a lot of funding from carbon markets unlike adaptation initiatives which is due to lack of a link between local adaptation needs and carbon revenue with 10% of carbon revenues going to adaptation. The study notes there is a limited analysis on impact of carbon markets on adaptation which is explored in my study on the direct contribution of carbon markets to adaptation initiatives in the local context.

Monitoring of project reports, field inventories, MRV calculations, financial analysis, interviews and media analyses was the methodology used in the overview of the Kasigau Corridor REDD+ project in Taita Taveta, Kenya. The variables in the study were revenue distributions, emission reductions claimed (tCO2e), number of jobs created, gender

disaggregation of employees, number of community projects funded, and area protected (ha). This study noted that verification project reports showed 1,642,971 tCO2e reductions in the monitoring period and reported 354 project employees and more than 50 water projects. Investigative articles and reviews noted discrepancies in revenue allocation and allegations of social harm.

CONCEPTUAL FRAMEWORK

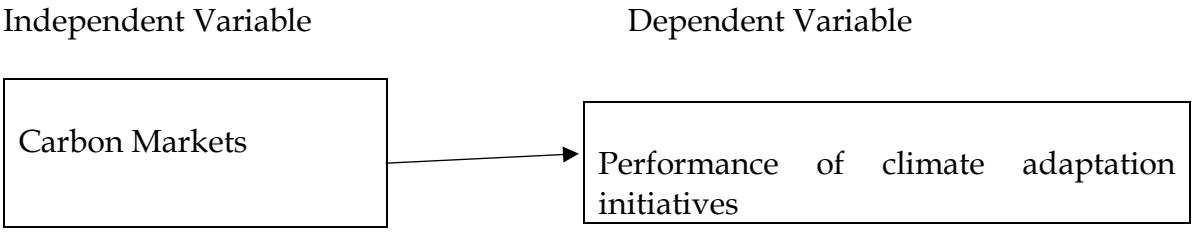

Figure 1: Conceptual Framework

METHODOLOGY

The methodology is the guide by which researchers address research questions as it provides a framework to conduct the study (Kothari, 2009). This study adopted a descriptive design which observes variables in their original state (Siedlecki, 2020). Researcher consequently is able to get a clear understanding of the respondents' perceptions and experiences. Using qualitative and quantitative data helps come up with valid and reliable conclusions. The study targeted Kenya's climate adaptive initiatives with a focus on KOKO Networks. Using the inclusion and exclusion criteria, a census sample of 100 KOKO Networks was done to include only staff working directly on climate finance within the organisation. Census sampling helps to eliminate bias as it does not rely on sub-sets of the population (Cochran, 1977).

Primary sources were used for data collection through questionnaires which is a set of printed or written questions with a choice of answers (Kombo &Tromp, 2006). The questionnaires included closed and open-ended questions. Reliability would be assessed using Cronbach's Alpha where a co-efficient between 0.7 and 1.0 was coefficient of between 0.7 and 1.0 was considered acceptable (Sekaran, 2002). For quantitative data, descriptive statistics, measures of central tendency and dispersion were used, Correlation and regression analysis were used to evaluate relationships between variables and a regression model done to establish the relationship between financing mechanisms and carbon markets.

$$Y = \beta_0 + \beta_1 X_1$$

Where;

Y Represents performance of climate adaptive initiative

β_0, Represents the regression coefficient

β_1 Represents independent variables Beta

X_1 Represents carbon markets

RESEARCH FINDINGS AND DISCUSSION

Of 100 staff involved in the financing initiative, 86 questionnaires were filled and returned hence an 86% response rate. Mugenda and Mugenda (2008), noted that 50% response is adequate for analysis and reporting and 70% is over excellent. The demographic was made of 51.2% female, 42% male of whom majority 29.1% were aged between 35 and 44 years followed by 23.3%, 17.4% were between 25 and 34 years and finally a tie at 15.1% were between 18 and 24 years old and above 55 years. The highest level of education was an undergraduate degree and the smallest group had a postgraduate noting that majority were well educated to have an understanding of the relationship between climate financing and carbon markets. The study noted that 48,8% had worked at KOKO for more between 4-6 years at KOKO and those over 6 years were the smallest group at 15.1%. The study targeted management, climate analysis, marketing, finance and human resource using the inclusion exclusion criteria. Through this, the study captured a comprehensive analysis of how different functional areas contribute to the performance of climate adaptive initiatives.

DESCRIPTIVE ANALYSIS

Carbon Markets

Respondents agree that carbon markets provide financial resources for adaptive initiatives, with a mean score of 4.95 corresponding with the increased leverage of carbon markets to mobilize funds (Tamba, 2021). Respondents with a mean of 4.05 agreed that revenue from carbon markets is effectively allocated to address local adaptation needs. Wekesa (2018), noted the importance of targeted allocation in maximizing adaptation benefits. There was moderate agreement at a mean of 4,41 that carbon markets benefit marginalized and vulnerable communities. Respondents highly rated encouragement of community participation, highlighting the value of involving local stakeholders with a mean of 4.47. UNDP (2016), noted participatory approaches are widely recognized as a driver of success. Respondents favorably viewed use of carbon credit programmes to make clean cooking technologies affordable at a mean of 4.44. Studies have shown carbon credits can reduce end-user costs and promote adoption of cleaner technologies (Bensch et al., 2021). Respondents largely agreed that use of ethanol stoves reduces environmental degradation mean of 4.44. This reflected literature that highlights ethanol and other clean fuels reduce deforestation and improve indoor air quality (WHO, 2020).

Performance of Climate Adaptive Initiatives

Respondents agreed that clean cooking technologies significantly reduced greenhouse gas emissions with a mean of 4.83. WHO (2020) highlighted the emission reduction potential of ethanol-based cooking solutions over traditional biomass fuels. With a mean of 4.08, respondents agreed that adoption of ethanol stoves improved community health outcomes which lines with Bensch et al., (2021) findings who found that there were measurable improvements in indoor air quality where charcoal and firewood were

replaced with clean burning ethanol stoves. Respondents strongly supported KOKO Networks' significant role in promoting Kenya's climate adaptation goals with a 4.72 mean. Osiolo (2023) noted that private sector's involvement in clean energy transitions is integral to achieving national adaptation targets. Dependence on traditional fuels was noted to reduce due to taking part in the initiative and mean was Central Bank of Kenya (2022), confirmed increased adoption of modern cook stoves had a direct correlation to decline in biomass fuel use.

Bivariate Linear Correlation Analysis

Table 42: Bivariate Linear Correlation Analysis

		Carbon Markets	Performance CAI
Carbon Markets	Pearson Correlation	1	.773**
	Sig. (2-tailed)		.000
	N	86	86
Performance CAI	Pearson Correlation	.773**	1
	Sig. (2-tailed)	.000	
	N	86	86

Carbon markets show a strong positive relationship with adaptation performance noting that as adaptive initiatives make use of carbon markets, adaptation projects effectiveness and efficiencies tend to improve. A correlation of 0.773 is a high perfect positive relationship with a strong statistical significance.

Linear Regression Analysis

Table 43: Model's Goodness of Fit Statistics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.509[a]	.259	.250	.26470

a. Predictors: (Constant), Carbon Markets

The R-square (R^2) value of 0.259 indicates that carbon markets account for 25.9% of the variation in the performance of climate adaptation highlighting that carbon markets may create revenue and create incentives, there are outside elements such as governance, community engagement and complementary financing also have influence on effectiveness of adaptation interventions. Wekesa (2018), noted proceeds from carbon markets improved incentives for reforestation and community adaptation.

Table 44: Regression Variable Coefficients

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.167	.523		2.233	.028
	Carbon Markets	.678	.125	.509	5.419	.000

a. Dependent Variable: Performance CAI

Performance of CAI = 1.167 + 0.678 * Carbon Markets

These findings align with empirical research that has noted carbon markets being essential to financing and sustaining adaptation initiatives. The regression analysis indicates that carbon markets and climate adaptation initiatives have a statistically significant positive relationship. The unstandardized coefficient (B) is 0.678 with a standardized error and Beta of o.125 and 0.509, respectively. The associated t-value is 5.419 all indicators of statistically and if all variables are held constant, a unit's increase in carbon market index leads to 0.678 increase in the performance of climate adaptation initiatives.

CONCLUSION

Carbon markets were found to be critical to climate adaptation initiatives. Effective leverage of carbon finance benefits from increased access to enhanced project sustainability, access to financial resources, and community participation. Carbon markets strengthen organizational capacity for adaptation and align with evidence that highlights the role of market-based climate financing in supporting transformative resilience outcomes. Findings reinforced Aggarwal et al (2020), on the growing impact of carbon finance in developing contexts. Descriptive analysis showed a strong agreement amongst respondents on the positive role played by carbon markets in providing financial resources, especially in improving clean cooking technologies affordably.

RECOMMENDATIONS

The study recommends that sector stakeholders in Kenya ought to prioritize the development of frameworks encouraging diverse climate financing mechanisms. The study notes the importance of adopting an integrated approach in climate finance research, recognizing the interplay of financing mechanisms in influencing adaptation mechanisms. In addition, organizations should foster financial innovation and adaptability in adaptation to enhance project outcomes. Further studies should be conducted further studies to understand the effectiveness of climate finance in various contexts. Scope beyond clean cooking technologies should be assessed on whether similar financing patterns would emerge in differing adaptation contexts. Strengthening capacity of communities to make the best of carbon markets should be studied to avoid

emerging issues around carbon markets. Longitudinal research to capture sustainability trends and tracks project outcomes over an extended period of time is recommended.

REFERENCES

Bwana, K. M. (2019). *Financial inter-mediation and economic growth in East Africa: Empirical analysis and policy implications*. Dar es Salaam: University of Dar- es Salaam, Press.

Fisher, I. (1930). The theory of Interest. Macmillan.

GCF. (2023). www.greenclimatefund. Retrieved from Green Climate Fund.

IPCC. (2021). The physical science basis. Contribution of working group 1 to the sixth assessment report of the intergovernmental panel on climate change. Cambridge University Press.

Keynes, J. M. (1936). The general theory of employment, interest and money. Macmillan.

Kombo, D. K., & Tromp, D. L. A. (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.

Kothari, C. R. (2009). *Research Methodology: Methods and Techniques* (2nd ed.). New Delhi: New Age International Publishers.

Mugenda, O. M. (2003). Research methods: Quantitative and Qualitative approaches. Acts Press.

Nakhooda, S., Watson, C., & Schalatek, L. (2014). The Global Climate Finance Architecture. Overseas Development Institute.

Nyangena, J. (2021). *Climate finance and adaptation in Kenya: Policy frameworks and local implementation*. Nairobi: Kenya Institute for Public Policy Research and Analysis (KIPPRA).

Osiolo H., H. M. (2023). The emergence of large-scale bio-ethanol utilities: Accelerating energy transitionsfor cooking energies.

UNEC. (2023). Retrieved from United Nations Economic Commission for Africa: https://www.uneca.org

World, B. (2020). Enhancing Household Financing for Climate-Smart Investments: A Global Perspective. Retrieved from https://doi.org/10.1596/978-1-4648-1337-5.